

A framework of routines and capabilities that support capacity raising and development of innovative products and services within the digital business sector: *Exploring seen and obscure dimensions of the innovation processes of small and medium sized enterprises through the lens of Activity Theory*

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Abstract

Supporting small and medium sized enterprises to achieve innovation success arguably has more value than even before, with research finding across all sectors that it increases productivity and turnover growth. This research focusses on the small and medium sized enterprises within the digital business sector, with this digital sector being increasingly important to the UK economy and the government stressing that no matter the scale of business, this is a key sector for UK growth and productivity. Through an Activity Theory lens, it interrogates how small and medium sized enterprises within the digital business sector innovate, and what activities they should take that result in successful completion of innovation. It addresses unanswered questions about how this innovation occurs through a systematic and analysed research study, resulting in a contribution to knowledge that answers the central research question, *how do small and medium sized enterprises within the digital business sector innovate?*

The research design adopted has been created so as consider cases of small and medium sized enterprises and their innovation and has been steered by Guba & Lincoln's constructivist '*Naturalistic Inquiry*' so as fulfil the research aim, to output a framework, that represents a contribution to practice and will act as a tool for small and medium sized enterprises within the digital business sector, supporting their innovation. The research nuances answers to the second research question, *how can Activity Theory be used to examine the innovation processes of small and medium sized enterprises within the digital business sector?* By placing Activity Theory at its centre, the design has been shaped as has the view of the research context. The literature review has provided definitions and at its conclusion outputs factors that impact innovativeness of small and medium sized enterprises, which have been used as initial coding categories for identifying and nuancing activities that enable innovation. By tracking the identified seen and obscure dimensions of the innovation processes to Activity Theory the final research question is answered, this being: *What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?* Furthermore, this application acts as is a contribution to theory though examining innovation and small and medium sized enterprises within the digital business sector through this theoretical lens.

That said, this current research has throughout its duration been impacted by the COVID-19 pandemic, which as with many research studies of this time, had a significant impact on the field research carried out. The United Kingdom, as with many countries implemented lockdowns and travel restrictions to curb the spread of the virus, which made it difficult for the researcher to conduct fieldwork in person; at times data collection phases postponed, and the survey data design within this current research emerged as a function of the need to collect data at a distance in a time of flux, and the offices of the case studies considered became their homes blurring the boundaries of Naturalistic Inquiry and perceptions of where work began and ended. This current research accepts that the knower, the known and the research context itself have constant interaction with the results generated, and the research accepts that if this study was repeated now in post-lockdown times, there would be potentially different, yet equally valid results and contributions, drawn from a strong conceptual framework, and the how the research has demonstrated the ability to draw together findings and present an appropriate toolkit for researchers and practitioners to draw upon.

Through synthesis of existing research and methodologies, this current research has developed a new technique for exploring both the seen and obscure dimensions of innovation processes of small and medium sized enterprises within the digital business sector. At the conclusion of this current research, contributions to theory, practice, knowledge, and methods are outlined and provides a systematic approach to examining innovation processes in small and medium sized enterprises within the digital business sector, a hybridism of methods for similar studies and a nuanced framework that can be used by the sector to increase capacities to innovate and support successful innovation. Furthermore, the research will demonstrate how the core contribution of this work is the development and use of Activity Theory to explore both the obvious and obscure dimensions of organisational innovation in small and medium sized enterprises within the digital business sector. This is discussed alongside its novel method that contributes to theory, and the aforementioned framework that provides guidance to small and medium sized enterprises within the digital business sector to support their organisational innovation as a contribution to practice, and presented within this thesis.

Table of contents

Abstract	3
Table of contents	5
List of abbreviations	11
List of figures	12
List of Tables	14
1.0 Introduction	16
1.1 Background to Research	16
1.2 Focus of the Research	17
1.3 Definition of Terms	20
1.3.1 Activity Theory (AT)	21
1.3.2 Frameworks	23
1.3.3 Factors enabling completion of innovations	24
1.3.4 Digital Business Sector	25
1.3.4 Small and Medium Enterprises (SMEs)	27
1.4 Rationale of this research	28
1.5 Aim and Objectives of the Research	34
1.6 Overview of the Research Questions and Strategy	35
2.0 Theoretical Framework Rationale	38
2.1 Introduction: Theoretical frameworks within research	38
2.2 Activity Theory (AT)	40
2.2.1 Historical application of AT	41
2.2.2 Application of AT in this current research	42
3.0 Literature review	45
3.1 The Digital Business Sector	45
3.2 Definition of small and medium sized enterprises (SME)	48
3.3 Categorisation of small and medium sized enterprises	50
3.3.1 Small and medium sized enterprise categorisation by sector	54
3.3.2 Small and medium sized enterprise categorisation by ownership and business model.	55
3.3.3 A definition of small and medium sized enterprises within the digital business sector	56
3.4 Innovation	58
3.5.0 Forms of innovation and the small and medium sized enterprise context	62

3.5.1 A definition of innovation in small and medium sized enterprises	66
3.6 Small and medium sized enterprises capacities to innovate	66
3.5.1 Small and medium sized enterprises absorptive and innovation capacities	66
3.6.0 Categories of capacity raising and innovation supporting activities in small and medium sized enterprises	69
3.6.1. Ownership characteristics	73
3.6.2 Embeddedness within networks	74
3.6.3 End-user integration in the innovation process	74
3.6.4 Strategic working with organisations offering institutional support for small and medium sized enterprise innovation	75
3.6.5 Small and medium sized enterprise strategic innovation planning	75
3.6.6 Small and medium sized enterprise internal organisational structure for innovation	76
3.6.7 Small and medium sized enterprise innovation process management	77
3.6.8 The small and medium sized enterprise learning process	78
3.6.9 Organisational resources dedicated to innovation	79
3.6.10 Organisational revaluation of processes	79
3.7 Conclusion and development of the conceptual framework	80
4.0 Methodology	84
4.1 Introduction	84
4.2 Research model	84
4.3 Epistemology	85
4.4 Research paradigms and theoretical perspectives	87
4.4.1 Reflexivity	89
4.4.2 Evaluation	91
4.4.2.1 Subtle realism	92
4.4.2.2 Complete reconfiguration of positivist evaluation criteria	93
4.5 Reasoning	95
4.6 Methodology and research design	97
4.6.1 Naturalistic inquiry	99
4.6.2 Implications for this research	100
4.7 Research question design	101
4.8 Methods	103
4.8.1 Approach	103
4.8.2 Strategy	106
4.9 Overview of data sources in this current research	109

4.9.1 Sampling	109
4.9.2 Interviews	111
4.9.3 Survey	112
4.9.4 Implication for this research	112
4.10 Conclusion	113
5.0 Pilot study rationale and value within the design of this current research.	115
5.1.1 Pilot Study Introduction	115
5.1.2 Definition of a pilot study	115
5.1.3 Value and goal of piloting research.	116
5.1.3.1 The value of a pilot study	116
5.1.3.2 The goal of piloting research	117
5.2.0 The pilot study within the context of this current research	118
5.2.1 The selection of the pilot case study	120
5.2.2 Ethical considerations	120
5.2.3. The data collection	121
6.0 Analysis, discussion, and findings from initial pilot study.	126
6.1 The analysis	131
6.1.1 AT Object: the innovation definition	132
6.1.2 Relational analysis: AT Tools to AT Object	133
6.1.3 Relational analysis: AT Subject to AT Object	141
6.1.4 Relational analysis: AT Rules to AT Object	143
6.1.5 Relational analysis: AT Community to AT Object	146
6.1.6 Relational analysis: AT Division of Labour to AT Object	149
6.2.1 AT Tools: mediating artefacts to the innovation process	151
6.2.2 Relational analysis: AT Subject to AT Tools	151
6.2.3 Relational analysis: AT Community to AT Tools	153
6.3.1 AT Subject: the individual's perspective	155
6.3.2 Relational analysis: AT Community to AT Subject	155
6.3.3 Relational analysis: AT Rules to AT Subject	157
6.3.4 Relational analysis: AT Division of Labour to AT Subject	160
6.4.1 AT Community	161
6.4.2 Relational analysis: AT Rules to AT Community	161
6.4.3 Relational analysis: AT Division of Labour to AT Community	163
6.5.1 AT Outcome to AT Object	165

6.6 Conclusion to pilot study.	167
7.0 Survey results and discussion with alignment to the initial case and literature.	172
7.1 The Analysis	175
7.1.1 AT Object: the innovation definition	176
7.1.2 Relational analysis: AT Tools to AT Object	178
7.1.3 Relational analysis: AT Subject to AT Object	193
7.1.4 Relational analysis: AT Rules to AT Object	197
7.1.5 Relational analysis: AT Community to AT Object	201
7.1.6 Relational analysis: AT Division of labour to AT Object	204
7.2.1 AT Tools: mediating artefacts to the innovation process	208
7.2.2 Relational analysis: AT Subject to AT Tools	208
7.2.3 Relational analysis: AT Community to AT Tools	211
7.3.1 AT Subject: the individual's perspective	213
7.3.2 Relational analysis: AT Community to AT Subject	213
7.3.3 Relational analysis: AT Rules to AT Subject	215
7.3.4 Relational analysis: AT Division of Labour to AT Subject	219
7.4.1 AT Community	221
7.4.2 Relational analysis: AT Rules to AT Community	221
7.4.3 Relational analysis: AT Division of Labour to AT Community	223
7.5.1 AT Outcome to AT Object	226
7.6.1 Post pilot study and survey summary	227
7.6.2 Conclusion to the survey data analysis within this chapter.	228
8.0 Case study two: presentation and analysis.	232
8.1 The Analysis	237
8.1.1 AT Object: the innovation definition	238
8.1.2 Relational analysis: AT Tools to AT Object	241
8.1.3 Relational analysis: AT Subject to AT Object	248
8.1.4 Relational analysis: AT Rules to AT Object	250
8.1.5 Relational analysis: AT Community to AT Object	253
8.1.6 Relational analysis: AT Division of Labour to AT Object	256
8.2.1 AT Tools: mediating artefacts to the innovation process	259
8.2.2 Relational analysis: AT Subject to AT Tools	259
8.2.3 Relational analysis: AT Community to AT Tools	261
8.3.1 AT Subject: the individual's perspective	264

8.3.2 Relational analysis: AT Community to Subject	265
8.3.3 Relational analysis: AT Rules to AT Subject	266
8.3.4 Relational analysis: AT Division of Labour to AT Subject	269
8.4.1 AT Community	271
8.4.2 Relational analysis: AT Rules to AT Community	271
8.4.3 Relational analysis: AT Division of Labour to AT Community	273
8.5.1 AT Outcome to AT Object	275
8.6.0 Conclusion to case study two analysis and closure of data collections	278
8.6.1 Diagram of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.	281
9.0 Research findings, method, and validation	284
9.1 Introduction	284
9.2.0 Main findings	284
9.3.0 Methodological evaluation and validation	289
9.4 Conclusions to this chapter	296
10.0 Conclusion	297
10.1 Final conclusions	297
10.2 Research contributions	297
10.2.1 Thesis contribution to knowledge.	298
10.2.2 Thesis contribution to theory.	302
10.2.3 Contribution to practice.	304
10.2.4 Methodological contribution.	306
10.3 Research limitations	306
10.4 Future research	308
10.5 Closure of final conclusions and this current research	310
11.0 References	311
12.0 Appendix A	346
12.1 Elements of Organisational Culture that research has indicated could be analysed through AT.	346
12.2 Elements of Institutional Support that research has indicated could be analysed through AT.	348
12.3 Historical Application of AT	350
12.4 Innovation AT aligned interview questions	354
Goals	354
Contradictions	355

Tool use	355
Working with others	356
Internalisation	356
Externalisation	356
Transition	357
Help	357
Life cycle	357
Change	357
Attitudes	358
12.5 Summary table of academic definitions of innovation	358
12.6 Disruptive Innovation	361
12.7 Search of the Department for Business, Energy & Industrial Strategy (BEIS) website for term innovation (July 2017)	372
12.8 Search of the Department for Business, Energy & Industrial Strategy (BEIS) website for term innovation (June 2022)	373
12.9 NVivo export of Innovation sentences and contextual words.	374
12.10 Word-count frequency Digital Business SME definitions of Innovation.	375
12.11 Research diary example page	384
12.12 Survey data collection introductory message	385
12.13 Survey data	385
12.13 Screenshot example of member checking process	397
13.0 Appendix B	398
13.1 Confirmation of Ethical Approval	398
13.2 Interview consent form	399
13.3 Participant Information sheet	401
13.4 List of achievements	402
Journal Publications	402
Book Section	403
Conference and Workshop Items	403
Online	403

List of abbreviations

AI – Artificial Intelligence

AT – Activity Theory

BEIS - Department for Business, Energy, and Industrial Strategy

B2B – Business-to-business

B2C – Business-to-consumer

EU – European Union

FSB – Federation of Small Business

HEI – Higher Education Institution

HR – Human Resources

IS – Information Systems

OECD - Organisation for Economic Co-operation and Development

R&D – Research and Development

SME – Small and Medium Sized Enterprise

UK – United Kingdom

US – United States

Furthermore, the researcher has made use of footnotes throughout this thesis to add context to the narrative and as a container for the notes from the researchers' diaries of this current research.

List of figures

Figure 1: Activity Theory Model (Engeström 1987)	22
Figure 2: adapted by the researcher, SME Hierarchy of Emotional Drivers (Abbott et al. 2008, p.7).....	52
Figure 3: The Digital Maturity Model; illustrating transformation actions showing their relationship to digital maturity (Fenton et al. 2019, p. 35).....	54
Figure 4: Created by the author, initial conceptual framework with labelled interactions for this research.....	82
Figure 5: Basis of the model of this current research, adapted from Crotty (1998).	85
Figure 6: The process of deductive reasoning adapted by the researcher from Trochim & Donnelly (2007).....	96
Figure 7: The process of inductive reasoning adapted by the researcher from Trochim & Donnelly (2007).....	96
Figure 8: Action case method location (Adapted by the researcher from Vidgen & Braa 1997).....	107
Figure 9: Sequential research diagram.	114
Figure 10: Coding of the AT element.....	124
Figure 11: Coding of the relationship between AT elements.....	124
Figure 12: Pilot case word cloud of innovation contextual words	132
Figure 13: Word Cloud of Innovation AT Outcomes (Pilot Case Study)	165
Figure 14: Figurative diagram illustrating post-pilot completed analysis.....	169
Figure 15: NVivo Word-Cloud visualisation of the definitions of innovation of 42 small and medium sized enterprises within the digital business sector.	177
Figure 16: Word cloud of survey free text visualised to draw words out in relation to outcomes of innovation.	226
Figure 17: First iteration figurative diagram of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.	230
Figure 18: Second case study word cloud of innovation contextual words	239
Figure 19: AT Tools and actions that enable innovation in small and medium sized enterprises within the digital business sector.....	248

Figure 20: Subject characteristics that enable innovation in small and medium sized enterprises within the digital business sector.....	250
Figure 21: Visualisation of AT Rules that enable innovation in small and medium sized enterprises within the digital business sector.	253
Figure 22: AT Community connections that small and medium sized enterprises within the digital business sector can develop to increase capacities to innovate.....	255
Figure 23: AT Division of Labour in completion of innovation in small and medium sized enterprises within the digital business sector.	258
Figure 24: The subject and the leveraging of innovation enabling AT Tools.....	261
Figure 25: The AT Community and the leveraging of innovation enabling AT Tools.....	264
Figure 26: The AT Subject and the AT Community within the process of enabling innovation	266
Figure 27: The AT Subject and application of AT Rules within the process of enabling innovation.	269
Figure 28: The AT Subject and AT Division of labour within the process of enabling innovation.	271
Figure 29: The relationship between the application of AT Rules and the AT Community and their enabling of innovation.....	273
Figure 30: The circular relationship between the AT Division of Labour and AT Community.	275
Figure 31: Innovation Outcomes in case study two visualised as a word-cloud.....	276
Figure 32: Innovation outcomes identified in the three stages of data collection and analysis ..	277
Figure 33: Diagram visualising elements of the framework acting as enablers supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector.	282
Figure 34: Vygotsky's 1978 AT Model	352
Figure 35: Engeström 1987 AT Model	354
Figure 36: Adapted by the author, from Paetz's Disruptive Innovation Model (Paetz 2014).....	370
Figure 37: NVivo export of Innovation sentences and contextual words.	375
Figure 38: Survey data collection introductory message.	385

List of Tables

Table 1: Adapted from Evaluation of the SME Definition (European Commission 2021)	51
Table 2: Capacity raising and innovation supporting activities in small and medium sized enterprise contexts	72
Table 3: Research paradigm core beliefs.....	89
Table 4: Levels of reflexivity (Alvesson and Sköldbberg 2009, p.273)	91
Table 5: Pilot case study summary Table	127
Table 6: Implications for small and medium sized enterprises within the digital business sector – Capacity building through learning	180
Table 7: Implications for small and medium sized enterprises within the digital business sector – Innovating through developing resource to support capacity building	183
Table 8: Implications for small and medium sized enterprises within the digital business sector – Creating networks to support capacity building	185
Table 9: Implications for small and medium sized enterprises within the digital business sector – Capacity building through strategic working with organisations offering support for SME innovation	187
Table 10: Implications for small and medium sized enterprises within the digital business sector – Capacity building through strategic innovation planning	189
Table 11: Implications for small and medium sized enterprises within the digital business sector - Capacity building through organisational re-evaluation of process	191
Table 12: Implications for small and medium sized enterprises within the digital business sector – Characteristics, actions, and attitudes that enable innovation within their organisation.....	195
Table 13: Implications for small and medium sized enterprises within the digital business sector – AT Rule actions that may enable innovation	199
Table 14: Implications for small and medium sized enterprises within the digital business sector – AT Community network relationships that may enable innovation of small and medium sized enterprises within the digital business sector and the values these offer.....	203
Table 15: Implications for small and medium sized enterprises within the digital business sector – AT Community network relationships that may enable innovation for small and medium sized enterprises within the digital business sector and the values these offer.....	206

Table 16: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools.....	210
Table 17: Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools.....	212
Table 18: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector operators and their AT Community relationships as an enabler of innovation activities.....	214
Table 19: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector operators and their application of AT Rules.....	217
Table 20: Implications for small and medium sized enterprises within the digital business sector – Implications for small and medium sized enterprises within the digital business sector operators relating to the relationship between the division of labour.....	220
Table 21: Implications for small and medium sized enterprises within the digital business sector – Application of identified AT Rules within the Community	222
Table 22: Implications about how tasks are allocated and completed by the AT Community ...	225
Table 23: Summary table of case study two.....	233
Table 24: Post Case Study Two, Nuances to the Innovation Definition	240
Table 25: Summary table of academic definitions of innovation.....	361
Table 26: Summary of definitions of disruptive innovation.	363
Table 27: Word-count frequency Digital Business SME definitions of Innovation.	384

1.0 Introduction

This introduction chapter will introduce the background to this current research, setting out its rationale and context. Key terms of relevance are outlined. The aim, objectives and research questions are presented, and the chapter closes with a summary of the research strategy and outline of chapters that follow.

1.1 Background to Research

According to the Federation of Small Business (FSB 2021), there were 5.5 million private sector firms at the beginning of 2021, a fall in volume of 389,600. The Covid pandemic has had a significant impact on these figures. For instance, in the beginning of 2017, there were a record 5.7 million private sector enterprises, up 197,000 from the year before and 2.2 million since the turn of the millennium. Small and medium sized enterprises (SME) made up 99.3% of the total private sector business, with 99.9% being categorised as small and medium sized enterprises (FSB 2017a¹). In addition, small and medium sized enterprises were found to account for 99.9% of the business population (5.5 million businesses), providing three-fifths of UK employment and roughly half of UK private sector revenue. The same report found that even with the impact of pandemic, at the start of 2021 there were 5.5 million small businesses (with 0 to 49 employees), making up 99.2% of all UK businesses. Additionally, small and medium sized enterprises were found to employ 16.3 million people in 2021, or 61% of the total, and generate an estimated £2.3 trillion in revenue, or 52% of the UK's overall revenue. Additionally, 12.9 million people (48% of the entire UK workforce) worked for smaller SME categories (with 0 to 49 employees), generating a combined turnover of £1.6 trillion, or around 36% of the UK's overall turnover. High start-up rates may indicate a strong entrepreneurial spirit in Britain, but they may not fully capture the picture of the UK small and medium sized enterprise landscape. For instance, more than half of new small and medium sized enterprises will cease to trade during their first years, and how in 2015:

¹ At that time in 2017 too comparatively, the SME workforce represented 16.1 million people, this being 60% of all private sector employment in businesses with a combined turnover of 1.9 trillion, making up around 51% of all UK private sector turnover.

“In fact, most new businesses are no more productive than existing businesses, even after five years. Raising the productivity of the whole economy depends on facilitating the growth of new and existing businesses with the greatest potential” (Her Majesty's Treasury 2015).

In addition, the UK had one of the lowest rates of start-ups with between one and nine employees that grow their workforces to 10 or more within three years amongst OECD countries between 2015 and 2021 (Financial Times 2015; Zhongming et al. 2021). This highlights issues with the capability of small and medium sized enterprise owners to innovate and sustainably grow their businesses. The European Union Innovation Scoreboard found in 2015 that UK businesses innovated 15 percent more than EU average (European Commission 2015a), but with the pandemic by 2021 this picture had reversed with comparative EU averages now being roughly 15% higher ranked for innovation (EU Commission 2021); although this 2021 report acknowledge that *“The United Kingdom is a Strong Innovator”* (p.1) it highlighted how as in contrast to previous years, innovation remains far below this average in UK small and medium sized enterprises. Furthermore, analysts Goldman Sachs (2017; 2021) have year-on-year highlighted a need to enable small and medium sized enterprises and their innovation, finding that across all sectors that it increases productivity and growth in turnover, in 2021 saying, *“Small businesses are the engine of the UK economy and at the heart of their local communities. 10,000 Small Businesses equips them with the tools to grow sustainability and unlock their full potential”*. In recent times, compounded by the Covid-19 pandemic, a phenomenon that ran for the duration of this current research, there has been an increased level of failure within the SME community (Amankwah-Amoah et al. 2020) as well as challenges that have driven such organisations to innovate to survive (Papadopoulos et al. 2020). Arguably now, more than ever, a tool for small and medium sized enterprises to help them achieve success in their innovations has more value than even before.

1.2 Focus of the Research

The focus of this current research is interrogation of how small and medium sized enterprises within the digital business sector innovate, and the activities that enable success in the completion

of their innovations. Innovation has been identified as a driver of small and medium sized enterprise business growth, and more so, a critical function of business survival (Adams et al. 2006; Porter 1991; Schumpeter & Nichol 1934). However, how innovation that increases organisational performance occurs needs further investigation (Forsman 2011). Furthermore, within small and medium sized enterprises, activities and factors enabling capacity building that unlocks innovation success are unclear (De Jong & Marsili 2006).

This research will be examined in relation to Activity Theory (AT), which will be used as a lens through which to view innovation-driven organisational change and management of processes in small and medium sized enterprises within the digital business sector. Activity Theory is a descriptive theoretical framework that considers an activity system and can be used to consider elements such as team dynamics, and organisations, as well as other elements within the system, beyond just consideration of a single actor. This means, in effect, it can be used to consider the environment, the history of the person considered, culture, role of tools applied, motivations, and the complexity of real-life activity. During this current research two cases of innovation activities in small and medium sized enterprises within the digital business sector are analysed and illustrate how AT locates these innovation processes within “*activity systems*” (Allen et al. 2013, p. 835). This current research will consider how AT can be used as a lens through which to view and gain greater understanding of activities, processes and enabling factors of small and medium sized enterprises within the digital business sector and their innovation.

AT is not a specific theory of any domain but in fact provides ready-made procedures and techniques. These have found application in educational contexts both in the UK and internationally (Ellis et al. 2010; Tsui & Law 2007; Oswald & Engelbrecht 2013). Application in health has been used to promote and understand learning of medical interventions, such as with Engeström’s (2001, p. 144) work where AT application to participative expansive learning shows “...*a contradiction emerges between the increasingly important object of patients moving between primary care and hospital care and the rule of cost-efficiency implemented in both*”.² Recent

² Sixty physicians participated in workshops watching videotapes of patient cases to highlight issues arising from a lack of communication and collaboration. Using real footage meant that practitioners were unable to blame either the child or family (who were often present), forcing contradictions to be more apparent.

years have also seen an increased exploration of AT in Information Systems (IS) literatures (Ditsa 2003; Chen et al. 2013; Kaptelinin & Nardi 2018; Pettersson 2021). Focus has been given to how IS innovation mediates change, processes of innovation implementation, and impact to organisational business models. Exploiting activity systems, research such as these examines emergent contradictions in work activities, which can be addressed through or arise from the implementation process (Allen et al. 2013). It is within this space, as part of IS literature, that this current research contributes. Activity Theory has found increasing use in IS research often to understand the ‘*variability in adoption patterns when it comes to the activities and purposes for which ICT is being used*’ (Kirkup & Kirkwood 2005, p. 186). Kaptelinin and Nardi (2006) understand Activity Theory as a conceptual framework enabling researchers ‘*to bridge the gap between motivation and action [and] provides a coherent account for processes at various levels of acting in the world*’ in relation to HCI (Kaptelinin & Nardi 2006, p. 62). Cultural-historical Activity Theory, which was developed from Marxist philosophy and Vygotsky's cultural-historical psychology (Chaiklin et al. 1999), combines Leont’ev's (1978) hierarchical structure of human activity with Vygotsky's (1978) concept of mediated action. Activity systems are sources of development because they are characterised by contradictions that spark innovation and change (Barab et al. 2002; Engeström 1987, 2001; Helle 2000). Contradiction should not be interpreted to mean a challenge, a point of contention, or a breakdown in communication; rather, ‘*contradictions are historically accumulating structural tensions within and between activity systems*’ (Engeström, 2001 p. 137). According to Kuutti (1996), ‘*Activity Theory uses the term contradiction to indicate a misfit within elements, between them, between different activities, or between different developmental phases of a single activity*’ (Kuutti 1996, p. 34). In the context of work practices, contradictions, ‘*manifest themselves as problems, ruptures, breakdowns, clashes*’ (Kuutti 1996, p. 34), or as disturbances, which ‘*interrupt the fluent flow of work*’ (Helle 2000, p. 87–88).

Activity systems move through relatively long cycles of transformations driven by the complex qualitative workspaces or contexts that form them. For Engeström (2001), ‘*An expansive transformation is accomplished when the object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity*’ (Engeström 2001, p. 137). The literature considered suggests that in relation to understanding

small and medium sized enterprises within the digital business sector and their innovation there are gaps that AT could address (Zott et al. 2011). For example, there are unanswered questions and methodically low numbers of systematic studies that have been analysed (Bock et al. 2012; Schneider & Spieth 2013), although in the last decade studies have been some published (for example, recently, Ramdani et al. 2022), which have focussed primarily on determinants of adoption (for example, Moh'd Anwer 2018; Awa & Ojiabo 2016; Ramdani et al. 2013) and uptake of digital technologies (for example, Cataldo et al. 2020; AlBar & Hoque, 2019), and these have not focussed directly on UK small and medium sized enterprises within the digital business sector and their contexts. In this current research, AT will present a cross-disciplinary approach offering both conceptual tools and methodological principles, wrapped within the research context of small and medium sized enterprises and their innovation. Although previously AT has not been specifically applied to this context, research suggests that AT is appropriate within diverse inter-professional contexts (Leadbetter et al. 2007; Daniels 2007; Daniels et al. 2013). On completion, this current research will propose a framework of activities supporting success for small and medium sized enterprises in completion of their innovations, which has been developed through being viewed through the lens of AT; as such, this tool will highlight innovation enabling activities for small and medium sized enterprises within the digital business sector, with AT used as a lens within this current research to understand processes and contradictions arising throughout the innovation process. Furthermore, it will contribute to the recent literature space in relation to understanding the outcomes of innovation³ in small and medium sized enterprises, although this will be understood in a novel way through the lens of AT viewing the data subjects and their understanding of their UK based small and medium sized enterprises within the digital business sector contexts.

1.3 Definition of Terms

³ Examples of innovation outcomes found in studies on global SMEs include cost reduction (Tan et al. 2010), profitability (Bala & Feng 2019), customer satisfaction (Scuotto et al. 2017), competitiveness (Adeniran & Johnston 2016), internationalisation (Pergelova et al. 2019), and innovation in products, processes, and business models (Peón & Martinez-Filgueira 2020; Bouwman et al. 2018).

It is essential to define the major terminology related to this study, as is customary in doctoral research such as this. In *Chapter 3.0: Literature Review*, a critical study of these terms is offered; that said, at this time, a general description of these terms can be found below.:

1.3.1 Activity Theory (AT)

According to research by Engestrom (1987), it is through the work of a group of Russian psychologists, particularly Vygotsky and Leont'ev, after the 1920s, that Activity Theory (AT) first emerged. As a theory it accounts for and is used as a mechanism for research within various human practises and developmental stages, offering a method for representation of people in social and organisational contexts (Hasan & Kazlauskas 2014). In AT, the unit of analysis of human endeavour is activity, which can be defined as interaction between a subject and an object that is carried out on purpose and results in both changing (Engestrom 1987). This means that most interactions are mediated by physical or mental tools, which then specify how people engage with the outside environment (Kaptelinin & Nardi 2006) within the AT system.

Engestrom (1987) contributed to, and extended Leont'ev's (1978) original model to describe activity as a collective phenomenon. His *Activity System* model is depicted as a triangle in which the sides represent the main components of the system and corners represent the mediating artifacts/elements of those relationships, so the activity is directed towards the AT Object and results in an outcome.

Figure 1 below is a visual of Engestrom's (1987) AT model:

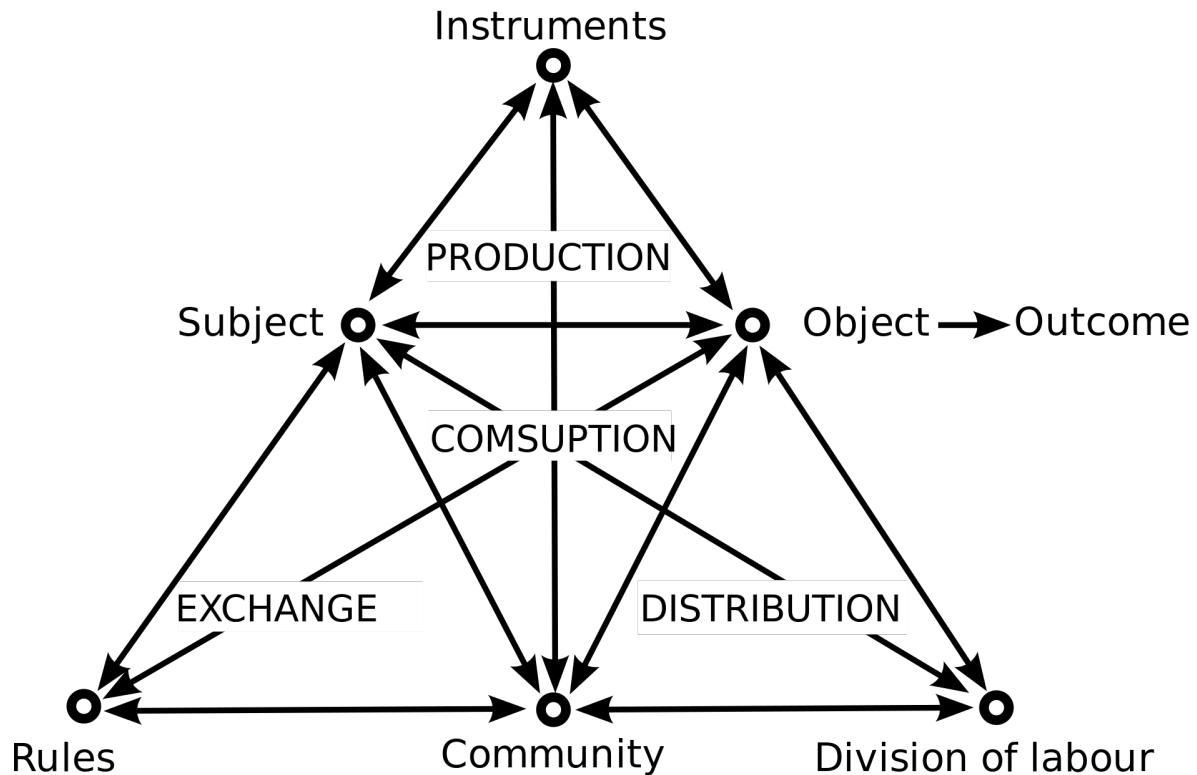


Figure 1: Activity Theory Model (Engeström 1987)

Engeström (2001) extended the model further to represent multiple perspectives and dialogs between interacting systems in a model known as the Activity System Network (Engeström 2001; Guy 2005). AT activities happen simultaneously at three levels in a hierarchical structure (Kaptelinin & Nardi 2006). At the top-level activity is directed towards a motive, that being what the subject ultimately wants or needs to attain. This means that typically activities are realised through actions which may not be directly related to the motive (DeVane & Squire 2012; Kaptelinin & Nardi 2006). Furthermore, each action is directed towards an object or goal. Subjects are typically aware of their goals, but potentially unconscious of their motives. Actions are furthermore composed of lower-level units, operations, performed unconsciously, according to given conditions. This means that activity is not a static in nature. Transformations occur between levels according to changes in environment, subject motivations, or the competencies of those involved (Kuutti 1995; Peachey 2010). Furthermore, the same activity can be realised through different sets of actions and operations, and actions can also be part of different activities simultaneously (Hasan 1999).

Consideration of AT has spanned multiple fields of research emerging as a theory for understanding change and development in work and social activity (Miettinen et al. 2012) within a system. As a contribution to theory, in this current research AT will be used as a theoretical lens through which to view the process of innovation and innovating in small and medium sized enterprises within the digital business sector.

1.3.2 Frameworks

This current research will consider the activities of small and medium sized enterprises to output a framework of enabling factors for organisational innovation. In academic research, conceptual frameworks have proven valuable in both large and small-scale studies (Ravitch & Riggan 2012; Maxwell 2008) spanning disciplines such as business (Milosevic & Srivannaboon 2006), social science (Rodman 1980), marketing (Jaworski et al. 1993) and applied science (Hobbs & Norton 1996). For these reasons, explicit definitions and methods of application vary. Such frameworks can be defined as the organisation of ideas aligned to the achievement of a research purpose (Shields & Rangarajan 2013), with explanation of a phenomenon commonly the purpose employed in empirical research (Yüksel & Yıldırım 2015).

The Cambridge Dictionary (2022) describes a framework as “*a supporting structure around which something can be built*” or “*a system of rules, ideas, or beliefs that is used to plan or decide something*”. This current research, which is exploratory in nature, will focus on why and how the phenomenon of innovation occurs in small and medium sized enterprises within the digital business sector. As a contribution to knowledge, the outputted framework will posit explanations to these questions, tested through collection of primary data and assessment of secondary evidence. Furthermore, increasingly academic frameworks have crossed into business practice and consultancy (Wood 2017). Contributing to practice, the final outputted framework will be offered so it can be used as a practical business tool for raising small and medium sized enterprises capacities to innovate, and in doing so driving productivity, and supporting innovation.

1.3.3 Factors enabling completion of innovations

This current research will consider how small and medium sized enterprises within the digital business sector innovate, and the factors and actions that enable completion of their innovations.

As such this research will consider elements such as:

- Absorptive capacity (Cohen & Levinthal 1990; Moilanen et al. 2014) - external ability to identify, assimilate, transform, and apply valuable external knowledge.
- Innovation capacity (Boly et al. 2014; Forsman 2011; Szetto 2000) - the internal organisational ability to innovate ahead of the competition.

For successful business growth, absorption of knowledge has become essential to achieve sustained competitive advantage (Nonaka et al. 2014). This absorptive capacity is found to enable business success and organisational development (Barney 1991; Cohen & Levinthal 1990). That said, by nature, small and medium sized enterprises have been found to generally focus their resources and capacities towards product development rather than the acquisition of external knowledge (Teece 2007). Yet, absorption of exterior knowledge is acknowledged as a key factor in raising levels of innovativeness and creating environments for organisational learning (Zahra & George 2002). Furthermore, literature suggests that there are obstacles to small and medium sized enterprises establishing a system for knowledge absorption, such as (Raymond et al. 2016):

- Insufficient strategic planning.
- Insufficient capital investment.
- Technological infrastructure.
- A lack of skilled human capital.

These themes are certainly found within the primary data considered in this current research. Research by Augier & Teece (2009) has also found that such obstacles prevent small and medium sized enterprises from assimilating knowledge, improving their innovation activities, and competing globally. Further academic research has considered internal innovation capacity

in small and medium sized enterprises as an enabler of innovation and performance (Forman 2011), this being developing and coordinating organisational processes that create innovative outputs (Adams et al. 2006; Boly et al. 2014; Yam et al. 2004). Innovation capacity encompasses factors and activities enabling organisations to grow in a sustainable way. Forsman's (2011) research finds capabilities to be distinct from resources; resources represent that which is owned by the organisation, whereas capabilities are their abilities to deploy resources and the activities that occur as part of that process (Amit & Schoemaker 1993). This means that resource-based perspectives consider organisational ability to innovate as a function of an organisation's present assets, whereas consideration of capacities contextualises the implementation and evolution of these. That said, these enabling factors that raise capacities to innovate and in turn enable completion of innovations will be considered in a novel manner through an Activity Theory (AT) lens; this will at its conclusion output a framework of innovation enabling actions that small and medium sized enterprises within the digital business sector could implement to raise their successes in completion of innovations.

1.3.4 Digital Business Sector

This current research will be focused on the United Kingdom Digital Business Sector. The government have stressed the importance of this sector in their 2022 UK Digital Strategy which aims to support growth in “...*the UK tech sector's annual gross value added (GVA) by an additional £41.5 billion by 2025 and create a further 678,000 jobs*” (GOV.UK 2022a). BEIS (2022) have announced record levels of financial support to this sector with a “...*£39.8 billion R&D budget for 2022-2025 [that] will help deliver the government's Innovation Strategy and drive forward ambition*”. Furthermore, there is significant support for innovation in this sector through over £500 million to boost small and medium businesses across the north of England⁴ and the regions as part of the Northern Powerhouse Investment Fund (2021); there are similar strategies in Scotland (GOV.SCOT 2021), Wales (GOV.WALES 2021) and Northern Ireland (INVESTNI.COM 2020), all of which place small and medium sized enterprises centrally within their plans. This means that is envisaged that the impact of this research can reach out of the North West to other areas and devolved nations. Through the “Help to Grow: Management

⁴ Where the two case studies considered in this current research are based.

scheme”, the researcher’s past and current university employers are part of the support that the government is targeting towards 30,000 SMEs to digitally transform their business model over a 4-year knowledge exchange programme (Small Business Charter 2022), and there are connected schemes focussed on digitisation to reduce business waste through innovative implementation of technology solutions GOV.UK 2022b). What is clear from this is just how important this sector is in the UK strategy for growth.

That said, in many United Kingdom government documents (ONS 2015) when searching a definition of the Digital Business Sector, these draw heavily on a 2001 definition which does not entirely fit within UK contexts, actually having been drawn from a US paper (Mesenbourg 2001) and consisting of:

- E-commerce / e-business (the trading of goods or services over computer networks such as the internet).
- Supporting infrastructure (that is, hardware, software, telecoms).

Innovation supporting organisations such as NESTA though have challenged the simplicity of this definition, which is misaligned to our modern times, saying:

“We’re witnessing an extraordinary series of digital revolutions in our economy, which are simultaneously exciting, scary, and surprising. They range from the mushrooming scale of new platforms like Uber and Airbnb, to new applications of machine learning, waves of investment going into AR, VR, new social media platforms and data analytics, to rapid change in the labour market. (NESTA 2022)”

And this point about the need for a better understanding of the definition of this sector is borne out in the same government documents focussing on using terms outside of their own scope of definition, such as defining the sector as containing business with models based on products and services that exploit “AI, data, and digital competition” (UK.GOV 2022a). It is hoped that this current research will add some definition to this underdefined sector.

1.3.4 Small and Medium Enterprises (SMEs)

The nature of this current research requires a definition of SME and will consider these business contexts uniquely. SME are defined within Europe as follows (European Commission 2009, p. 3):

“The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.”

The researcher has made the decision that with United Kingdom having transitioned by leaving the European Union but still officially following this definition, that this research will be guided by the official definition of the European Commission; to be clear, it is not envisaged that there will be definition change, and this has remained constant (European Commission 2022; House of Commons Library 2021; GOV.UK 2022). Furthermore, this current research has considered further academic literature specific to defining a UK definition, which have remained consistent, for example Ward & Rhodes (2014), and these echo both the current European and UK definitions discussed above:

“The usual definition of small and medium sized enterprises (SMEs) is any business with fewer than 250 employees.” (Ward & Rhodes 2014, p. 3).

Furthermore, considering Ward & Rhodes (2014, p.3) and the FSB (2021):

- In 2014 there were 5.2 million UK small and medium sized enterprises which made up over 99% of all UK business. That said, there was only minimal growth to 5.5 million small businesses at the start of 2021.
- In 2014, 5 million smaller micro-businesses, with 0-49 employees, accounting for 96% of all businesses, with a change in 2021 where there was growth to 5.5 million small businesses (with 0 to 49 employees), accounting for 99.2% of the total businesses.

- Likewise in 2014, where most UK businesses employed fewer than 10 people accounting for 33% employment and 19% turnover, in 2021 this only marginally changed (35% employment and 21% turnover).
- Similarly, in 2014, large businesses, with 250 employees or more, accounted for less than 0.1% of businesses but accounted for 40% of employment with 53% of turnover, whereas in 2021 these still accounted for less than 0.1% of businesses but with 43% of employment and with 50% of turnover.

This suggests that in this current research within this definition, cases considered could potentially involve either one person or at most a handful of people through to more developed small and medium sized enterprises within the digital business sector⁵. Furthermore, in further defining SME and to inform the researcher in his choice of cases, categorisation is discussed in the literature review section of this thesis.

1.4 Rationale of this research

The rationale of this current research is to contribute to knowledge of understanding how small and medium sized enterprises within the digital business sector innovate. As discussed above, through understanding of how this innovation happens, a framework of activities that support capacity raising and innovation in small and medium sized enterprises within the digital business sector contexts will be proposed. Academic research has found that innovative small and medium sized enterprises share characteristics central to their capacities to innovate (Gronum et al. 2012; Keizer et al. 2002); these include owner characteristics, integration in business networks and interactions with their end users, as well as internal organisational support and processes in place that create conditions for innovation. Furthermore, the research of Man et al. (2002, p. 128) finds that:

“A small firm is not a scaled-down version of larger firms. Larger and smaller firms differ from each other in terms of their organizational structures, responses to the environment,

⁵ This has in fact ended up being the case as with both cases considered the small and medium sized enterprises have been small with less than 10 employees.

managerial styles and, more importantly, the ways in which they compete with other firms”.

Increasing academic and industry consideration has been given for many years to supporting and fostering the small and medium sized enterprise innovation process and their capacities to do so (OECD 2000; Zonooz et al. 2011; GOV.UK 2022) and, furthermore, their growth. But there has been less attempt made to understand how this innovation happens through examination of what the processes are, how can they be realised, embedded, and receive the investment required for them to succeed⁶.

Within industry, small to medium sized enterprises are challenged to innovate to drive productivity and economic growth (Telegraph Connect 2017). BEIS’ *Schemes to help your business innovate and grow* (GOV.UK 2012), originally published in 2012 (and updated periodically with new and further initiatives) offers assistance such as tax credits, patent protection, grants, links to university networks, design assistance through the design council and finance. The small to medium sized enterprise action plan (GOV.UK 2022) continues this. Furthermore, increasingly UK governmental priority has aligned innovation to productivity. In 2015 they said that:

“Productivity is the challenge of our time. It is what makes nations stronger, and families richer. Growth comes either from more employment, or higher productivity. We have been exceptionally successful in recent times in growing employment. We are proud of that. But now in the work we do across government we need to focus on world-beating productivity, to drive the next phase of our growth.” (Her Majesty's Treasury 2015, p. 3).

This commitment has not changed with time and in the UK Innovation Strategy (BEIS 2021) this is echoed as follows, saying that:

“... the 2020s are a pivotal moment for the UK’s future prosperity. That is why Government has published “Build Back Better: our plan for growth” which focuses on

⁶ An area where this research, though its AT lens will contribute.

infrastructure, skills, and innovation as the foundation of recovery and growth across the economy.” (p.5) and in doing so “... driving innovation and improvements in productivity to ensure that the UK continues to have competitive, innovative and world-class industries that drive prosperity and growth across the UK” (p.8).

The connection between innovation and productivity aligns with recent academic research, for example, Roper et al. (2008) and the OECD (2018) that find that growth rates amongst small to medium sized enterprises that innovate are significantly greater than those that do not, with evidence of a positive relationship between:

- Innovation and higher growth rates.
- Product/process innovation and productivity growth.

Having stated that, how can these be promoted in small to medium sized enterprises, how do they actually innovate, and do they have a natural aptitude or desire to do so? More so, these issues appear to be of great importance given that the contribution of small to medium sized enterprises to the UK economy in recent years (FSB 2021) currently accounts for three-fifths of employment and roughly half of revenue in the UK private sector, with 16.3 million people (61% of total UK employment) and a revenue estimated at £2.3 trillion (52% of UK turnover). Recent research by the Federation of Small Businesses (2020), although this situation has been exacerbated by the pandemic, revealed that one-third of closed small businesses fear they will not ever be able to reopen due to widespread redundancy plans. This finding has led to the frightening reality that between 2020 and 2021, the total number of businesses decreased by 390,000 (6.5%) (FSB 2021). It follows that fostering and enabling SME innovation now could have a substantial impact on both small to medium sized enterprise and UK productivity.

That said, a belief that all sectors of small to medium sized enterprises would choose to innovate is perhaps a naive one. For many they may simply wish to *tick-along*, make enough to live comfortably, contribute to society, and develop their expertise, for example traditional industries such as stonemasons or sign-writers where historic preservation of their craft could be as equally important to the owner as profit (Halim et al. 2011; BEIS 2016; Vladimír et al. 2022). Although

elements of this current research may have some transferable value in these sectors, it is not designed to primarily address them; instead, its scope will consider small and medium sized enterprises within the digital business sector as the primary focus of this research. This sector has been chosen because it has clearly evidenced year-on-year growth (FSB 2017b; FSB 2018; FSB 2020; FSB 2022). Furthermore, it is clearly evidenced that growth rates such as those amongst digitally innovative small to medium sized enterprises are far greater (Janger et al. 2017; GOV.UK 2022) and for many, business growth will be part of their organisational priorities. Studies demonstrate a connection between innovation and growth that is unmistakable, and links between innovative products, services, processes, and future productivity development are also readily apparent (Roper et al. 2008; BEIS 2021; Fahnbulleh et al. 2022). In order to produce a framework that encourages innovation and, in turn, facilitates this productivity development, this current research will examine the critical processes that make it possible for innovation to take place.

However, compared to eleven (11) comparable industrialised nations including Australia, Canada, Finland, Denmark, the Netherlands, and Norway, the UK has more small to medium sized enterprises that are decreasing their numbers with fewer that are growing (Bravo-Biosca 2010; Bijmens & Konings 2018; Akcigit & Ates 2021). According to research by Anyadike-Danes et al. (2015), just 20-30% of UK small and medium sized enterprises will statistically survive a decade, and of those that do, 75% will have not increased their staff during that time. These trends have continued up until recently, where the pandemic has made matters worse (Mason & Hruskova 2021). Additionally, Criscuolo et al.'s (2014) study found that the UK had one of the lowest percentages of micro-enterprise start-ups (that being companies with fewer than 10 employees that grow to more than 10 employees within three years), along with a higher percentage of zero growth small and medium sized enterprises, compared to other advanced economies, which in turn has an effect on and contributes to lower UK productivity levels (Andrews et al. 2021; Akcigit & Ates 2021). Additionally, as already mentioned, the Covid-19 pandemic has exacerbated this problem, causing numerous SMEs to fail (FSB 2021). It should also be noted that this research has taken place within the time of the Covid Pandemic, which has framed some of the responses found within the primary data collection.

Even more troubling is the finding that UK small to medium sized enterprises have historically been reluctant to innovate in comparison to other EU nations (Love & Roper 2015; Calabrò et al. 2019; Kotlar et al. 2020). According to the 2015 results of the European Innovation Scoreboard (European Commission 2015a), 30% of EU small to medium sized enterprises have innovated through their products or processes. Higher levels of innovation are being attained in Luxembourg, Germany, Belgium, the Netherlands, and Finland, where more than 40% of SMEs have introduced a product or process innovation. In contrast, UK small to medium sized enterprises are below the EU average at 28% and ranked 24th of the 34 countries for innovation, for having introduced a product or process innovation. The good news is that over time the UK has started to improve this situation (Statista 2022), and SME activities are clearly part of that improvement (EU Commission 2021) through what is described as '*Innovative*' small to medium sized enterprises collaborating with each other; that said, UK small and medium sized enterprises are still 30% less likely to innovate with products and 25% less likely to innovate with processes than comparative EU countries as recently as 2021⁷.

This begs the question of why this should be the case because, despite the UK having the greatest rate of start-ups relative to the OECD average (OECD 2022), more than half of these fail to survive past three years, indicating that the issue is with company growth rather than company creation and formation. Additionally, the data from the ongoing Global Entrepreneurship Monitor Project, which has run from 1999 to 2021 so far (Global Entrepreneurship Monitor 2021), and subsequent recent academic research align to suggest existence of a UK '*ambition gap*' (Levie 2014) that has opened between the UK and the rest of the G8 economies. For many years UK small to medium sized enterprises had lower growth expectations compared to all but one G8 economy, although there are some encouraging signs that have already been discussed. This underlines the need to support and encourage innovation even more, especially considering the academic research linking small to medium sized enterprises and their growth aspirations to increases in productivity (Levie & Autio 2013; Eide et al. 2021).

⁷ The EU continue to track comparison to the EU and UK through the scorecard although the direct comparison to specific countries is no longer done so the above 2021 calculation is based on EU countries as a whole.

This current research will consider that which presents a contemporary dilemma for the UK, in that it must address the mind-set of the operators of UK small to medium sized enterprises and their attitudes to innovation, and in doing enable increased growth ambition that may generate jobs and stimulates productivity. Furthermore, recent academic research has also suggested that intangible factors – attitudes, dispositions, aspirations, behaviours, or past-experience of small to medium sized enterprise operators – may, in fact, have as much to do with this mindset as access to tangibles such as finance and skills (Theodorakopoulos et al. 2015; Nyfoudi et al. 2022). A central factor of AT in relation to this current research and its aim is its potential ability to highlight both these tangible and intangible factors.

This current research will also consider the relevance of AT in the understanding of innovation in small and medium sized enterprises within the digital business sector. The research of Hasan & Kazlauskas (2014, p. 9) looks at how historically AT has been applied in research and concludes that it can be used to consider “*who is doing what, why and how*” (p. 9), which as a notion is supported in later research in relation to application of theories in IS research (Iyamu 2021). Furthermore, Huizingh (2011, p. 6) emphasising how:

“... innovation requires managers to make new decisions in developing and exploiting innovation activities. When, how, with whom, with what purpose, and in what way should they cooperate with outside parties?”.

This study will look at how organisations produce obscurity in their innovation processes, including both formal and informal interactions (King & Ockels 2009; Canik et al. 2017). The use of AT as a theoretical lens will emphasise, for instance, how actors involved in the innovative process may develop covert, unofficial solutions to their organisational challenges that may result in innovation (Macpherson & Clark 2009). The research of Cash et al. (2015) emphasises that through AT, it may be possible to analyse unconscious data, such as organisational culture (Appendix A:12.1) or internal organisational support (Appendix A:12.2). These are undoubtedly present in the data collection, and would provide a valuable future focus for research, though slightly outside the scope of this project. Additionally, AT has previously been shown to be significant as a framework that supports both observations and interviews in complex situations,

enabling researchers to conduct multi-dimensional studies (Cash et al. 2015; Hasan & Kazlauskas 2014). This aligns with the research questions below and will address these, but also consider how the context of the UK and its small to medium sized enterprises being examined impacts innovation. It will enable the researcher to determine whether there is a trend in the innovativeness of UK small to medium sized enterprises within the industry sector under consideration. More specifically, in relation to the current research and its questions, it will consider the steps small to medium sized enterprises and their owners take to increase their "*absorptive capacity*" (Cohen & Levinthal 1990; Moilanen et al. 2014) and "*innovation capacity*" (Boly et al. 2014; Forsman 2011; Szetto 2000), which in turn may unlock and enable successful completion of innovations.

1.5 Aim and Objectives of the Research

The aim of this current research is: *To develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory.*

In response to this aim, the researcher has set objectives, and these are as follows:

1. To complete a critical analysis of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector from literature, to be updated throughout the lifespan of this current research.
2. To explore Activity Theory in relation to innovation within small and medium sized enterprises within the digital business sector.
3. To employ an action case approach within a pilot case study to test procedures, gather survey data and complete a second action case study that considers capacity raising and innovation enabling activities data within small and medium sized enterprises within the digital business sector.
4. To examine and analyse data to present a framework of innovation enabling activities supporting capacity raising in small and medium sized enterprises within the digital business sector.

5. To evaluate the research project against research questions, outlined methods and research contribution by project completion.

1.6 Overview of the Research Questions and Strategy

The following research question is the central narrative enquiry within this current research:

- How do small and medium sized enterprises within the digital business sector innovate?

In addition, 2 sub-questions are considered:

- How can Activity Theory be used to examine the innovation processes of small and medium sized enterprises within the digital business sector?
- What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?

These questions have been formed in response to the methodology which is explained in the methodology chapter of this document (see 4.7 Research question design). This research, which is exploratory in nature, will interrogate the processes of innovation in small and medium sized enterprises within the digital business sector. A discussion and rationale for the use of Activity Theory as a lens for this interrogation is presented in chapter 2.0. Aligning with this exploratory studies' nature, the above discussed rationale and literature gaps highlighted in chapter 3.0, the methodology is presented in Chapter 4.0 that enables a data collection of 5 stages with a mixed-methods approach.

1. In stage 1, aligning with the aim and objectives of this research, a critical analysis of activities supporting capacity raising and innovation is defined through literature enquiry used as structural backbone for coding themes and forming questions for case studies.
2. In stage 2, a pilot case study is carried out in response to the assumptions formed from the literature enquiry.

3. In stage 3 a survey is used to interrogate, identify, and verify key activities that enable innovation with 40 + small to medium sized enterprises.
4. In stage 4 a further case study that refines and nuances the previous analysis of data is carried out.
5. In stage 5, analysis and interpretation of results are carried out and conclusions drawn. A final deliverable of this project, that being a framework of innovation enabling activities supporting small and medium sized enterprises within the digital business sector is the product of project completion.

At its conclusion this current research will outline its contributions. As a thesis contribution to knowledge, enabled by the data collection discussed above, this current research will break down and backwards engineer adopted innovation processes in small and medium sized enterprises within the digital business sector cases to provide a qualitative response to the primary research question: *How do small and medium sized enterprises within the digital business sector innovate?* In doing so it will define innovation in this sector, as well as the elements/processes of the innovation system and how and why they should be employed to support innovation, revealing unconscious and unseen activities and furthermore, knowledge of the outcomes of completed innovation. The innovative analytical and methodological approach of this current research will contribute to theory through a toolkit of methods for AT research within small and medium sized enterprises within the digital business sector contexts, that may be transferable to other sectors in future research, and in doing so answer the second research question: *How can Activity Theory be used to examine the innovation process of small and medium sized enterprises within the digital business sector?* In doing so it will contribute to IS research, considering the context of small and medium sized enterprises within the digital business sector systemically, with data collected, filtered, and processed to understand the phenomenon of innovation. The Activity Theory lens will present a view of the process of innovation in small and medium sized enterprises within the digital business sector, responding to the third question: *What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?* In doing so it will also provide a contribution to practice, outputting a framework diagram that visualises and gives weights to elements of this framework acting as enablers supporting capacity raising and innovation for small and medium sized enterprises

within the digital business sector, that also captures elements that cannot be seen or measured, such as attitudes, dispositions, goals, behaviours, or prior experiences of operators of small and medium sized enterprises within the digital business sector. This, in turn, will fulfil the research aim, *‘To develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory’*.

As discussed above, a detailed explanation of the underpinning research philosophy and methods are discussed in Chapter 4.0. This is followed by Chapter 5.0 which discusses piloting and the selection of the initial pilot case. Chapter 6.0 will present and discuss the results from the pilot study, chapter 7.0 will present the results of the survey and then chapter 8.0 will present the final case study and conclude with the presentation of the framework as a diagram visualising the elements acting as enablers supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector. Chapter 9.0 will present a consideration of the research questions and methodological analysis, as well as consideration of research contribution. The thesis will end with chapter 10.00 which will present final conclusions, limitations, and areas for future research. There are also two final sections that complete this work, these being the complete set of references considered and two detailed appendix sections, which are found at the end of this document.

2.0 Theoretical Framework Rationale

The author has at this stage made the decision to discuss theoretical frameworks, their value within research and a justification for their choice of Activity Theory (AT) as the theoretical backbone of this piece. Chronologically there could be an argument that this section could have found its place after the literature review of the following chapter: that said, it is the author's position that theory shapes design and this is supported by Merriam (2001) who suggests, the lens through which a researcher can view a research context in consideration, and as such should be factored in at an early stage. That said, this does pre-inform the reader some of the literature and assumptions that are revealed in the chapters that follow.

2.1 Introduction: Theoretical frameworks within research

A theoretical framework is considered an important aspect in the research process, with Iqbal (2007) describing identification and preparation of the theoretical framework for the research dissertation as *"the most difficult but not impossible part of [the] proposal"* (p.17). According to Lysaght (2011), selecting a theoretical framework for a research study is crucial because it offers a foundation for the literature evaluation, the methodology, and the analysis that is in line with the nature of the research.

"A researcher's choice of framework is not arbitrary but reflects important personal beliefs and understandings about the nature of knowledge, how it exists (in the metaphysical sense) in relation to the observer, and the possible roles to be adopted, and tools to be employed consequently, by the researcher in his/her work." (p. 572)

Additionally, there has been a growing trend in research across fields to incorporate a theoretical framework (Connelly 2014). Furthermore, Silver & Herbst (2007) examine the idea of academic rigour and agree that journal articles are frequently rejected because they are either theory-light or lack theoretical support.

Eisenhart defined a theoretical framework as *"a structure that guides research by relying on a formal theory ... constructed by using an established, coherent explanation of certain*

phenomena and relationships” (1991, p. 205). This effectively means that the chosen theory (or theories) that drive the researcher's ideas about how they perceive and intend to explore their subject, as well as the terms and concepts from that theory that are pertinent to the current investigation, make up the theoretical framework. The criteria for applying or creating theory to research are defined empirically by Lovitts (2005) as being that it must be applicable, logically interpreted, well understood, and align with the relevant subject. Furthermore, on a philosophical level, Dooyeweerd (cited in Sire 2004; Caudill 2009) has suggested that researchers need to demonstrate “*pretheoretical commitments*” and specifically identify their (cited in Sire 2004; Naugle 2002) “*worldview of the heart rather than the mind.*”

Evidence from various study fields shows how crucial it is to explicitly identify and include a theoretical framework. Mertens finds that the theoretical framework “*has implications for every decision made in the research process*” (1998, p. 3). This emphasises the importance of theory-driven thinking and acting that aligns with the research topic, development of questions, literature review, the method, and analysis plan for the research. Anderson et al. (2006) quote a supervisor within their work who states, “*I don’t see how you can do a good piece of work that’s atheoretical*” (p. 154). Similarly, Sarter (2006, p. 494) addressed the “*limited usefulness of findings and conclusions*” when a study is not justified by a theoretical framework.

The underpinning theory selected for a piece of research offers a conceptual basis for understanding, analysing, and designing ways to answer the research aim. This is discussed by Maxwell (2004) who finds:

“The function of this theory is to inform the rest of your design—to help you to assess and refine your goals, develop realistic and relevant research questions, select appropriate methods, and identify potential validity threats to your conclusions. It also helps you justify your research” (p 33-34).

A theory that has been tested and supported by additional research and is regarded as academically rigorous serves as the foundation for a theoretical framework. Consideration of Activity Theory is discussed below in the following sections as a lens through to view the

innovation process in SME; a justification of its appropriateness for this current research and a gap is revealed through how it has been historically applied, and outlining how this research will contribute to theory.

2.2 Activity Theory (AT)

AT (Engeström 2015) originates in the works of Marx, Engels, Vygotsky, Leont'ev and Luria (Engeström et al. 1999). More recently, Waycott et al. (2005) have defined the theory as “*a collection of broadly defined concepts that are open to interpretation*” (p. 111). In relation to this current research, an activity will be a unit of analysis that provides “*the dialectic relationship between subject and object*” (Vygotsky 1978) that enables consideration of various related elements (Engeström 2015):

- Instruments.
- Rules.
- Community.
- Division of labour.

Engeström (1993, p. 67) define elements of AT as follows:

- Object: “*the ‘raw material’ or ‘problem space’ at which the activity is directed, and which is moulded or transformed into outcome*”.
- Subject: “*the individual or subgroup whose agency is chosen as the point of view in the analysis*”.
- Community: “*multiple individuals and/or subgroups who share the same general object*”.
- Tools/Instruments/Artefacts⁸: “*physical and symbolic, external and internal tools (mediating instruments and signs)*”.
- Division of labour: “*both the horizontal division of tasks between the members of the community and to the vertical division of power and status*”.

⁸ Throughout I have used the term Tools in this current research.

- Rules: *“the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system”*.

This current research will look at how AT might be utilised as a lens to view the innovation processes in small and medium sized enterprises within the digital business sector. The academic study of AT has covered several research areas to become a paradigm for comprehending change and advancement in employment and social activity (Miettinen et al. 2012). It has in recent years been applied in the fields of:

- Organisation (Engeström 2000).
- Management (Jarzabkowski 2003).
- Social psychology (Blunden 2010).
- Education (Roth & Lee 2007); and,
- Human Computer Interaction and IS design (Kuutti 1999; Nardi 1996).

As a modern social theory for both the framing of investigations and the creation of insight, AT has gained reasonable acceptance. Additionally, its application has spanned the public sector, intricate organisational contexts, disaster response, education, health, and ICT advancement. For this reason, to produce fresh insights, academics have also combined AT with philosophies and theories including critical realism (Allen et al. 2013), institutional theory (Ogawa et al. 2008), complexity theory (Hasan et al. 2010), and structuration theory (Canary & McPhee 2009). In relation to this current research, it will be used uniquely to provides insights into enabling activities of the innovation process in small and medium sized enterprises within the digital business sector contexts, through which it will contribute theoretically to application of AT within IS innovation studies.

2.2.1 Historical application of AT

A detailed explanation of AT and its historical application is found in Appendix A:12.3 of this document. This research has been done to identify a context where AT could be applied as a theoretical lens, this being in this current research interrogation of how small and medium sized

enterprises within the digital business sector innovate. Furthermore, a consideration of its application in this current research is found in the following section of this thesis.

2.2.2 Application of AT in this current research

In the previous sections and discussed Appendix, AT has demonstrated its value as a framework for analysing complex activity and its context. However, its application has not been applied to the analysis of innovation or more specifically how small and medium sized enterprises within the digital business sector innovate, the topic examined in this current research. Application of AT required the formation of interview questions.

Academics such as Nardi (1996) have defined the value provided by AT as tool which:

"... offers substantial tools for a broadly scoped study of 'computer-mediated activity'... it weaves together, in a single coherent framework, so many interesting theoretical constructs crucial to an understanding of human activity: dynamic levels of activity, mediation, contradiction, intentionality, development, history, collaboration, functional organ, the unity of internal and external." (p.375)

That said, there has been little methodological guidance in relation to the formation of interview questions for studies of this sort, where innovation and a specific type of business are considered. In this current research the researcher has considered the nature of AT interview design so that it can be pivoted to this type of research below.

As part of this current research, examination of AT interview design in the research of key AT academics, for example Nardi (1996) and Engeström (2001) found that identical questions were often placed/framed differently, and although there is commonality in question design, there are several differences. This consideration allowed for the creation of a set of base questions. The evaluation of questions was further nuanced by consideration of the research of Duignan et al. (2006) who presented a checklist for AT interviews. Their analysis outputs a baseline method for the formation of AT interview questions, underpinned by the questions asked within key AT

studies⁹ and furthermore, describes how they had approached this development process, whilst reflecting on their experience in applying AT interviews in a case of computer mediated music production. Although within a wildly different context, the underpinning logic can be applied and shaped to other research, for example, in the case of this current research that interrogates how small and medium sized enterprises within the digital business sector innovate. The concept of such a universal reference was supported as necessary by Nardi (1996) who finds that the existence of a question checklist could make AT accessible, and in fact, this was used by the Duignan et al. (2006) as a rationale for their creation of their template set of AT interview questions.

The basis of the semi-structured interview questions asked as part of initial pilot case study are a function of this process and reflection on the questions of Duignan et al. (2006) discussed above. They are available in their complete form in the appendixes, although these are expanded upon during the more than 16 hours of interview data that was gathered through both of the case studies considered. Furthermore, their framing/wording in this current research is focussed on innovation and the organisational innovative process. Initial codes generated were formed from the 10 categories of capacity raising and innovation enabling activities.

The steps for this research journey were as follows:

- Ten overarching categories of capacity raising and innovation enabling activities, with how these are operationalised were defined through literature enquiry.
- Opened-ended interviews of pilot case study using AT interview questions were conducted.
- Response coding was aligned to these categories.
- A survey was used to interrogate and nuance definitions from literature and AT pilot case study data.
- A final case study was conducted to add definition to the framework of capacity raising and innovation enabling activities.

⁹ Although these were looking at different phenomena and contexts.

- Evaluation of project completion was carried out.

In sum, this chapter has presented a rationale for the use of AT as a theoretical framework within this research and explained how it is used to generate novel insights. Now, having outlined the value of a theoretical framework in research and explained how AT has been used in this current research as a structural backbone, the following section will discuss the pertinent aspects of the literature enquiry.

3.0 Literature review

Following on from the rationale for AT in the previous chapter it is now time to consider literature relevant to this current research, focussing on definition and understanding of the research context. As will be discussed in chapter 4 as part of the methodology, the researcher works as an academic, often teaching in relation to business innovation, as well as managing knowledge exchange schemes with small and medium sized enterprises within the digital business sector; it is often the case that as part of a research journey a researcher might carry out their literature and close the process, whereas in this case literature has been returned to throughout and until the end of this current research and considered holistically throughout the lifespan of this project. Some literature has been moved to the appendix of this work; the reason for this is that when considering innovation in SMEs and also the target context of small and medium sized enterprises within the digital business sector, it became apparent that some forms of innovation, especially more disruptive forms are less common – it was a valuable area to consider, if only because it became clear that small and medium sized enterprises are less comfortable purposely innovating with products and services with a lower level functionality, and in preference consider solutions that are more mature that have achieved this maturity over an extended time, meaning that they will in general choose established solutions with closer proven alignment to their customer needs.

This literature review chapter is linked to completion objective one of this current research, that being, *“To complete a critical analysis of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector from literature to be updated throughout the lifespan of this current research”*. As such, it will consider terms and definitions relevant to this current research spanning small and medium sized enterprises within the digital business sector, small and medium sized enterprises, innovation, and activities supporting capacity raising and innovation.

3.1 The Digital Business Sector

The digital business sector encompasses a wide range of industries and companies that use technology to enhance their operations, products, and services. This includes businesses that

operate primarily online, such as e-commerce companies, as well as brick-and-mortar businesses that have integrated digital technology into their operations, for example through exploiting online marketplaces (Tapscott & Tapscott 2016). Digital technology has had a significant impact on the way businesses operate, allowing for increased efficiency, improved communication and collaboration, and new revenue streams. The rise of the internet and mobile technology has led to the emergence of new business models, such as the sharing economy and the gig economy. Furthermore, the increasing availability of data and advances in analytics have also led to the growth of data-driven businesses, such as digital marketing agencies and companies offering customer relationship management services.

The digital business sector has also been a driving force behind the development of new technologies, such as blockchain and business that offer products and services that are based artificial intelligence. Technologies such as these have shown their abilities in disrupting traditional business models and create new opportunities for companies in the digital business sector (Brynjolfsson & McAfee 2014). That said, this is a double-edged sword, as one of the challenges facing businesses in the digital sector is the need to constantly adapt to rapidly changing technologies and consumer preferences. In addition, there is increasing competition in the digital marketplace, as well as concerns about data privacy and security, that results in the digital business sector being a rapidly evolving and dynamic space, with the potential for significant growth and innovation, and where companies in this sector must be able to adapt to changing technologies and consumer preferences to stay competitive (Porter 2001).

In recent years, compounded by the pandemic, practically all businesses can be considered digital (Microsoft 2020). The United Kingdom Digital Business Sector has been loosely defined governmentally (UK Government 2017, p.1) and covers:

“... digital goods, digital services and digitally-enabled transactions of goods and services, whether digitally or physically delivered, involving consumers, business or government, all of which are underpinned by movement of data across borders. The digital sector includes: audio-visual (AV); e-commerce; telecommunications; data; and a

raft of emerging sectors, such as artificial intelligence (AI), FinTech (which is dealt with in a separate report), the internet of things, and cyber security”.

This means that businesses that form the digital business sector include those that operate primarily online or through digital means, such as e-commerce companies, digital media companies, technology companies, and internet service provider, and examples of specific types of businesses within the digital business sector might include online retailers, digital advertising agencies, social media platforms, cloud computing providers, and software development companies. This sector has achieved success through what academics’ term business clusters (Porter 1988) which are spread across the UK (Tech Nation 2021). There is evidence of thriving digital clusters in regional cities (Nesta 2016); in this report London is the highest ranked for volume of businesses in this sector, but there are others digital cluster such as Cambridge, Bristol, Oxford, Manchester, Edinburgh, and Birmingham which rank highly when compared to similar European technology clusters. Furthermore, there are significant micro clusters achieving success, such as Salford’s Media City, recently suggested to be the *“UK’s top city for start-ups”* in the press (LPC Living 2020).

Recent government reports (GOV.UK 2020) find that in the Digital Business Sector is worth more than £400 million a day to the UK economy, and that statistically:

- The digital sector contributed £149 billion to the UK economy in 2018
- The sector accounts for 7.7 per cent of the UK economy as a whole
- Growth in the sector is nearly six times larger than growth across the economy as a whole

It should be noted that this sector is increasingly important to the UK economy as a source of inward investment, reportedly having attracted 50% higher than any other European country (Zhongming et al. 2021). Furthermore, despite uncertainty surrounding Brexit, global technology leaders such as Facebook, Apple, Google, and Amazon have announced significant UK investments since the referendum (BBC News 2016; The Guardian 2016), and in fact the UK retains its leadership for digital investment in EU (Ernst & Young 2021) where:

- The UK recorded 322 inbound digital Foreign Direct Investment (FDI) projects in 2020¹⁰.
- London remained the city driving the UK's digital technology success, securing 57.8% of all digital tech FDI recorded in the UK in 2020.
- Digital was one of the main identified drivers of UK growth in future¹¹.

On a final note, it is evidenced (GOV.UK 2020) that no matter the scale of business, this is a key sector for UK growth and productivity. It is envisaged that as a contribution to practice the final outputted framework will contribute to innovation success in this sector.

Yet, in relation to future work, this raises several questions about the ways industry sectors innovate and activities and factors that enable this innovation to occur as functions of their sectoral contexts. In future research there may be opportunities to consider how this current research and its methods could be applied across multiple sectors and with what effect, and to what extent the final framework will be relevant in other industry sectors. Furthermore, in future work it would also be valuable to understand what forms of innovation are possible across SME industry sectors and the level to which innovativeness is relative to both the sector and specifics of the small and medium sized enterprise case considered¹².

3.2 Definition of small and medium sized enterprises (SME)

The nature of this current research requires a definition of small and medium sized enterprises and will consider these business contexts uniquely.

Firstly, and perhaps worryingly, there is no universal definition of a small and medium sized enterprise. It is often used as a general phrase to refer to a small business within a sector of the larger business community. That said, it does have specific definitions in UK law, and within institutions such as the EU. Small and medium sized enterprises are defined within Europe as

¹⁰ However, project numbers fell by 25% from 2019 (432)

¹¹ For all the reported negatives of Brexit and the pandemic to, the vaccine roll-out has been found to prompt investors to see the UK as having Europe's best pandemic recovery plan, creating opportunities for growth

¹² This will be discussed in the final chapter where there will be a consideration of future research.

follows (European Commission 2015) and this definition is current until today and continuously reviewed in yearly EU documentation (European Commission 2021):

“The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.”

The United Kingdom, as discussed in the introduction section has now ended its membership of the European Union; that said, it continues to follow the above definition (GOV.UK 2022). In this same report the UK government state that:

“There are over 5.7 million Small to Medium Enterprises in the UK. They are the engine of growth in our economy, driving innovation and greater productivity, finding solutions, and creating jobs” (GOV.UK 2022).

It is clear that the government consider a UK small and medium sized enterprises to be essential to growth and productivity, to be innovators and essential to UK employment, but rather simplistically continue to define as a reflection of the EU definition above as follows:

“An SME is any organisation that has fewer than 250 employees and a turnover of less than €50 million or a balance sheet total less than €43 million.” GOV.UK 2022).

There are though some further specific UK complications caused by having different calculations that are fixed to sterling and euro values that do not change with fluctuations in currency values between the EU and UK (see the above definition, and consider that does not take into account exchange rates). Furthermore, a company may fall outside the small and medium sized enterprises definition if it is a franchise or has a close working relationship with another company (European Commission 2015; McKinsey & Company 2020; GOV.UK 2022). Moreover, to complicate things further, not everyone subscribes to the same definition and different organisations use their own criteria to determine what is actually a small and medium

sized enterprise. For example, OFGEM, a UK Government organisation have applied specifics in relation to use of energy to their understanding of the small and medium sized enterprise definition (OFGEM 2021), where such businesses will use no more than 100,000 kWh of electricity per year, or use no more than 293,000 kWh of gas per year.

A further defining factor of being an SME is their eligibility to access various grants that other businesses cannot. Some grants available uniquely to UK small and medium sized enterprises¹³ are:

- Industrial partnership awards (2020), which support academic-led science projects where an industry partner has an interest in its potential use.
- Innovate UK (2022), to help UK businesses realise the potential of new technologies, develop ideas, and make them a commercial success.
- BBSRC ‘Stand-alone’ LINK (2022) grants, which support collaborations in new areas of science with no current industrial use.
- Construction Industry Training Board grants scheme (CITB.co.uk 2022) – England only, offering support and potential funding to help construction businesses increase competitiveness

There are also various categories of small and medium sized enterprises which are further defined below based on staff headcount, turnover, and yearly balance sheet, which are discussed in the section that follows.

3.3 Categorisation of small and medium sized enterprises

Further defining SME categorisation can be made through a consistent legal definition determined by number of staff and either turnover or balance sheet total (European Commission 2021), with these “*Ceilings of the Definition*” detailed in the table below:

¹³ It is interesting to note that in the two cases considered in this current research, both required support from organisations to know about such things as relevant grants.

Company category	Staff headcount	Turnover	Balance sheet total
Medium-sized	< 250	< € 50 m	< € 43 m
Small	< 50	< € 10 m	< € 10 m
Micro	< 10	< € 2 m	< € 2 m

Table 1: Adapted from Evaluation of the SME Definition (European Commission 2021)

That said, this above definition contrasts, although only in a minor way, with the Companies Act of 2006 (Legislation.gov.uk 2006), that has three categories of SME, each with different financial reporting requirements to the above where:

1. A micro company will have no more than £632,000 revenue; £316,000 or less on their balance sheet total; and fewer than 10 employees.
2. A small company's ceilings are a maximum £10.2 million turnover; £5.1 million balance sheet total; and 50 employees.
3. A medium-sized company's maximums ceilings are £36 million turnover; £18 million balance sheet; and 250 employees.

Furthermore, small and medium sized enterprises must be fully independent and they are part of a group, then to be classed as a small and medium sized enterprise the business must hold less than 25% of capital or controlling rights in another business or equally another business must hold less than 25% of capital or controlling rights of another small and medium sized enterprise, following the following conditions (European Commission 2015b, p.16):

1. The business must not have relationships with other businesses within the definition of SME that mean that together they exceed the ceilings.
2. The business must be autonomous or part of a group of affiliated enterprises that together fall below the above ceilings of definition – the status as 'autonomous', 'partner' or 'linked' enterprise determines whether when calculating, headcount and turnover or balance sheet total, the numbers directly associated with the business itself must be taken

into account or a proportion or all of those of associated enterprises need to be included too.

This current research, which is qualitative in nature, considers how small and medium sized enterprises within the digital business sector innovate. An underpinning logic for case selection was an initial conversation with Professor Carl Abbott at the early stage of this research journey; the research of Abbott et al. (2008, p.7) considers a different context of business, that being architectural small and medium sized enterprises, where their research finds that small and medium sized enterprises by nature will fit into three categories within a triangle that represents a “*hierarchy of motivational drivers*” which are (see figure 2 below):

- *Survival* – actively looking for contracts and revenue streams.
- *Stable* – have sources of income and enough traction to be safe in their market, yet to remain competitive they need to innovate to avoid slipping back into a survival mode or to enable them to progress into the developmental category.
- *Developmental* – within this category SME have achieved both traction and revenue but face potential risk of failing to remain innovative.

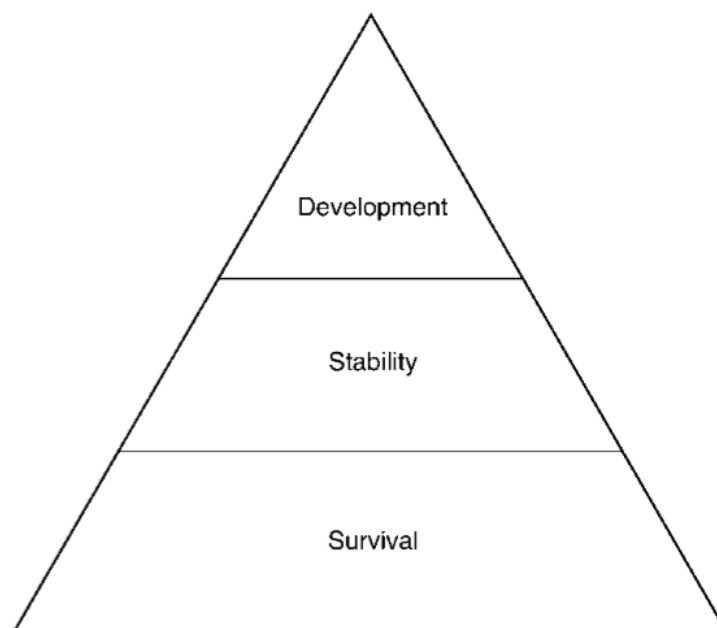


Figure 2: adapted by the researcher, SME Hierarchy of Emotional Drivers (Abbott et al. 2008, p.7)

Returning to the context of small and medium sized enterprises within the digital business sector in this current research, selected case small and medium sized enterprises will need to be stable and willing to innovate with enough financial capital and security to be able to implement innovation within their organisation; through aligning this model with the ceilings of definition discussed above, this research will focus on what can in reality be classed as small to medium sized SMEs. Similarly, practitioner organisations supporting business growth, such as the Business Growth Hub (2022), draw comparisons between levels of business category, where there is a clear difference in digital maturity between what is *start-up* and that which could be termed a *scaleup* (Business Growth Hub 2022). Such businesses are by nature already looking to be more productive, increase commercial lifespan of products and services, produce economies of scale not possible and achieve stronger financial performances. This aligns with the research of Fenton et al. (2019, p. 29) which discusses the notion of digital maturity through which organisations that are more mature can make “*appropriate use of technology to both maximise the advantage that can be gained*”. The level of maturity is visualised, in a similarly triangular model to that of the Abbott et al. (2008) model above, in their Digital Maturity Model (see figure 3 below):

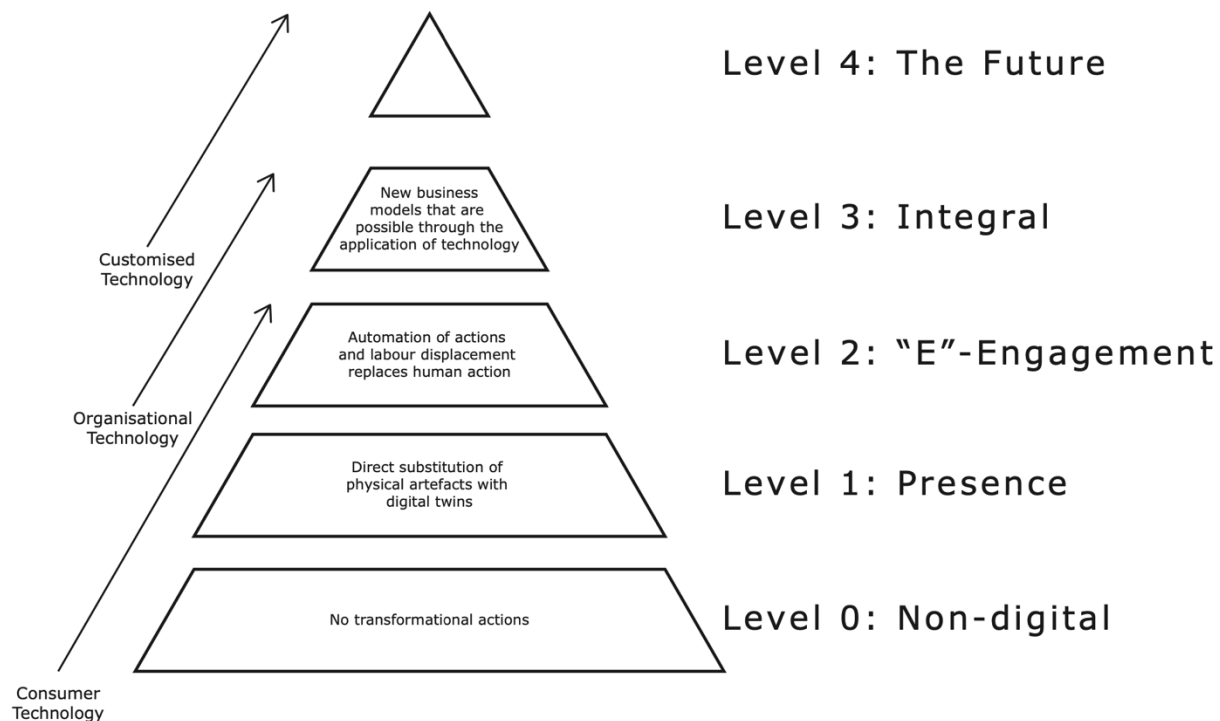


Figure 3: The Digital Maturity Model; illustrating transformation actions showing their relationship to digital maturity (Fenton et al. 2019, p. 35)

Returning to this current research, a key takeaway of these two models is that the concept of innovation is relative to organisations and sectors where transformation actions being undertaken, and these are indicative of their current level of maturity. That said, for some small and medium sized enterprises that are immature, simply having a Facebook page may be innovative, whereas there are others with increased maturity who are able to manage implementation of more complex innovation that can disrupt their models of business.

As discussed above in the introduction, this current research is not aimed at the less mature start-up organisations or for those simply wishing to *tick-along*, make enough to live comfortably, contribute to society, and develop their expertise (an example might be traditional industries such as stonemasons or sign-writers where historic preservation of the craft could be as equally important to the owner as profit). Instead, consideration of literature has indicated that case selection should be focussed on those with a certain level of maturity, ability, and desire to scale-up.

In the below sections, in further nuancing the definition of small and medium sized enterprise business contexts, consideration will be given to further categorisation by industry sector, ownership model and business model.

3.3.1 Small and medium sized enterprise categorisation by sector

Small and medium sized enterprise may be defined by sector. The Nation Federation of Self-Employed and Small Businesses has identified a list of 11 SME sectors (FSB 2017b; FSB 2020; FSB 2022):

1. Information and communication.
2. Professional, scientific, and technical activities.
3. Arts, entertainment, and recreation.
4. Manufacturing.

5. Construction.
6. Wholesale and retail trade; repair of motor vehicles and motorcycles.
7. Education.
8. Real estate activities.
9. Accommodation and food service activities.
10. Transportation and storage.
11. Administrative and support service activities.

Furthermore, these are categories for which measurement of performance and productivity are made on a year-to-year basis. This current research project will focus on small and medium sized enterprises within the digital business sector, which can sit across several the official FSB categories, although this research will focus on businesses within categories 1, 2 and 6 where the case of digital sector small and medium sized enterprises considered sit and Digital Businesses by nature are more typical.

3.3.2 Small and medium sized enterprise categorisation by ownership and business model.

The European commission states that if “... *an enterprise has access to significant additional resources it might not be eligible for SME status*” (European Commission 2015, p.4) and define the list below as possible small and medium sized enterprise ownership models:

- Autonomous.
- Partnership.
- Linked enterprise.

The cases considered in this current are all small and medium sized enterprises as per European Commission definition, and as discussed above of a size and revenue where implementation of innovation may involve engaging with external organisations. Returning to AT and the research questions, this current research will consider the value of the Community (an element of AT) within its final outputted framework and how collaboration with others as an activity raises absorptive capacity to innovate. In doing so, the research will nuance how structural organisation and business models impact innovativeness of small and medium sized enterprises.

Baden-fuller & Morgan (2010, p.1) argue business models “*provide means to describe and classify businesses*”. That said, business models are, in fact, a distinct management research area. This means that there has been much research in this area and from an academic perspective they have become “*a focal concept for strategy*” (McGrath 2010, p. 247) closely aligned to “*business strategy, innovation management and economic theory*” (Teece 2010, p. 172). Furthermore, business models have been found to reduce business IS gaps providing alignment between organisational strategy and IS design (Al-Debei & Avison 2010; Gordijn & Akkermans 2001; Hedman & Kalling 2003). For these reasons business model research is increasingly an area of academic interest and “*moving toward conceptual consolidation*” (Zott et al. 2011 p.1038) with such research providing an alternative for enterprise and industry analysis (McGrath 2010). LeCocq et al. (2010, p.214) find:

“... although the business model is not (yet) a theory per se but rather . . . a concept or a tool which helps to describe an economic activity, or potentially a “framework” (Teece 2007) . . . it presents the features of a research program”.

Aligning with the assertion of Teece above, this current research, through its examination enabling activities for innovation capacity building in small and medium sized enterprises within the digital business sector can contribute to further understanding and definition of business models of small and medium sized enterprises within the digital business sector, and more so to those that enable innovation and raise productivity.

3.3.3 A definition of small and medium sized enterprises within the digital business sector

A key characteristic of digital sector businesses is their potential ability to reach a global audience through the internet connectivity, with many having business models that rely heavily on data analytics and personalisation to improve their customer experiences and drive their sales, which in turn allows for greater market potential and the ability to scale quickly (Buganza et al. 2020). This is seen in e-commerce businesses that use data to personalise product recommendations, or digital subscription services that use data to create custom playlists or personalized news feeds (Budzinski et al. 2022). Furthermore, another characteristic of digital

businesses is potentially their ability to test and iterate quickly where being digital potentially allows for easy experimentation and data-driven decision-making (Wright & Dyer 2000; Farah et al. 2022). This also means these businesses potentially need to pivot quickly and adjust strategies as needed, which can lead to disruption of how they operate and compete (Lumpkin & Dess 2004). However, digital businesses can face many challenges, such as increased competition (Wirtz 2019), the need for significant investment in technology and infrastructure (Weill & Vitale 2002), and the risks of data breaches and privacy concerns (Kaushik & Dahiya 2018). Additionally, the rapid pace of innovation and constant change in the digital landscape can make it difficult for businesses to keep up, compounded recently by the pandemic (Soto-Acosta 2020).

Furthermore, small and medium sized enterprises within the digital business sector do not sit in one single category, business, or ownership model, being diverse organisations. This means that a definition of small and medium sized enterprises within the digital business sector is that they can include organisations that work in:

1. audio-visual (AV).
2. e-commerce.
3. telecommunications.
4. businesses whose business models offer products or services within the spaces of artificial intelligence (AI), FinTech, the internet of things, and/or cyber security.

Moreover, to an extent they follow the UK Government definition discussed above, where businesses are based on:

“... digital goods, digital services and digitally-enabled transactions of goods and services, whether digitally or physically delivered, involving consumers, business or government, all of which are underpinned by movement of data ...” (UK Government 2017, p.1).

That said, it also worth noting that this definition has not been updated since 2017 – at this time AI, Cyber security, IoT were perhaps considered as emerging sectors, whereas now they are

established general purpose technologies with businesses whose business models offer products or services within these specific spaces.

In sum to close this section, this review has provided a definition for small and medium sized enterprises within the digital business sector which will be the basis of case selection. For this research focus will be given to autonomous businesses, past their start-up phase, with a level of maturity that enables them to be able and ready to be innovative. This aligns to Abbot et al.'s (2008) model discussed above, where small and medium sized enterprises that have reached stability can demonstrate developmental features and abilities to innovate as a function of their stability.

3.4 Innovation

This current research considers innovation and for this reason it is necessary to define not only innovation, but the forms that innovation can take, and finally its definition with SME contexts, which aligns to the rationale and aim of this research, *to develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory*. Within the UK the government has declared a need to encourage innovation as key to a successful UK economy and improvement in life quality. Furthermore, in 2014 the Department for Business Innovation & Skills stated how:

“Innovation has been, and will continue to be, a key driver of UK growth and economic prosperity, accounting for up to 70 per cent of economic growth in the long term. It enhances health and welfare and helps us to address key challenges facing society such as ensuring clean and sustainable energy and food security and responding to demographic change. Pushing forward the boundaries of knowledge and development and exploitation of new technologies is central to the Government’s Industrial Strategy.”
(Department for Business Innovation & Skills 2014)

This has been reinforced in recent times with BEIS stating that post-covid and leaving the EU:

“Innovation is crucial to the UK building back better. It is at the heart of ‘Build Back Better: our plan for growth’ and so much else we want to achieve, from fighting coronavirus (COVID-19) to achieving net zero and building Global Britain. Boosting innovation in the private sector is an essential part of the UK’s future prosperity and key to achieving UK objectives to be a force for good on global challenges around climate, biodiversity, prosperity and security. We are calling on businesses to invest in innovation, getting British firms to the front of the pack” (BEIS 2021).

That said, although there is governmental (Department for Business, Enterprise, and Regulatory Reform 2008; BEIS 2021) and academic agreeance (Gkikas et al. 2014; Boshkoska 2021) in the importance of innovation, there is less agreement about a universal definition. Furthermore, there have been academic calls to *“press the case for the development of an integrative definition”* of innovation (Baregheh et al. 2009; see also Harel 2021) and research across multiple sectors, for example, education (Tierney & Lanford 2016; Baregheh et al. 2022), IS (Jha & Bose 2016; Chatterjee et al. 2021) and marketing (Santomier et al. 2016; Ferreira et al. 2020).

This current research acknowledges the essential nature of growing organisational ability, or *“absorptive capacity”* (Moilanen et al. 2014; Ng & Sanchez-Aragao 2021) and internally *“innovation capacity”* (Boly et al. 2014; Saunila 2020) to innovate as both a national and global challenge, and furthermore, certainly within the UK, how there is a need for alignment of *“strategies for innovation and to understand and highlight the innovation strengths”* (Innovate UK 2017) regionally with small and medium sized enterprises that is crucial to economic growth plan success.

With this in mind, and to further qualify a definition of innovation, this following statement could be considered as a base definition from a governmental perspective:

“The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm.” US Government

Publishing Office (2007, p. 18627)

Furthermore, the current UK definition (BEIS 2021) echoes and nuances that of the US, although it is also grounded in the EU-wide adopted definition of Eurostat, which includes any of the following activities (Eurostat 2022):

1. Introduction of a new or significantly improved product (good or service) or process.
2. Engagement in innovation projects not yet complete, scaled back, or abandoned.
3. New and significantly improved forms of organisation, business structures or practices, and marketing concepts or strategies.
4. Investment activities in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

The UK, following this definition (BEIS 2020), finds that:

- A business that had engaged in any of the activities described in points 1 to 3 can be defined as being ‘innovation active’.
- A business that had engaged in any of the activities described in points 1 to 4 is defined as a ‘broader innovator’.
- A business that had engaged in the activity described in point 3 is classed as a ‘wider innovator’.

This current research has also considered how academic literature has attempted to define innovation typologies over time. Furthermore, to further ‘*typologize*’ innovation an evolution of academic definitions considered by the researcher has been presented as a summary table found in Appendix A:12.5 and is presented as a narrative form below.

In academic terms, initial concepts of categorisation and typologies of innovations were outlined by Schumpeter (1934; 1942), considering innovation with new products, methods of production, sources of supply, exploitation of new markets, and new methods of organisation of doing

business. Yet, the theories of Schumpeter have evolved. Evan (1966) defined administrative and technical innovation categories, as did Damanpour (1987), who also identified ancillary innovations which are formed through collaboration with the user. Furthermore, Cooper (1988) identified radical and incremental forms of technical and administrative innovation. Knight's (1967) research also considered innovation of product and service, production-process, organisational structures, and HR in relation to people. Cooper (1988) furthered this definition through consideration of process and product in incremental or radical forms.

The term innovation has grown to consider development of technological products and processes, non-technical organisational levels and marketing methods (Mortensen & Bloch 2005; Schmidt & Rammer 2007). Similarly, the research of Francis & Bessant (2005) considered categories of product and process innovation, but also those of position and paradigm. Subsequently, classifications have evolved, through discovery of innovation typologies such as radical and incremental (Dewar & Dutton 1986; Garcia & Calantone 2002; Pitt et al. 2021). Furthermore, comprehensive typologies outlined by Rowley et al. (2011) or Edwards-Schachter (2018) define innovation to be of product, process, and position.

Recent definitions of innovation align closer to that of disruptive innovation forms with Kjellberg et al. (2015) identifying market innovation, which changes the nature of a business market and Nagy et al. (2016), who use the term “*disruptive*” similarly to Christensen (1997) where “*innovation with radical functionality, discontinuous technical standards and/or new forms of ownership that redefine marketplace expectations*”¹⁴.

Recent research by Purchase et al. (2016) and García-Hurtado et al. (2022) identifies both technical innovation and new methods of commercialisation as innovative but find also that innovation occur through “*ambidextrous*” combinations of technical and commercial resources of organisations brought together through collaboration and merger. Such definitions of innovation though can generally often be teased apart in terms of innovation as:

¹⁴ A detailed review defining disruptive innovation is found in Appendix A:12.6 – it has been moved to the appendix because as discussed in the following literature section, findings from that literature evidence is, SMEs do not generally innovate in a disruptive form.

- Process.
- Product.
- An implementation of creativity.

In a further defining the nature of innovation, academic research has attempted to classify typologies of innovation, for example, as discussed in Kotsemir & Meissner (2013) and developed into a summary presentation of typologies of innovation in Kotsemir et al. (2013). Furthermore, academic literature has also attempted to define innovation forms (such as incremental, radical, or disruptive) of innovation which is discussed in the following section in relation to the SME context.

3.5.0 Forms of innovation and the small and medium sized enterprise context

This current research has now considered not only academic definition of innovation but the forms that innovation takes. It will, at this stage, consider these forms within small and medium sized enterprise contexts. The researcher has found that within academic literature there are crossovers between terms. For example, it has been argued that disruptive and radical are in practical terms the same, with disruptive forms being simply the most radical with “*significant impact on a market and on the economic activity of firms in that market*” (The Innovation Policy Platform 2013). This aligns with research of Abbott et al. (2006) which does not acknowledge disruptive innovation as a form, finding this simply to be a form of radical innovation.

But how are forms of innovation linked (incremental, radical, *and disruptive*) and how are they different? In many ways, their interconnection originates with Schumpeter and his research that showed how “*radical*” innovation creates major “*disruptive*” change, whereas this contrasts “*incremental*” innovation that merely moves forwards and updates existing solutions (Schumpeter 1942). Academic research finds that radical innovation brings together fundamentally new methods to create significant advances in performance; and for this reason, understanding radical innovation is central to academic innovation research (Dewar & Dutton 1986; Henderson 1993). More over, in understanding radical innovation it is necessary to

consider how it contrasts with the dominant mode, incremental innovation, and equally why radical and disruptive innovation are not the same. Furthermore, understanding these key definitions is a vector of this research in that it aligns to the research aim and questions that consider what activities enable small and medium sized enterprises within the digital business sector to raise their capacities to innovate to drive increased productivity and growth.

Although the more competitive industries call for radical innovation to boost productivity and growth (Storey & Easingwood 1998; Storey et al. 2016), most organisations, including small and medium sized enterprises (Oke et al. 2007), are incremental innovators by nature in their organisational cultures. Updates are made to existing business models, goods, and services through incremental improvements. In conservative business environments, incremental innovation typically takes place when:

- Creating new business models that do not damage existing business models.
- Growing revenue and sales of existing product and services.
- Protecting existing business models.

That said, it has been argued that although it is possible for an organisation to succeed through a strategy of incremental innovation, however this may only extend lifespan created by a radical innovation until subsequent disruption occurs (Christensen 2013).

Aligning with the rationale of this current research, it is necessary to consider the activities that enable organisations to implement innovative solutions. Furthermore, this current research will reveal factors that enable capacity building to enable small and medium sized enterprises to be more innovative. With increased competition organisations are required to develop radical innovations that will become new products and services which in effect raise levels of competitive advantage. That said, businesses, and small and medium sized enterprises, by nature innovate incrementally with their existing technologies, products, business models and services. This raises the question of how business can manage the process of implementation of incremental, radical, or even more dramatic disruptive, innovations which have the greatest possibility to impact organisational growth.

“There are certain kinds of innovation you cannot get to through a process of marginal improvements ... Simply being conscious that long shots matter, and being willing to take those risks, and to carve out a space for those risks, can work.” - Tim Harford, columnist of The Financial Times (O'Reilly Radar 2015).

Many academic studies have concentrated on how radical innovations that are introduced by new entrants affect incumbents when they undermine competence (Tushman & Anderson 2018; Henderson & Clark 1990; Chesbrough 2001; Kaplan & Henderson 2005). According to academic research, complementary assets (Tripsas 1997; Rothaermel 2001; Rothaermel & Hill 2005; Taylor & Helfat 2009; Lourdes Sosa 2013), cognition (Eggers & Kaplan 2009; Nadkarni & Barr 2008), and external stakeholders can either enable or constrain incumbent organisations from adapting to radical inventions (Benner 2010). Radical innovations have been found to be competence-enhancing (Tushman & Anderson 2018), with incumbents gaining new competencies that they fuse with their existing knowledge to develop potentially radical technologies (Gatignon et al. 2002) that transform their existing capabilities (Schumpeter 1934; Van de Ven 1986; Anderson & Tushman 2018; Hargadon & Sutton 1997). This aligns with this current research, which will consider the innovation activities in small and medium sized enterprises and their motivations (Lavie 2006) for capacity building.

Academic research has also shown how established organisations will often drive implementation of radical innovation (Christensen and Bower 1996; Tripsas 1997; Tripsas & Gavetti 2000), often developing breakthrough innovations (Ahuja & Lampert 2001; Jiang et al. 2010; Lin et al. 2014), and furthermore introducing products that are both radical and new themselves (Méthé et al. 1997; Chandy & Tellis 2000). That said, there is an academic opinion that disruptive innovation is generally driven by outsider organisations and entrepreneurs (Von Hippel 2005; Christensen 2013). Incumbents may in fact search radical innovation to exploit complementary knowledge resources (Tripsas 1997; Furr & Snow 2014; Eggers 2014; Wu et al. 2014) and avoid falling behind new entrants (Klepper & Simons 2000; King & Tucci 2002; Bayus & Agarwal 2007). This current research will consider absorptive capacity and the processes necessary for small and medium sized enterprises to embed innovation within their

organisations. It will consider questions of how, when, and why incumbents chose to pursue competence-enhancing (radical) innovations, an area which academically is still relatively unexplored. Furthermore, it will consider that with the dominant form being incremental (Oke et al. 2007) how can small and medium sized enterprises raise their absorptive capacity (Moilanen et al. 2014) to potentially innovate in more radical forms.

This current research will consider how the innovation process in small and medium sized enterprises can be examined and explained. Moreover, it will consider how exploring the types of innovation in UK small and medium sized enterprises and understanding of their radical or incremental natures can further our knowledge of the impact of innovativeness on performance and productivity. Aligning with the research aim, questions and rationale of this current research, it is clear that the UK government is increasingly focussed on fostering innovation in small and medium sized enterprises, and a search of the Department for Business, Energy & Industrial Strategy website for example returned 17,784 search references for this site on a search carried out by the researcher on 7th July 2017 (Appendix A:12.7). This process was repeated by the researcher on 25th June 2022, and this time returned 29,073 search references, demonstrating ongoing and increasing importance (Appendix A:12.8).

As previously mentioned, there is a direct connection between innovation, productivity, and economic growth in UK policy documents. Moreover, academic studies of innovation in small and medium sized enterprises have been conducted for several years (Motwani et al. 1999), though they are few in comparison to studies of large companies (Cagliano & Spina 2002; Oke et al. 2007). According to certain research (Kanter 1985; Simon et al. 2002; Prajogo et al. 2013), some small and medium sized enterprises, such as those in the manufacturing, electronics, engineering, and technology sectors, are more naturally able to adopt radical innovation than huge corporations. Academically, however, this seems to be an assumption without much current empirical evidence to back it up (Oke et al. 2007). Comparatively to studies of bigger organisations, there have been very little research that has sought to identify innovation types within SMEs (Rizoni 1991; Bernaert et al. 2014). Furthermore, these do not entirely focus on the UK contexts or the processes that underpin how innovation happens (Avlonitis et al. 2001; De Brentani 2001; Storey et al. 2016). That said, the research of Oke et al. (2007, p. 15) shows

through quantitative research that small and medium sized enterprise innovation is in the majority incremental and that:

“...for this group of “ambitious to grow” UK SMEs, there is a greater focus on incremental innovation (that is, improvements to products, services and/or processes often in response to customer needs) than on radical innovation (that is, new products, services and/or processes and/or new markets).” (Oke et al. 2007, p. 18)

This appears also to align to studies of innovation in larger organisations (Storey & Easingwood 1998; Storey et al. 2016) and is perhaps a reflection of the nature of both smaller and larger UK businesses.

3.5.1 A definition of innovation in small and medium sized enterprises

In sum, this current research has found that a definition of innovation in SME contexts is that it is *predominantly incremental in response to the needs of customers*. Aligning with the research aim, questions and rationale, this current research will consider how small and medium sized enterprises within the digital business sector can be enabled raise their capacities to innovate (and potentially, in more radical forms).

3.6 Small and medium sized enterprises capacities to innovate

The aim of this research is to develop a framework of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory, and as such this literature has considered small and medium sized enterprises and their capacities to innovate. The following discussion presents a summary of literature considering absorptive capacity (ability to identify, assimilate, transform, and apply valuable external knowledge) and innovation capacity (the firm's internal organisational ability to innovate ahead of the competition) below:

3.5.1 Small and medium sized enterprises absorptive and innovation capacities

This current research considers the absorptive capacity of small and medium sized enterprises and questions how the understanding of such factors can enable innovation and knowledge that raises SME capacities to innovate through product, process, and service (Gebauer et al. 2012; Müller et al. 2021). As discussed above, small and medium sized enterprises are facing changing, increasingly complex environments (Grant 1996; O'Connor et al. 2008; Buckley 2019; Troise et al. 2022) whilst challenged and incentivised to innovate (COV.UK 2012; GOV.UK 2022) to achieve organisational growth and raise productivity. As discussed in earlier sections of this thesis, these challenges have recently been compounded by the Covid-19 pandemic (FSB 2021).

According to Cohen and Levinthal (1990), absorptive capacity enables organisational reaction and perseverance within competitive situations and supports the development of systems for the integrating outside knowledge to benefit the business (Lane & Lubatkin 1998; Zahra & George 2002). Academic literature considered for this current research suggests that there is a pathway to absorption (Lane et al. 2006):

- Identification and acquisition of external knowledge - exploratory learning.
- Assimilation, understanding and retention - transformative learning.
- Transmutation and application - exploitative learning.

This current research will define a framework of activities supporting innovation in small and medium sized enterprises within the digital business sector and consider how these enable absorptive capacity building. It will align these factors/activities to the dimensions of AT to nuance processes, factors and activities that enable small and medium sized enterprises to innovate and leverage advantageous increased knowledge (Jansen et al. 2005; Lane et al. 2006) of how to approach innovation. AT will be applied as a theoretical lens to consider absorption of external knowledge (community activity). Furthermore, it will consider how these activities and processes of SME innovation enable new, transformative, knowledge and exploitative application (McGrath 2010). This current research also aligns to the need to addresses further questions of how the raising absorptive capacity addresses organisational innovation problems (Atuahene-Gima & Wei 2011) can increase responsiveness and ability to innovate.

Aligning with the research rationale, aim and questions, this current research will also consider SME innovation capacity as relevant in the assessing of innovation activities and internal innovation performance. Innovation capacity allows the firm to develop and coordinate their processes to input what is contextually innovative to produce innovative outputs (Adams et al. 2006; Boly et al. 2014; Yam et al. 2004). Academic literature considered by the researcher finds a definition of innovation capacity to be located within organisational continuous improvement of capabilities and resource enabling exploration and exploitation of opportunities for new product development that meet needs of the market (Boly et al. 2014; Forsman 2011; Sztetto 2000).

As discussed above, enabling of SME innovation and raising capacities to innovate is not only a UK (Her Majesty's Treasury 2015) but European and global (World Trade Organization 2017) priority:

“The innovation capacity of SMEs is a key topic for Europe's competitiveness and growth. The contribution of enterprises to innovation is crucial, and a dynamic business sector is a key source and channel of technological and non-technological innovation. For instance, smaller companies often exploit technological or commercial opportunities that are neglected by more established firms, and take them to market. SME innovation is therefore at the top of regional, national and European innovation policy agendas.”
(Interreg 2017).

The current study will explore, through the prism of AT, how small and medium sized enterprises and their innovation capacity can be increased to enable their organisational capacity to continuously innovate ahead of the competition (Qian & Li 2006). Academic literature considered find that building innovation capacity increases organisational sustainability and enables (Qian & Li 2006):

- Movement into new markets.
- Accelerated increases in product quality levels.
- Drive others firm to imitate.

- Rapidity of gains in competitive advantage.

Furthermore, the research of Forsman (2011) suggests that capabilities are distinct from resources aligning with that of Amit & Schoemaker (1993) who find:

- Resources are tangibles of organisations.
- Capabilities are abilities to deploy resources within constraints of organisational processes.

This current research is looking to develop a framework of processes that support small and medium sized enterprises within the digital business sector absorptive and innovation capacity building viewed through the lens of AT. A traditional academic resource-based perspective would attempt to explain SME innovation as a product of organisational assets (Terziovski 2010). However, capability perspectives look at how these assets are used and develop over time. For example, '*Continuous improvement*' is a central dimension of innovation capacity (Szetto 2001, p.149), that being enabling of the evolution of organisational resources and capabilities to remain sustainably innovative. Furthermore, innovation capacity is defined by such dimensions, known as innovation capabilities (Forsman 2011).

The following section of this research will define categories of innovation enablers and activities that contribute to the completion of innovations.

3.6.0 Categories of capacity raising and innovation supporting activities in small and medium sized enterprises

The unique characteristics of small and medium sized enterprises have been considered in academic literature as a factor affecting their organisational capacity to innovate (Gronum et al. 2012; Keizer et al. 2002; Motwani et al. 1999; Knol et al. 2018; Kiran & Reddy 2019), both in the UK and elsewhere (Gronum et al. 2012). This is also demonstrated within Man et al's (2002) research, which reveals that:

“A small firm is not a scaled-down version of larger firms. Larger and smaller firms differ from each other in terms of their organizational structures, responses to the environment, managerial styles and, more importantly, the ways in which they compete with other firms” (p. 128).

This is reinforced within more recent academic research (Ibidunni et al. 2021; Tehseen et al. 2019; Gaganis et al. 2019). Only a third of small and medium sized enterprises, according to De Jong & Marsili (2006), have deliberate innovation strategies, and in general, innovation activities are just activities that may or equally may not result in innovation; this finding is confirmed in a number of further research studies (Love & Roper 2015; Beynon et al. 2020). The definition of innovation itself and its nature within small and medium sized enterprises has been outlined in the earlier sections of this literature review. That said, academic studies (for example, Forsman 2011) have found that few studies have focused on consideration of innovation enabling factors, activities, and processes, making it challenging to identify the individual dimensions of SME capacity to innovate in contrast to their other activities (De Jong & Marsili 2006; Forés & Camisón 2016; Broadstock et al. 2020). The current research will consider small and medium sized enterprise settings in respect to their specific characteristics and behaviours known to influence innovation practise (Gronum et al. 2012; Motwani et al. 1999), and the activities that support innovation (Julien 1993; Volery & Mazzarol 2015). Nevertheless, the literature on these innovation-enabling characteristics, activities and processes is scant and does not adequately describe how small and medium sized enterprises innovate.

In the below table, identified capacity raising and innovation enabling activities are tracked against the literature that has been considered:

Capacity raising and innovation supporting activities in small and medium sized enterprise contexts	References
Owner characteristics	De Jong & Marsili 2006; Forsman, 2011; Gronum & Verreynne 2011; Hadjimanolis 2000; Kickul & Gundry 2002; Lefebvre et al. 1997; Marchersnay 2014; Mazzarol & Reboud 2009; O'Regan et al. 2006; Romijn & Albaladejo 2002; Pavitt 1984; Rizzoni 1991; Teirlinck & Spithoven 2013; Dziallas & Blind 2019; Rampa & Agogué 2021; Zahoor & Al-Tabbaa 2020; Maietta 2015; Gronum et al. 2012; Crupi et al. 2020; Mendoza-Silva 2020; Hwang et al. 2020; Ahmad et al. 2020; Haag & Achtenhagen 2021; Hervás-Oliver et al. 2021; Lin & Lin 2016
Embeddedness within networks	Madrid-Guijaro et al. 2009; Forsman 2011; Freel 2003; Gronum et al. 2012; Guijaro 2009; Hewitt-Dundas 2006; Julien & Carrier, 2002; Keizer et al. 2002; Lasagni 2012; Liu & Laperche 2015; Motawani et al. 1999; O'Regan et al. 2005; Pittaway et al. 2004; Zeng et al. 2010; Rybníček & Königsguber 2019; Orazbayeva et al. 2019; Lin & Lin 2016; Prasanna et al. 2019
End user integration in the innovation process	Apiah-Adu and Singh 1998; Gronum et al. 2012; Liu & Laperche 2015; Danneels 2002; Von Hippel 2005; Gault 2018; Wu et al. 2022; Inauen et al. 2011; Nielsen et al. 2016; Bengtsson & Edquist 2022
Strategic working with organisations offering institutional support for small and medium sized enterprise innovation	Kaufman & Todtling 2002; Keizer et al. 2002; Laperche 2012; Laperche et al. 2010; Liu & Laperche 2015; Patel & Pavitt 1994; Doh & Kim 2014; Masood & Sontag 2020; Kearney & McHattie (2014); Neves et al. 2021; Das et al. 2020; Alkahtani et al. 2020; Radas & Božić 2009;
Small and medium sized enterprise strategic innovation planning	Dyer & Singh 1998; Helfat & Peteraf 2003; Leonard-Barton 1992; Marchersnay 2014; Prahalad & Hamel 1990; Ramanujam & Mensch 1985; Rothwell & Dodgson 1991; Tidd & Bessant 2020; Teece et al. 1997; Teece 2007; Sundbo 1997; Terziovski 2010; Chesbrough et al. 2006; Laghzaoui 2011; López-Fernández et al. 2021; Adams et al. 2006; Casidy et al. 2020; Mazzarol & Reboud 2014; Mazzarol & Reboud 2020
The small and medium sized enterprise internal organisational structure for innovation	Bessant et al. 2005; Chesbrough 2003; Christensen 1997; Damanpour 1991; Eisenhardt & Martin 2000; Lawson & Samson 2001; Tidd & Bessant 2020; Teece et al. 1997; Teece 2007; Terziovski 2010; Van de Ven et al. 1999; Didonet & Diaz-Villavicencio 2020; Gentile-Lüdecke et al. 2020; Teece 2020; Christensen et al. 2018; Baragheh et al. 2009; Anning-Dorson 2021; Rothwell & Dodgson 1991; Barrett et al. 2021; Saunila et al. 2014; Matricano et al. 2021
Small and medium sized enterprise innovation process management	Adams et al. 2006; Afuah 2002; Avlonitis et al. 2001; Boly et al. 2014; Chakravorti 2004; Chen & Guan 2011; Chiesa et al. 1997; Day 1994; Deeds 2001; Forsman 2011; Rothwell 1994; Salerno et al. 2014; Song & Parry 1996; Tidd & Bessant 2020; Van de Ven et al. 1999; Verhaeghe & Kfir 2002; Yam et al. 2004; Prasanna et al. 2019; Rothwell & Dodgson 1991; Magistretti et al. 2020; Roach et al. 2016; Thornhill 2006; Randhawa et al. 2021; Preciso 2021; Camisón-Haba et al. 2019; Martínez-Román et al. 2020; Saunila et al. 2014; Didonet & Diaz-Villavicencio 2020; Cooper 2019
The small and medium sized enterprise learning process	Adams et al. 2006; Cohen & Levinthal 1990; Darroch 2005; Farace & Mazotta 2015; Ferreira et al. 2015; Fu et al. 2014; Keskin 2006; Lee & Tsai 2005; Liu & Laperche 2015; Muscio 2007; Nonaka 1991; Tsai 2001; Germanos 2018; Thomas et al. 2017; Hassan & Raziq 2019; Pi et al. 2018; Marshall et al. 2020; Senivongse et al. 2020; Fogg 2012; Fabrizio et al. 2021; Khan et al. 2020; Zhou et al. 2021
Organisational resources dedicated to innovation	Birchall et al. 1996; Boly et al. 2014; Forsman 2011; Freel 2003; 2005; Garcia & Calantone, 2001; Hoffman et al. 1998; Keizer et al. 2002; Koc 2007; Nijssen & Frambach 2000; Qian & Li 2003; Romijn, & Albaladejo 2002; Tang 1999; Terziovski 2010; Soderquis et al. 1997; Birchall & Tovstiga 2005; Ryan et al. 2018; Atzmon et al. 2022; Meier 2021; Hilmersson & Hilmersson 2021; Radas & Božić 2009; Blanchard 2020; Ferreira et al. 2020; Arsawan et al. 2020;

	Georgiadis & Pitelis 2012; Prasanna et al. 2019; Heilmann et al. 2020; Huesig & Endres 2018; Saghiri & Wilding 2021; Endres et al. 2022; Hervás-Oliver et al. 2021; Jibril et al. 2021
Organisational revaluation of processes	Boly et al. 2014; Forsman 2011; Helfat & Peteraf 2003; Keizer et al. 2002; Motwani et al. 1999; Teirlinck & Spithoven 2013; Cropley & Cropley 2017; Martínez-Costa et al. 2019; Martinez-Conesa et al. 2017; Cillo et al. 2019; Alvino et al. 2020; Arsawan et al. 2020

Table 2: Capacity raising and innovation supporting activities in small and medium sized enterprise contexts¹⁵

¹⁵ The literature considered in defining these categories examined academic works focussing on high-ranking and high-impact journals.

The following section will consider the limited literature to identify these enablers of innovation specific to small and medium sized enterprise contexts (Damanpour & Wischnevsky 2006; Motwani et al. 1999; Salerno et al. 2014; Terziovski 2010; Forés & Camisón 2016; Broadstock et al. 2020). Through this analysis, this current research has identified 10 categories of capacity raising innovation enabling factors which are further defined in the section below. These have also been used to generate the initial codes used in the coding of interview data (although these evolved in response to the data in the chapters that follow).

3.6.1. Ownership characteristics

Academic literature finds that capacity to innovate is influenced by ownership in their role as creator/initiator of innovative projects within small and medium sized enterprise contexts (O'Regan et al. 2006; Teirlinck & Spithoven 2013; Lin & Lin 2016). Three factors in relation to this are regularly found within literature that are shown to influence small and medium sized enterprises and their capacities to innovate.

1. The prior work history and relevant professional skills acquired by the ownership in previous years are discussed within academic literature (Romijn & Albaladejo 2002; Dziallas & Blind 2019; Rampa & Agogue 2021), who find professional capacities combine own expertise, activities, experiences, and training that enable SME ownership to manage innovation efficiently within small and medium sized enterprise contexts. Such professional capabilities enable detection, analysis, and designing suitable innovation strategies that consider both internal and external elements relative to their small and medium sized enterprise (Forsman 2011; Hadjimanolis 2000; Romijn & Albaladejo 2002; Zahoor & Al-Tabbaa 2020; Maietta 2015).
2. Gronum & Verreynne (2011) finds that positive owner attitude toward risk and taking risks is essential to enabling small and medium sized enterprises to innovate (further evidenced in Gronum et al. 2012; Crupi et al. 2020; Arias-Pérez et al. 2021). This is supported by the research of Hadjimanolis (2000) and Kickul & Gundry (2002) who find that owner openness to business environments that involve risk and their abilities to

understand this directly affect a small and medium sized enterprise's ability to recognise opportunities or risks and in turn to innovate (see also Wardani et al. 2020).

3. Hadjimanolis (2000) finds that owner commitment to innovation activities directly impacts the firm's innovation capacity (see also Mendoza-Silva 2020; Hwang et al. 2020). Differences between owner commitment are found to create a variety of behaviours in how small and medium sized enterprises engage with their innovation practices (Marchersnay 2014; Ahmad et al. 2020; Haag & Achtenhagen 2021) and typologies of innovation within their SME contexts (De Jong & Marsili 2006; Kickul & Gundry 2002; Lefebvre et al. 1997; Mazzarol & Reboud 2009; Pavitt 1984; Rizzoni 1991; Hervas-Oliver et al. 2021; Baierle et al. 2020).

3.6.2 Embeddedness within networks

Literature considered (Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999) finds that, caused by small and medium sized enterprise lack of resource, embeddedness within networks of SME acts an enabler of innovation through granting access to resources and division of risk and cost (Gronum et al. 2012; O'Regan et al. 2006; Lasagni 2012; Pittaway et al. 2004; Lin & Lin 2016; Prasanna et al. 2019). Academics such as Forsman (2011), Freel (2003), Martínez-Román et al. (2020) and Temel & Forsman (2022) find that this embeddedness requires small and medium sized enterprises to have the ability to identify potential networks as well as create and maintain relationships for collaboration, so as to be able to leverage the advantages of their network relationships. Furthermore, collaboration with both public and private sector partners is found to further enable of SME innovation (Gronum et al. 2012; Keizer et al. 2002; Lasagni 2012; Rybnicek & Königsgruber 2019), although it has been discovered that small and medium sized enterprises prefer networks that are directly related to their market over partnerships with HEI (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019).

3.6.3 End-user integration in the innovation process

Von Hippel (2005) find end-users to be an enabler of innovation performance and completion bringing direct knowledge to the small and medium sized enterprise (Appiah-Adu & Singh 1998;

Gronum et al. 2012; Von Hippel 2005; Lui & Laperche 2015; Gault 2018; Wu et al. 2022), giving fresh perspectives and ideas that help them better understand consumer requirements and ensuring agility in response to market needs, with the potential to avoid losses caused by market failure. Furthermore, Danneels (2002) and Inauen et al. (2011) find that small and medium sized enterprises need to integrate the end-user within their processes to identify new users from outside of their typical user base as well as potential future users; this means that to further enable innovation, communication with the end user is essential (see also Nielsen et al. 2016; Bengtsson & Edquist 2022).

3.6.4 Strategic working with organisations offering institutional support for small and medium sized enterprise innovation

Academics such as Laperche (2012) and Patel & Pavitt (1994) find that institutional support for the small and medium sized enterprise innovation system provides them with essential resources and knowledge supporting their internal innovation process (see also Doh & Kim 2014; Masood & Sontag 2020). Research such as that of Kaufman & Todtling (2002), Kearney & McHattie (2014), and Neves et al. (2021) support how working with such organisations enables the provision of financial or technical support for small and medium sized enterprise innovation through transference of their social capital value. Additionally, it has been discovered that public institutions have been supporting small and medium sized enterprise innovation and competitiveness since the 1980s, which in turn has encouraged small and medium sized enterprises in worldwide expansion and competitiveness (Laperche et al. 2010; Das et al. 2020) through financial aid that supports tax incentives, direct financing, coaching, networking, and facilities (Liu & Laperche 2015; Alkahtani et al. 2020). The research of Keizer et al. (2002), Radas & Božić (2009) and Martínez-Román et al. (2019) find that the ability to identify and use these supports enables the raising of innovation capacities in small and medium sized enterprises although this requires SME to have knowledge of these national support systems which many do not have and do not attempt to engage with.

3.6.5 Small and medium sized enterprise strategic innovation planning

An innovation strategy refers to the internal strategic design processes of an organisation that allows it to remain competitive (Dyer & Singh 1998; West et al. 2006) including its designated resources and expertise (Helfat & Peteraf 2003; Leonard-Barton 1992; Prahalad & Hamel 1990; Ramanujam & Mensch 1985; Tidd & Bessant 2020; Teece et al. 1997; Teece 2007; Laghzaoui 2011). López-Fernández et al. 2021 and Marchesnay (2014) find that strategic innovation management helps lessen market vulnerability brought on by developing competitive and technological contexts, as well as risks of excessive dependence on a small and medium sized enterprise industry value chains. Scholars such as Sundbo (1997), Adams et al. (2006) and Casidy et al. (2020) suggest that the SME innovation strategy should align with the overall business strategy to support organisational competitiveness (see also Leonard-Barton 1992; Teece et al. 1997; Teece 2007; Tidd & Bessant 2020). Furthermore, small and medium sized enterprises with formalised strategic innovation design and planning have been shown to achieve greater productivity and business success (Mazzarol & Reboud 2014; Berman et al. 1997; Porter 1991; Mazzarol & Reboud 2020) and successful completion of innovation objectives (Rothwell & Dodgson 1991; Terziovski 2010; Mazzarol & Reboud 2014; Mazzarol & Reboud 2020).

3.6.6 Small and medium sized enterprise internal organisational structure for innovation

Terziovski (2010) finds the impact of SME structure on capacity to innovate complex and potentially undefinable (see also Didonet & Diaz-Villavicencio 2020; Gentile-Lüdecke et al. 2020; Zahoor & Al-Tabbaa 2020); this in turn raises questions related to the levels of formalisation necessary to foster innovation, which as of yet still remain unclear. Scholars such as Chesbrough (2003), Damanpour (1991) and Grama-Vigouroux et al. (2020) find that small and medium sized enterprises need to be flexible to be able to adapt to the environment, encourage creativity and promote internal collaboration, ideas which are further supported in the works of Teece (Teece et al. 1997; Teece 2007; Teece 2020). Lawson & Samson (2001), Tidd & Bessant (2020) and Grama-Vigouroux et al. (2020) suggest there is a need to structure firms to be able to improve their innovation processes, as well as their operating practices and general efficiency (see also Zahoor & Al-Tabbaa 2020; Lorenzo et al. 2022). Furthermore, Christensen (1997; see also Christensen et al. 2018) finds that enabling innovation to address these

constraints can be achieved through an organisational hybridism that balances both structure and creativity (supported by Bessant et al. 2005; Eisenhardt & Martin, 2000; Van de Ven et al. 1999; Baragheh et al. 2009).

Scholars such as Adams et al. (2006) and Lemon & Sahota (2004) suggest that the internal culture in relation to innovation can explain many organisational structure choices (see also recent academic work such as Anning-Dorson 2021); this assertion is supported in further academic research that finds that organisational structure is a function of many things such as “*corporate conditions for innovation*” (Rothwell 1991, p.227; see also Rothwell & Dodgson 1991; and later work such as Barrett et al. 2021), “*contextual factors*” (Tidd & Bessant 2005; see also later work such as Saunila et al. 2014) or “*enabling context*” (Nonaka & Takeuchi 1995; see also later work such as Matricano et al. 2021).

3.6.7 Small and medium sized enterprise innovation process management

Scholars such as Boly et al. (2014) and Forsman (2011) find that innovation process management enables innovation in small and medium sized enterprises even when both resource and capability is scarce (see also Prasanna et al. 2019). Rothwell (1994; see also Rothwell & Dodgson 1991) finds historically the innovation process was considered as linear, yet, in more recent times has been found to be the sum of both iterative and discontinuous activities (supported in the research of Salerno et al. 2014; Van de Ven et al. 1999; Magistretti et al. 2020; Roach et al. 2016). Furthermore, various academic research (Salerno et al. 2014; Tidd & Bessant; Van de Ven et al., 1999; Magistretti et al. 2020; Roach et al. 2016) has found that these activities can be categorised into three steps which are:

1. Identification of ideas.
2. The development of these concepts.
3. Implementation.

These operations are divided into several sub-strands, including organisational competences and internal resource management (Afuah 2002; Thornhill 2006; Randhawa et al. 2021); capabilities

to detect and analyse and the eventual promotion of the innovation (Adams et al. 2006; Chakravorti 2004; Day 1994 Verhaeghe & Kfir 2002; Preciso 2021); research and development (Deeds 2001; Yam et al. 2004; Camisón-Haba et al. 2019; Martínez-Román et al. 2020); production of the new, innovative good (Chiesa et al. 1997; Yam et al. 2004) and commercialisation through sales (Avlonitis et al. 2001; Song & Parry 1996; Cooper 2019). Furthermore, Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) find that the success of these activities will depend on organisational managerial skills that are internal to the organisation context itself, such as project management procedures, the size of project portfolios, internal communication channels, and decision-making abilities, which can facilitate iterative innovation development.

3.6.8 The small and medium sized enterprise learning process

It has been found that small and medium sized enterprises in general lack qualified human resources which may negatively impact their ability to absorb knowledge (Farace & Mazzotta 2015; Liu & Laperche 2015; Muscio 2007; Germanos 2018). Research by Adams et al. (2006) and Darroch (2005) finds that the learning process of small and medium sized enterprises and their ability to manage innovation depends critically on knowledge management activities (which is found too evidenced in recent works such as Thomas et al. 2017; Hassan & Raziq 2019). Various academics have identified sources for absorption of knowledge (Keskin 2006; Lee & Tsai 2005; Nonaka 1991; Pi et al. 2018; Marshall et al. 2020) as part of their research which is supported in a significant cannon of academic research, which include:

1. Identification and integration of external knowledge – Darroch (2005), Pi et al. (2018) and Marshall et al. (2020) find that in doing so organisations increase their knowledge capital (see also Senivongse et al. 2020).
2. Renewal of internal knowledge - Ferreira et al. (2015) finds that investment in R&D, subcontracting and increasing the integration of the organisation within networks enables organisations to renew their internal knowledge (supported by Khan et al. 2020; Zhou et al. 2021).

Furthermore, the research of Cohen & Levinthal (1990) finds no matter the source of knowledge, organisations need the capacity to absorb (supported by Tsai 2001; Fogg 2012; Fabrizio et al. 2021; Pi et al. 2018) this to create a competitive advantage based on knowledge.

3.6.9 Organisational resources dedicated to innovation

Research (Birchall et al. 1996; Soderquis et al. 1997; Birchall & Tovstiga 2005; Ryan et al. 2018; Atzmon et al. 2022) finds that capacity to innovate of small and medium sized enterprises is a function of their having highly specialised capabilities and resources dedicated to innovation, although levels of resources and capabilities are lower in general in most SME contexts compared to larger firms. Research (Qian & Li 2003; Terziovski 2010; Meier 2021; Hilmerston & Hilmerston 2021) find that SME must be especially effective in maximising returns from their investments and hiring procedures because they are resource-constrained by nature. Research (Keizer et al. 2002; Radas & Božić 2009; Blanchard 2020) also finds that successful firms investing in specialised resources, for example, human resources and equipment, gain specific advantages through successfully implementing innovation (Forsman 2011; Freel 2003; Ferreira et al. 2020; Arsawan et al. 2020). Furthermore, research (Hoffman et al. 1998; Koc 2007; Romijn & Albaladejo 2002; Georgiadis & Pitelis 2012; Prasanna et al. 2019; Heilmann et al. 2020) suggests that specialised human resources enable organisations to access external knowledge, especially in technology-based industries. Additionally, studies (Birchall et al. 1996; Boly et al. 2014; Prasanna et al. 2019; Heilmann et al. 2020) show that diversifying human resources helps organisations produce innovative ideas and disruptive thinking, but in doing so these force them to concentrate on their recruitment and training strategies, because failing to do so can complicate firm cohesion and communication (Nijssen & Frambach 2000; Huesig & Endres 2018; Saghiri & Wilding 2021; Endres et al. 2022). Furthermore, research (Birchall et al. 1996; Boly et al. 2014; Garcia & Calantone 2001; Koc 2007; Hervás-Oliver et al. 2021) also finds that investment in specialised equipment which increases accuracy is also an enabler of innovation capacity building, with further researchers suggesting that high-quality, specific equipment investment maintains innovativeness.

3.6.10 Organisational revaluation of processes

The ability to internally assess organisational innovation capacity (Boly et al. 2014; Motwani et al. 1999; Teirlinck & Spithoven 2013; Cropley & Cropley 2017; Martínez-Costa et al. 2019) is considered crucial to improving and updating resources and capabilities which address changing business environments and increase competitiveness. Research (Forsman 2011; Helfat & Peteraf 2003; Keizer et al. 2002; Teirlinckand & Spithoven 2013; Martinez-Conesa et al. 2017; Cillo et al. 2019; Alvino et al. 2020) has found that successful SME have strategies, processes, and tools through which they optimise and update their set of internal capabilities, innovation strategy, processes, and organisation to remain innovative and competitive. Furthermore, further research (Forsman 2011; Cillo et al. 2019; Alvino et al. 2020; Arsawan et al. 2020) finds that the ability to quickly implement change is a key enabler of building capacities of SME to innovate.

3.7 Conclusion and development of the conceptual framework

The purpose of this literature review, referencing objective 1, was to complete a critical analysis of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector from literature to be updated throughout the lifespan of this current research. This literature review has explored and defined UK SMEs, the digital business sector context, innovation and how this is manifested in small and medium sized enterprises within the digital business sector. At its end it has outputted 10 categories of capacity raising and innovation supporting activities in SME contexts (see *Table 2: Capacity raising and innovation supporting activities in small and medium sized enterprise contexts*, found above in this chapter). The author has considered brought together and assembled the core theories, factors, concepts, and knowledge considered in the literature review to create an initial conceptual framework.

The research of Miles & Huberman (1994a) defines a conceptual framework as:

“... the current version of the researcher’s map of the territory being investigated”
(p.33).

In effect, it is a tool that has evolved as a function of the research journey. Furthermore, a conceptual framework has been found to demonstrate the researcher’s views of concepts

involved in the research and relationships between these (Collis & Hussey 2013). Furthermore, Miles & Huberman (1994a) suggest that the benefits of developing a conceptual framework:

“... forces you to be explicit about what you think you are doing. It also helps you to be selective; to decide which are the important features; which relationships are likely to be of importance or meaning; and hence, what data you are going to collect and analyse.”
(p 150–151).

Using definitions from above, an initial conceptual framework (Figure 4 below) has been developed. Interactions are labelled and can be explained as follows:

- Interaction A: In the first block small and medium sized enterprises and the categories that they can sit within are defined. This connects to the definition of small and medium sized enterprises within the digital business sector.
- Interaction B: In the upper block the definition of innovation, the forms it takes in small and medium sized enterprises and their capacities to innovate feed into the central definition of small and medium sized enterprises within the digital business sector
- Interaction C: In the lower block the definition of the Digital Business Sector feeds into the central definition of small and medium sized enterprises within the digital business sector.
- Interaction D: The central definition of the small and medium sized enterprises within the digital business sector connects to the dimensions of capacities to innovate within small and medium sized enterprises. These are the 10 categories of innovation enabling activities that have been defined in the proceeding section of this literature review.
- Interaction E: These categories connect and align to AT and its elements (see figure 1: The Activity Theory Model, in chapter 1, section 1.1.3 for further details of the dimensions of this model).

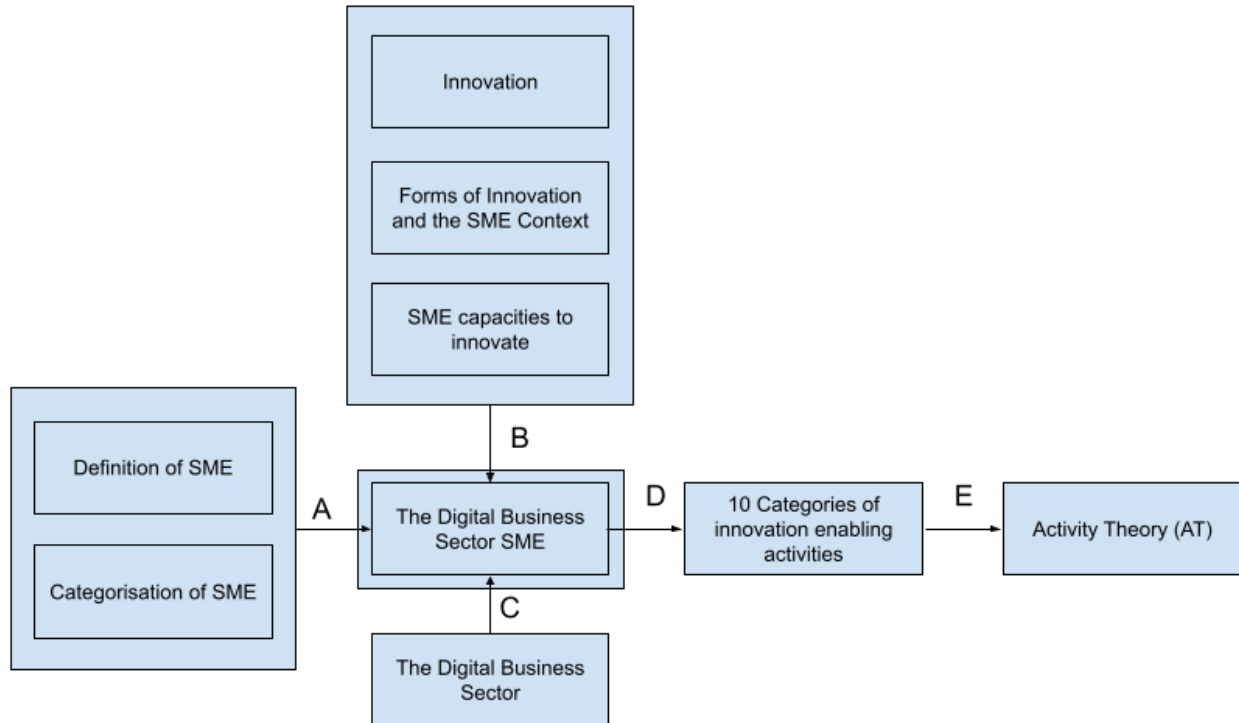


Figure 4: Created by the author, initial conceptual framework with labelled interactions for this research

In summary, the analysis above has explained interactions and associations between the themes of this initial conceptual framework. However, returning to Miles and Huberman (1984) definition of a conceptual framework as emergent and evolutionary, this framework has been revisited throughout the research process, continually evolving until the completion of this thesis. Furthermore, returning to the aim, objectives, and research questions of this current research the following has been achieved:

1. Firstly, in relation to the aim of this research (*To develop a framework of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory*), to this stage essential definitions have been presented in relation to *activities supporting capacity raising, innovation, the Digital Business Sector, SME and in the preceding chapter Activity Theory*.
2. Secondly, in response to the objective one, the researcher has also completed a critical analysis of activities supporting capacity raising and innovation in small and medium

sized enterprises within the digital business sector; and in response to objective four has outlined the initial coding categories of innovation enabling activities supporting capacity raising in small and medium sized enterprises within the digital business sector.

3. Thirdly, in response to the central research question, (*How do small and medium sized enterprises within the digital business sector innovate?*), the literature has outlined forms and provided as a partial response to sub-question two (*What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector*¹⁶?), which will be nuanced through the primary data collection to focus specifically on the small and medium sized enterprises within the digital business sector context.
4. Finally, in chapter two, literature has been presented that provides a rationale for answering the question, “*How can Activity Theory be used to examine the innovation processes of small and medium sized enterprises within the digital business sector?*”, the method for which will be examined in the chapter that follows.

¹⁶ This will be fully answered through the primary data collection and analysis. To this stage there has been general identification of activities supporting capacity raising and innovation, although these have not been considered in relation to small and medium sized enterprises within the digital business sector and their context at this time.

4.0 Methodology

4.1 Introduction

The research methodology utilised in this study to examine how small and medium sized enterprises within the digital business sector innovate and the activities that support their ability to do so will be illustrated in the chapter that follows. The research design used in this study, which contrasts earlier positivist conceptions of traditional grounded theory (Glaser & Strauss 1967; Glaser 1978), has been guided by Lincoln & Guba's (1985) 'Naturalistic Inquiry' concept, which they later acknowledged to be a form of "Constructivism" (Guba & Lincoln 1998), and to a lesser extent by Charmaz's (2006) constructivist Grounded Theory. At no point does the researcher claim that this is a primary method. These ideas are developed in the sections that follow and are aligned to the research at hand employing Crotty's (1998) four research design components, which are explained below. Decisions taken that influenced the research design are woven into the narrative that follows followed by an explanation of the methods used.

4.2 Research model

In academic literature considerable differences in opinions, interpretations and terminologies exist for description of the research process; furthermore, there is disagreement between authors in relation to the sequence of research activities within models. Crotty (1998) suggests that terminology is confusing and of particular obscurity in discussions of epistemology, theoretical stance, methodology and methods where terms have historically been "*thrown together in a grab-bag style as if they were all comparable terms*" (Crotty, 1998, p .3); instead, he proposes these central terms form sequential stages for decision-making within research design. A researcher adopts a stance towards the nature of knowledge (examples being, objectivism or subjectivism). This stance or '*epistemology*' will underlie the entirety of the research process, governing the theoretical perspective selected (examples being, positivism, interpretivism or pragmatism). This theoretical perspective will implicitly define research questions and dictate choice of methodology (for example, grounded theory or case study). Finally, this methodology will inform choice of research methods (examples being, questionnaires or interviews). Crotty (1998) recognises his omission of ontology from the research process which he fuses with

epistemology claiming both are mutually dependent and difficult to distinguish conceptually, saying that:

“... to talk about the construction of meaning [epistemology] is to talk of the construction of a meaningful reality [ontology]” (Crotty 1998, p.10).

That said, tight adherence to Crotty's (1998) four research design aspects leads to research methodologies that are more quantitative, qualitative, or mixed, depending on the initial position of the researcher towards the nature of knowledge, according to Creswell's (2003) research process framework. This current research is roughly modelled to follow these four stages, these being 1). Epistemology, 2). Theoretical Perspective, 3). Methodology, and 4). Methods, which are visualised in the below diagram (see figure 5 below):

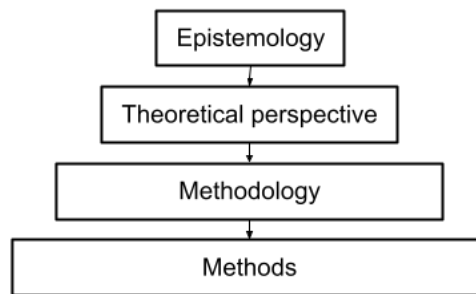


Figure 5: Basis of the model of this current research, adapted from Crotty (1998).

4.3 Epistemology

It is argued by Easterby-Smith, et al. (2012) that the central academic debate in relation to research concerns epistemology and ontology. Yet, Crotty (1998) believes that these are mutually dependent and practically indistinguishable as concepts; he argues that when talking about construction of meaning (epistemology) it is impossible to separate discussion of construction of a meaningful reality (ontology). In this current research this understanding is adopted. Epistemology is the consideration of *“how we know what we know”* (Crotty 1998, p.8) or *“the nature of the relationship between the knower or would-be knower and what can be known”* (Guba & Lincoln 1998, p. 201). Epistemology looks to provide a philosophical grounding for decisions about the kinds of knowledge that are possible and ensures that these are

adequate and legitimate (Maynard 1994). It is closely related to ontology, this being “*the study of being*” (Crotty 1998, p.10) or “*The nature of reality*” (Lincoln & Guba, 1985, p.37). Crotty (1998) notes a relational link between the two where an ontological stance will imply a particular epistemological stance and vice versa, suggesting that if one stance is adopted, so is its complement. To demonstrate this, he draws attention to the complementary nature of these terms; he cites the ontological notion of realism, which postulates realities exist outside of the mind, and its complement objectivism, an epistemological notion asserting meaning exists in objects independent of any consciousness.

Guba & Lincoln (1998) state how constructivist research is, in fact, relativist, transactional and subjectivist. In effect, adopting a relativist stance considers “*there is no objective truth to be known*” (Hugly & Sayward 1987, p.278) and emphasises diversity in interpretations that can be applied. Transactional realities arise through interactions with rhetorical situations (Berlin 1987), which in turn result in individuals’ thoughts or ‘constructed realities’. Subjectivist research views the world, including the psychological (and obscure) world of research data subjects, as unknowable; it is the researcher’s role to construct the world as they see it (Ratner 2006). However, constructivist research blurs the lines between ontological and epistemological worldviews as the “*investigator and the object of investigation are ... interactively linked so that the ‘findings’ are literally created as the investigation proceeds*” (Lincoln & Guba 1985, p.207).

The analysis above has multiple implications in relation to relativist, transactional and constructivist research:

1. Research produces “*multiple constructed realities that can be studied holistically; inquiry into these multiple realities will inevitably diverge (each inquiry raises more questions than it answers)*” (Lincoln & Guba 1985, p. 37).
2. ‘Humans’ should collect data (Lincoln & Guba 1985); humanity enables interaction with participants in a way that reveals their multiple constructed realities.
3. Because “*the knower and the known are inseparable*” (Lincoln & Guba 1985, p.37) research involving participants should be carried out within their contextual “*natural*

setting” as their *“realities are wholes that cannot be understood in isolation from their contexts”* (Lincoln & Guba 1985, p.39).

4. As *“every act of observation influences what is seen”* (Lincoln & Guba 1985, p.39), to properly comprehend, react to, and characterise the interactions occurring, the researcher must be the main data-gathering tool.
5. Research should concentrate on discovering contextualised meaning from the individual points of view of research participants to reconstruct meaning from their many realities (Green 2000; Guba & Lincoln 1989). This suggests that research subjects contribute to the development of research process and negotiate outcomes.

The researcher’s epistemological position, based on the analysis above, is that of constructivism. Within this current research the world can be interpreted in different ways in environments that are socially constructed (Berlin 1987) and not concrete entities, where it is the researcher’s role to construct the world as the research participant sees it (Ratner 2006). Furthermore, in this current research, the researcher is the sole ‘human instrument’ investigator in interaction with research participants and thus placed to realise and holistically study constructed realities of research participants. As this research considers small and medium sized enterprises within the digital business sector, it is appropriate that research is conducted within their ‘natural setting’ where research can be focussed on participants and their individual points of view to identify and contextualise meaning from these.

4.4 Research paradigms and theoretical perspectives

This subsection considers paradigms and theoretical perspectives to provide focus for that which has been selected for this current research. Crotty describes his research framework's theoretical approach, or paradigms, as *“The philosophical stance informing the methodology”* (Crotty 1998, p.3); as discussed in the previous section, he claims choice of epistemological and ontological stance has led to a wide variety of theoretical research perspectives. Guba & Lincoln (1998) state that such paradigms can be thought of as *“a set of basic beliefs (or metaphysics) that deals with ultimate or first principles”* (p.107). Kuhn (1962a;1962b) finds a paradigm is *“the set of common beliefs and agreements shared between scientists about how problems should be understood and*

addressed” (p.45). Furthermore, Pickard (2013) nuances the definition of paradigm as being a “worldview that is accepted by members of a particular scientific discipline which guides the subject of the research, the activity of the research and the nature of the research outputs” (p.5). However, in line with the current research, objectivist epistemologies underlie the theoretical viewpoints of positivism and post-positivism, which in turn have led to a variety of approaches such as experiment, survey, and designs based in grounded theory.

Schwandt (1994) finds constructivism to be generally aligned to interpretivist approaches. The origins of the interpretivist approach are found in Max Weber’s concept of ‘*verstehen*’ (Tucker 1965) meaning the “*understanding something in its context*” (Daymon & Holloway 2010, p.2). He believed that the use of positivist methods in research with humans was incorrect since human behaviour is very complex, independent of natural principles, and influenced by an individual's habits, emotions, beliefs, and rationale. Human data subjects can respond to stimuli in a variety of ways other than in scientific studies linked to positivist research since their behaviours are context-bound and reliant on the time, place, and mindsets of individuals involved (Dayman & Holloway 2010). As such:

“People create and associate their own subjective and intersubjective meanings as they interact with the world around them”; interpretive research makes the “attempt to understand phenomena through accessing the meanings participants assign to them” (Orlikowski & Baroudi 1991, p.5),

For this reason, Weber considered human-centred research¹⁷ to be inherently biased, where neutrality and objectivity are impossible to achieve (Daymon & Holloway 2010); researchers simply cannot ever be completely disconnected from the phenomenon of study (Daymon & Holloway 2010). Returning to paradigms, Table 3 below briefly considers those of potential relevance to this study:

¹⁷ This current research is human centred, and clearly focussed on constructing understanding and meaning from the participants’ views of the situation that is studied.

Paradigm:	Core beliefs:
Positivist	● A single reality exists, and this can be measured. ● The researcher can be considered as an <i>objective observer</i>, remaining independent to the observation and who reports on observations (Bryman 2006; Pickard 2013). ● The approach taken may be deductive and key constructs relate to measurement and objectivity. ● The paradigm is closely associated with quantitative methods of data collection and analysis.
Interpretivist	● Interpretivists note how “<i>reality is socially constructed</i>” (Mertens 2014, p.12). ● Interpretivism is aligned to the “<i>participants’ views of the situation that is studied</i>” (Creswell 2014 p.8). ● Interpretivist approaches may be inductive where qualitative data collection and analysis techniques may be employed.

Table 3: Research paradigm core beliefs

This research is by its nature interpretivist, accepting that reality is socially constructed, and the understanding of the phenomenon considered is understood through the participants’ views of their situation; following from this analysis there are implication for such interpretivist research.

4.4.1 Reflexivity

It is claimed by Daymon & Holloway (2010) that interpretive research requires reflexivity. Within interpretive research knowledge is considered socially and culturally constructed; to evaluate the intricacies of the various realities involved, the researcher must consider how assumptions and viewpoints have affected the study process and its findings. According to Levy, this is:

“... not in order to suspend subjectivity, but to use the researcher’s personal interpretive framework consciously as the basis for developing new understandings” (Levy 2003, p.94).

Reflexivity aligns with Naturalistic Inquiry (Lincoln & Guba 1985) and addresses issues in relation to hermeneutics (Bleicher 2017; Levy 2003) in research practice. Ruby (1980) finds that “... *being reflexive in doing research is part of being honest and ethically mature in research practice*”; researchers require to “*stop being ‘shamans’ of objectivity*” assuming value-free positions of neutrality, an approach that is “*an obscene and dishonest position*” (p.154).

Issues of power highlighted in relation to reflectivity by Al  x & Hammarstr  m (2008) consider the research of Foucault, concentrating on the idea of power in relation to the dominant discourses that permeate society and the significance of identifying discourses in routine actions. According to their research, both the interviewer and the interviewee will behave during an interview based on how much power they believe they have over the other. As a result, the interviewer may unintentionally accentuate some elements of the interview while covering up others. Issues with perception may be related to factors such as:

- Age.
- Education.
- Gender.
- Ethnicity.
- Theoretical position.

Although this list is in no way exhaustive, such factors may influence interview dynamics. For example, feminist qualitative researchers emphasise the significance of being aware of power structures in interview settings, where:

“Despite the best intentions, the interview situation may be experienced as, and may in fact be, a form of abuse. Practising reflexivity can be one way to minimize such experiences in interview situations” (Al  x & Hammarstr  m 2008, p.170).

Reflexivity should, however, be used at all levels and throughout the entire research process. Alvesson & Sk  ldberg (2017) find there are four levels of reflexivity that can be considered (see Table 4 below):

Level	Focus
Interaction with empirical data	● Interview accounts ● Observations of situations ● Other empirical materials
Interpretation	Underlying meanings
Critical interpretation	● Ideology ● Power ● Social reproduction – that being “structures and activities that transmit social inequality from one generation to the next” (Doob 2015).
Reflection related to the text produced and language used	● Personal text of the researcher ● How does the text claims to be authoritative? ● Selectivity in relation to voices represented in the text

Table 4: Levels of reflexivity (Alvesson and Sköldberg 2009, p.273)

Logic dictates reflexive research will attempt to identify held viewpoints; these may affect the researcher’s interpretations at:

1. The micro level within the research narrative and empirical material collected.
2. The macro level within underlying interpretations.

Furthermore, truly reflexive research needs to understand what has been highlighted, played down, and missed within research. As such, a research diary is kept as a tool within reflexive research to enable reflections of carrying out the research and the researcher’s role within construction of knowledge (Blaxter et al. 2010).

4.4.2 Evaluation

The more scientific, positivist research evaluation criteria like internal validity, reliability, generalizability (external validity), and objectivity do not have the same meanings because interpretivist research outputs are by their very nature provisional and context-specific (Angen 2000). In response to the aforementioned positivist assessment standards, Lincoln & Guba (1985; 2000) describe how Angen identifies two major strategies used in interpretivist research to assess the qualities of study. They can be categorised as:

1. Subtle realism (Hammersley 2002).
2. Complete reconfiguration of positivist evaluation criteria (Angen 2000).

4.4.2.1 Subtle realism

Application of subtle realism as an approach involves development of interpretive evaluation criteria of equivalence to those used for evaluation of positivist research (Hammersley 1995). These explicitly reformulate positivist assessment standards for interpretive research. Examples of this area as follows:

- Hammersley (1995) redefines validity as confidence and suggests researchers consider plausibility, relevance, and importance of research.
- Lincoln & Guba (1985) define trustworthiness criteria consisting of credibility, transferability, dependability, and confirmability, to serve as equivalent terms to positivist notions of internal validity, external validity, reliability, and objectivity respectively.

Although there are procedures suggested aimed at increasing validity within interpretative research (Lincoln & Guba 1985), these have been criticised for their alignment to positivism (Angen 2000). Examples are:

- Member checking – returning analysis to participants for accuracy confirmation has come under fire for presuming a fixed truth (Sandelowski 1993).
- Reflexivity – criticised for giving the appearance of objectivity (Smith 1994).

- Triangulation – the employment of various techniques, sources, or investigators is criticised in a manner similar to member checking (Silverman 2015).
- Peer review - criticised for downplaying the significance of the lead researcher (Morse 1994).

Central to interpretivist research is credibility, for which the researcher needs to develop intimate familiarity with the contextual setting and topic. Lincoln & Guba (1985, p.301) define this as a process of:

1. ‘Prolonged engagement’ - where an investment in time enables the researcher to become “*orientated to the situation*”, open to multiple influences and someone who is trusted.
2. ‘Persistent observation’ - where the researcher pays particular attention to characteristics and components pertinent to the investigation.

However, researchers who spend a lot of time in the field risk losing their “*detached wonder*” (Lincoln & Guba 1985, p.304), although being aware is a “*great step toward prevention*”. Within this current research, application of Action Case is used as a tool to enable both situational orientation and observation, whilst maintaining distance and detachment that aligns with these criteria.

4.4.2.2 Complete reconfiguration of positivist evaluation criteria

This approach “*views interpretative knowledge claims and truth as negotiable features*” (Angen 2000, p.386) and “*trustworthiness or goodness of a piece of research a continuous process occurring within a community of researchers*” (Angen 2000, p.387). This means in general focus will be the interpretivist inquiry process itself rather than the outcome of the inquiry (Schwandt 1997). For Smith, “*The task for interpretivists is to elaborate what lies beyond epistemology and beyond the idea that there are special, abstract criteria for judging the quality of research*” (Smith 1993, p.150), especially because an “*interpretivist [will] see criteria not as abstract standards, but as an open-ended, evolving list of traits that characterize what we think research should do and be like*” (Smith 1993, p.153). Furthermore, Angen (2000) emphasises the iterative

nature of evaluation of a research inquiry drawing a distinction between the terms ‘*validation*’ and ‘*validity*’, characterising them as substantive and ethical validation in their altered forms.

Although definition of trustworthiness criteria has been iteratively discussed by Lincoln & Guba (Guba & Lincoln 1981; 1982; Lincoln & Guba 1985) they have reconsidered validation; what was once for them a subtle realism, has been reconfigured to empower participants and capture “*the quality of a constructivist approach*” (Guba & Lincoln 1989). They suggest consideration of four authenticities:

1. Ontological – whereby “*over time, everyone formulates more informed and sophisticated constructions and becomes aware of the content and meaning of competing constructions*”.
2. Educative – through which participants gain understanding and tolerance of perceptions of others within the research.
3. Catalytic – providing sufficient motivation of participants to want to act.
4. Tactical – that which empowers participants to act.

In summary, the researcher used a research diary for this study to reflect on the phases of data collecting, his participation in the process, and induced tentative underlying meanings. The researcher also kept reflective notes throughout the study about data analysis and potential assumptions.; these were originally handwritten and then typed up (because the researcher acknowledges that his handwriting at times is not legible), with an example page of these diaries included in the appendix (see Appendix A 12:11). Through reflection upon interactions with data subjects and analysis of the data, this research tool attempts to capture thoughts that may be overlooked, inclusive of micro-level reflections of power relationships between researcher and data subject. Additional macro-level thoughts, such as how the choice of data collection methods affects results, are to be considered later as part of writing up. Aligning with the exploratory and reflective nature of this current research, these are embedded within the narrative of this thesis.

The researcher accepts this current research may be considered by readers who have both positivist and interpretative beliefs. Guba & Lincoln’s (1989) authenticity criteria and Lincoln &

Guba (1985) trustworthiness criteria are used as mechanisms to convince all readers of the value, trustworthiness, and authenticity of this current research, maintaining notions of interpretivist theoretical perspectives. Triangulation is repurposed so as not to be a benchmark of reliability within in this research, yet instead supporting credibility and dependability. Furthermore, to ensure the rigor of final outcomes, this current research will consider credibility, transferability, dependability, confirmability of results and focussing on the process of the inquiry will consider its ontological, educative, catalytic, and tactical authenticities.

4.5 Reasoning

In broad terms reasoning can deductive or inductive in nature (Bryman 2008; Trochim & Donnelly 2007). Deductive reasoning initially considers generalities of the research working towards precision and can be seen as a top-down approach (Bryman 2008; Trochim & Donnelly 2007). Deductive research can, in effect, begin with an overarching theory in relation to a subject, which through the activities of the research process be focussed into a specific hypothesis to be tested (Bryman 2008). It is also possible to reiterate and add further focus through the process of data collection and observation (Trochim & Donnelly 2007). A researcher can test their ideas using this method of reasoning, which also allows for the confirmation or denial of their initial theory. Figure 6 below is a simplistic representation of the process of deductive reasoning:

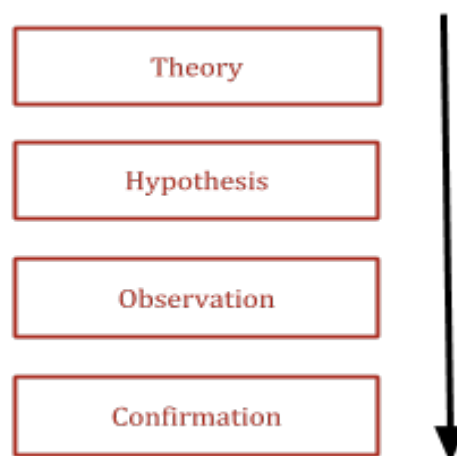


Figure 6: The process of deductive reasoning adapted by the researcher from Trochim & Donnelly (2007).

In contrast to the deductive form, inductive reasoning as a process moves away from precision towards broader in nature generalisation and theories (Figure 7) and can be considered a bottom-up approach (Bryman 2008; Trochim & Donnelly 2007).

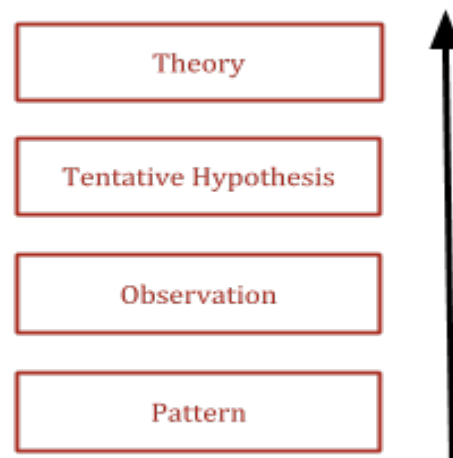


Figure 7: The process of inductive reasoning adapted by the researcher from Trochim & Donnelly (2007).

When conducting research that uses inductive reasoning, an observational approach may be taken as a beginning point. Once patterns are identified, basic hypotheses can then be developed, examined further, and general findings and theories can then be presented (Bryman 2008; Trochim & Donnelly 2007). Deductive reasoning may have a tight emphasis centred on hypothesis testing, but inductive reasoning can be more open-ended and exploratory, especially in the beginning (Bryman 2008; Trochim & Donnelly 2007). Business research, like many disciplines, use both inductive and deductive reasoning at various points throughout the project (Trochim & Donnelly 2007).

This current research is considering small and medium sized enterprises within the digital business sector and the activities that enable the building of their capacities to innovate. This subsection has considered how reasoning can by nature be deductive or inductive (Saunders et al. 2012) and that deductive approaches are generally used when hypotheses exist, and data gathered

can be used to test these. In this current research an inductive approach will mainly be followed (Guthrie 2010) with data gathered used to achieve greater understanding of the phenomenon of cases of implementation of innovation in SME, with comparison of these to theoretical models for perspective (Guthrie 2010), with a deductive approach used to draw hypotheses that form the questions of the survey and which generate the new knowledge drawn from this data collection phase (Saunders et al. 2012). As discussed above, business research uses both inductive and deductive reasoning at various points throughout projects (Trochim & Donnelly 2007).

Therefore, this research project is primarily inductive in nature as at the beginning there are no theories or hypotheses being initially tested, and in the later stages of the survey and second case both deductive and inductive so as to nuance the formation of the final framework. Activity Theory (AT) has been applied to the interpretation of results where interview data and survey free text have been coded to align the categories of capacity raising and innovation supporting activities to firstly the elements of the AT model, and secondly to the relationship between the AT elements to account for how these interact. For reference, literature considering AT itself, the value of theoretical frameworks, and the rationale for the selection of Activity Theory is found in Chapter 2.0.

4.6 Methodology and research design

This subsection will discuss the research design and methods by which this research will examine multiple cases of small and medium sized enterprises within the digital business sector and the activities that enable the building of their capacities to innovate. A methodology is the “*strategy, plan of action, process or design*” underlying choice and use of research methods (Crotty 1998, p.3). Furthermore, whereas approaches frequently have the same underlying theoretical ideas, they can actually be formed from a variety of distinct combinations of research techniques. Furthermore, different researchers may perceive various approaches as coming from various theoretical vantage points. A good example of this is grounded theory, which Charmaz (2006) suggests can be regarded from theoretically interpretative and positivist viewpoints. Crotty (1998) classifies grounded theory as a method along with experimental research, ethnography, and action research.

Academics like Crotty (1985) would regard Lincoln and Guba's (1985) constructivist Naturalistic Inquiry as an approach relevant to this current research. Although their interpretations are in and of themselves simply interpretations, the researcher can use them to generate 'working hypotheses' in constructivist research, which tries to interpret meaning from its data subjects (Lincoln & Guba 1985). Additionally, because constructivist inquiry is interpretive by nature and theorising is based on researcher viewpoints, it cannot stand alone without this context (Charmaz 2006). In turn, this means developed substantive theories or working hypotheses 'emerge', being *induced*, or *grounded* in the data that the research process yields (Lincoln & Guba 1985; Charmaz 2006) allowing "*for indeterminacy rather than seeking causality*" and giving "*priority to showing patterns and connections rather than linear reasoning*" (Charmaz 2006, p.126). Guba & Lincoln consider this a "*replacement concept for causality*" that is "*mutual simultaneous shaping*" in situations with blurred boundaries in the distinguishing of cause and effect where actually "*everything influences everything else, in the here and now*" (Lincoln & Guba, 1985, p.151). In alignment with the nature of this current research, which creates rhetorical situations through the interviewing of data subjects, multiple factors interact simultaneously producing outcomes affecting all parties within the research. As such, in this research context, researcher and data subject views and understandings take shape with the data collection; to address the demands for interpretation, intervention, and a practical response to the management of in-context research, the use of Action Case, a combination of action research and case study, is used, and is discussed in further detail later in - *Section 4.8.2. Strategy* - of this chapter.

For this current constructivist, interpretivist research, the above discussion has implications:

1. Instead of making rigid generalisations, working hypotheses will be established; interpretations and theorising will be unique to the context and researcher (Lincoln & Guba 1985).
2. Research design will continually emerge.
3. With both data subjects and researcher in a state of "*mutual simultaneous shaping*", the researcher must be aware of the intricate interconnections that have occurred and the probable temporal nature of findings in relation to data collection outcomes.

4. The researcher acknowledges Guba & Lincoln's (1989) argument for leveraging intuitive or tacit knowledge by the researcher; *"the nuances of the multiple realities can be appreciated only in this way; because much of the interaction between investigator and respondent or object occurs at this level; and because tacit knowledge mirrors more fairly and accurately the value patterns of the investigator"* (Lincoln & Guba, 1985, p.40).

The aforementioned methodological, theoretical, and epistemological implications are important to Guba & Lincoln's methodology (1985). The following subsections consider its procedures and implications in relation to this current research:

4.6.1 Naturalistic inquiry

According to Guba and Lincoln (1985), conducting a Naturalistic Inquiry recognises that the environment of the research is crucial to the interpretations that are produced. With the aid of techniques like interviews, observations, and document analysis, the researcher expands on tacit knowledge. These techniques are used in an iterative cycle with the following four components:

1. Purposeful sampling.
2. Inductive analysis.
3. Grounded theory development.
4. Emergent design/next-step decision making.

The research may come to an end due to time or resource restrictions at any time before new data stops emerging and the theory stabilises. A case study report is developed to help people understand how the research might be used in their contexts. The researcher makes effort to engage in member checking and ensure minority viewpoints are appropriately represented. Finally, a panel of study participants who have been continuously interviewed by the researcher over the course of the research objectively evaluates trustworthiness. The methodological procedures of Guba & Lincoln (1985) also involve:

- Use of researcher-centred research methods.

- Viewing of data collection as a series of similar iterative cycles.
- Emphasising that theories should be grounded in the data.
- Promoting of purposeful sampling and constant comparison techniques.

In qualitative research literature, the timing of the literature review is also widely addressed and can cause some conflict between academics (Heath & Cowley 2004). Constant comparison, according to Guba & Lincoln (1985), should be the primary technique. They also suggest paradigms are a systematic set of beliefs and methods that “*represent a distillation of what we think about the world (but cannot prove)*” (Lincoln & Guba 1985, p.15) and would view paradigmatic differences between constructivists as both rather technical and disproportional.

4.6.2 Implications for this research

Aligning with Guba & Lincoln (1985), only qualitative researcher-centred approaches were used in this study. Data was largely gathered from participants through extensive, in-depth interviews that required *active* as opposed to *passive* listening. To make sure that working hypotheses were based on the facts gathered, information analysis techniques from Lincoln & Guba (1985) were applied. Due to the requirement to gather data from numerous small and medium sized enterprises examples and the desire to ensure that the most pertinent participant opinions and understandings were represented in this research, this study utilised a purposeful sampling technique as opposed to one that was theoretical, or convenience based. Prior to the deliberate selection of more participants, more theoretical sampling procedures would have called for further information analysis. During the development process of the framework, results were iteratively presented to the case study data subjects to contribute and demonstrate catalytic authenticity, co-create and drive change in the organisations. On a final note, literature for this research was revisited throughout the lifespan of the project. Due to the nature of the researcher’s academic role and teaching preparation as well as other research studies, there was little or no attempt to avoid reading literature relevant to this research throughout, which in fact enabled the expected constant comparison of Guba & Lincoln (1985) Naturalistic Inquiry. Furthermore, a return to literature after data collection allowed some further focussing of the review of literature yet meant that conclusions were mainly formed after the initial literature had been considered

and were thus firmly grounded in the primary data of the cases¹⁸.

The following section will consider the methodology behind the development of the research questions of this current research.

4.7 Research question design

The central research questions of this current research have been evolutionary in nature and have been through multiple iterations; that said, their definition and how they have been nuanced are essential to the design of the research. According to Saunders et al. (2009, p. 134):

“Identifying and formulating the research problem is a critical step in the process of developing a research foundation. It is essential that the appropriate level of theoretical examination is developed in the context of the research problem”.

The nature of qualitative research is constructivist (Agee 2009). Such research considers what could be seen as “*microscopic*” (Geertz 1973, p.10) details of social and cultural aspects of individual lives. Research credibility is in effect a function of context, place and data subjects considered (Geertz 1973; Maxwell 2008; Patton 2002); that is:

“... the degree to which [the researcher] is able to clarify what goes on in such places, to reduce the puzzlement – what manner of men are these?” (Geertz 1973, p.16).

As such, Creswell (2014) suggests that the qualitative questions start with words such as ‘how’ or ‘why’ to interrogate these human interactions. Janesick (2000) finds that this first question should be reflective asking “*What do I want to know in this study?*” (p. 382) and Maxwell (2008, p.65) terming this question “*provisional*”, notes even these early questions dictate decisions related to theory and methods. Furthermore, Creswell (2014) suggests that qualitative questions should set the scene for exploration and discovery, and as such need to be open. This is supported by Maxwell (2008) cautioning that questions that are too focused lead to “*tunnel*

¹⁸ It is the intention of the researcher to return to literature throughout and until completion of this project.

vision” (p.67) and inhibit understanding and analysis. A central qualitative question needs to be focused on the research context and the “*thick description*” (Geertz 1973, p.6) of human interactions within this.

An initial central question can be used to set the context for developing related sub-questions. Collis and Hussey (2013) suggest that qualitative research have a central question supported by associated sub-questions which can take many forms, depending on the focus of the overarching central question. Having considered the work of Stake (1995), Creswell (2014, p.109–110), described “*issue*” and “*procedural*” sub-questions; although questions may fall in both categories, they emerge from the central question to interrogate the specifics of a topic, issue, or phenomenon. Sub-questions should narrow the broader focus of the central question yet give direction to data that will need to be collected as part of the research (Agee 2009).

Maxwell (2008) suggests that research questions need to account for “*tentative theories about ... phenomena*” (p.68), with Yin (2003), proposing that a theoretical framework should inform the research questions within case study research, with the theory defining selection and parameters of the case in consideration. Furthermore, Creswell (2014) finds that qualitative research begins with:

“... the broad assumptions central to qualitative inquiry, a worldview consistent with it, and in many cases, a theoretical lens that shapes the study” (p. 42).

Following this guidance, this research question is the central narrative enquiry within this current research:

- How do small and medium sized enterprises within the digital business sector innovate?

In addition, 2 sub-questions are considered:

- How can Activity Theory be used to examine small and medium sized enterprises within the digital business sector and their innovation processes?

- What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?

The following section provides the specific methodological details of the research conducted.

4.8 Methods

Crotty defines methods as “*the techniques or procedures used to gather or analyse data related to some research question or hypothesis*” (Crotty 1998, p.3). Although there are many methods that can be used, some may be more appropriate than others because they align with the underlying theoretical perspective. For instance, an experiment is unlikely to be used in constructivist research, but this does not mean that quantitative research methods cannot be used in this type of study. Because of this, Rodwell (1998) finds that it is possible to conduct qualitative and/or quantitative research while adhering to the epistemological positions of each theoretical perspective, even though it is impossible to hold both positivist and interpretive assumptions at the same time. As discussed above, this current research will follow an overarching epistemological approach paradigm based in constructivism. This nature of this interpretivist research will recognise how “*reality is socially constructed*” (Mertens 2014, p.12). Interpretivism is fitting for this qualitative research that will consider the “*participants’ views of the situation that is studied*” (Creswell 2014, p.8). Aligning with this current research, constructivist approaches may be inductive, as in this case, where qualitative data collection and analysis techniques are employed.

4.8.1 Approach

The approach for this research is guided by the overarching constructivist philosophy discussed above; aligning this with the research aim, rationale, and questions, this provides the basis of a designed approach to output results and recommendations. This current research will consider multiple case studies that address a contemporary phenomenon outside of the researcher’s control; that being, how small and medium sized enterprises within the digital business sector innovate and the activities that enable them to do so. Although there is a longstanding academic debate about case studies, their credibility, and limitations comparative to other methods, these

are increasingly popular amongst researchers (Thomas & Magilvy 2011; Hyett et al 2014). Creswell (2014, p.97) finds that:

“The case study method explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information ... and reports a case description and case themes”.

There are primarily two key academic voices in relation to case study research, Stake (1995) and Yin (2003); although their approaches differ, both have the same aim, seeking detailed exploration of the topic of interest and revelation of the core drivers of the phenomenon. Furthermore, in common with this current research, both base their approaches on constructivist paradigms. As discussed above, constructivism finds truth is relative and dependent on individual perspectives, and as such:

“... recognizes the importance of the subjective human creation of meaning but doesn't reject outright some notions of objectivity. Pluralism, not relativism, is stressed with focus on the circular dynamic tension of subject and object” (Crabtree 1999, p. 10).

Furthermore, constructivism builds on the central premise of social construction of reality (Searle & Willis 1995). Having its grounding in constructivism, case study creates an opportunity for close collaboration between a researcher and data subjects, while enabling participants to tell stories (Crabtree 1999) that describe their views of reality, which in turn helps researchers better understand their actions (Lather 1992).

In common with Yin's (2003) criteria for case study design, in this current research:

1. The study is attempting to answer both “how” and “why” questions.
2. The researcher cannot manipulate behaviours of those involved.
3. Consideration of contextual conditions are relevant to the phenomenon studied.
4. Boundaries are unclear between phenomenon and context.

Miles & Huberman (1994) define case study research as consideration of:

“a phenomenon of some sort occurring in a bounded context ... [where] ... the case is, in effect, your unit of analysis”” (p. 25).

In this current research the unit of measurement will be the activities that enable small and medium sized enterprises within the digital business sector to innovate. As discussed above, multiple academic definitions and understandings of case study exist, but roughly it can be thought of as a *“systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest”* (Bromley 1990, p.302) with varying units of analysis between cases.

Commonly, qualitative case study methods leverage tools to enable researchers to *“study complex phenomena within their contexts”* (Baxter & Jack 2008, p.544). As such this research will employ multiple *action cases* (Vidgen & Braa 1997; Braa & Vigden 1999), a single-iteration derivative of action research, as a vehicle to gather data and iteratively inform framework development. ‘*Action case*’ will give the researcher flexibility to collaborate with data subjects and transform knowledge generated as part of the research into actual practice. This research will employ action case as a single iteration tool of action research, used iteratively throughout data collection phases, to examine multiple cases of how small and medium sized enterprises within the digital business sector innovate and the activities that enable them to do so. In this current research each action case will acts as a container for an arbitrary this contemporary phenomenon (Robson 2002). These action cases will address a phenomenon over which the researcher has no control with research that will be exploratory in nature and addresses the research questions (Benbasat et al. 1987; Darke. et al. 1998; Yin 2003). Aligning with the nature of this current research, case study research is increasingly popular, satisfying needs to increase the value of research findings through relevance and connection to industry practice (Applegate & King 1999; Benbasat & Zmud 1999; Davenport & Markus 1999; Lee 1999; Lyytinen 1999), as well as complementing the qualitative methods of Charmaz (2006) and Lincoln & Guba (1995) in this current theory building research (Eisenhardt 1989). Furthermore, although single case research

remains methodologically valid in studies of extreme and critical cases, multiple case study approaches have been found more appropriate in the study of cases of innovativeness (Yin 2003). Furthermore, the academic research considered by the researcher suggests increased methodological rigor of study is achieved by “*strengthening the precision, the validity and stability of the findings*” (Miles & Huberman 1994, p. 29), particularly, because “*evidence from multiple cases is often considered more compelling*” (Yin 2003, p. 45). This is further supported by the research of Baxter & Jack (2008) who suggest that the evidence from multiple cases has increased credibility and can be considered more reliable. The consideration of multiple cases will enable development of stronger research contributions and outputs in this research; Eisenhardt & Graebner (2007) find it is aligned closely to theory producing recommendations grounded in multiple empirical evidence, which in turn comprehensively answer research questions and contribute through evolution of theory.

4.8.2 Strategy

A strategy creates a scheme through which to research tasks within a timeframe (de Casterle et al. 2012). This current research, following the philosophy of constructivism will gather qualitative data through a series action cases designed to output a framework of activities that support innovation small and medium sized enterprises within the digital business sector. As discussed above, this research will, in fact, take the form of a hybridism of action research and case study; as such this research justifies employing the strategy of *Action Case* study (Vidgen & Braa 1997; Braa & Vigden 1999). This method has been developed to be responsive to:

1. The complexities of interpretation of a phenomenon where the researcher intervenes as an active part of the research.
2. The need to efficiently manage in-context research.

As such this method aligns with the overarching interpretivist paradigm of this research. Furthermore, contributing to theory, this method will be applied in contexts other than the educational and IS research where it has traditionally and successfully been used (Hughes & Wood-Harper 1999; Stenmark 2000). In this way, this current research has potential to contribute to methodological application theory through gathering valuable data about how small and

medium sized enterprises within the digital business sector innovate and the activities that enable them to do so. Figure 8 below highlights an area labelled action case. Research using the *Action Case* method fuse the:

1. Interpretation and understanding of case studies (Yin 2003).
2. Intervention and process driven change driven of action research (Koshy 2010; Koshy et al. 2010).

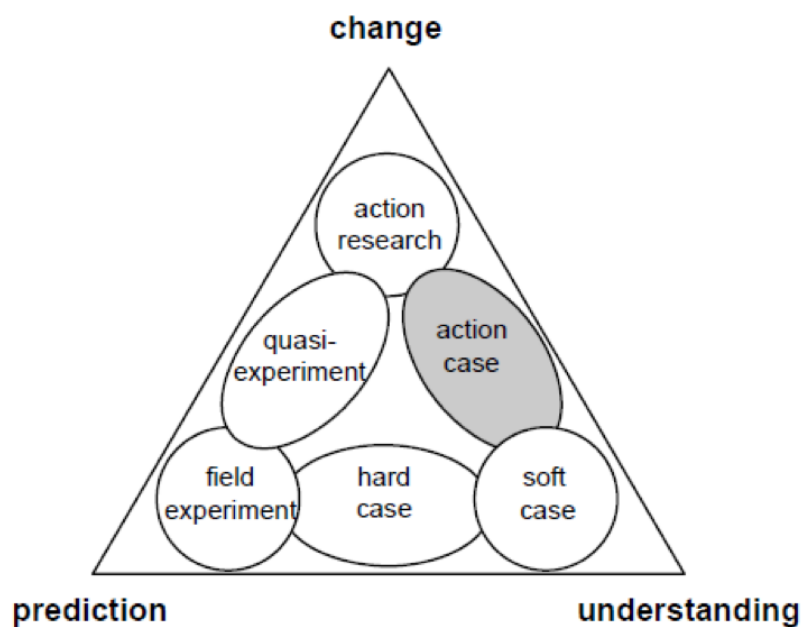


Figure 8: Action case method location (Adapted by the researcher from Vidgen & Braa 1997)

Furthermore, research applying this method reflect:

1. How research drives organisational change, built on Lewin's change model (Lewin 1958), the basis of the action research method (Lewin 1946).
2. Growing understanding through active research processes (Braa 1995).

Returning to this current research, action case hybridism provides flexibility within the research to collaborate with data subjects and transform knowledge generated into theory and practice.

This current research analyses activities supporting small and medium sized enterprise

innovation. This research involves detailed consideration of small and medium sized enterprise case contexts; application of action case allows the researcher “*to delve deeply into a topic and to understand thoroughly the answers provided*” (Harrell & Bradley 2009, p. 27). More so, aligning with the nature of this current research and in response to the research questions and aim, Barriball & While (1994) have found that this method is useful when observing complex phenomenon that involve confidentiality and interaction with human data subjects, as will be the case with small and medium sized enterprise cases.

Furthermore, by viewing small and medium sized enterprise innovation processes through the lens of AT this research develops a framework of enabling activities that support innovation within small and medium sized enterprises within the digital business sector. It has been suggested that research conducted alongside theory is “*immediate, insightful, and applicable in practice*” (Reeves et al. 2008, p.634). Research which lacks theory may in fact not be inferior yet interpreted results which are aligned to theory may have the appearance of increased insightfulness. Furthermore, Lewin (1951) discusses how in research “*there’s nothing so practical as good theory*” (p.169); for him, theory is a lens through which to interpret results and enable output of relevant practical conclusions. This aligns with the nature of this current research which involves collaboration with data subjects where results consider activities, opinions, and internal organisational understandings within the case SMEs. The active research method enables a deeper understanding of the phenomenon whilst maintaining a process that creates both scientifically rigorous and impactful results. Therefore, one potential novel contribution to knowledge that this current research offers is through its application of *Action Case* and AT to the study of SME innovation.

This current research considers multiple cases; the strategy changes from the individual case being the purpose of study to focus on issues connected to credibility, transferability, and dependability (see section 3.4.2 for discussion of evaluation criteria). Such credibility, transferability, and dependability, in terms of authenticity of findings will be established through the replication logic common to multiple case study design. In this current research, characteristically multiple *Action Case* studies are fitting (Vidgen & Braa 1997) in that:

1. They involve real-time intervention: Action Case is a method valuable to developmental projects, bringing users and relevant people within that process. The deliverable of the project is co-production of a framework of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.
2. Duration is typically shorter than action research allowing for multiple cases to be considered and act as an enabler of increased credibility, dependability, and authenticity of results.
3. Reduction of research complexity will be achieved by focusing on single data collection methods in each Action Case and thus maximising value from each research stage.
4. Rich real-life context and opinion of people relevant to the study will be considered at all stages of the research.

In this current research employing Action Case enables the researcher to retain distance from the case being considered and reduce bias, which in turn improves management of relationships between the researcher and data subjects. Furthermore, the Action Case strategy enables observation in an ethical way where participants feel comfortable and but allows for detailed consideration of activities of data subjects.

4.9 Overview of data sources in this current research

The method of case study has its strengths in its flexibility and adaptability, allowing for single or multiple methods of data collection within an investigation (Cavaye 1996), with action case offering the same strengths (Vidgen & Braa 1997). As such, Yin (2003) finds data from case study research can come from multiple sources: these include documentation, archival records, interviews, direct observations, participant observation and physical artifacts (Myers 2009), but this can in no way be considered a definitive list. The following sections summarise the key issues related to the research methods aligned to Case & Action Case Study (Yin 2003; Vidgen & Braa 1997), Naturalistic Inquiry (Lincoln & Guba 1985) and Constructivist Grounded Theory (Charmaz 2006).

4.9.1 Sampling

In qualitative research, like in this current research, typically sampling choices are made to provide understanding of a phenomenon being studied and as such, Marshall (1996, p.522) finds that:

“Choosing a study sample is an important step in any research project since it is rarely practical, efficient or ethical to study whole populations”.

Furthermore, qualitative studies, rather than testing hypotheses and producing generalizable results as common with quantitative forms of research, instead aim at providing understanding to more complex, “*humanistic*” (Marshall 1996, p.522) why and how questions, like those found in this current research (see section 4.7 above – Research question design). Academics such as Etikan & Bala (2017) and Marshall (1996) outline sampling techniques relevant to qualitative research inquiries:

1. Convenience sample – this is sampling that involves drawing from that part of the population that is close to hand. As such it is the least rigorous technique (Sedgwick 2013; Etikan et al. 2016), as it simply involves the selection of the most accessible subjects. It is the least costly to the researcher, in terms of time and effort, but may result in poor quality data and lacks some intellectual credibility (Suen et al. 2014).
2. Purposeful (or judgement) sample – this is the most common sampling technique (Marshall 1996; Etikan et al. 2016; Campbell et al. 2020) where the researcher actively selects the most productive sample to answer their research question. This can involve the researcher understanding and considering variables in relation to data subjects or definitions of cases considered that may influence contribution and will be based on the researcher’s knowledge of the area of study, available literature and in response to evidence from the research journey itself (Suen et al. 2014).

Although there are additional sampling techniques, such as

1. Snowball sampling – where the researcher relies on participant referrals to recruit new participants (Goodman 1961; Parker et al. 2019). That said, with this representativeness

of the sample and true distribution of population and sample cannot be guaranteed. Furthermore, sampling bias occurs when initial data subjects nominate people that they know well (Parker et al. 2019).

2. Quota sampling – where the researcher selects cases from within several different subgroups (Moser 1952; Moser & Stuart 1953; Yang & Banahmah 2014), although there is common agreement that following this method the sample selection is in no way random and there is a high potential for selection bias which results in unrepresentative population samples.

Furthermore, most qualitative research will employ either convenience or purposeful sampling (Marshall 1996; Etikan et al. 2016; Campbell et al. 2020) as these have been shown to avoid the two issues discussed immediately above.

4.9.2 Interviews

The majority of qualitative data is likely collected through interviews (Mason 2002), which are also frequently used in case studies (Yin 2011) and Guba and Lincoln's (1985) Naturalistic Inquiry. Three different types of qualitative interviews are identified by Mason (2002):

1. In-depth (or intensive).
2. Semi-structured.
3. Loosely structured or unstructured.

She finds that each typically involves an “*interactional exchange of dialogue*”, that is informal in style, being “*thematic, topic-centred, biographical or narrative*” which considers that knowledge is situated and contextual, designed “*to ensure that the relevant contexts are brought to into focus so that situated knowledge can be produced*” (Mason 2002, p.62). Despite this, Mishler (1986) discovered that research interviews were frequently done with a limited understanding of the interview process, and Mason (2002) asserts that many qualitative researchers made an unwise decision to use interviews as their primary method of data gathering.

According to Mason (2002), there are several reasons why qualitative interviewing is chosen as the main approach for gathering data. Examples of these include:

- Ontological position – they are interested in the opinions of the participants.
- Epistemological position – they believe that communication between a researcher and a data subject is the only worthwhile way to get data.

Mason (2002) and Silverman (2015), however, caution that the second perspective is problematic because qualitative interviews rely on the participants' abilities to verbalise, interact, conceptualise, and remember, thus potentially do not genuinely recreate realities (Mason 2002). Additionally, the accounts of those surveyed show points of view that have a specific purpose while also considering elements like unspoken rules of discourse, standards for what one *'should'* say in a professional setting, and subliminal indications of participant power dynamics (Charmaz 2006).

4.9.3 Survey

Combining methods in research provides value to discoveries from case studies with, as stated above, Yin (2011) finding that data from case study research can come from multiple sources. Qualitative surveys do not aim at establishing frequencies, means or other quantitative parameters but instead determining the diversity of opinion for a relevant sample of data subjects, establishing the meaningful variation of opinion, and thought within that population. Fink (2003) recommends qualitative survey analysis for the exploration of meanings and experiences. Furthermore, Jansen (2010) uses the term qualitative survey, specifying this as one of three main types of qualitative research that he suggests can be combined with case study (and ethnography).

4.9.4 Implication for this research

The researcher will apply purposeful sampling within this current research, firstly to avoid poor quality data and intellectual credibility issues. Furthermore, cases will be selected by the researcher to answer the research question, considering variables in relation to cases considered

based on the researcher's knowledge of the area of study, available literature and in response to evidence from the research journey itself. In line with this analysis for this current research the primary data collection will be through qualitative semi-structured interviewing of data subjects in their place of work¹⁹. A complimentary qualitative survey was run for the duration of the project, that was used to interrogate assumption that have been driven from the initial pilot case study and later the final case was considered as part of the development that nuanced the final framework presented as an output of this current research.

4.10 Conclusion

In conclusion, a sequential research diagram has been produced to explain the methods and methodology of this research and is shown below:

¹⁹ There was a period where places of work in reality meant through Teams as both case studies considered shifted to remote work during the pandemic, although either side was face-to-face and in situ.

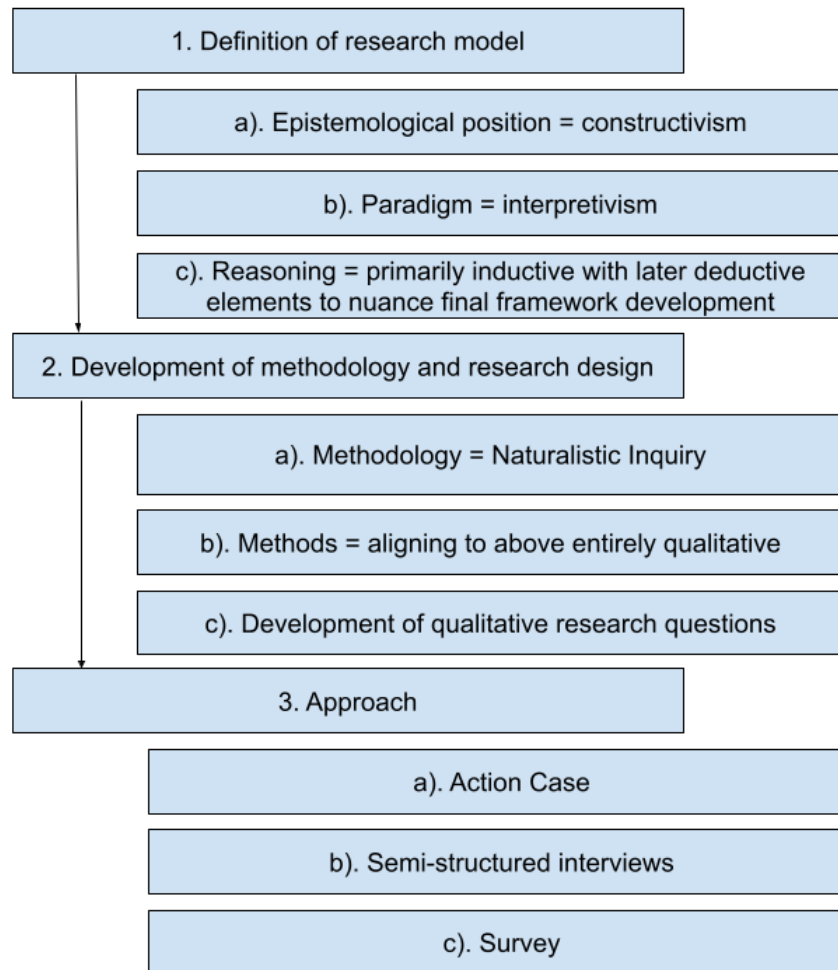


Figure 9: Sequential research diagram.

This chapter has illustrated the research design used in this current research to investigate how small and medium sized enterprises within the digital business sector innovate and the activities that enable them to do so. As discussed, the research design adopted has been designed so as consider multiple cases of SME innovation and been steered by Guba & Lincoln's (1985) '*Naturalistic Inquiry*' which is acknowledged as a form of '*Constructivism*' (Guba & Lincoln 1998). Throughout these have been aligned to the research with reference to Crotty's (1998) research design elements. This has outputted a logical and sequential research process that is visualised in the above research diagram (figure 9).

5.0 Pilot study rationale and value within the design of this current research.

5.1.1 Pilot Study Introduction

The pilot study of this current research represents an initial step towards practical application of AT as a lens through which to view innovation within small and medium sized enterprises within the digital business sector. This chapter covers theoretical backgrounds in relation to definition and value of pilot studies. Furthermore, it considers the goal of carrying out the pilot study in this current research, aligning these to the aim, objectives, and research questions, as is the coding method that has been used within NVivo to ensure alignment of analysis to the AT model.

5.1.2 Definition of a pilot study

A pilot study is a trial conducted in advance and early stages of a more thorough investigation. It is also sometimes referred to as a '*feasibility*' study and offers value through pre-testing of research instruments like questionnaires (Van Teijlingen & Hundley 2002). It is carried out once the researcher has a clear understanding of the study topic and questions, as well as the methodologies and techniques that will be used. According to Blaxter (2010), it's a way of re-evaluating the planning that prevents mistakes from happening in the later stages of a research project. If necessary, as a function of a pilot, a project can be adjusted and amended accordingly before further in-depth data gathering is carried out.

The pilot study in this current research acted in the main as a method of testing the planned research techniques, methods, data analysis tools and open-ended interview techniques employed. The research conducted a series of interviews to examine how small and medium sized enterprises within the digital business sector innovate. The interview data was transcribed and edited by the researcher then taken for analysis within NVivo (QSR NVivo 2023). The application of this method was used to allow the researcher a method of tracking the data to the dimensions of AT as well as the relationships between these elements – there is a detailed discussion of this in section - 5.2.3. *The data collection* - later in this chapter. This pilot project

served as a pre-test for tools, procedures, and interviews as well as a feasibility study. The value of piloting research is covered in the section that follows.

5.1.3 Value and goal of piloting research.

The researcher has considered academic thought in relation to pilot study value and aligned this to the current research; furthermore, he has considered objective three of this research, *to employ an action case approach within a pilot case study to test procedures, gather survey data and complete a second action case study that considers capacity raising and innovation enabling activities data within small and medium sized enterprises within the digital business sector.*

This pilot case study will complete the first clause, that being to *employ an action case approach within a pilot case study to test procedures* in relation to *capacity raising innovation enabling activities data within small and medium sized enterprises within the digital business sector.*

Furthermore, it will provide a partial, first-stage, response to the aim, *to develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory* through the process of piloting. Finally, it provides an initial response to the research questions. This is further considered - in section 5.2.0. *The pilot study within the context of this current research* - below. Furthermore, there is a discussion of specific values of piloting that follows.

5.1.3.1 The value of a pilot study

Blaxter (2010) argues that:

“You may think that you know well enough what you are doing, but the value of pilot research cannot be overestimated. Things never work quite the way you envisage, even if you have done them many times before, and they have a nasty habit of turning out very differently than you expected” (p.122).

The pilot study has been employed inside this research project to eliminate as much project waste as possible in the future. According to Welman & Kruger (1999), the justification for

conducting a pilot study must focus on the researcher's disillusion brought about through learning that research guidelines are only applicable in ideal settings rather than in real-world research contexts. They list three benefits of doing a pilot study:

1. Detection of flaws in measurement procedures and the ability to interact within the research.
2. Identification of unclear or ambiguous questions.
3. To give insight into non-verbal behaviour of data-subjects, such as embarrassment or discomfort that is experienced in relation to content or wording of questions.

Further advantages of conducting a pilot study discussed by Van Teijlingen & Hundley (2002) are as follows:

- They provide warning in relation to where a research project may fail.
- They indicate where research protocols may not be followed.
- They identify practical problems within the research procedure.
- They indicate the appropriateness and complications in application of proposed methods and data collection instruments.

The pilot study of this present research which was especially designed and implemented so as to discover real-world issues with the methodology and methods used, contains and benefitted from many of the advantages mentioned above. It has served to demonstrate the suitability of suggested approaches and tools for gathering data, as well as to warn of scenarios in which methods within the study might fall short or fail. This means that the viability of research data collection tools, the research procedure itself, and analytic techniques have all been tested using the pilot study.

The following section discusses the goal of piloting in general as well aligning this specifically to this current research.

5.1.3.2 The goal of piloting research

Within this current research the goal of piloting is aligned to the aim of the larger research project as a whole; a general goal of piloting is to inform and contribute to the success of the project avoiding points of failure with the process, supported as an academically rigorous process and of value as discussed above in this chapter. In this current research the aim of piloting is driven by achieving two outcomes:

1. To examine practical arrangements that may negatively influence success of the research procedure.
2. To test practicalities related to applicability of instruments, measurement, and analysis tools within this current research context and its potential outcome.

Furthermore, the implementation of piloting was used to shape the final phases of the data collection of the final case. The piloting procedure of this current research project will now be discussed below.

5.2.0 The pilot study within the context of this current research

The piloting phase of this current research follows the discussed design, that being the research strategy discussed in Chapter 4.0 Methodology. De Vos et al. (2005) suggest that after a strategy is defined and procedures determined early development and piloting is a natural progression within research. The methodology stated having, in the main, been developed before the active research process began is a function of consideration of academic methods literature; therefore, some procedural elements discussed have been further refined and nuanced through the activities of piloting. Furthermore, piloting aligns to the aim, objectives, and research questions of this current research in that it:

1. References objective three of this research, *to employ an Action Case approach within a pilot case study to test procedures, gather survey data and complete a second action case study that considers capacity raising and innovation enabling activities data of small and medium sized enterprises within the digital business sector*, where it will complete the first clause, that being to *employ an action case approach within a pilot case study to test*

procedures in relation to capacity raising innovation enabling activities data of small and medium sized enterprises within the digital business sector. Furthermore, this will demonstrate how Action Case retains distance from the case being considered and reduces bias, to improve management of relationships between the researcher and data subjects and enables observation in an ethical way where participants feel comfortable, yet allows for detailed consideration of the capacity raising activities supporting innovation of the data subjects and their businesses.

2. It provides a partial, first-stage, response to the aim, *to develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory* through the process of piloting.
3. It partially considers all research questions:
 - a. *How do small and medium sized enterprises within the digital business sector innovate?* – The detailed and substantial case study will harness ‘*Prolonged engagement*’ and ‘*Persistent observation*’ to output an analysis that will provide a detailed explanation of how small and medium sized enterprises within the digital business sector innovate, through a holistic study of the constructed realities of research participants.
 - b. *How can Activity Theory be used to examine the innovation processes of small and medium sized enterprises within the digital business sector?* – In this analysis the opened-ended interviews of the pilot case study using AT interview questions are coded to the ten overarching categories of capacity raising and innovation supporting activities that were defined through the literature enquiry.
 - c. *What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?* – The ten overarching categories of capacity raising and innovation supporting activities are nuanced, and with new activates emerging through the analysis to make up the backbone of the framework, which will be expanded and further clarified through the two data collections that will follow.

A rationale for the selection of pilot case study is outlined below.

5.2.1 The selection of the pilot case study

The piloting of this current research is designed to contribute to the fulfilment of the research project aim which is *to develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory*. In line with this, a single comprehensive case study has been determined to be suitable for the research's pilot phase. Its goal is to attempt to explain or interpret phenomena in terms of the personal meanings that data participants assign to them (Denzin & Lincoln 2011). Walsham (1995) finds in-depth case study suitable within empirical, interpretive research, with Klein & Myers (1999, p.68) stating that:

“... positivist criteria ... are inappropriate for interpretive research.”

Greenhalgh & Taylor (1997) and Darke et al. (1998) argue a researcher should provide an argument why a specific case study is appropriate. For consistency the researcher has used the same selection criteria for the pilot study as the final research, following his definition of small and medium sized enterprises within the digital business sector, this being organisations that base their business on:

“... digital goods, digital services and digitally-enabled transactions of goods and services, whether digitally or physically delivered, involving consumers, business or government, all of which are underpinned by movement of data ...”

Within the framework of this definition this primary case focuses on a UK based B2B and B2C e-commerce small and medium sized enterprise, and they are discussed in further detail in the chapter that follows.

5.2.2 Ethical considerations

Following the norms, before the data collection began the data-subject was provided with an information sheet explaining the process and consent form explaining their rights in relation to

the data collection. This process allowed the researcher to pilot these formalities and the process of recording interviews. The example *interview consent form* and *participant information sheet* are found in Appendix B:13.2 and B:13.3.

5.2.3. The data collection

The pilot data collection comprised of more than 8 hours of in-depth interviews carried out over the period of three months. These interviews were:

1. Recorded and transcribed – transcription was carried out rapidly to remain close to the data that had been gathered.
2. Imported to NVivo for coding – coding has been carried out to account for individual nodes and relationships between these, to map to the AT model dimensions (see chapter 1.3.1, figure 1).
3. In response to the methodology a reflexive diary has been kept, its content being inclusive of reflections on the data collection phases, the researcher's role within the process and induced tentative underlying meanings – throughout the analysis chapters that follow, this is referenced, often in the footnotes of this work²⁰.

The interviews looked to establish key definitions, activities that are enablers of innovation, their impact on organisational capacities to innovate and their relation to AT, with initial codes having been generated from the activities identified within the 10 categories of capacity raising and innovation supporting activities in small and medium sized enterprise contexts, discussed in the literature review of this report (chapter 3.6.0, table 2). Coding has been carried out in NVivo to highlight relationships between AT elements. Within NVivo this coding was achieved following the following steps:

1. A complete set of coding themes and sub-themes were drawn out of the literature, structured on the 10 categories of capacity raising and innovation supporting activities in SME contexts from the literature see chapter 3.6.0, table 2).

²⁰ As discussed, an example page of these diaries included in the appendix (see Appendix A 12:11).

2. This complete set of coding themes were mapped into NVivo where they had node and sub-nodes created (QSR NVivo Help 2022a) – nodes and sub-nodes are a collection of references about a specific theme, topic, concept, idea, or experience, created by gathering references to that theme and by '*coding*' sources at that specific node or sub-node. The following steps were then taken:
 - a. Interview data coded - interview data sources were coded to connected nodes – an example in this current research is that any content related to the definition of innovation in small and medium sized enterprises within digital business sector contexts can be coded to a specific 'Innovation definition' node, and this also allows a node to be explored where all references to this theme can be seen in one place. Not all coding themes that were mapped from the literature were found to be evident in the case study data, and new coding themes emerged through the analysis.
 - b. The elements/dimensions of AT were created as principal nodes, and the node list above, structured on the 10 categories of capacity raising and innovation supporting activities in SME contexts of were repositioned through dragging and dropping these within NVivo so as to place them to be relative to the AT elements as sub-nodes of these.
 - c. This coding process provided the emerging definitions of the activities that form the AT elements – this means that a key understanding that has emerged is that these dimensions are defined through the process of analysis and are relative to the innovation system of the small and medium sized enterprises within the digital business sector considered within the research project itself; this means that elements such as AT Tools when considered through the words and lived experience of the data subjects can be found to be such things as a '*network*' or the having a process in place for re-valuation, and connected actions that can be applied to these to leverage value also emerge through the analysis. This finding is discussed in further detail in the chapters that follow and within the results and contributions of this current research thesis.
3. A coding of relationships between nodes (QSR NVivo Help 2022b) was carried out – in effect a second coding phase - to map the relationships that were present between the

unilateral and multilateral dimensions of the AT model – within NVivo relationships tracking can be used to consider how project data is connected.

- a. Within this current research as discussed above, coding was carried out at the individual node level (see the example in point 2a, above, the example of a *specific 'Innovation definition' node*).
- b. Relationships between node references were then as part of this process stored in the *Relationships* folder under the *Nodes* group in the NVivo Navigation View.
- c. Furthermore, relationship types were stored and classified as *Relationship types* (this process creates a folder of relationship classification groupings - labelled as a *Classifications* group in Navigation View). These relationships, within NVivo, are made up of three parts, these being, "*from*", "*to*" and the "*type*" of relationship. To align the data analysis to AT, relationships between project nodes have been created through choosing project nodes that are involved in the relationship, and through selection of a relationship type. These relationship types indicate the nature of the relationships, which have been mapped to the relationship types within the AT model. So, for example, when adding a relationship, this is defined following the structure as below:

i. Unilateral (e.g., *AT Object relationship to AT Outcome*) 

21

ii. Multilateral (e.g., *AT Tools relationship to AT Subject*) 

iii. Associative (*Anna 'knows' Ken*)  - that said, it should be noted though that there are no Associative Relationships within the AT model, so this is not reflected withing this current research.

- d. Finally, as with other types of coding, such as NVivo nodes, these relationships can be explored where all references to a relationship can be seen in one place.

Below there are screenshot figures of how the coding was carried out to map to the elements of the AT model discussed in earlier chapters.

²¹ It should be noted too thought that this is the only unilateral relationship within AT, and in this research, this highlights the specific post-innovation outcomes of Digital Business SMEs.

Nodes							
Search Project							
Name	Files	References	Created On	Created By	Modified On	Modified By	
Community		2	13 31/05/2019 22:48	RMD	01/06/2019 07:12	RMD	
Division of labour		2	12 31/05/2019 22:59	RMD	01/06/2019 07:12	RMD	
Object		1	25 31/05/2019 22:38	RMD	01/06/2019 07:12	RMD	
Outcome		2	70 31/05/2019 22:39	RMD	01/06/2019 07:12	RMD	
Rules		2	118 31/05/2019 22:48	RMD	01/06/2019 07:12	RMD	
Subject		2	38 31/05/2019 22:35	RMD	01/06/2019 07:12	RMD	
Tools		2	153 31/05/2019 22:48	RMD	01/06/2019 07:12	RMD	

Figure 10: Coding of the AT element

In the above figure the elements of AT were created as principal nodes, and the node list structured from the 10 categories of capacity raising and innovation supporting activities in SME contexts of were repositioned through dragging and dropping these to be relative to these AT elements as sub-nodes of these.

Relationships											
Search Project											
From Name	Type	To Name	From Fold	To Fold	Direction	Files	Referenc	Created	Created On	Modified	Modified On
Community	Community to division of l	Division of lab	Nodes	Nodes	↔	2	14	RMD	01/06/2019 07:	RMD	01/06/2019 14:
Community	Community to object	Object	Nodes	Nodes	↔	2	9	RMD	01/06/2019 07:	RMD	01/06/2019 14:
Division of labo	Division of Labour to Object	Object	Nodes	Nodes	↔	2	5	RMD	01/06/2019 07:	RMD	01/06/2019 15:
Object	Object to tools	Tools	Nodes	Nodes	↔	2	76	RMD	01/06/2019 07:	RMD	03/06/2019 09:
Object	Object to outcome	Outcome	Nodes	Nodes	↔	2	27	RMD	01/06/2019 07:	RMD	07/09/2019 12:
Rules	Rules to community	Community	Nodes	Nodes	↔	2	21	RMD	01/06/2019 07:	RMD	07/09/2019 14:
Rules	Rules to object	Object	Nodes	Nodes	↔	2	41	RMD	01/06/2019 07:	RMD	08/09/2019 15:
Subject	Subject to rules	Rules	Nodes	Nodes	↔	2	15	RMD	01/06/2019 07:	RMD	09/09/2019 09:
Subject	Subject to object	Object	Nodes	Nodes	↔	1	11	RMD	01/06/2019 07:	RMD	09/09/2019 10:
Subject	Subject to division of labour	Division of lab	Nodes	Nodes	↔	2	2	RMD	01/06/2019 07:	RMD	09/09/2019 10:
Subject	Subject to community	Community	Nodes	Nodes	↔	2	5	RMD	01/06/2019 07:	RMD	09/09/2019 13:
Tools	Tools to subject	Subject	Nodes	Nodes	↔	2	40	RMD	01/06/2019 07:	RMD	09/09/2019 13:
Tools	Tools to Community	Community	Nodes	Nodes	↔	2	34	RMD	01/06/2019 07:	RMD	09/09/2019 14:

Figure 11: Coding of the relationship between AT elements

In the above figure the coding was revisited having mapped the relationships that exist in the AT model, and data that referenced the interaction between these elements was coded to the nodes that these relationships created as a second coding phase.

This chapter has introduced the pilot study as a concept, as well as provided a definition of a pilot study and explanation of the value and goal of piloting research. The pilot study within this current research has also been considered alongside the selection of the pilot case, the ethical considerations pre-data collection and the data collection itself. In the following section the results from this pilot phase are presented and discussed. In a later chapter, drawing on assumptions from the pilot study data, a qualitative survey has been used to check the strength of

agreement about the innovation enabling activities highlighted and nuanced in the pilot study, followed by a second case that is considered so as to further nuance the final framework deliverable and its dimensions.

6.0 Analysis, discussion, and findings from initial pilot study.

The chapter that precedes this has presented a rationale for piloting, covering the theoretical backgrounds of pilot studies, considering the goal of carrying out the pilot study, alignment to the aim, objectives, and research questions, and the coding method that has been used within NVivo to ensure alignment of analysis to the AT model. Moving forwards, this following chapter will present and discuss findings from the initial pilot case. The data analysis that will be presented will evidence the unique contribution of this research to this stage. This will set the stage for the later stages of this thesis by describing primary ideas and their alignment to theory. These are presented with their potential theoretical, practical and knowledge contributions throughout the chapter.

The pilot case study is a 2015 founded Northwest based, UK Health fashion brand selling B2B and B2C through ecommerce, selling around the world through their website, which is available in English, Spanish and German, and other online platforms. Their main business focusses are on U.K., USA, Australian, Spanish, and German markets and have offices in both Germany and the USA. Within the Companies House Register the initial pilot case uses multiple Standard Industrial Classification (SIC) codes²² (GOV.UK 2022d) to reflect how their business activities are varied, complex and cannot be described by a single code, and reflect the small and medium sized enterprises within the digital business sector definition, being listed as:

- 63110, Data processing, hosting, and related activities
- 46160, Sale of textiles, clothing, fur, footwear, and leather goods
- 86900, Other human health activities

The company has a single managing director and 8 employees as of July 2022. A summary table of the pilot case is presented below:

²² In effect, as with the second case, self-describe themselves within the small and medium sized enterprises within the digital business sector definition.

Pilot case study summary table	
Description	• UK Health fashion brand selling B2B and B2C through ecommerce, selling around the world through their website, which is available in English, Spanish and German, and other online platforms. • Their main business focusses are on U.K., USA, Australian, Spanish, and German markets and have offices in both Germany and the USA.
Interviewees within case study data	1. Managing Director/Owner 2. Operations Manager 3. Associate (Digital Asset Management)
Length of time SME in operation	7 Years
Number of employees	8
Standard Industrial Classification (SIC) Codes	• 63110, Data processing, hosting, and related activities • 46160, Sale of textiles, clothing, fur, footwear, and leather goods • 86900, Other human health activities

Table 5: Pilot case study summary Table

The chosen and defined case is aligned to answering the central narrative enquiry; *How do small and medium sized enterprises within the digital business sector innovate?* Furthermore, interview responses are focussed on the activities that have enabled innovation within the business and provide data to be tracked to the AT model in response to the sub-questions of this current research. The data considered as part of this initial pilot study is inclusive of more than 8 hours of interviews, as well as participant observation recorded within the researcher's research diary.

The structure of this chapter is laid out as follows to consider all elements of the AT model systematically:

1. Below, chapter section 6.1 presents the steps supporting the analysis process.
2. 6.1.1 focusses on the AT Object, that being Innovation – it draws on the definition of innovation within SME contexts and using the data of the pilot study nuances a definition that reflects the specifics of small and medium sized enterprises within the digital business sector and their contexts. Section 6.1.2 through to section 6.1.6 will present data,

discussion, and findings in relation to interaction between the AT Object (Innovation) and the connected dimensions of the AT model as follows:

- a. Chapter section 6.1.2 considers relational analysis between AT Tools and AT Object. Engeström (1993, p. 67) defines AT Tools as the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. Through analysis of the interview’s factors linking Tools to the AT Object (that being innovation) have been examined. As discussed in the previous chapter, it is important to note that the analysis process of viewing SME innovation through an AT lens defines what these AT Tools are, relative to the model and the observations of the data subject. For example, AT Tools when considered through the words and lived experience of the data subjects can be found to be such things as a ‘network’ or the having a process in place for re-valuation and connected actions that can be applied to these to leverage value also emerge through the analysis and are discussed in this chapter. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
- b. Chapter section 6.1.3 considers relational analysis between AT Subject (the data subject and their understanding) to AT Object where the subject is defined by Engeström (1993, p. 67) as “*the individual or subgroup whose agency is chosen as the point of view in the analysis*”. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
- c. Chapter section 6.1.4 considers relational analysis between AT Rules (Rules are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”) and AT Object – as with other elements of AT, the analysis process of viewing SME innovation through an AT lens defines what these AT Rules are, relative to the model and the observations of the data subject. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.

- d. Chapter section 6.1.5 considers relational analysis between the AT Community and the AT object, where the AT Community are defined by Engeström (1993, p. 67) as “*multiple individuals and/or subgroups who share the same general object*”, and as with above, the analysis process of viewing SME innovation through an AT lens defines who these AT Community members are. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
 - e. Chapter section 6.1.6 considers relational analysis between the AT Division of labour and the AT object, where the division of labour is defined by Engeström (1993, p. 67) as “*both the horizontal division of tasks between the members of the community and to the vertical division of power and status*” and as such, this analysis highlighting factors connected to team dynamics and leadership within the innovation process. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
3. Chapter section 6.2.1 breaks down interactions of AT Tools with AT elements (excluding interactions with the AT Object, which is referenced above in the chapter structure). As discussed above, the analysis process of viewing small and medium sized enterprise innovation through an AT lens has defined these AT Tools. There are two sub-sections:
- a. Chapter section 6.2.2 presents relational analysis in relation between the AT Subject and AT Tools – this captures data about the application of the identified AT Tools of innovation (see above note about how the analysis process of viewing SME innovation through an AT lens defines what these AT Tools are) of small and medium sized enterprises within the digital business sector. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
 - b. Chapter section 6.2.3 presents relational analysis in relation to interactions between the AT Community and AT Tools – this captures data about how the AT Community share and interact with the AT Tools discussed in the process of innovating. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.

4. Chapter section 6.3.1 breaks down interactions between the AT Subject (excluding interactions with the AT Object and AT Tools, which have been referenced above in the chapter structure). As such it focusses further on the AT Subject (the data subjects within the case) within the innovation activity system of small and medium sized enterprises within the digital business sector. There are three sub-sections:
 - a. Chapter section 6.3.2 presents relational analysis in relation to interactions between the AT Community and the AT Subject, providing focus on the AT Community and its relationship to the AT subject. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
 - b. Chapter section 6.3.3 presents relational analysis in relation to the identified AT Rules to the AT Subject (also, see above points in relation to how the analysis process of viewing small and medium sized enterprise innovation through an AT lens has defined what these AT Rules are). Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
 - c. Chapter section 6.3.4 presents relational analysis in relation to AT Division of Labour and the AT Subject, capturing how innovation tasks are shared and processed. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
5. Chapter section 6.4.1 breaks down interactions with the AT Community (excluding interactions with the AT Object, AT Tools and AT Subject which have been referenced above in the chapter structure). There are two sub-sections:
 - a. Chapter section 6.4.2 presents relational analysis between the AT Rules and the AT Community, highlighting how the AT Community sharing innovation task and goals interact with the identified innovation AT Rules. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.
 - b. Chapter section 6.4.3 presents relational analysis between the AT Division of Labour and the AT Community, highlighting how tasks are allocated and shared within the AT Community that shares the same purpose, to innovate. Implications

of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section.

6. Chapter section 6.5.1 breaks down the interaction between the AT Outcome and the AT Object – this section focusses on the AT Outcome, in effect the impacts of the process of innovation in small and medium sized enterprises within the digital business sector. Unlike other elements within the AT model this analysis is unilateral as it only the AT Object that interacts with the AT Outcome in the AT model.
7. Chapter section 6.6 presents and detailed and critical summary. In this section a discussion of codes that have emerged through the analysis, as well as those that were not coded against is presented. Finally, the pilot case study data collection, analysis, and discussion chapter close.

6.1 The analysis

The analysis that follows presents empirically identified factors examined through in-depth open-ended interviews with the initial case study SME. The basis of questioning is grounded in:

1. The initial questions formed as the basis of the interview align to the forming of AT interview questions discussed in previous chapters (refer to 2.4.2 - Application of AT in this current research which are found in appendix A:12.4 of this document for reference. These are supported through extensive open-ended interviews that discussed in the point below.
2. The extensive open-ended interviews within the case focus and nuance the 10 categories of capacity raising and innovation supporting activities in SME contexts that were identified as part of the literature enquiry (refer to *table 2, Capacity raising and innovation supporting activities in small and medium sized enterprise contexts*, in chapter 3, section 3.6.0 - *Categories of capacity raising and innovation supporting activities*).
3. Subsequent codes were nuanced and emerged through the data collection and analysis; using NVivo, these in the have been coded and tracked to the AT model (refer to figure 1) using the process discussed in the chapter above (refer to 5.2.3 - The data collection).

4. The interview process was iterative within the pilot and involved both the *prolonged engagement* and *persistent observation* that was discussed within the methodology chapter with data from observations within the researcher's diaries woven into the analysis that follows within the narrative and footnotes of this analysis chapter.

6.1.1 AT Object: the innovation definition

Central and always relative to this current research is the definition of innovation for the small and medium sized enterprises within the digital business sector context. As discussed in the introduction to this chapter, this is considered the AT Object, “the ‘raw material’ or ‘problem space’ at which the activity is directed and which is moulded or transformed into outcome” (Engeström 1993, p. 67). Within interviews the word ‘innovation’ is used many times. A word cloud (see figure 12 below) has been produced to demonstrate the words used within the context of innovation.



Figure 12: Pilot case word cloud of innovation contextual words

This pilot case visualisation nuances definitions of innovation; within the word cloud we can infer that innovation is considered:

- To create something important needed by customers.
- Created in response to market feedback.
- Required for business growth.
- Grounded in knowledge, understanding, and learning from customers.

The literature inquiry of chapter 4.0 nuanced a definition of innovation for small and medium sized enterprises within the digital business sector contexts that ‘is predominantly incremental in response to the needs of customers’²³; a further nuanced post-pilot definition in small and medium sized enterprises within the digital business sector contexts, that reflects the data of the pilot study, can be expressed as:

‘Innovation is an act of creation generally in the form of a product or process and incremental in response to market feedback and understanding the customer need. It is aligned to vital business growth and evolution and its success or failure requires organisational commitment to innovation and a community of public and private sector organisations to leverage their human, social and financial capital values’.

This definition is expanded upon within the corresponding section of the following chapter. Focussing now on the responses in the pilot study, in the sections that follow below an analysis, viewed through AT is presented that examines how small and medium sized enterprises within the digital business sector innovate.

6.1.2 Relational analysis: AT Tools to AT Object

As discussed in the introduction to this chapter, Engeström (1993, p. 67) defines AT Tools as the “physical and symbolic, external and internal tools (mediating instruments and signs)” within

²³ This is the researcher’s definition as a response to the literature – see 3.5.1 A definition of innovation in SME

the research investigation. Through analysis of the interview's factors linking AT Tools to the AT Object (that being innovation) have been examined²⁴.

Within the pilot study an initial AT Tool²⁵ that was found to enable innovation was learning through the initially coded activities that 1). Identify and integrate external knowledge, and 2). Renew internal knowledge. The data subjects discussed how learning that enabled innovation was:

1. A reflective task – an ongoing function of past failure (“... *I failed. I did it again and I was learning throughout this process ...*”) and self-awareness where he (“... *understood my strengths and I understood my weaknesses ...*”) and even discussions which enable “... *refreshing my memories, making me think in different ways ...*”.
2. Driven by collaboration – through collaboration they found that they were more “*ready for our innovation ... [providing]... ammunition to be able to understand the market, to be able to raise enough capital to invest.*” Furthermore, gaining insight into how they operate; “... *what they do and sometimes do better. So, I learned from them as well, and what I can do better, you know ... their flaws*”.
3. Accessed through organisations supporting SMEs – for example, they say, “*There are a few different organisations for entrepreneurs ...that basically give mentorship and support in their office to help entrepreneurs and their businesses ... they were giving me ...one-to-one support as well as a lot of masterclasses on different aspects of learning about business ... they advise about marketing, about the Consumer Law and blah, blah, blah, so many different things that they were teaching us. I was getting access and use of this masterclass for free ...*” and absorbing knowledge, such as being “... *able to claim all those taxes back ... something that I didn't know, but with planning now,*

²⁴ As discussed in the previous chapter, the coding process provided the emerging definitions of the activities that are part of the AT elements - so a key understanding that has emerged is that these dimensions are defined through the process of analysis.

²⁵ As discussed in the introductory chapter, AT Tools are a function of the analysis in relation to the AT model and consideration of the words and lived experience of the data subjects within the activity system; as such an AT Tool can be found to be such things as a ‘*network*’ or the having a process in place for re-valuation, and connected actions that can be applied to these to leverage value also emerge through the analysis.

understanding what's available out there, and I'm doing everything with this knowledge in mind".

4. Accessed through public sector organisations supporting SME – for example, they say *"...I got a lot of support from some of the digital students from the University of xxxxxxxx, so we actually got them involved with different projects ..."* and because of this absorptivity raising their capacity to innovate where they now understand essential skill such as *"... what is H1 and H2 [and] why writing content is so important. I didn't have a clue ... and I'm going to have to have this knowledge."*
5. Renewed also through actively researching – for example, they says that we have *"... a world on the internet too, where to go and do research, and we can learn ..."*.

Within the pilot study an AT Tool that was found to enable innovation was organisational resources dedicated to innovation, coded through the activities of 1). Making investment, 2). Investment in equipment and 3). Early adoption. The data subjects discussed how resources enabled innovation through:

1. Investment in people – that was not always financial where, *"... the people that I invested in here were my students ... the students come and give their time for them to learn something, ... to say I've learned this, but actually I have done something that is for a good company ... what I will do then in return, I really do give my time, you know"*.
2. Financial investment to raise team knowledge– for example, they discussed having *"... paid this agency ... [to] ... teach everything that you know to this girl, she's going to be doing this ... and then [I can] let that student do everything."* This also allows the organisation to retain this absorbed knowledge.
3. Planning for future investment and innovation – the data subjects discussed how *"We've got to put more money into ... [helping] ... us to grow. Tomorrow, we're going to invest in translating the website into the different languages ... it will change things."*
4. Investment in equipment – for example, they discussed *"... going to China ... to find the right manufacturers ... to create a relationship to invest in."*
5. Early adoption – the data subjects discussed how this has enabled them to make *"... new and different [that] will give us the edge against the others"*.

Also, within the pilot study a further AT Tool that was found to enable innovation was embeddedness within networks, coded through the activities of 1). Exploiting networks, 2). Accessing network resources and 3). Dividing risk and cost through the network. The data subject discussed how this enabled innovation through:

1. Exploiting networking opportunities – the data subjects discussed how he “*saw the ... head of BBC in one of these events ... which gave me contact with two of the main producers ... we are now in contact we are having this story going onto the BBC soon ...*”.
2. Creating platforms to exploit network relationships – they continued to talk about platforms through which to exploit network connections – “*I came across ... social media and I realised how important [it] is because ... a New York distributor came and started distributing our products ...*”
3. Leveraging network relationships – the data subjects discussed how “*... there’s a lot of things ... we achieve ... [where] ... I don’t even pay a penny ... it allows me to access a resource or split a cost*”. Also, collaboration with network relationships also provides “*more understanding of the markets ... and ... opportunity ... to create something new [and] generate Capital for our project.*”.

Within the pilot study another AT Tool found to enable innovation was strategic working with organisations offering institutional support for SME innovation, and the coded activity identification of relevant support. The data subjects discussed how this enabled innovation through:

1. Attributes of organisations – the data subjects talked extensively about “*organisations we work with*”. He discussed the attributes of private sector organisations that they sought to work with, saying “*... he was in love with my idea ... [and] said, ‘my goodness this is going to be ... fantastic ... you will be doing something amazing ... I ended up starting the business with them and he was my one-to-one manager, and he did give me the support that I needed, one-to-one support that I needed ... I needed twenty thousand*

pounds finance in order to ...I got that approved within one hour.” This highlights how enthusiasm and one-to-one support are desired attribute of supporting institutions and that identification of the most relevant creates further innovation enabling values such as generating finance.

- a. Other public sector organisations created value through training and one-to-one support *“as well as a lot of masterclasses on different aspects of learning about business ... I was getting access and use of this masterclass for free, and it was funded by the European Union.”*
 - b. Furthermore, a value is placed upon ongoing support where the data subjects says organisations are *“[they are] giving me lots of support every time [they] come here ... and without that mentorship, that partnership, our business would have not been here.”*
2. Demonstrating support – the data subjects found evidencing support enables creation of business relationships saying how organisations *“... respect that we have support ...”*

A further aspect within the pilot study highlights another AT Tool found to enable innovation, that being strategic innovation planning and the coded activities 1). Planning and designing processes to remain competitive, b). planning reduction of risk, c). alignment of planning to business strategy and, d). formalising innovation design and planning. The data subject discussed how these enabled innovation through:

1. Planning and designing processes to remain competitive – the data subjects discussed the reflective nature of this activity and how *“... we always think about making something new ...”* linking this to remaining competitive where *“... if you stay still, you will never compete with your competition, and they will always swallow you”*. This also shows how innovation is seen as a planned approach to the reduction of risk.
 - a. Furthermore, they discussed planned investment of *“... translating the website into the different languages ... [creating] ...a platform for other countries and that ... will change things.”*
2. Alignment of planning to business strategy – the data subjects also discussed various alignments of innovation to the business strategy where they will be *“... using the*

materials which are also eco-friendly and ... be able to reuse our recyclable materials [and] recycled packaging soon ... [as] part of how we give back to the community”.

3. Formalising innovation design and planning – the data subjects discussed the process for innovation where he has a “... *completely new innovation, which I’m why I am going to patent it... “which is seen as a necessary expense as the “... concept is expensive to patent, to create ...”*
4. Planning reduction of risk – the data subjects discussed strategically partnering with a competitor for as “*long is needed ... [to create] enough ammunition to be able to understand the market, to be able to raise enough capital to invest ...”*

A final aspect within the pilot study highlights another AT Tool found to enable innovation, that being organisational re-evaluation of process and coded activities that a). create strategies, processes and tools, and b) assess need to innovate. The data subjects discussed how these enabled innovation through:

1. Re-evaluation of process – the data subjects discuss again the value of reflection in innovation, which is a recurring theme within the interview data. For example, he says, “...*you start innovating, you start creating the things you start doing things different than other people, because ... [then we] try to copy off other people ... but how far can you go? [You ask yourself] is there a way of doing something better and more innovative?”*
2. Create strategies, processes, and tools – the data subjects see formalisation of strategy and implementation to be “*part of our innovation plan ... because ... when you want to become something in a country, for example ... Germany ... you want to approach the ... market the best way ... you have got your website in German to ... make [it] a more friendly ... German platform. So, we need to invest in that and then ... be ready to enter a new market ...”* resulting in business growth.
3. Assess the need to innovate – the data subjects discussed the value of creating feedback loops as a tool for re-evaluation and future innovation “... *so people could directly give us feedback about our products which we didn’t have before.*”
 - a. Furthermore, they discussed how feedback from end-users enabled innovation in his business model saying, “*So ... we had ... people from America, from Ireland,*

Portugal ... [and] ... I would say, sorry we don't have this yet. So, we realised ... we realised there was a problem. We realised that we needed to do something different." This once again returns to the value of reflection in the innovation process.

This analysis has implications for small and medium sized enterprises within the digital business sector employing these tools through actions that enable innovation within their organisation.

These are:

1. In relation to supporting capacity building through leaning SME should:
 - a. Develop reflective practices to past failures²⁶.
 - b. Collaborate with competitors to learn from their working practices²⁷.
 - c. Engage with organisations supporting SME innovation²⁸.
 - d. Access support from public sector and educational establishments to absorb knowledge through knowledge exchange²⁹.
 - e. Actively research new ideas and solutions that answer the needs of the customer.
2. In relation to innovating through developing resource to support capacity building:
 - a. Invest in people, although it possible that this investment does not always involve financial investment³⁰.

²⁶ Research diary note: The data subjects talked extensively about learning from failures and iteratively improving how they approached innovation.

²⁷ Research diary note: The data subjects discussed this in early interviews as something he intended to do, and by the final interview had begun a new collaboration through the discussion and was very excited by learning not only from them but through access to their customers and learning about their market.

²⁸ Research diary note: This is something that the interview subject found of the highest importance, having been through Business Growth Hub support and various Chamber of Commerce schemes which had allowed them to scale up their business and had led to creation of new products and services.

²⁹ Research diary note: The data subjects talked extensively about close working with HEI as an enabler of his innovation success, and how at all times they now sought partnership or created student opportunities to work on development of his products and services, an example being that there were multiple students working on multilingual site development, and new marketing strategies as part of their research. Furthermore, since completion of interviews they have been in contact several times about student projects and research. Finally, as a result of this current research's active involvement they had made a number of changes week to week, for example discussions of collaboration with competitors had developed into actual new product development.

³⁰ Research diary note: This was an emerging code, but an activity that the data subjects saw as very important, and connected to their extensive knowledge exchange activities that have already been discussed. For example, they had achieved a great deal of success in innovation through a student wanting to test ideas, or through conversation with this researcher where they had discussed their research and they had fed these forwards.

- i. Make financial investments in training that enables absorption of knowledge³¹.
 - b. Create an investment plan for future innovation.
 - c. Invest in equipment and adopt early to allow innovation ahead of the market.
3. In relation to creating networks to support capacity building:
 - a. Engage with network events to create opportunities to collaborate³².
 - b. Create and develop platforms for conversations with customers and engage with network opportunities³³.
 - i. Leverage networks to access resources or collaborations which enable splitting costs, learning about the market, or generating capital for future investment³⁴.
4. In relation to capacity building through strategic working with organisations offering support for SME innovation:
 - a. Engage with public sector organisations offering training (one-to-one support and masterclasses)³⁵.
 - b. Demonstrate and discuss the support you receive to your networks to leverage their organisation social capital³⁶.
5. In relation to capacity building through strategic innovation planning:
 - a. Plan strategic investments to align to your overall business strategy.

³¹ Research diary note: Where a student had worked on a project sometimes they had paid for specific training by external organisations that had been valuable to student, but also had allowed them to create a new product or service, or in many cases marketing innovation to allow them to extend their reach.

³² Research diary note: Acting as a networker was clearly very important and the data subjects stressed many times that this had created opportunities that led to innovation, for example working with new organisations that needed new product and services.

³³ Research diary note: At the start of the interview process the data subjects were already exploiting various platforms, and throughout was developing this, for example a student project that was looking at marketing through Instagram had led to sales in the USA, the need to create a supply chain solution and this has finally resulted in the creation of a USA Office. It was clear from them that establishing value through platforms was a key route to innovation.

³⁴ Research diary note: As discussed a connection to a collaborator was leading to a new product but had also resulted in splitting costs, learning about the market of the competitor, or generating capital through discussion with their bank who were actively supporting this product development innovation.

³⁵ Research diary note: This was very important within the case study data, as the data subjects actively discussed training schemes that they had been involved in that had led to innovation with their process, and also introduction of new platforms and marketing innovations.

³⁶ Research diary note: This is anecdotal to the pilot study data, although it resulted in an emerging code that was explored further in the following cases. The pilot study data subjects felt it was critically important to demonstrate the quality of your network and talked about this within his business strategy.

- b. Plan strategic collaborations that enable reduction of risk.
- 6. In relation to capacity building through organisational re-evaluation of process:
 - a. Formalise an innovation strategy.
 - b. Create feedback loops to communicate with users of your products and service to better understand their needs³⁷.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.1.3 Relational analysis: AT Subject to AT Object

As discussed in the introduction to this chapter, the AT Subject is defined by Engeström (1993, p. 67) as *“the individual or subgroup whose agency is chosen as the point of view in the analysis”*.

Within the pilot study the relationship between the data subjects and innovation was considered with the interviewees talking frequently about how the business operator needed to be *“the person behind the idea, the machine, that is the brain, it is the motor you know, of the idea”* so as to drive innovation.” A factor found to enable innovation found were characteristics of the data subject through the initially coded activities that 1). Demonstrating commitment to innovation, 2). Demonstrating a positive attitude to risk, and 3). Having past work experience. The data subject discussed how their characteristics enabled innovation through:

1. Demonstrating commitment to innovation – the data subjects find this to be essential aligning this to resilience, mental stability, and hard work – *“that resilience, mental resilience, is a key for them, it shows that they are ... willing to do things differently”* and *“you need to have ... mental stability, and you need to be a hard-working person. You know, there is no shortcut without hard work.”*

³⁷ Research diary note: This is something that had clearly led to innovation with the interview data subjects discussing how creation of feedback loops (for example he discussed Social Media/Trustpilot) had led to better understanding of markets and the creation of new products and service.

- a. Such commitment is demonstrated in future planning and action – “*I’m thinking ... there are a lot of other innovations though ... we could do in future which has nothing to do with what we are doing now ... you become more and more innovative through doing things differently and new. It’s all about what your goal and motivation is going to be*”. This is aligned to attitude, which is discussed below.
2. Demonstrating a positive attitude to risk – the data subjects discuss their change in business which effected “*sellers who buy from you, or the distributors who buy from you, when you start to compete with them you will risk making them upset ...*” “and also collaboration with a competitor being a risk but providing benefits of “*more understanding of the markets ... and ... opportunity ... to create something new [and] generate Capital for our project.*”. He also discussed how in previous innovations he has failed, and this had enabled future innovations.
 - a. The literature supports the data subjects who said that attitude to work was also an enabler of innovation – he said “*You know, if I would not have been getting up in the morning at five o’clock in the morning, and really settling down constantly to do the work and to carry on, you know, like that, I would not have been able to achieve what I have achieved*” and to quality through being “*perfectionist in order to make sure that what we create is right.*” This also reflects the need to demonstrate commitment to innovation discussed previously.
3. Having previous work experience – this data subject saw this as an enabler of innovation and growth allowing the rapid winning of “*a contract with NHS, to work with the Christies Hospital*” shortly after starting the enterprise.

This analysis has implications for small and medium sized enterprises within the digital business sector, where developing these characteristics and attitudes may enable innovation within their organisation. These are that they should:

1. Demonstrate commitment to innovation.
2. Take thought out risks.
3. Make use of past work experience.

4. Demonstrate positivity in attitude to the business³⁸.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.1.4 Relational analysis: AT Rules to AT Object

As discussed in the introduction to this chapter, AT Rules are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”.

Within the pilot study an initial AT Rule³⁹ whose application was found to enable innovation was requiring the identifying and leveraging networks of value. The data subjects discussed how the constraining AT Rules enabled innovation through:

1. Requiring identifying and creating collaborative network relationships – the data subjects discussed the importance of creating these opportunities, so “... *suddenly we were doing something amazing working with them ... it’s all about understanding who is the right person to approach*”.
 - a. The data subject discussed what he felt required to do to create relationships of value saying “... *I don’t get paid ... when I do talks, or I give advice ... or do whatever ... I give something and in return access to their networks ...*” acknowledging that value is created through these where “... *there’s a lot of things ... we achieve in our ... business, ... [where] ... I don’t even pay a penny [but] it allows me to access a resource or split a cost, it is something I often can do.*”.

³⁸ Research diary note: This forms an emerging code, and is an aspect that the pilot data subject discussed in great detail, saying that their positivity in all things they do has enabled them to grow their business through new connections that have led to innovation.

³⁹ As discussed, as with other elements of AT, the analysis process of viewing SME innovation through an AT lens defines what these AT Rules are, relative to the model and the observations of the data subject. Implications for Digital Business SME of this analysis are presented at the end of this section.

- b. In relation to creating relationships with HEI following this AT Rule has enabled specific innovations to occur where they have got “... *a franchise using German students, Italian students, Polish students [doing] digital marketing in the language of the different market.*”
2. Requiring the development of meaningful relationships from networks – for example, the data subjects discussed how a business “... *in Budapest ... sent us an email ... they ... [met] ... one of our customers, they ... [have become] ... our B2B customer because of that ... referral from the B2C customer, the end-user ... accounts that have opened because of that ...*”

Furthermore, within the pilot study an AT Rule whose application was found to enable innovation was management of the innovation process. The data subjects discussed how this constraining AT Rule enabled innovation through:

1. The process requires management – the data subjects discussed how they would manage the process saying – “...*I’ve got a timescale that I need to follow to do things. I have ... steps, that I need to take*” and “*it’s all about ... planning ... well ahead ... to understanding what things you need ... to understand what resources you need to supply, the finances, the people involved ... to be able to create something new*”.
- a. Particular processes such as IP protection is discussed as part of this, where the data subjects say “... *I will do some IP on that because we are creating something new ... you have to do that, have a timescale for that to get approved because you can’t just put things out ... we establish a patent with IP number, so we know it is protected ...* “
 - b. R&D is defined as an AT Rule – the data subjects indicate that this process aligns and enables innovation, production, and commercialisation to occur, for example saying “*this means that we need to make a prototype, then we need to basically get actual samples and then we need to give this to some customers to test it ...*” and “...*if feedback for a product is amazing, then, then we go on to production ...*” contributing to the development of concepts.

2. The process requires management of the team – for example, the data subjects discuss how for innovation to occur he has “*managed everything with the right people in your team and delegating those responsibilities ...*”
3. The process require management of production – for example, the data subject discusses the “*...need to have trust in your suppliers ... you give the instructions about ... the prototype that you are developing and what you want that to look like that, they need to be trusted to do as you require*” and then to manage the relationships, saying “*... You are going to do this this ... and this is our timeframe. And I will be ... overseeing everything*”.

Finally, within the pilot study an AT Rule whose application was found to enable innovation was involving the end-user in generation of ideas the development innovation. The data subjects discuss how the constraints of this AT Rule:

1. It is necessary to communicate with the end-users – for example, the data subjects say they realise the values of “*... a way to approach our end-user ... before we had our website only for our B2B market, but then we understood that we need to approach [and] get to our end-users ...*” because it is “*important how you communicate with your end-users all the time, ... getting their feedback and doing things [in response].*”
 - a. They discuss the need to enable easier and more natural ways to communicate with the end-user and involve them, for example saying “*... I realised how we can push our words through our website. So, we are making our websites to be translated into German or Italian ...*”
2. Communicate with the end-user for idea generation - “*...if feedback for a product is amazing, then, then we go on to production*” but that it is essential as “*... people may say to us it may not be the right thing ...*”
 - a. They continue indicating that ideas are a function of communication with end-users that enables innovation, saying “*... we had ... feedback ... they ... [wanted] ... to be able to directly buy from us. So, we knew, and we needed to think about doing something fast, quickly, what we could create in order to be able to fulfil those requirements and through that ... initial idea, we knew it was*

an opportunity for us ... because obviously we could get direct ... contact ... with ... customers and users... [and] ... feedback from them ... it was amazing that we could have this.”

3. Test ideas and leverage feedback from the end user – the data subjects discuss how this is an enabler of innovation saying “... *we’re going to... test the market and see what the response is ... and understanding [of] what the end-user wants ... then we will be able to innovate.*”

This analysis has implications for small and medium sized enterprises within the digital business sector and AT Rule actions that they could follow that may enable innovation within their organisation which are further nuanced in the chapter that follows. These are:

1. Identify and create meaningful relationships and collaborative network relationships of value and leverage resources.
2. Implement a formal process for managing innovation (which is inclusive of formal steps such as IP protection and R&D, team, and supplier management).
3. Create methods to communicate with and generate ideas from the end user⁴⁰.
 - a. Test ideas and leverage feedback from end users⁴¹.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.1.5 Relational analysis: AT Community to AT Object

As discussed in the introduction to this chapter, the AT Community are defined by Engeström (1993, p. 67) as “*multiple individuals and/or subgroups who share the same general object*”.

Within the pilot study an initial AT Community member found to enable innovation were the

⁴⁰ Research diary note: Nuanced Emerging theme. The data subject talked extensively about experimenting with and growing his platforms to communicate and generate ideas from existing customers. Although in the literature this is recommended, the data subject was testing and growing the suite of methods for this communication.

⁴¹ Research diary note: Emerging theme; the data subject discussed how establishing a process for testing ideas and getting feedback into iterative development of products and services had enabled them to successfully innovate.

organisation's public sector network. The data subjects discussed how this AT Community, sharing the same AT Object of innovation had enabled this:

1. Within the public sector AT Community are HEI – the data subjects discuss how they had leveraged value from an HEI saying *“I am now part of the university itself ... I don't get paid for when I do talks, or I give advice to students, or do whatever I do, but I give something, and in return and the university is giving me an amazing place and access to their networks”* which in turn has given him and access to the knowledge of the student cohorts who *“do things that I never thought possible. These actions enable innovation within the organisation.*
2. Within the public sector AT Community are organisations that have exiting social capital value – the data subjects indicate how choice of public sector network AT Community members have enabled opportunities to innovate with others in the network: *“Business Growth Hub ... University of xxxxxx, all these are great partners of ours ... [and] ... the NHS respect that we have support ... ”.*
 - a. The interviewees discussed who these AT Community members are and the values of their public sector organisational support for innovation – *“There are ... different organisations for entrepreneurs ... [that] do different things. I was wanting ... one of them ... Entrepreneurial Spark ... give mentorship and support in their office to help entrepreneurs and their businesses. Then there was Business Growth Hub and ... the Chamber of Commerce was one of the larger ones.”*
 - b. The data subjects found that selection of public sector organisational support focused on competitiveness and innovation provided value, for example, saying *“... they were giving that one-to-one support as well as ... masterclasses on different aspects of ... business. In addition, they advise about marketing, about the Consumer Law ... so many different things ... I was getting access and use of this masterclass for free and ... I understood something, that the government, for example, they give a lot of support for research and development through claiming back tax. So, we are now doing things in a way knowing that we are going to be able to be able to claim all those taxes back ... ”* and technical support where *“they also had some organisations to recommend to us ... [and] ...*

training and it's what we needed. So, I had a better understanding what platform we need[ed]”.

Within the pilot study a further AT Community member found to enable innovation were the organisation's private sector network. The data subjects discussed how this AT Community, sharing the same AT Object of innovation had enabled this:

1. Within the private sector are banking services – the data subjects discuss how these have enabled innovation, saying, *“I needed twenty thousand pounds finance in order too, in order to create that collection, to bring it in. I got that approved within one hour.”*
 - a. The interviewees also talked about values of the private sector networks being more than simply finance or technical. *“I was ... networking [with the] ... head of the Santander ... Then ... my banker says look, I've got this great idea [and] ... he put me in touch [with] ... their head of a marketing ... suddenly we were doing something amazing working with them”.*
2. Within the private sector are suppliers and competitors – the data subjects had leveraged value demonstrating an absorptive capacity enabling innovation activity from a private sector collaboration where *“... they will just act like a supplier to us. ... We are going to be using them ... this then will give us opportunities to understand how big the sales opportunities [are] ... this kind of gives us a little bit more understanding of the markets, a better up-to-date understanding and that gives us opportunity to be able to create something new and also, this first stage will generate some extra capital for our project.”*

This analysis has implications for small and medium sized enterprises within the digital business sector, AT Community network relationships they should form that may enable innovation within their organisation and the values these offer which are nuanced in the following chapter. These are:

1. Create links to and engage with universities.
2. Create links to and engage with innovation supporting public sector organisations.

3. Create links to and engage with banks and exploit networking opportunities as well as finance.⁴²
4. Create links to competitors and collaborate strategically⁴³.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.1.6 Relational analysis: AT Division of Labour to AT Object

As discussed in the introduction to this chapter, the AT Division of Labour is defined by Engeström (1993, p. 67) as “*both the horizontal division of tasks between the members of the community and to the vertical division of power and status*”. In the above section we have considered the larger AT Community, and now the internal dynamics of the team are analysed. Within the pilot study the data subjects discuss how organisational human resources enable innovation to occur:

1. Creation of a power structure – the data subjects discussed the power structure within the team and the value this created in completion of innovations, saying “... *when you have that right team it is all about, like everything else in business, it is all about delegation. You know that if I give a task to a person and another to another person you need to have the trust that they can deliver these things.*” And that “*team staff members, our staff, that’s one of the keys ... I mean, you know, having a person who understands, they have the same passion like you, who has got the capabilities that, you know, you need and fully can use to improve the business*”.

⁴² Research diary note: This coding emerged as part of the interviews and was not highlighted within the literature and 10 categories of capacity raising and innovation supporting activities in SME contexts.

⁴³ Research diary note: This emerging code is a nuance of the coding developed from the literature – the data subjects were keen to stress that collaborating with competitors had allowed them to learn about new markets and to bring new products to market at speed with associated reduction in risk.

- a. They have the vision of how the innovation will take shape – the data subjects discussed the team and *“the vision I have and what I want to create and ... who is going to be behind me with this vision”*.
- b. Achieves innovation success through human capital in role as a mentor – *“... they have got this idea and they say I want to do this and I tell them you should do this and they start to shine ... then they become uninhibited and that’s how ... passionate people in your team ... create order. Let them do what they do great. And trust them.”*
- c. They define tasks and roles saying *“they work with us and help us, they, you they know different aspects of the platforms, not mainly making the website, but through ... content, creating content, improving the website and making it more SEO friendly. Or marketing campaigns around our website such as paid advertising [like] pay-per-click.”*
- d. They manage the completion of tasks within the team: *“Then you need to have the trust in your team. If you give them the task in order for them to, for example, do this market research, or do this part of the project, and do this design for me, that they are going to do a great job and how, by understanding the capabilities of those individuals and managing them”*

This analysis has implications for small and medium sized enterprises within the digital business sector and how team dynamic act as an enabler or innovation and the division of labour within the team that are nuanced in the following chapter. These are:

1. Create a hierarchical structure within the team⁴⁴.
2. Have a plan for innovations.
3. Complete innovations through reflecting on capabilities of the team⁴⁵.
4. Define team tasks and roles.

⁴⁴ Research diary note: Nuanced emerging theme – it is noted that in the literature there are themes focussed on SME internal organisational structures, but the pilot case data stressed the need for clear hierarchies.

⁴⁵ Research diary note: Nuanced emerging theme – the data subjects clearly link innovation as function of reflection on team capabilities, and discusses the ways in which he has either upskilled or augmented the teams as a response to reflection.

5. Manage completion of tasks within the team.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.2.1 AT Tools: mediating artefacts to the innovation process

As discussed above, Engeström (1993, p. 67) considers AT Tools the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. The below analysis considers the alignment of AT Tools to the AT Subject (section 6.2.2) and the Community (section 6.2.3). Within the following analysis various contradictions, a characteristic of AT, arise that nuance understanding of how innovation happens in small and medium sized enterprises within the digital business sector.

6.2.2 Relational analysis: AT Subject to AT Tools

The following analysis discusses characteristics of the data subject in relation to application of the AT Tools of innovation identified within the earlier sections of this report. As stated above, the subject is defined by Engeström (1993, p. 67) as “*the individual or subgroup whose agency is chosen as the point of view in the analysis*”. Within this interview data is captured thoughts and feelings of the data subjects about the application of the AT Tools of innovation discussed and contradictions within the innovation process:

1. Resistance to using AT Tools to enable network embeddedness – for example, the data subjects say how with “... *social media, I was very much against it ... you need human contact ... especially because I’m a person-person.*”
 - a. The data subjects realised, through re-evaluation of processes driven by implementation of innovation, value from embeddedness in networks – he says “... *I’m a good seller ... because I’m a passionate person and people buy from passionate people, and people buy from people who believe in what they’re selling ... then I came across the social media and I realised how important that*

platform is ... we put a picture on Instagram, the next day a New York distributor came and started distributing our products, and wow, how small the world is now we can see video of our products in New York."

- b. The data subjects talks extensively about the AT Tool of network embeddedness, and developing this is a key activity which he aligns to his characteristics- *"... the key to networking ... [is] ... confidence to be able to network with anybody ... that is important ... I always treat my business like I treat my own family life ... it is important how you value your friends and family, and how you network with them. This is a way that I have always done my business and I still do this now. In business, I always look at it in a way."* This is something that is part of his character, and he says, *"it's so easy to do, you go on Eventbrite and you want to go to something that is attractive to you, and you go in there, and you just basically start being there and actively involved, and you just go and talk to people."*
2. In relation to leveraging value from ownership characteristics the data subjects' past work experience allow them to *"see opportunities, and that's a gift, and you need to be able to understand who is important to you to network with, you know, what's the benefit of you seeing that person"*; in turn this enables value creation form forming new network relationships, leveraging network embeddedness. For example, they say *"I like to go out there and say hello ... so we can do something together and to build that relationship."*
 - a. Furthermore, they find that their characteristics are an enabler in the building of relationships and evidence their commitment to opportunity and acceptance of risk – *"I never had that shyness ... So, will that conversation end-up as the start of something good or not? That's a chance, you have to just take it."*
3. In relation to the entrepreneur's nature and the AT Tool of strategic working with organisations, the data subjects acknowledge that *"success [is] not just because of me ... I may be the person who is behind ... the business, ... the motivator of this company ... [but] everything happens because of the ... great organisations we work with ..."* He is aligning organisational success in completing innovations to his leveraging of strategic working with organisations of value and his networking activities discussed above – this

further evidence the owner characteristic commitment to innovation through establishing relationships.

4. The data subjects' commitment to innovation is considered in relation to the AT tool of strategic investment – he gives examples such as “*we’re going to invest in translating the website*”, “*we invest in people*” and commit “*capital to invest in our website*”, “*because it allows us to invest more into the business*” in the future and further supports the innovation enabling value of commitment to an organisational growth strategy.

This analysis has implications for small and medium sized enterprises within the digital business sector ownership and their employing of innovation enabling AT Tools that are nuanced in the corresponding section of chapter 7. These are:

1. The subject should be open to adoption of AT Tools.
2. The subject when implementing innovation should reflect on the process.
3. The subject should develop personal skills to network.
4. The subject should use past experience to assess risks and commit to strategic investments.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.2.3 Relational analysis: AT Community to AT Tools

The following analysis discusses characteristics of the data subjects in relation to the AT Community identified within the earlier sections of this report. As stated above, the AT Community are defined by Engeström (1993, p. 67) as “*multiple individuals and/or subgroups who share the same general object*”. Within this interview data is captured the data subjects and their thoughts and feelings about the AT Community and how the AT Tools discussed in the sections above enable innovation to occur:

1. The relationship between the public sector AT Community and their use of AT Tools – the data subjects discussed issues with the AT Tool of strategic planning that enabled increased competitiveness and innovation – *“We ... were getting busier ... because we have the B2B market already and were moving to B2C ... the difficult challenge for me was ... time management and delegating things ... because I was doing everything ... so it was all about you know finding the right team ... knowing what their capabilities are and getting them to delegate more.”* Strategically working within the public sector network of a university was an enabler of innovation and business growth.
2. How the AT Community share access to AT Tools – the data subjects discussed shared access to strategic innovation planning and how he designed processes to align to this and enable innovation – he says, *“We’ve got the WhatsApp group ... we always use [because its] much faster than email keeping each other updated with all the progress that we were making.”* The interviewees talked about creating processes to communicate with the AT Community about innovations that:
 - a. Enable the AT Community to rapidly innovate – *“we put them on this group, and we will keep communicating ... that person now could finalize the next project and you know for example this person was creating content and then this other person was creating the keyword research ...”*
 - b. Share resources and communicate with the AT Community – *“Dropbox ... had all our files in Dropbox and everything was shared in that folder so we could we were anytime we were updating files or updating notes or we were making changes we were updating the shared folder of Dropbox and then we were keeping each other informed about the changes that we’ve made.”*
 - c. Clarify communications – *“... you can write to email and ... try to describe ... your work ... perhaps ... you need ... pictures ... [with] ... some arrows ... and an explanation ... I simply just create a video and I send a video with my explanation over that product whatever I want to talk about ... it works much more efficient ... and it works really well when things would have gone wrong in your innovation process.”*
3. The private sector AT Community access to AT Tools – the data subjects discussed enabling communication of strategic innovation planning saying *“Sometimes ... I now*

communicate in my factory with WhatsApp ... if I have problems in my factory, I create a video ... look there is a discrepancy ...” As with the public sector networks, strategic proactive applications of AT Tools support technical issues with product innovation.

There are implications for small and medium sized enterprises within the digital business sector and how they can support the AT Community through the AT Tools discussed to enable innovation to occur. These are:

1. Strategically working with HEI (within the public sector At Community) can enable innovation and business growth.
2. Create processes to communicate the strategy with the AT Community sharing innovations to:
 - a. Enable the AT Community to rapidly innovate.
 - b. Share resources with the AT Community.
 - c. Clarify communications.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.3.1 AT Subject: the individual’s perspective

As discussed above, Engeström defines the AT Subject as (1993, p. 67) *“the individual or subgroup whose agency is chosen as the point of view in the analysis”*. The below sections consider the alignment of the AT Community to the AT Subject in the completion of innovations and in the AT Rules applied to achieving success in the implementation of innovation.

6.3.2 Relational analysis: AT Community to AT Subject

As stated above, the AT Community are defined by Engeström (1993, p. 67) as *“multiple individuals and/or subgroups who share the same general object”*. The following analysis considers the AT Community and its relationship to the subject:

1. Strategic selection of AT Community members creates values that raise competitiveness and capacities to innovate – the data subjects say “...you ... *have to always choose the right-minded people with a positive attitude or who are able to be understood, who understand, who have the same mentalities, the same willingness as you, like you, who are ready to do things, you know, the doers, you know.*” Shared AT Community values create environments which enable innovation – the data subjects say “... *I selected those organisations ... because ... we have got the same understanding and principles*”.
2. Essential shared values that enable innovation within the AT Community are trust, quality, and knowledge of the organisations from past work experience and shared commitment to innovation – these enable collaborative innovation, technical knowledge sharing and splitting of financial risk.
 - a. Trustworthiness – “... *we need to have, to always to have the understanding of who we are dealing with, know that they’re sincere, honest, open, especially in this market and I mean you know I work with it, you know, you can end up working with unknown countries with unknown cultures, and you know that you may not know how they do things*” ...
 - b. Knowledge of their ways of working “... *this company I am working with I knew over the 15 years I was working my previous job, I knew them very well, we were at exhibitions all the time, we would see each other.*”
 - c. Shared commitment to innovation – “*I had great respect for their products ... the way that they do things ... they were they were always perfectionists*”.
3. Human relationships created by the business operator within the AT Community create values that enable capacity building and innovation – data subjects say “*I actually went there, to each bank ... to meet and see a real manager ... to talk to someone ... about my passion, about what I’ve got and done, the vision I have and what I want to create and see who is going to be behind me with this vision.*”
 - a. AT Community relationships enable generation of resource – the data subjects discuss how “... *we ended up opening a contract ... I needed twenty thousand pounds ... to create that collection ... I got that approved within one hour*”.

This analysis has implications for small and medium sized enterprises within the digital business sector operators and their AT Community relationships as an enabler of innovation activities that are nuanced within the chapter that follows. These are:

1. Identify AT Community members offering values and attributes that create an environment that raise capacities to innovate⁴⁶.
 - a. Trustworthiness
 - b. Previous knowledge of ways of working
 - c. Shared commitment to innovation.
2. Foster human relationships with the AT Community⁴⁷.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.3.3 Relational analysis: AT Rules to AT Subject

As stated above, AT Rules are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”. The following analysis considers the relationship between AT Rules identified in the earlier section of this report and the subject:

1. This subjects’ characteristics enable identifying networks, leveraging advantage from these and creating sustainable relationships for collaboration – they say “*... the key of networking ... confidence to be able to network with anybody ... I saw ... the head of BBC in one of these events and I said, ‘Excuse me, do you know I have got this great business? I think I am doing this, and that I think I should be able to go on the BBC and talk about this’ ... he said to me ... yes please tomorrow, which gave me contact with ... the main*

⁴⁶ Research diary note: The data subjects were very focussed on the shared values of the AT Community. This and the subsections below are nuanced themes that have emerged as a function of analysis through AT.

⁴⁷ Research diary note: The data subject was very focussed and discussed in detail the value of creating human relationships in all parts of the AT Community. This is a nuanced theme that has emerged as a function of analysis through AT.

producers ... we are having this story going onto the BBC soon". This strongly links the AT Subjects' characteristics to their capacity to innovate and innovation success.

- a. The subject can be uncomfortable with adoption of AT Tools that allow this to occur They discussed their fears and realisation of the need to accept new technologies – *"I realise ... that social media, I was very much against it ... I was thinking it was a waste of time and that you need human contact. You need to be with people, you need to be able to touch and feel and see and human nature reaction, and action is the only important part of who we are as a human."*
 - b. Yet, adoption is seen as an enabler of business growth and brand awareness *"I realised how important that platform is because ... we put a picture on Instagram, the next day a New York distributor came and started distributing our products ..."*. In turn, these enable creation and maintenance of relationships.
2. Knowledge of the industry space enables creation of sustainable relationships – *"There are so many organisations that want to get onboard with the NHS ... you've got the tender process to apply, lots don't know how ... then you need to have so many ... ISOs and ... ticks ... for them to be even considering you. And for me to be able after only six months to get a contract with the NHS, to work with the Christies Hospital, which is the most respected cancer charity organisation, is because of that, because of me being lucky enough to understand ..."*
 3. Communicating with the end user is made easier and clearer through his experience of the industry space – *"I did this over the course of 11 years ... by going seeing them ... understanding them, doing the analysis of the market ... of their what their requirements are ..."*
 - a. The data subjects discussed value of creating feedback loops with users of the products saying it is – *"important how you communicate with your end-users ... getting their feedback and doing things with that"*.
 - b. The data subjects discussed the introduction of technical solutions to enable further communication with these people: *"Trustpilot ... we put in place so people could directly give us feedback about our products which we didn't have before."* This introduction of technology mitigated communications he associates with increased business intelligence and capacity to innovate: *"I had then had a direct*

contact with the end-users. Before I had to rely on [the] NHS ... to give me feedback ... sometimes I would never get it that was ... a game changer ... because it gave us ... knowledge ... power”.

4. The AT Subject needs project management practices, a process for managing innovation and its dependencies, with the data subjects saying – “... *it’s all about, again, planning ... well ahead and to understanding what things you need ... what resources you need to supply, the finances, the people involved ... all those things ... to create something new*”
 - a. The subject and his relation to the management of external relationships and timeframes for innovation projects – the data subjects say “... *you need to have trust in your suppliers ... you give the instructions about what the prototype that you are developing and ... they need to be trusted to do as you require ...in a timely ... manner, then you are able to decide how to do it. This is how I do this, so, for example, my next project ... you are going to do this this and this and this is our timeframe. And I will be kind of overseeing everything ... our timeframe is that by 2020, latest mid 2020 that we will need to finalise this project*”

As discussed above, Engeström defines AT Rules as (1993, p. 67) “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”. This analysis has implications for small and medium sized enterprises within the digital business sector operators and their application of the AT Rules identified in the earlier section of this report, which are nuanced in the chapter that follows. These are:

1. The AT Subject needs to have or develop skills enabling identifying networks, leveraging advantage from these and creating sustainable relationships for collaboration.
 - a. The subject needs to realise the benefits through early adoption of digital tools that support the identified AT Rules.
2. The AT Subject should demonstrate their knowledge of their industry space within networks to enable the creation of sustainable relationships for collaboration.
3. The AT Subject should maximise their knowledge of the industry space in their communications with the end user.

- a. The AT Subject should implement and create value through feedback loops to communicate with the end user and where there are digital tools supporting that they should realise the benefits through early adoption.
4. The subject should develop project management skills for managing innovation internally within the organisation and within their external relationships.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.3.4 Relational analysis: AT Division of Labour to AT Subject

As stated above, the Division of Labour is defined by Engeström (1993, p. 67) as *“both the horizontal division of tasks between the members of the community and to the vertical division of power and status”*. The following analysis considers the relationship between the division of labour as discussed earlier within this report and the subject:

1. Throughout the interviews, it was evident that the interviewees considered there was a difference in superiority and roles within the team. It can be seen how the ownership consider that their role within the process is focussed on management and motivation – *“when you have that right team ... it is all about delegation ... I give a task to a person and another to another person ... [and] ... need to have the trust that they can deliver these things”*
 - a. The interviewees discussed their process and thoughts about motivation of the team – *“it is important to understand their passion and why they’re there ... I sit with them ... and I realise ... they’ve got the raw talent for a certain thing and ... they become uninhibited and through passionate people in your team and they create order. Let them do what they do great. And trust them.”*

This analysis has implications for small and medium sized enterprises within the digital business sector operators relating to the relationship between the AT Division of Labour and the AT Subject as discussed earlier within this report which is expanded upon in chapter 7. These are:

1. Create a formal team structure that enables team motivation.
2. Project management practices should be applied with the team.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.4.1 AT Community

As discussed above, Engeström defines the AT Community as (1993, p. 67) “*multiple individuals and/or subgroups who share the same general object*”. The following section will consider the AT Community and its relationship to the AT Rules of innovation and the AT Division of Labour. The definitions of these have been discussed in the earlier sections of the report with their specific analysis in relation to the AT Community is presented below:

6.4.2 Relational analysis: AT Rules to AT Community

The analysis below considers the relationship between the AT Community and AT Rules, “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*” (Engeström 1993, p. 67).

1. The data subjects apply the AT Rule of leveraging the network through an AT Community sharing the same AT Object, these being the organisation’s innovations – for example, they discuss how “*students are creating content ... in their own languages. So, you know we have got a franchise using German students, Italian students, Polish students. They do all the digital marketing in the language of the different market.*”
2. The data subjects apply the AT Rule of project managing of the innovation processes within the AT Community – “*... when you ... work ... with factories ... a lot ... in China*

and India and of course you know the ... first language ... is not English. So, I learned a way to make sure that it's so important the communication needs to be as clear as possible ... I always kind of doubled and troubled my explanation every time. Okay so this is what I mean. Did you understand is it all clear. Any questions? So ... we do a lot of voice messaging on the on ... WhatsApp ... I'll explain clearly and they will go back to it. If they could not understand it, then they could ask the questions." Furthermore, application of this aligns with the AT Rule of demonstrating commitment to creating and maintaining relationships.

- a. They further discussed application of the AT Rule to create relationships through the AT Rule of leveraging the network – *"LinkedIn was a great platform ... you have access to these amazing contacts and then you Send them a quick message and ... make things happen."*
3. The data subjects discussed the AT Rule of involving the end-user AT Community in the innovation process. They discussed, for example the move to a B2C business model: *"... I decided to ... make on our platform, an area ... where we sell to the end-users"*.
 - a. This creates an opportunity to involve others from the user base within this innovation *"where we actually promoted our ... distributor ... they could now understand the reason behind our motives to start selling online but the fact that we were giving them the support too was great, we reached out on our social media and started to promote ... for example, on Instagram ... as soon as we started promoting ourselves as selling B2C, we asked them, can you please send us a picture ... so we could start promoting you ..."*.

This analysis has implications for small and medium sized enterprises within the digital business sector SME operators and their application of the identified AT Rules within the AT Community sharing the same innovations in its value in creation of future relationships which are further nuanced in chapter 7. These are:

1. Leveraging the network through the AT Community enables creation of future relationships for business growth.

2. Project managing the innovation processes within the AT Community demonstrates commitment to creating and maintaining relationships.
3. Involving the end user enables the creation of relationships with potential and other user bases.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

6.4.3 Relational analysis: AT Division of Labour to AT Community

The analysis below considers the relationship between the AT Community and AT Division of Labour, that being *“both the horizontal division of tasks between the members of the community and to the vertical division of power and status”*.

There is little new that has not been discussed within previous sections of this analysis although the data subjects discussed the team, their role and the owner role in managing them, and the value they gets from the team AT Community saying how the *“... team staff members ... that’s one of the keys ... we call them the xxxxxx family ... [some have] now gone to London and Nigeria ...and they’re still working with us from those places ... we invest in people ... we invest time and our passion in them, and they give back”*. In line with previous analysis:

1. The AT Community are part of a defined power structure through which tasks are completed – the data subjects discussed this power structure withing the team and the value this created in completion of innovations, saying *“... when you have that right team it is all about, like everything else in business, it is all about delegation. You know that if I give a task to a person and another to another person you need to have the trust that they can deliver these things”*.
 - a. The AT Community achieve innovation success through tasks allocated by the owner/entrepreneur, although the data subjects are flexible to how tasks are approached – *“... they have got this idea and they say I want to do this and I tell them you should do this and they start to shine ... then they become uninhibited*

and that's how ... passionate people in your team ... create order. Let them do what they do great. And trust them."

- i. The AT Division of labour within the AT Community requires definition of tasks and roles "*... mainly making the website, but through ... content, creating content, improving the website, and making it more SEO friendly. Or marketing campaigns around our website such as paid advertising [like] pay-per-click.*"
- ii. The division of labour involves completion of tasks by the AT Community: "*... you give them the task in order for them to, for example, do this market research, or do this part of the project, and do this design for me*". This is completion of tasks is reflected in the external AT Community, for example suppliers where the data subject discusses giving "*the instructions about ... the prototype that you are developing and what you want that to look like that ... You are going to do this this ... and this is our timeframe*".

This analysis has implications for small and medium sized enterprises within the digital business sector operators and how tasks are allocated and completed by the AT Community which are expanded upon within the following chapter. These are:

1. The AT Community benefit from a power structure that defines how the labour will be divided.
 - a. The AT Community require the allocation of tasks contributing to completion of innovations.
 - b. The AT Community share a purpose in completion of tasks contributing to completed innovations.

These implications for small and medium sized enterprises within the digital business sector have been carried through to the following chapter where they have been considered alongside the survey data and literature.

The AT Outcome is a function of the AT Object which is to ‘innovate’ – as such this analysis is unilateral, considering actual impacts of the process of innovation and success in completion of innovations.



- Understanding user needs and market agility: furthermore, the data subjects discussed how because of successful innovation “*we have got a great network of data and users on our platform signed up, and we are in contact with them, and we ... can get feedback instantly from them. We can really understand what their requirements are ... it is a*

constructive feedback ... that we are then able to take on board and we use this to make improvements or make changes and then we know what we need to bring in next season.” This in turn leads to readiness for further innovation “*focused primarily on our end-user*”, such as innovation with website languages to increase relevance to target markets, for example: “*to approach the German market the best way is if you have got your website in German ... so we need to invest in that and then, then be ready to enter a new market, a larger B2C a new market.*”

- Increased ideas and insight: the data subjects discussed that by innovating with business models towards B2C “*... we could also see the trends in ... orders*”. Furthermore, collaboration increases insight and ideas leading to future commercial product ideas with lower level of risk during R&D: “*this then will give us opportunities to understand how big the sales opportunities through our B2C platform for wigs are ... [this] gives us ... more understanding of the markets ... and ... opportunity to be able to create something new ... also this first stage will generate some extra capital for our project.*”
- Better addressing the business environment and increased competitiveness in new markets: the data subjects discussed, for example, how through innovation in distribution channels “*In the USA we have now got our products on Amazon Prime USA, meaning that the users tomorrow say, oh, I want this product, then click, then the day after it is in their house in Chicago, or ... in Los Angeles.*”
- Advantageous contradictions and unexpected outcomes, for example, marketing innovations were created through the process of innovating: “*... with the NHS patients ... we started to give ... our hospitals a leaflet with our pictures of our products ... and they promoted us to the patients who already had trust in our brand because they had already started to wear products from our brand ... we put a little note in there saying thanks for shopping, you can also order more designs online and here’s a discount code you can use at checkout. And that worked really well, we had a lot of orders from these mini campaigns using those codes. So that’s also how we knew that those customers who were buying from us from had come to us through the NHS*”

Completion of this current research will provide further insight into these outcomes of innovation. The following chapter will offer conclusions and recommendations in relation to the discussion above and considered alongside survey data and the literature that was reviewed.

6.6 Conclusion to pilot study.

It is, as discussed, as part of IS literature that this current research contributes, considering the small and medium sized enterprises within the digital business sector context systemically, with data that can be collected, filtered, and processed to understand the phenomenon of innovation within their context. Furthermore, there is a definitive boundary made up of elements such as users, processors, storage, inputs, outputs and network that forms the activities within the AT activity system. The pilot case study data viewed through an AT lens, has focussed on how innovation mediates change, and how the processes of innovation implementation impact small and medium sized enterprises within the digital business sector. It has exploited analysis of the pilot case study activity systems, examining emergent contradictions in work activities, which can be addressed through or arise through the innovation implementation process (see Allen et al. 2013).

The analysis has resulted in a series of basic recommendations for activities that support capacity raising and innovation for small and medium sized enterprises within the digital business sector, which are presented at the end of chapter sections – these recommendations have been carried forwards into the following chapter where they will be considered alongside survey data and the literature.

To this stage, relative to the Pilot Case study data, the following has been achieved through AT analysis:

1. A definition of innovation for small and medium sized enterprises within the digital business sector context based on the Pilot Case Study Data – this is: *'Innovation is an act of creation generally in the form of a product or process and incremental in response to market feedback and understanding the customer need. It is aligned to vital business*

growth and evolution and its success or failure requires organisational commitment to innovation and a community of public and private sector organisations to leverage their human, social and financial capital values’ (see chapter section 6.1.1).

2. A pilot study specific based definition of AT Tools of innovation and actions that can be taken to raise capacities to innovate and drive success in completion of innovations (see chapter section 6.1.2).
3. A pilot study specific based definition of SME ownership characteristics providing positive value in enabling raising capacities to innovate (see chapter section 6.1.3).
4. A pilot study specific based definition of AT Rules that should be applied to enable innovation (see chapter section 6.1.4).
5. A pilot study specific based definition of valuable AT Community connections that business operators can create to raise capacities to innovate and the values that they offer (see chapter section 6.1.5)
6. A pilot study specific based understanding of how innovation projects tasks are divided within the team (see chapter section 6.1.6).
7. A pilot study specific based understanding of not only the process of innovation within their context, but the tensions and contradictions that arise through implementation, where the value of AT analysis has revealed some of the unconscious enabling activities (see chapter sections 6.2.2, 6.2.3, 6.3.2, 6.3.3, 6.3.4, 6.4.2 and 6.4.3).
8. Pilot study specific based insight into the outcomes of completion of innovations (see chapter section 6.5.1).
9. Finally, a pilot study specific Figurative diagram illustrating post-pilot completed analysis and is found in Figure 14, below.

Furthermore, the below figurative diagram visualises the analysis process that has been completed so far:

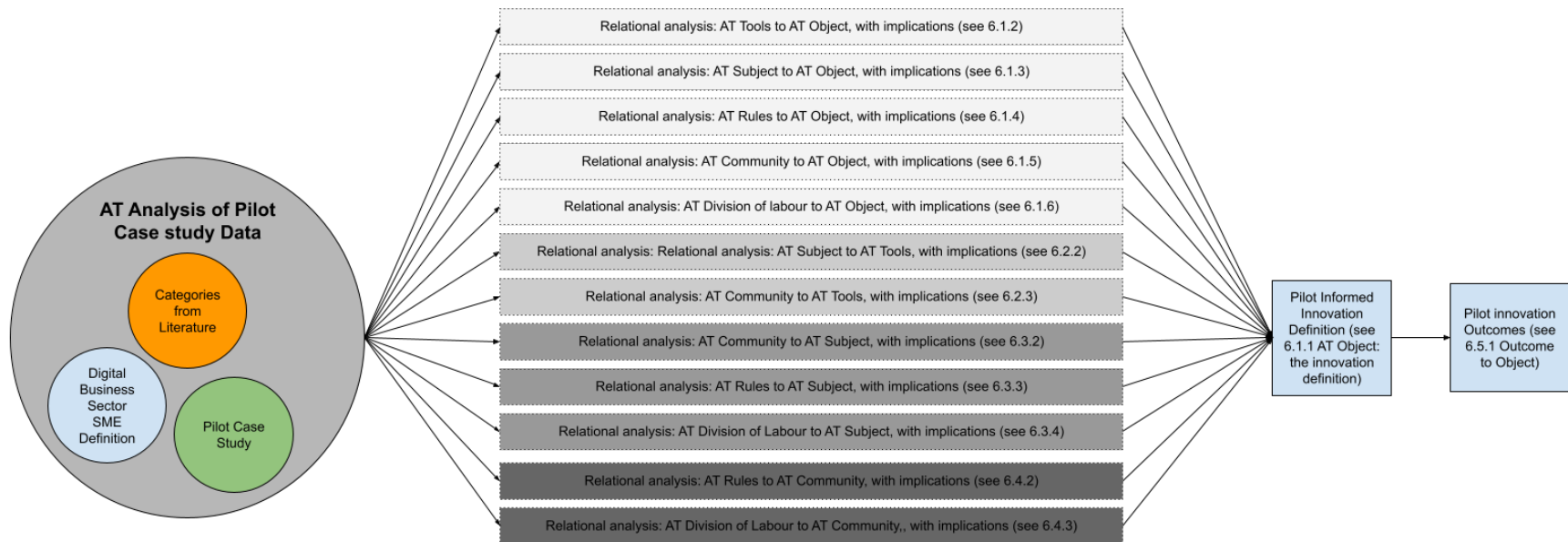


Figure 14: Figurative diagram illustrating post-pilot completed analysis

Furthermore, in relation to coding there were several observations and themes that have been nuanced and emerged, that are pertinent to raise at this stage, as these have been carried forwards into the following stages of this current research and reflected in the framework development:

1. Through the data analysis coding emerged around the theme of *Investing in people, although not always financially* - this was very important to the data subjects and was recorded in the research diary of note (for example, giving students opportunities to trial research ideas).
2. Through data analysis coding emerged around the theme of *Demonstrating/discussing support received to networks to leverage social capital* – this was noted too in the research diary where the data subjects felt it was critically important to demonstrate the quality of your network and talked about this within his business strategy.
3. Through data analysis coding emerged around the theme of *Demonstrating positivity in attitudes to business* – this was noted in the research diary note where the pilot data subjects discussed in detail, saying that their positivity in all things they do had enabled them to grow their business through new connections that have led to innovation.
4. Through data analysis coding emerged around the theme of *Creating methods to communicate with and generate ideas from the end user* – this was noted in the research diary, where the data subjects talked extensively about experimenting with and growing their platforms to communicate and generate ideas from existing customers.
5. Through data analysis coding emerged around the theme of *Testing ideas and leveraging feedback from end users* – this was noted in the research diary where the data subjects discussed in detail how establishing a process for testing ideas and getting feedback into iterative development of products and services had enabled them to successfully innovate.
6. Through data analysis coding emerged around the theme of *Creating/engaging with banks for networking opportunities* – this was noted in the research diaries where the data subjects talked about how banks had created collaborative relationships that had led to innovation.
7. Through data analysis coding emerged around the theme of *Creating links to competitors to collaborate strategically* - this was noted in the research diary where the data subjects

were keen to stress that collaborating with competitors had allowed them to learn about new markets and to bring new products to market at speed with associated reduction in risk.

8. Through data analysis coding emerged around the theme of *Creating a hierarchical structure within the team* - this was noted in the research diary where the pilot case data stressed the need for clear hierarchies. This is in effect a nuanced theme as literature does discuss SME internal organisational structures.
9. Through data analysis coding emerged around the theme of *Complete innovations through reflecting on capabilities of the team* - this was noted in the research diary as nuanced theme definition where the data subjects clearly link innovation as function of reflection on team capabilities and discuss the ways in which they have either upskilled or augmented the team as a response to reflection.

The implications drawn from the analysis have now been carried forwards as have the coding themes that have emerged or been nuanced. Having completed this stage, this research will move towards completion through the following steps:

1. In chapter 7 that follows, consideration will be given to survey data which will be aligned to the implications outlined in the pilot study and considered against the literature. This will consider how the data nuances understandings from the literature.
2. A second case study is considered and analysed in chapter 8 – this case study will be used to further nuance the research discoveries to date and augment the framework development in response to the data gathered.
3. A framework of enabling innovation activities will be produced and conclusions will be drawn that review the project in relation to contributions after which this research will close.

7.0 Survey results and discussion with alignment to the initial case and literature.

The chapter that precedes this has presented an analysis of the pilot case study data. The analysis that follows presents an examination of the factors discussed within the initial case study SME considered in the previous chapter and their alignment to a survey and the literature inquiry⁴⁸.

The survey was an extensive survey in length, taking 5 minutes on average to complete, that ran for a period of 3 months, that was developed and deployed through 5 large, that being with more than 5000 participating businesses, Northwest UK forums for small and medium sized enterprises within the digital business sector on the LinkedIn platform, gathering data through Microsoft forms, that are easy to share in such online forums – this survey was launched at the early stages of the pandemic and it should be noted that responses may be framed by this context, and the number of people prepared to respond is also perhaps a function of the global situation at that time; for reason the questions were less quantitative in nature, rather focussing on strength of feelings about hypotheses drawn out of the pilot study, and in this phase of the research a level of deductive reasoning has been applied, which has been discussed in the methodology chapter. Introductory text made clear who the survey was for and explained the process, and those that were recruited were given the opportunity to contact the researcher with questions⁴⁹.

The survey consisted of:

- A welcome message that explained the process (see appendix A 12:12).
- Questions that used Likert scales to assess strength of agreement in relation to discoveries from the pilot study.
- A free-text box was used through which the participants provided a definition of innovation in their business.
- Tick boxes were used through which participants could select specific activities that had enabled capacity raising and innovation.

⁴⁸ The complete survey data is found in the appendix (A12.13).

⁴⁹ In total 10 of the SMEs did have interest in the results and contacted the researcher, which reflects the ontological, educative, catalytic, and tactical values of this current research discussed within the methodology chapter.

- There were 52 responses to the questionnaire, although only 42 business provided definitions of innovation through the free-text box for their specific small and medium sized enterprises within the digital business sector businesses.

The aim of this chapter is not to restate but nuance the definitions that came out of the initial pilot case, and so this chapter that follows is structured to mirror the one that proceeds it. The data analysis that will be presented will evidence, strengthen, update, and nuance the unique contribution of this research to this stage. This will also set the stage for the final stages of this thesis. The structure of this chapter is laid out as follows to consider all elements of the AT model systematically:

1. Below, chapter section 7.1 introduces the analysis process in this chapter.
2. 7.1.1 focusses on the AT Object, that being Innovation – it draws on the definition of innovation within small and medium sized enterprises brought forwards from the pilot study and nuances a definition that reflects small and medium sized enterprises within the digital business sector contexts through the free text entry of the survey. Section 7.1.2 through to section 7.1.6 will present data, discussion, and findings in relation to interaction the AT Object (Innovation) and the connected dimensions of the AT model as follows:
 - a. Chapter section 7.1.2 considers relational analysis between AT Tools and AT Object. Engeström (1993, p. 67) defines AT Tools as the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. Through analysis of the interview’s factors linking AT Tools to the AT Object (that being innovation) have been examined.
 - b. Chapter section 7.1.3 considers relational analysis between AT Subject (the data subjects and their understanding) to AT Object where the subject is defined by Engeström (1993, p. 67) as “*the individual or subgroup whose agency is chosen as the point of view in the analysis*”.
 - c. Chapter section 7.1.4 considers relational analysis between AT Rules (AT Rules are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations,*

norms and conventions that constrain actions and interactions within the activity system”) and AT Object.

- d. Chapter section 7.1.5 considers relational analysis between the AT Community and the AT Object, where the AT Community are defined by Engeström (1993, p. 67) as *“multiple individuals and/or subgroups who share the same general object”*, and as with above, the analysis process of viewing SME innovation through an AT lens defines who these AT Community members are.
 - e. Chapter section 7.1.6 considers relational analysis between the AT Division of labour and the AT Object, where the AT Division of Labour is defined by Engeström (1993, p. 67) as *“both the horizontal division of tasks between the members of the community and to the vertical division of power and status”* and as such, this analysis highlights factors connected to team dynamics and leadership within the innovation process.
3. Chapter section 7.2.1 breaks down interactions of AT Tools with AT elements (excluding interactions with the AT Object, which is referenced above in the chapter structure). As discussed above, the analysis process of viewing SME innovation through an AT lens has defined these AT Tools. There are two sub-sections:
- a. Chapter section 7.2.2 presents relational analysis in relation between the AT Subject and AT Tools – this captures data about the application of the identified innovation supporting AT Tools (see above notes about how the analysis process of viewing SME innovation through an AT lens defines what these AT Tools are) of small and medium sized enterprises within the digital business sector.
 - b. Chapter section 7.2.3 presents relational analysis in relation to interactions between the AT Community AT Tools – this captures data about how the AT Community share and interact with the AT Tools discussed in the process of innovating.
4. Chapter section 7.3.1 breaks down interactions with the AT Subject (excluding interactions with the AT Object and AT Tools, which have been referenced above in the chapter structure). As such it focusses further on the AT Subject (the data subjects within the survey) within the innovation activity system of small and medium sized enterprises within the digital business sector. There are three sub-sections:

- a. Chapter section 7.3.2 presents relational analysis in relation to interactions between the AT Community and the AT Subject, providing focus on the AT Community and its relationship to the AT Subject.
 - b. Chapter section 7.3.3 presents relational analysis in relation to the identified AT Rules to the AT Subject (also, see above points in relation to how the analysis process of viewing SME innovation through an AT lens has defined what these AT rules are).
 - c. Chapter section 7.3.4 presents relational analysis in relation to AT Division of Labour and the AT Subject, capturing how innovation tasks are shared and processed.
5. Chapter section 7.4.1 breaks down interactions with the AT Community (excluding interactions with the AT Object, AT Tools and AT Subject which have been referenced above in the chapter structure). There are two sub-sections:
 - a. Chapter section 7.4.2 presents relational analysis between the AT Rules and the AT community, highlighting how the AT Community sharing innovation task and goals interact with the identified innovation AT Rules.
 - b. Chapter section 7.4.3 presents relational analysis between the AT Division of Labour and the AT Community, highlighting how tasks are allocated and shared within the AT Community that shares the same purpose, to innovate.
6. Chapter section 7.5.1 breaks down the interaction between the AT Outcome and the AT Object – this section focusses on the AT Outcome, in effect the impacts of the process of innovation in small and medium sized enterprises within the digital business sector. Unlike other elements within the AT model this analysis is unilateral as it only the AT Object that interacts with the AT Outcome in the AT model.
7. Chapter section 7.6.1 presents a detailed and critical summary to the chapter which includes chapter section 7.6.2 a first iteration that visualises the dimension of the framework that has been produced through the AT analysis so far.

7.1 The Analysis

The analysis that follows brings forwards the implications that have been drawn from the previous chapter, the pilot study, to be compared with the survey data and key literature of this current research.

7.1.1 AT Object: the innovation definition

Carried forwards from the previous chapter, the data suggested that in the pilot case a clearer definition⁵⁰ of innovation in small and medium sized enterprises within the digital business sector and their contexts was:

‘Innovation is an act of creation generally in the form of a product or process and incremental in response to market feedback and understanding the customer need. It is aligned to vital business growth and evolution and its success or failure requires organisational commitment to innovation and a community of public and private sector organisations to leverage their human, social and financial capital values’.

The survey provides further nuance to the definition of small and medium sized enterprises within the digital business sector. Figure 15 below visualises as a word cloud the definitions of innovation of 42 small and medium sized enterprises within the digital business sector.

⁵⁰ This is a definition created as a function of the research.



Figure 15: NVivo Word-Cloud visualisation of the definitions of innovation of 42 small and medium sized enterprises within the digital business sector.

In avoidance of making this a quantitative analysis the word-count frequency has been included simply for reference in Appendix A:12.10. Using high-frequency words it can be inferred that a further nuance to the definition of innovation in small and medium sized enterprises within the digital business sector is:

‘New creative services, technologies, practices, processes, products and ideas that better respond to client needs and offer them improvements, developed in collaboration with the market and business communities.’

From this, it would be possible to infer that innovation:

- Is a developmentary, evolutionary, creative act in response to the market and client needs.
- It may be a *product*, *service*, or *process*.
- Is supported through *community* collaboration.

This means that a further nuanced definition of innovation in small and medium sized enterprises within the digital business sector and their contexts can be summarised as:

'New creative services, technologies, practices, processes, products, and ideas that better respond to client needs and offer them improvements, developed incrementally in response to collaboration with the market and business communities.'

This definition, which has been refined in the two stages until now, is further developed in the chapter that follows and will output a contribution, that being a nuanced definition of innovation in small and medium sized enterprises within the digital business sector.

Focussing now on the responses from the survey results, in the sections that follow below an analysis, viewed through AT is presented that examines further how small and medium sized enterprises within the digital business sector innovate.

7.1.2 Relational analysis: AT Tools to AT Object

Conclusions from the pilot case study have been aligned to the literature with reference to the data to produce clear implication and recommendations. These are:

Capacity building through leaning		
Implication from Pilot Case Study	Literature	Survey
a. Develop reflective practices to past failures. b. Collaborate with competitors to learn from their working practices. c. Engage with private sector organisations supporting SME innovation. d. Access support from public sector and educational establishments to absorb knowledge through knowledge exchange. e. Actively research new ideas and solutions that answer the needs of the customer	a. Research (Romijn & Albaladejo 2002; Dziallas & Blind 2019; Rampa & Agogué 2021) finds ownerships experiences enable management of innovation in SME contexts. b. Forsman (2011), Freel (2003), Martínez-Román et al. (2021) and Temel & Forsman (2022) find SMEs who collaborate can also be able to leverage the advantages of their network relationships. c. Cohen & Levinthal (1990) find organisations need to absorb knowledge (supported by Tsai 2001; Fogg 2012; Fabrizio et al. 2021; Pi et al. 2018) and in doing so create competitive advantage based on knowledge. d. Research (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019) finds that SME prefer developing networks directly linked to their market rather than partnering within HEI or the public sector. e. Salerno et al. (2014), Tidd & Bessant (2020), Van de Ven et	a. Strongly associates learning to manage innovation as a function of past failure with 73% agreeing or strongly agreeing. b. Supports that successfully innovating is enabled by collaboration with 74% agreeing or strongly agreeing. c. Less agreeance that external organisations offering support have enabled innovation with only 40.3% agreeing or strongly agreeing. That said this indicates that there has been some value provided through such organisations. d. SMEs have engaged less with the public sector and educational establishments, although of the sample half had been helped to innovate with the help of the public sector with only 50% agreeing or strongly agreeing that this had provided value. e. Strong level of agreeance within the survey that Digital Business Sector SME have innovated through actively researching products and services with 75% agreeing or strongly agreeing with its value.

	al. (1999), Magistretti et al. (2020) and Roach et al. (2016) find that innovative SME are active in research that identifies ideas.	
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Table 6: Implications for small and medium sized enterprises within the digital business sector – Capacity building through learning

Based on this analysis it is possible to provide a simplistic ranking to these implications from what small and medium sized enterprises within the digital business sector have done within their responses to the survey and alignment to the literature:

1. Actively research new ideas and solutions that answer the needs of the customer
2. Collaborate with competitors to learn from their working practices.
3. Develop reflective practices to past failures.
4. Access support from public sector and educational establishments to absorb knowledge through knowledge exchange.
5. Engage with organisations supporting SME innovation.

Points 1 to 3 have the highest levels of agreeance and recalling the pilot case study that these are important factors. That said, factors 4 and 5 are clearly supported in the literature considered which finds that SMEs by nature avoid public sector and educational support (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019) and need to but struggle to identify relevant support (Cohen & Levinthal 1990; Tsai 2001; Fogg 2012; Fabrizio et al. 2021; Pi et al. 2018); furthermore, in contrast the pilot case study had had significant innovation success through access to support. These factors are interrogated further through the analysis of the second case in the chapter that follows this.

Innovating through developing resource to support capacity building		
Implication from Pilot Case Study	Literature	Survey
a. Invest in people, although it possible that this investment does not always involve financial investment. i. Make financial investments in training that enables absorption of knowledge. b. Create an investment plan for future innovation. c. Invest in equipment and adopt early to allow innovation ahead of the market.	a. Qian & Li 2003; Terziovski 2010; Meier 2021; Hilmersson & Hilmersson 2021 find SME gain advantages through innovating enabled by disruptive thinking (Birchall et al. 1996; Boly et al. 2014; Prasanna et al. 2019; Heilmann et al. 2020) of skilled employees. i. Adams et al. (2006) and Darroch (2005) finds that learning and absorption of knowledge play a crucial role in capacities to manage innovation (and this is found still in more recent works such as Thomas et al. 2017; Hassan & Raziq 2019) and research (Keskin 2006; Lee & Tsai 2005; Nonaka 1991; Pi et al. 2018; Marshall et al. 2020) finds these are enablers of innovation. b. Formalised planning enables innovation success (Mazzarol & Reboud 2009; Berman et al. 1997; Porter 1991; Mazzarol & Reboud 2020).	a. Strong levels of agreeance that investment in people has enabled innovation within the survey with 59.6% either strongly or very strongly agreeing in its value. i. There is significant neutrality, 34.6% of the sample, in relation to value of investment in training in successfully innovating. b. Agreeance that it had been necessary to plan the creation of innovative products and services with 75% of the sample agreeing of strongly agreeing in the value of planning. c. Less agreeance, with only 51% of the sample either agreeing or strongly agreeing that equipment investments have enabled innovation to occur.

	c. Research (Birchall et al. 1996; Boly et al. 2014; Garcia & Calantone 2001; Koc 2007; Hervás-Oliver et al. 2021; Jibril et al. 2021) finds that investment in specialised equipment which increases accuracy is an enabler of innovation capacity building, with others suggesting that high-quality, specific equipment investment maintains innovativeness.	
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Table 7: Implications for small and medium sized enterprises within the digital business sector – Innovating through developing resource to support capacity building

Based on this analysis it is possible to provide a simplistic ranking to these implications based on responses to the survey and alignment to the literature:

1. Create an investment plan for future innovation.
2. Invest in equipment and adopt early to allow innovation ahead of the market⁵¹.
3. Invest in people, although it possible that this investment does not always involve financial investment.
 - a. Make financial investments in training that enables absorption of knowledge.

This sort of ranking is not overly contrasting with that of the pilot case who were clear that all these aspects had been valuable in enabling them to innovate. What is of interest is that the pilot data subjects discussed how investment in people and finding mechanism to train as necessary had enabled innovation, whereas the data from the survey link people to innovation yet places less value on training.

⁵¹ Arguably though the survey was neutral on this, so potentially numbers 2 and 3 could be interchangeable.

Creating networks to support capacity building		
Implication from Pilot Case Study	Literature	Survey
a. Engage with network events to create opportunities to collaborate. b. Create and develop platforms for conversations with customers and engage with network opportunities. i. Leverage networks to access resources or collaborations which enable splitting costs, learning about the market, or generating capital for future investment.	a. Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999 highlight how networks act an enabler of SME innovation. b. See above literature. i. Access to resources and division of risk and cost can be achieved through the networks (Gronum et al. 2012; O'Regan et al. 2006; Lasagni 2012; Pittaway et al. 2004; Lin & Lin 2016; Prasanna et al. 2019).	a. 41.6% of the sample agreed or strongly agreed that innovation required access to networks, which in turn provides resource and skills. That said there was significant levels of neutrality (34.6%) and lesser levels of disagreement (19.2%). b. Agreeance that communicating with clients has enabled innovation and learning to innovate has been a response to feedback with 82.7% agreeing or strongly agreeing. i. Agreeance (75% either agreeing or strongly agreeing) that collaboration with organisations and 41.6% either agreeing or strongly agreeing that being part of a business network has enabled Digital Business Sector SME to innovate.

Table 8: Implications for small and medium sized enterprises within the digital business sector – Creating networks to support capacity building

Based on this analysis it is possible to provide a simplistic ranking to these implications based on responses to the survey and alignment to the literature:

1. Create and develop platforms for conversations with customers and engage with network opportunities.
 - a. Leverage networks to access resources or collaborations which enable splitting costs, learning about the market, or generating capital for future investment.
2. Engage with network events to create opportunities to collaborate.

This corresponds clearly with the patterns of the pilot case data, although it was clear that the pilot case study data subjects were clearly aware of networking as an enabler or opportunities to innovate. Furthermore, there are also specific nuances in relation to this analysis that were drawn out specifically through the primary data collection:

1. It was noted within the research diaries that this was an area of focus and value creation for the pilot study data subject.
2. It is only within the primary data from the pilot study and survey, within the SME's definitions of innovation, where developing platforms are specifically mentioned.
3. It was specifically within the data from the pilot study that learning about the market and generating capital through collaboration were initially highlighted.

Capacity building through strategic working with organisations offering support for SME innovation		
Implication from Pilot Case Study	Literature	Survey
a. Engage with public sector organisations offering training (one-to-one support and masterclasses).	a. Darroch (2005), Pi et al. (2018) and Marshall et al. (2020) find SME increase their knowledge capital through identification and integration of external knowledge.	a. Agreeance that public sector organisations have enabled innovation with various key factors identified as help received: i. Coaching – 23% of sample. ii. Financial aid supporting tax incentives – 38% of sample. iii. Networking – 61% of sample. iv. Technical support – 27% of sample

Table 9: Implications for small and medium sized enterprises within the digital business sector – Capacity building through strategic working with organisations offering support for SME innovation

There is a specific nuance in relation to this analysis that was drawn out specifically through the primary data collection, that being:

- A discussion of the value of demonstrating and discussing the support you receive to your networks to leverage their organisation social capital was anecdotal to the pilot study data, although it is explored further in the following case.
- Also, within the research diaries it has been noted that the pilot study data subjects felt it was critically important to demonstrate the quality of your network and talked about this within his business strategy.
- This has been carried through to the framework development.

Capacity building through strategic innovation planning		
Implication from Pilot Case Study	Literature	Survey
a. Plan strategic investments to align to your overall business strategy. b. Plan strategic collaborations that enable reduction of risk.	a. Sundbo (1997), Adams et al. (2006) and Casidy et al. (2020) suggests that the SME innovation strategy should align with the overall business strategy to support organisational competitiveness which is supported by other research. (Leonard-Barton 1992; Teece et al. 1997; Teece 2007; Tidd & Bessant 2020). b. Collaboration is found to enable SME innovation (Gronum et al. 2012; Keizer et al. 2002; Lasagni 2012; Rybnicek & Königsgruber 2019).	a. Strong and very strong acceptance that organisations realise the value of innovation through planning (75% of sample) and then that investment in people (59.6% of sample) and equipment (50% of sample) has in turn made innovation possible. b. Strong agreeance that collaboration with organisations has enabled innovation with 74% agreeing or strongly agreeing with its value in innovating.

Table 10: Implications for small and medium sized enterprises within the digital business sector – Capacity building through strategic innovation planning

All factors mentioned here are considered high value in the primary sources. There is also strong agreeance across all data sources that planning is an enabler of innovation, although less formalised planning evidenced in the survey in relation to investment in people and equipment. Furthermore, there is strong agreeance in both the pilot, survey data collaboration has clear value in enabling innovation.

Capacity building through organisational re-evaluation of process		
Implication from Pilot Case Study	Literature	Survey
a. Formalise an innovation strategy. b. Create feedback loops to communicate with users of your products and service to better understand their needs.	a. Formalised planning enables innovation (Mazzarol & Reboud 2009; Berman et al. 1997; Porter 1991; Mazzarol & Reboud 2020)). b. Von Hippel (2005) find communication with the end-user to enable innovation through bringing direct knowledge to the SME (see also Appiah-Adu & Singh 1998; Gronum et al. 2012; Von Hippel 2005; Lui & Laperche 2015; Gault 2018; Wu et al. 2022).	a. Planning is accepted as aligned to innovation success with 75% of the sample agreeing or strongly agreeing in the value of planning. b. Innovation has occurred as a response to customer needs (with 63.4% either agreeing or strongly agreeing) and that SMEs have learned to innovate from customer feedback with 82.7% either agreeing or strongly agreeing).

Table 11: Implications for small and medium sized enterprises within the digital business sector - Capacity building through organisational re-evaluation of process

There are some interesting points here; the pilot case stressed that they were creating feedback loops and had learned to innovate through customer feedback, and this is clearly a high value strategy. Furthermore, innovation planning is linked in all data sources to innovation success.

7.1.3 Relational analysis: AT Subject to AT Object

Aligning the pilot study to the literature and referencing the survey data there are clear implications and recommendations produced, these being:

Characteristics, actions, and attitudes that enable innovation within their organisation		
Implication from Pilot Case Study	Literature	Survey
a. Demonstrate commitment to innovation. b. Take thought out risks. c. Make use of past work experience.	a. Hadjimanolis (2000) which finds commitment to innovation activities directly impacts the firm's innovation capacity (see also Mendoza-Silva 2020; Hwang et al. 2020). b. Gronum & Verreynne (2011), Gronum et al. (2012), Crupi et al. (2020) and Arias-Pérez et al. (2021) find owner attitude toward risk enabling in SME innovation, supported by Hadjimanolis (2000) and Kickul & Gundry (2002) who find openness to risk and ability to understand these have impact on SME capacity to innovate (see also Wardani et al. 2020). c. Romijn & Albaladejo 2002, Dziallas & Blind 2019 and Rampa & Agogué 2021) find professional capacities combine personal knowledge, experiences, activities, and training that enable ownership to manage innovation efficiently within SME contexts and design appropriate innovation strategies (Forsman 2011; Hadjimanolis 2000; Romijn & Albaladejo	a. Strong agreement (82.2% agreeing or strongly agreeing) that innovation has required organisational commitment. b. 73% the data subject sample agree or strongly agree to having learned to innovate through past failure. c. 88.5% either agree or strongly agree that past work experience has enabled innovation.

	2002; Zahoor & Al-Tabbaa 2020; Maietta 2015).	
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Table 12: Implications for small and medium sized enterprises within the digital business sector – Characteristics, actions, and attitudes that enable innovation within their organisation

These implications are all important across all data sources. There is also a specific nuance in relation to this analysis that was drawn out specifically through the primary data collection; although not revealed as part of the literature, the pilot study data highlighted how demonstrating positivity in attitude to the business has been an enabler of innovation and this characteristic was strongly reinforced within the survey data.

7.1.4 Relational analysis: AT Rules to AT Object

Returning to the definition of AT Rules within AT: these are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”. In this section the implications of the previous chapter have been realigned to the literature and survey data, and nuance AT Rule actions enabling innovation that are:

AT Rule actions that may enable innovation		
Implication from Pilot Case Study	Literature	Survey
a. Identify and create meaningful relationships and collaborative network relationships of value and leverage resources. b. Implement a formal process for managing innovation (which is inclusive of formal steps such as IP protection and R&D, team, and supplier management). c. Create methods to communicate with and generate ideas from the end user. i. Test ideas and leverage feedback from end users.	a. Creating relations and networks (Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999) acts an enabler of innovation. b. Boly et al. (2014), Forsman (2011) and Prasanna et al. (2019) find that innovation process management enables innovation in SME. Furthermore, Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) support this finding that successful project management process implementation enables iterative development of innovation. c. Von Hippel (2005) find end-users enable innovation performance bringing direct knowledge to organisation, with other scholars (Appiah-Adu & Singh 1998; Gronum et al. 2012; Von Hippel 2005; Lui & Laperche 2015; Gault 2018; Wu et al. 2022) finding they provide new ideas and insights into user needs and ensuring agility in response to the market, whilst	a. Strong agreeance that collaboration has enabled innovation to occur (with 75% agreeing or strongly agreeing) and that some have benefitted from their network relationships with 46.5% agreeing or strongly agreeing that this has enabled completion of innovations. b. Strong agreeance that both planning (75% agreeing or strongly agreeing) and organisational project management skills (61.5% agreeing or strongly agreeing) have enabled innovations within their organisations – that said, many (38.4%) of the survey data sample were neutral to strongly disagreeing that they had the project management skills necessary for successful completion of innovations, with smaller numbers indicating that they do not plan (25%). c. Strong agreeance that innovation has been a response to customer needs and feedback with 82.7% either agreeing or strongly agreeing with its value in completing innovations i. There is strong agreeance that innovation has been enabled by testing new products with the market with 80.6% agreeing or strongly agreeing with its value in completion of innovation.

	also identifying potential future users (Daneels 2002; Inauen et al. 2011; Nielsen et al. 2016; Bengtsson & Edquist 2022). i. SME have been found to gain insights and innovate product ideas through feedback (Appiah-Adu & Singh 1998; Gronum et al. 2012; Von Hippel 2005; Lui & Laperche 2015; Gault 2018; Wu et al. 2022).	
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Table 13: Implications for small and medium sized enterprises within the digital business sector – AT Rule actions that may enable innovation

Based on this analysis it is possible to provide a simplistic ranking to these implications based on responses to the survey and alignment to the literature:

1. Create methods to communicate with and generate ideas from the end user.
 - a. Test ideas and leverage feedback from end user
2. Identify and create meaningful relationships and collaborative network relationships of value and leverage resources.
3. Implement a formal process for managing innovation (which is inclusive of formal steps such as IP protection and R&D, team, and supplier management).

In both the survey and the pilot there are clear agreeance that generating ideas and testing these with the user has had clear value in their innovation success. Both other points are seen as highly valuable in all the primary sources although there is some nuance of interest in that collaboration has led to innovation, but the SMEs are not necessarily converting their network relationships to actual value.

Furthermore, there is clearly agreeance that planning, and project management skills have enabled innovations within their organisations, but less feel that they have the skills and some finding they struggle to plan. This aligns to the literature and the discussion of the SME landscape in this thesis and the pilot case too where this is reflected in their data.

7.1.5 Relational analysis: AT Community to AT Object

Returning to the definition of the AT Community within AT: this has been defined as “*multiple individuals and/or subgroups who share the same general object*”. Their consideration has been realigned to the literature and references the qualitative survey data, outputting AT Community building actions that enable innovation, which are:

AT Community network relationships that may enable innovation of small and medium sized enterprises within the digital business sector and the values these offer		
Implication from Pilot Case Study	Literature	Survey
a. Create links to and engage with universities. b. Create links to and engage with innovation supporting public sector organisations. c. Create links to and engage with banks and exploit networking opportunities as well as finance. d. Create links to competitors and collaborate strategically.	a. (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019) SME have been found to prefer networks directly linked to their market rather than partnering within HEI. b. Laperche (2012), Patel & Pavitt (1994), Doh & Kim (2014), and Masood & Sontag (2020) find that such support unlocks essential resources and knowledge supporting innovation processes, with Kaufman & Todtling (2002), Kearney & McHattie (2014), and Neves et al. (2021) suggesting they enable the provision of financial or technical support through their connections. c. SME networks are generally directly linked to the organisation (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019) as would be the case with banking.	a. This lack of engagement with HEI is evidenced in the survey data where a minority of SME discuss specific limited engagement or say they have not yet explored this option. b. Within the survey data 50% of the sample agree or strongly agree that public sector organisations have helped in the completion of innovations, with many receiving specialist advice – that said, 19.2% are neutral about this and 30.8% have found little value. c. Although many have sought finance through the private sector (28.8%), others within the survey sample, although smaller numbers, have sought networking opportunities. d. The majority of the survey sample (75%) agree or strongly agree that collaboration has enabled completion of innovations.

	d. (Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999) finds collaboration an enabler of innovation through access to resources and division of risk and cost (Gronum et al. 2012; O'Regan et al. 2006; Lasagni 2012; Pittaway et al. 2004; Lin & Lin 2016; Prasanna et al. 2019) and an enabler of innovation (Keizer et al. 2002; Radas & Božić 2009; Martínez-Román et al. 2019).	
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Table 14: Implications for small and medium sized enterprises within the digital business sector – AT Community network relationships that may enable innovation of small and medium sized enterprises within the digital business sector and the values these offer

Based on this analysis it is possible to provide a simplistic ranking to these suggested actions that small and medium sized enterprises within the digital business sector should take based on responses to the survey and alignment to the literature:

1. Create links to competitors and collaborate strategically
2. Create links to and engage with innovation supporting public sector organisations.
3. Create links to and engage with banks and exploit networking opportunities as well as finance.
4. Create links to and engage with universities.

All primary sources strongly agree that collaboration leads to innovation. That said, although the pilot data had had strong experiences with the other recommended factors, there is less support for the value of these, especially as discussed before partnership with HEI, which very few have seen success with.

There is a specific nuance in relation to this analysis that was drawn out specifically through the primary data collection:

- Within the pilot study creating links to and engaging with universities was a primary enabler of innovation for the data subject and within the research diaries it has been noted how passionate the interviewee was about this.

7.1.6 Relational analysis: AT Division of labour to AT Object

Returning to the AT definition of the AT Division of Labour as “*both the horizontal division of tasks between the members of the community and to the vertical division of power and status*”, this consideration has been aligned to the literature and references the survey data, outputting recommendations/actions for team organisation that enable innovation, which are:

AT Community network relationships that may enable innovation for small and medium sized enterprises within the digital business sector and the values these offer		
Implication from Pilot Case Study	Literature	Survey
a. Create a hierarchical structure within the team. b. Have a plan for innovation. c. Complete innovations through reflecting on capabilities of the team d. Define team tasks and roles. e. Manage completion of tasks within the team.	a. Adams et al. (2006), Lemon & Sahota (2004) and Anning-Dorson (2021) suggest that an internal structure creates enablers of innovation such as “<i>corporate conditions for innovation</i>” (Rothwell 1991, p.227; see also Rothwell & Dodgson 1991; and later work such as Barrett et al. 2021), “<i>contextual factors</i>” (Tidd & Bessant 2020; see also later work such as Saunila et al. 2014) or “<i>enabling context</i>” (Nonaka & Takeuchi 1995; see also later work such as Matricano et al. 2021). Furthermore, Lawson & Samson (2001), Tidd & Bessant (2020) and Grama-Vigouroux et al. (2020) suggest there is a need to structure organisations to improve their innovation processes, operating practices, and general efficiency. b. The owner has a clear role as initiator of innovation activities with SME contexts (O’Regan et al. 2006; Teirlinck & Spithoven 2013; Lin & Lin 2016).	a. Within the survey data there is agreeance that innovations have been enables through investing in people (59.6% agreeing or strongly agreeing) and that having a team increases innovativeness (78.8% agreeing or strongly agreeing). b. 75% agree or strongly agree that innovative businesses have a plan for what they will create. c. There is strong agreeance that innovation has been enabled through HR (59.6% agreeing or strongly agreeing). d. That said, within the survey there is little data to support formalisation of roles. e. There is a strong acceptance that project management skills have enabled innovation to be successful with 60.5% agreeing or strongly agreeing that these have provided value in completion of successful innovation.

	c. Koc (2007) suggests investment in HR enables organisations to access external knowledge, especially in technology-based industries, which is supported by Hoffman et al. (1998), Romijn & Albaladejo (2002), Georgiadis & Pitelis (2012), Prasanna et al. (2019), and Heilmann et al. (2020). d. Within the literature there is a warning to not over formalise with Chesbrough (2003), Damanpour (1991) and Grama-Vigouroux et al. (2020) finding structures need flexibility so as to be able to adapt to the environment, encourage creativity and promote internal collaboration, supported in the works of Teece (Teece et al. 1997; Teece 2007; Teece 2020) and balancing both structure and creativity (Christensen 1997). e. Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) find that innovation is a function of managerial capabilities such as project management practices and internal communication.	
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Table 15: Implications for small and medium sized enterprises within the digital business sector – AT Community network relationships that may enable innovation for small and medium sized enterprises within the digital business sector and the values these offer

Based on this analysis it is possible to provide a simplistic ranking to these suggested actions that small and medium sized enterprises within the digital business sector should take based on responses to the survey and alignment to the literature:

1. Have a plan for innovation.
2. Create a hierarchical structure within the team.
3. Manage completion of tasks within the team.
4. Define team tasks and roles.
5. Complete innovations through reflecting on capabilities of the team

The strongest agreeance across the primary data sources is that having a plan for innovation is essential. There is general agreement that there needs to be a defined team structure, but general less agreeance about what that structure should look like and the levels of formality and hierarchies that need to exist⁵².

⁵² It is interesting to note that at the time of writing this the second case was in hand and that the second case agreed there needed to be structure but felt that over formality and over managing team dynamics caused issues with creativity and issues with agency of team members.

7.2.1 AT Tools: mediating artefacts to the innovation process

As discussed in chapter 6 above, Engeström (1993, p. 67) considers AT Tools the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. The below analysis considers the alignment of AT Tools to the AT Subject (discussed in section 6.2.2) and the AT Community (discussed in section 6.2.3). Within the following analysis various contradictions, a characteristic of AT, arise that nuance understanding of how innovation happens in small and medium sized enterprises within the digital business sector. This section will continue from the consideration in chapter 6 and will nuance comparatively to the literature and survey data.

7.2.2 Relational analysis: AT Subject to AT Tools

Considering the literature and survey data not only nuances definitions of AT Subject and AT Tools⁵³ but highlights interrelation between factors and contradictions within the ways that the subject believes they innovate. This analysis has outputted the following recommendations about the subject and their application of AT Tools:

⁵³ Also, as discussed in the previous chapter, AT Tools are a function of the analysis in relation to the AT model and consideration of the words and lived experience of the data subjects within the activity system; as such an AT Tool can be found to be such things as a ‘network’ or the having a process in place for re-valuation, and connected actions that can be applied to these to leverage value also emerge through the analysis.

Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools		
Implication from Pilot Case Study	Literature	Survey
a. The subject should be open to adoption of AT Tools. b. The subject when implementing innovation should reflect on the process. c. The subject should develop personal skills to network. d. The subject should use past experience to assess risks and commit to strategic investments.	a. Gronum & Verreyne (2011) finds that positive owner attitude toward risk and taking risks is essential to enabling SME innovation (further evidenced in Gronum et al. 2012; Crupi et al. 2020; Arias-Pérez et al. 2021). b. (Forsman 2011; Hadjimanolis 2000; Romijn & Albaladejo 2002; Zahoor & Al-Tabbaa 2020; Maietta 2015) found that the nature of the subject's reflection on experience enables the design of appropriate innovation strategies for SME which is a reflective activity. c. Forsman (2011), Freel (2003), Martínez-Román et al. (2021) and Temel & Forsman (2022) find that ownership ability to identify potential networks and create and maintain relationship enable innovation through leveraging advantages of network relationships. The subject considers his character as a conduit for this to occur, which in turn creates opportunities to collaborate. d. Hadjimanolis (2000), Kickul & Gundry (2002) and Wardani et	a. Strong acceptance that innovation has occurred through the testing of ideas with the market (80.8% either agreeing or strongly agreeing), which is in fact an act with risk, with the majority agreeing (75% either agreeing or strongly agreeing) that learning from failure has enabled completion of innovations. b. Agrees strongly that reflection on failure (73% either agreeing or strongly agreeing) or organisational business capabilities (69.2% either agreeing or strongly agreeing) had been an enabler of completion of innovations within their businesses. As found above, within the survey data innovation has occurred through testing of ideas with the market, with significant agreeance that leveraging feedback from the end-user has enabled that act of innovation to occur, which allow this reflection to occur. c. 46.2% of the sample agree or strongly agree that the developing of business networks have enabled completion of past innovations. d. 88.5% either agree or strongly agree that past experience has enabled them to make the right decisions, inclusive of accepting risk of failure and investment, that have enabled the completion of innovations.

	al. (2020) find owner openness to risk has a direct impact on SME capacity to identify opportunities to innovate and design appropriate innovation strategies for their SME (Forsman 2011; Hadjimanolis 2000; Romijn & Albaladejo 2002; Zahoor & Al-Tabbaa 2020; Maietta 2015). Furthermore, Hadjimanolis (2000), Mendoza-Silva (2020), and Hwang et al. (2020) find commitment to innovation activities impact innovation capacity.	
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Table 16: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools

7.2.3 Relational analysis: AT Community to AT Tools

Following on from chapter 6, when considered alongside the literature and survey data there are implications for small and medium sized enterprises within the digital business sector and how they can support the AT Community through the AT Tools discussed above to enable innovation to occur:

Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools		
Implication from Pilot Case Study	Literature	Survey
a. Strategically working with HEI (within the public sector AT Community) can enable innovation and business growth. b. Create processes to communicate the strategy with the AT Community sharing innovation tasks to: a. Enable the AT Community to rapidly innovate. b. Share resources with the AT Community. c. Clarify communications.	a. Although this seems obvious, within the literature there is evidence of resistance from SME to working with HEI, preferring those closer to their marketplace (Liu & Laperche 2015; Zeng et al. 2010; Orazbayeva et al. 2019; Rybnicek & Königsgruber 2019). b. There is a need for SME to have an innovation strategy that includes strategically designing processes to remain competitive and enable innovation (Dyer & Singh 1998), allowing the sharing of resources and competencies through the AT Community (Helfat & Peteraf 2003; Leonard-Barton 1992; Prahalad & Hamel 1990; Ramanujam & Mensch 1985; Tidd & Bessant 2020; Teece et al. 1997; Teece 2007; Laghzaoui 2011).	a. Within the survey data there is agreeance that successfully innovating requires access to both the private (55.7% either agreeing or strongly agreeing) and public (50% either agreeing or strongly agreeing) sector AT Community; that said, aligning with the literature that suggests resistance to working with HEI, although only some agree that these relationships have enabled innovation, and there are many that are neutral about the value created (19.2%) with others (30.8%) who do not feel they have benefitted from this.⁵⁴ b. Within the survey data there is agreeance that re-evaluation of processes (with 80.8% either agreeing or strongly agreeing) have enabled innovation to occur.

Table 17: Small and medium sized enterprises within the digital business sector ownership employing innovation enabling AT Tools

⁵⁴ This raises a further question, that being, do SME naturally consider HEI as partners in their innovation? This is a theme that is reflected in the case study two data, where not for lack of trying that case has failed to achieve success through partnering with universities.

7.3.1 AT Subject: the individual's perspective

Restating the discussion of the pilot study in chapter 6, as discussed, Engeström defines the subject as (1993, p. 67) “*the individual or subgroup whose agency is chosen as the point of view in the analysis*”. The below sections consider the alignment of the AT Community to the AT Subject in the completion of innovations and in the AT Rules applied to achieving success in the implementation of innovation with implications from the pilot study nuanced in response to the literature and survey data.

7.3.2 Relational analysis: AT Community to AT Subject

This analysis when tied to the literature and survey data has implications for small and medium sized enterprises within the digital business sector operators and their AT Community relationships as an enabler of innovation activities.

Small and medium sized enterprises within the digital business sector operators and their AT Community relationships as an enabler of innovation activities		
Implication from Pilot Case Study	Literature	Survey
a. Identify AT Community members offering values and attributes that create an environment that raise capacities to innovate. i. Trustworthiness ii. Previous knowledge of ways of working iii. Shared commitment to innovation. b. 2. Foster human relationships with the AT Community.	a. Hadjimanolis (2000), Mendoza-Silva (2020), and Hwang et al. (2020) and find that owner commitment to innovation activities directly impacts innovation capacity, reflected in the need to find shared commitment in AT Community members. b. Within theory the value of social capital (Bourdieu 1986) in relationships has become an established enabler of business. This is supported within the literature considered where research (Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999) has found that building AT Community relationships act as an enabler of innovation.	a. 75% the sample either agreed or strongly agreed that collaboration had enabled innovation. b. 46.2% either agree or strongly agree that relationships within networks having enabled innovation within their businesses⁵⁵.

Table 18: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector operators and their AT Community relationships as an enabler of innovation activities

⁵⁵ It is interesting that the survey has highlighted a slightly negative opinion in relation to networks and innovation.

7.3.3 Relational analysis: AT Rules to AT Subject

As discussed above, Engeström defines AT Rules as (1993, p. 67) “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”. This analysis, nuanced through the literature and survey data has implications for small and medium sized enterprises within the digital business sector operators and their application of the AT Rules identified in the earlier section of this report, as follows:

Small and medium sized enterprises within the digital business sector operators and their application of AT Rules		
Implication from Pilot Case Study	Literature	Survey
a. The subject needs to have or develop skills enabling identifying networks, leveraging advantage from these and creating sustainable relationships for collaboration. a. The subject needs to realise the benefits through early adoption of digital tools that support the AT Rules of innovation discussed above. b. The subject should demonstrate their knowledge of their industry space within networks to enable the creation of sustainable relationships for collaboration. c. The subject should maximise their knowledge of the industry space in their communications with the end user. d. The subject should develop project management skills for managing innovation internally within the	a. The benefits of doing this are recognised (Madrid-Guijaro et al. 2009; Hewitt-Dundas 2006; Julien & Carrier 2002; Motwani et al. 1999) as an enabler of innovation. a. Within the literature Garcia & Calantone (2001) and Koc (2007) find investment and adoption to be an enabler of innovation capacity building, which maintains and supports SME innovativeness (Birchall et al. 1996; Boly et al. 2014; Hervás-Oliver et al. 2021; Jibril et al. 2021). b. Demonstrating knowledge increases social capital value of relationships (Bourdieu 1986). c. Returning to Bourdieu (1986), perception of knowledge and thought leadership increases trust. Furthermore, the research of Danneels (2002) and Inauen et al. (2011) find that such communication enables identification of new users from outside the existing user base as	a. 75% either agree or strongly agree creating collaborations are considered an enabler of innovation. b. The value of developing sustainable relationships for collaboration from within networks is supported above and within the survey data 75% either agree or strongly agree that forming relationships with organisations for collaboration has enabled innovation. c. The subject should implement and create value through feedback loops to communicate with the end user and where there are digital tools supporting that they should realise the benefits through early adoption. As discussed in previous sections, within the survey data 82.7% either agree or strongly agree that feedback has enabled innovation. d. 61.5% either agree or strongly agree that their project management skill had enabled completion of their innovations.

organisation and within their external relationships.	well as potential future users, increasing access to feedback. d. Boly et al. (2014), Forsman (2011) and Prasanna et al. (2019) find that innovation process management enables innovation in SME even when both resource and capability is scarce.	
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Table 19: Implications for small and medium sized enterprises within the digital business sector – Small and medium sized enterprises within the digital business sector operators and their application of AT Rules

There is a specific nuance in relation to this analysis that was drawn out specifically through the pilot primary data collection:

- In relation to point a, within the research diary kept by the researcher the data subjects of the pilot case were clear that having developed collaborative relationships had enabled innovation to occur.
- In relation to point b, within the research diary kept by the researcher the data subjects were clear that demonstrating knowledge increases social capital value of relationships (Bourdieu 1986). This is clearly linked to literature in point c, that has been brought forwards and highlighted from the pilot study in the above table and is supported in general terms within the survey data.

7.3.4 Relational analysis: AT Division of Labour to AT Subject

This analysis has implications for small and medium sized enterprises within the digital business sector operators relating to the relationship between the division of labour as discussed earlier within this report and the subject. These are:

Implications for small and medium sized enterprises within the digital business sector operators relating to the relationship between the division of labour		
Implication from Pilot Case Study	Literature	Survey
a. Create a formal team structure that enables team motivation. b. Project management practices should be applied with the team.	a. Internal organisational structure is an enabler of innovation, although its exact form is not defined (Terziovski 2010; Didonet & Diaz-Villavicencio 2020; Gentile-Lüdecke et al. 2020; Zahoor & Al-Tabbaa 2020). Furthermore, Chesbrough (2003), Damanpour (1991) and Grama-Vigouroux et al. (2020) find that structures need to be flexible so as to encourage creativity and promote internal collaboration, supported by the research of Teece (Teece et al. 1997; Teece 2007; Teece 2020). b. Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) find that project management practices are essential in enabling innovation success.	a. Within the survey data, although there is no discussion of formalisation of team structures, 78.8% of the sample either agree or strongly agree that a team enables completion of innovations. This moves to the point below. b. 60.5% either agree or strongly agree that their project management skills have enabled successful completion of innovations.

Table 20: Implications for small and medium sized enterprises within the digital business sector – Implications for small and medium sized enterprises within the digital business sector operators relating to the relationship between the division of labour

7.4.1 AT Community

As discussed in the previous chapter, Engeström defines the AT Community as (1993, p. 67) “*multiple individuals and/or subgroups who share the same general object*”. The following section will consider the AT Community and its relationship to the AT Rules of innovation and the Division of labour, both of which have been discussed in the earlier sections of the report. Implications will be realigned to the survey data and literature.

7.4.2 Relational analysis: AT Rules to AT Community

When considered alongside the survey and literature this has clear implications for small and medium sized enterprises within the digital business sector operators and their application of the identified AT Rules within the AT Community sharing the same innovations in its value in creation of future relationships. These are:

Application of identified AT Rules within the AT Community		
Implication from Pilot Case Study	Literature	Survey
a. Leveraging the network through the AT Community enables creation of future relationships for business growth b. Project managing the innovation processes within the AT Community demonstrates commitment to creating and maintaining relationships. c. Involving the end user enables the creation of relationships with potential and other user bases	a. Forsman (2011), Freel (2003), Martínez-Román et al. (2021) and Temel & Forsman (2022) support that by identifying potential networks, creating and maintenance of relationships for collaboration is achieved. b. Hadjimanolis (2000), Mendoza-Silva (2020) and Hwang et al. 2020 find owner commitment to innovation activities impact successful completion of innovations. Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) find that success in completion innovations are a function of capabilities such as project management practices. c. Danneels (2002), Inauen et al. (2011), Nielsen et al. (2016) and Bengtsson & Edquist (2022) support this, finding that involvement helps identify users from outside of typical user base, as well as potential future users.	a. 59.6% of the sample either agree or strongly agree that investment in people have enabled completion of innovations; in this case innovation occurs through leveraging the network through the team and their competencies. b. 82.7% either agree or strongly agree that innovation requires organisational commitment. 60.5% either agree or strongly agree that project management skills have enabled successful completion of innovations. c. Point of nuance: within the survey data there is little to support this other than strong agreeance that both feedback and testing new products with the market have enabled completion of innovations.

Table 21: Implications for small and medium sized enterprises within the digital business sector – Application of identified AT Rules within the Community

7.4.3 Relational analysis: AT Division of Labour to AT Community

Considered alongside the literature and survey data this analysis has implications for small and medium sized enterprises within the digital business sector operators and how tasks are allocated and completed by the AT Community. These are:

Implications about how tasks are allocated and completed by the AT Community		
Implication from Pilot Case Study	Literature	Survey
a. The AT Community benefit from a power structure that defines how the labour will be divided. a. The AT Community require the allocation of tasks contributing to completion of innovation. b. The AT Community share a purpose in completion of tasks contributing to completed innovation.	a. Terziovski (2010), Chesbrough (2003), Damanpour (1991) and Grama-Vigouroux et al. (2020) find that SME need to define their structure yet be flexible enough to encourage creativity and promote internal collaboration (Teece et al. 1997; Teece 2007; Teece 2020). a. Tidd & Bessant (2020), Saunila et al. (2014) and Didonet & Diaz-Villavicencio (2020) find that success in completion innovations to be a function of capabilities such as project management practices and as discussed above. b. Sundbo (1997), Adams et al. (2006) and Casidy et al (2020) find the organisational innovation strategy should align with the overall business strategy (Leonard-Barton 1992; Teece et al. 1997; Teece 2007; Tidd &	a. This was not captured within the survey data but is discussed in the pilot study data.⁵⁶ a. 60.5% either agree or strongly agree that project management skills have enabled successful completion of innovations.

⁵⁶ The pilot study data subjects were flexible to the community defining how tasks would be completed although had clear defining of their role within the power structure and the hierarchy in management of innovation.

	Bessant 2020) and where there is clarity for all in the AT Community about the direction of the organisation.	
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Table 22: Implications about how tasks are allocated and completed by the AT Community

7.5.1 AT Outcome to AT Object

As discussed in chapter 6, the AT Outcome is a function of the AT Object which is to ‘innovate’ – as such this analysis is unilateral, considering actual impacts of the process of innovation and success in completion of innovations. As such, it is not expanded upon in detail here. That said the free text discussion did highlight some innovation outcomes that align to those of the pilot, and are visualised as a word-cloud (see figure 16 below):



Figure 16: Word cloud of survey free text visualised to draw words out in relation to outcomes of innovation.

Within the pilot case the implications drawn were as follows:

- Understanding user needs and market agility – within the survey data you can see phrases connected to understanding client needs and market space. Furthermore, within the free text this is reflected in various phrases, such as: “... *to create something completely bespoke to a customer’s needs*”, “... *to understand and respond to their needs*”, “...

better than any current, available market offerings” and having “... ability to change and being at the forefront of the market”.

- Increased ideas and insight – within the survey data there are phrases connected to increased ideas and insight, such as *“Identifying new, meaningful ways to frame problems”* and *“Ability to continuously review the way the business works by networking, collaboration and openness to ideas”*,
- Better addressing the business environment and increased competitiveness in new markets – within the survey data there are phrases connected to this, such as *“brainstorming and development of new services to meet the needs of our target market”*,
- Advantageous contradictions and unexpected outcomes, for example, marketing innovations were created through the process of innovating – this is also seen within the survey which shows such unexpected outcomes, such as post innovation implementation *“we have not renewed the lease on our office suite, and we are now a remote business. Our processes are more robust (they have to be because nobody is in the office to ‘fix things’ all the time). As a result, our profitability is better and our customer service is improved”*.

This adds only minor nuance to the understanding of post-innovation outcomes, but at completion of this current research further insight into these outcomes of innovation through addition of the second case study data will be addressed as part of the chapter that follows.

7.6.1 Post pilot study and survey summary

As a conclusion to this chapter to this stage, the researcher has outlined the project and rationale, aligned it with AT as theoretical lens through which the study is viewed, examined literature, and developed a conceptual framework that has driven definitions that have formed the initial coding of interview data, as well as testing the outlined method through a detailed exploratory pilot study and complementary survey. AT has been used throughout as a backbone for this current research at this stage. It has demonstrated at this stage the novelty of the study and indicates its contribution to theory through application that provides analysis of small and medium sized

enterprises within the digital business sector contexts and innovation within these. Furthermore, as discussed, the piloting phase of this current research, with its stated methodology having, in the main, been developed before the active research process began has been carried out so that the procedural and design elements discussed could be further refined through the activities of piloting (chapter 6.0). Piloting has driven two outcomes:

1. Examination of practical arrangements that may negatively influence success of the research procedure.
2. Testing practicalities related to applicability of instruments, measurement, and analysis tools to this current research's potential outcome.

These two steps have been also shaped by the data to ensure a more efficient and robust data collection is achieved in the following case data collection.

Furthermore, the pilot and survey data of this research, discussed in this chapter above, have demonstrated how its design can provide analysis that responds to the research project aim:

- To develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory.

Also, at this stage, aligning with this aim and the 1st, 2nd and 3rd objectives, a pilot case study has been carried out in response to the assumptions formed from the literature enquiry, and a survey has been used to interrogate, identify, and verify key activities supporting capacity raising and innovation with a group of relevant small and medium sized enterprises.

7.6.2 Conclusion to the survey data analysis within this chapter.

At this stage a first iteration figurative diagram of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector has been created. This shows how the categories of capacity raising and innovation supporting enablers

are viewed through the lens of Activity Theory and contextualised through the pilot study case and survey data; this in turn outputs a series of enablers for successful support of capacity raising and innovation. This diagram is found in figure 17 below⁵⁷:

⁵⁷ Although at this stage this is only a first iteration with the final framework is still in development.

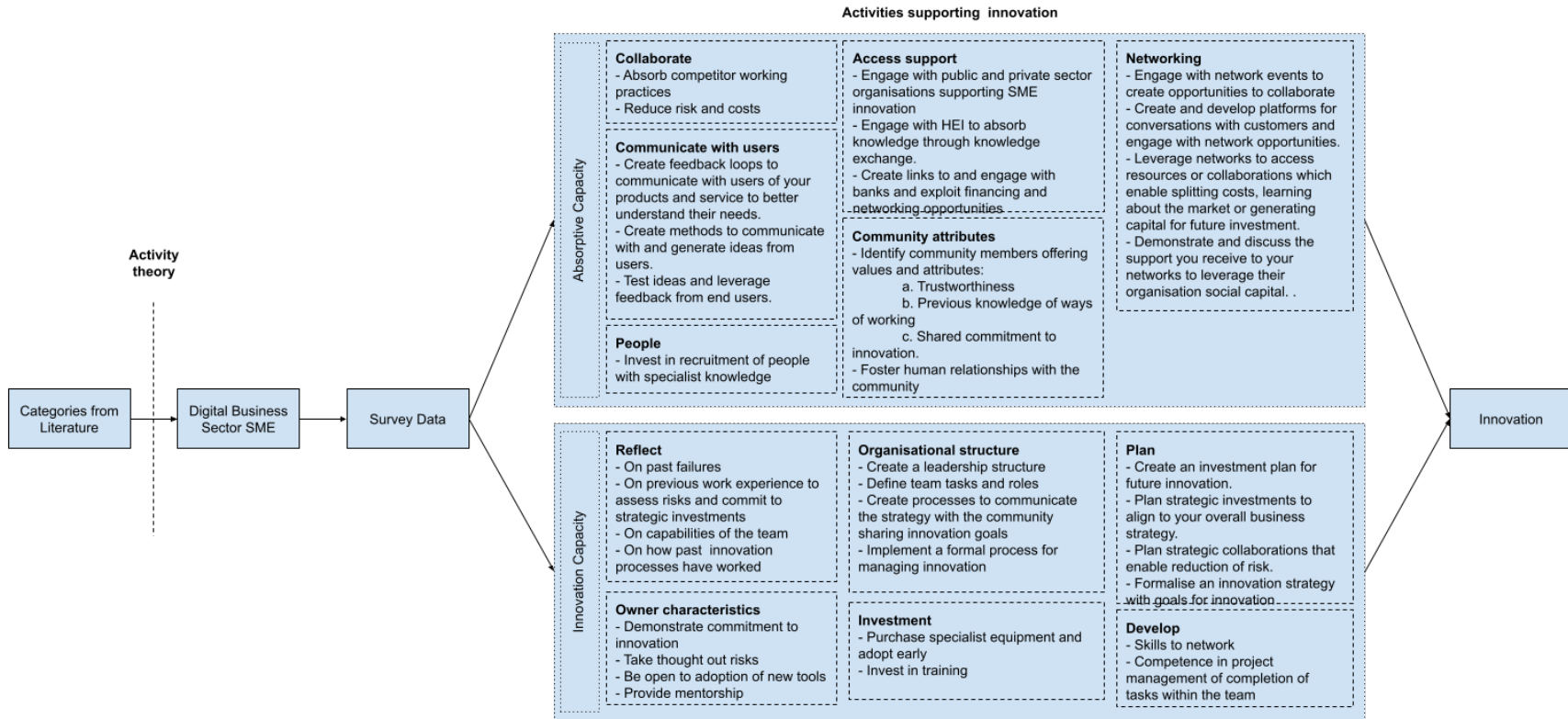


Figure 17: First iteration figurative diagram of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.

Having completed this stage, this research will move towards completion through the following steps:

1. A second case study is considered and analysed – this case study will be used to check and nuance the research discoveries to date and augment the framework development in response to the data gathered. Action case hybridism will continue to provide flexibility within the research to collaborate with data subjects of the second case, as was the case with the pilot, and transform knowledge generated into theory and practice, with researcher discussing findings so far and actively supporting and monitoring the development of innovations during the data collection.
2. A final framework will be produced for evaluation and validation. Implications from this second case study will be reflected and validate the final diagram.
3. Conclusions will be drawn that review the project in relation to contributions after which this research will close.

The following chapter will move into the consideration of the second and final case study, presenting analysis and will conclude with the presentation of the results, that being elements of the framework produced though analysis with an AT lens.

8.0 Case study two: presentation and analysis.

This chapter will introduce, present, and analyse data from the second case. Data analysis will build on the chapters that proceed this to further evidence the unique contribution of this research. For consistency the researcher has used the same selection criteria as pilot study, following the same definition of small and medium sized enterprises within the digital business sector, this being organisations that base their business on:

“... digital goods, digital services and digitally-enabled transactions of goods and services, whether digitally or physically delivered, involving consumers, business or government, all of which are underpinned by movement of data ...”

Sitting within the framework of this definition, this second case focuses on a 2015 founded Northwest UK based problem-solving organisation that focusses on the use of data to drive solutions for clients who were introduced to the researcher through a university knowledge exchange scheme for small and medium sized enterprises innovating with AI products and serviced; they align to the digital business sector definition through their service that is *“digitally or physically delivered, involving consumers, business or government, all of which are underpinned by movement of data”*. Within the Companies House Register the second case uses multiple Standard Industrial Classification (SIC) codes (GOV.UK 2022d) to reflect how their business activities are varied, complex and cannot be described by a single code⁵⁸, and reflect through alignment to the small and medium sized enterprises within the digital business sector definition, being listed as:

- 63110, Data processing, hosting, and related activities
- 74909, Other professional, scientific, and technical activities not elsewhere classified

The company had a single managing director and 6 employees as of July 2022. A summary table of case study two is presented below:

⁵⁸ As with the first case they in effect self-identify as within the definition of small and medium sized enterprises within the digital business sector,

Case study two summary table	
Description	• Northwest UK based problem-solving organisation that focusses on the use of data to drive solutions for clients. • Their main business focusses are on U.K • Innovate with data-analysis techniques and at time of research innovating with AI through machine learning, sentiment and complex data set analysis.
Interviewees within case study data	1. Managing Director/Owner 2. Project manager/Solution architect 3. Digital marketer
Length of time SME in operation	7 Years
Number of employees	6
Standard Industrial Classification (SIC) Codes	• 63110, Data processing, hosting, and related activities • 74909, Other professional, scientific, and technical activities not elsewhere classified

Table 23: Summary table of case study two.

This second chosen and defined case is aligned to further respond to the answering the central research question, *how do small and medium sized enterprises within the digital business sector innovate?* As with the pilot case, activities that have enabled innovation within the business have been tracked to AT in response to sub-questions of this current research. The data considered as part of this second case study is inclusive of more than 8 hours of interviews participant observation recorded as part of the researcher's research diary.

This analysis in this chapter has focussed on nuance, verifying the conclusions drawn from the pilot and survey data, whilst drawing out the new elements that can be fed into the final framework. The structure of this chapter is laid out as follows to consider all elements of the AT model systematically:

1. Below, chapter section 8.1 presents the steps supporting the analysis process.
2. 8.1.1 focusses on the AT Object, that being Innovation – it draws on the definition of innovation within SME contexts and using the data of the pilot study nuances a definition that reflects small and medium sized enterprises within the digital business sector

contexts. Section 8.1.2 through to section 8.1.6 will present data, discussion, and findings in relation to interaction between the AT Object (Innovation) and the connected dimensions of the AT model as follows:

- a. Chapter section 8.1.2 considers relational analysis between AT Tools and AT Object. Engeström (1993, p. 67) defines AT Tools as the *“physical and symbolic, external and internal tools (mediating instruments and signs)”* within the research investigation. Through analysis of the interview’s factors linking AT Tools to the AT Object (that being innovation) have been examined. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
- b. Chapter section 8.1.3 considers relational analysis between AT Subject (the data subject and their understanding) to AT Object where the subject is defined by Engeström (1993, p. 67) as *“the individual or subgroup whose agency is chosen as the point of view in the analysis”*. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
- c. Chapter section 8.1.4 considers relational analysis between AT Rules (AT Rules are defined by Engeström (1993, p. 67) as *“the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system”*) and AT Object. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
- d. Chapter section 8.1.5 considers relational analysis between the AT Community and the AT Object, where the AT Community are defined by Engeström (1993, p. 67) as *“multiple individuals and/or subgroups who share the same general object”*, and as with above, the analysis process of viewing SME innovation through an AT lens defines who these AT Community members are. Implications of this analysis for small and medium sized enterprises within the digital business

sector are presented at the end of this section and carried forwards into the development of the final framework.

- e. Chapter section 8.1.6 considers relational analysis between the AT Division of labour and the AT Object, where the division of labour is defined by Engeström (1993, p. 67) as *“both the horizontal division of tasks between the members of the community and to the vertical division of power and status”* and as such, this analysis highlighting factors connected to team dynamics and leadership within the innovation process. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
3. Chapter section 8.2.1 breaks down interactions of AT Tools with AT elements (excluding interactions with the AT Object, which is referenced above in the chapter structure). As discussed above, the analysis process of viewing SME innovation through an AT lens has defined these AT Tools. There are two sub-sections:
 - a. Chapter section 8.2.2 presents relational analysis in relation between the AT Subject and AT Tools – this captures data about the application of the identified AT innovation tools (see above note about how the analysis process of viewing SME innovation through an AT lens defines what these AT Tools are) of small and medium sized enterprises within the digital business sector. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
 - b. Chapter section 8.2.3 presents relational analysis in relation to interactions between the AT Community AT Tools – this captures data about how the AT Community share and interact with the AT Tools discussed in the process of innovating. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
4. Chapter section 8.3.1 breaks down interactions between the AT Subject (excluding interactions with the AT Object and AT Tools, which have been referenced above in the chapter structure). As such it focusses further on the AT Subject (the data subjects within

the case) within the innovation activity system of small and medium sized enterprises within the digital business sector. There are three sub-sections:

- a. Chapter section 8.3.2 presents relational analysis in relation to interactions between the AT Community and the AT Subject, providing focus on the AT Community and its relationship to the AT Subject. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
 - b. Chapter section 8.3.3 presents relational analysis in relation to the identified AT Rules to the AT Subject (also, see above points in relation to how the analysis process of viewing SME innovation through an AT lens has defined what these AT Rules are). Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
 - c. Chapter section 8.3.4 presents relational analysis in relation to AT Division of Labour and the AT Subject, capturing how innovation tasks are shared and processed. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
5. Chapter section 8.4.1 breaks down interactions with the AT Community (excluding interactions with the AT Object, AT Tools and AT Subject which have been referenced above in the chapter structure). There are two sub-sections:
- a. Chapter section 8.4.2 presents relational analysis between the AT Rules and the AT Community, highlighting how the AT Community sharing innovation task and goals interact with the identified innovation AR Rules. Implications of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.
 - b. Chapter section 8.4.3 presents relational analysis between the AT Division of Labour and the AT Community, highlighting how tasks are allocated and shared within the AT Community that shares the same purpose, to innovate. Implications

of this analysis for small and medium sized enterprises within the digital business sector are presented at the end of this section and carried forwards into the development of the final framework.

6. Chapter section 8.5.1 breaks down the interaction between the AT Outcome and the AT Object – this section focusses on the AT Outcome, in effect the impacts of the process innovation in small and medium sized enterprises within the digital business sector. As in the previous chapter, unlike other elements within the AT model this analysis is unilateral as it only the AT Object that interacts with the AT Outcome in the AT model.
7. Chapter section 8.6 presents a detailed and critical summary. In this section a discussion of codes that have emerged through the analysis, as well as those that were not coded against is presented and these conclusions are carried forwards into the development of the final framework, in chapter 8.6.1 – *Final Framework presentation*. And then finally, the second case study data collection, analysis, and discussion chapter close.

The analysis of case study two follows below.

8.1 The Analysis

The analysis that follows builds on the analysis of the empirically identified factors examined in the previous chapters through in-depth open-ended interviews and participant observation with a second case. The basis of questioning follows the same structure as previous chapters and is grounded in:

1. The initial questions formed as the basis of the interview align to the forming of AT interview questions discussed in previous chapters (refer to 2.4.2 – Application of AT in this current research (which as before, are found in appendix A:12.4 of this document for reference). These are supported through extensive open-ended interviews that are discussed in the point below.
2. The extensive open-ended interviews within the second case focus and nuance the 10 categories of capacity raising and innovation supporting activities in SME contexts that

were identified as part of the literature enquiry (refer to table 2: Capacity raising and innovation supporting activities in SME contexts, in chapter 3, section 6.0 – Categories of capacity raising and innovation supporting activities).

3. The codes that were nuanced and emerged through the data collection and analysis of the previous two chapters are also now considered and interrogated; using NVivo, these have been coded alongside the original coding and tracked to the AT model (refer to figure 2) using the process discussed in the chapter section 5.2.3 – The data collection.
4. The interview process of the second case follows on from the pilot case in that it was iterative and involved both the *prolonged engagement* and *persistent observation* that was discussed within the methodology chapter with data from observations within the researcher's diaries woven into the analysis that follows within the narrative and footnotes. Furthermore, the application of Action Case hybridism involved the researcher discussing findings so far and actively supporting and monitoring the development of innovations during the data collection, which has steered and informed the final framework.

8.1.1 AT Object: the innovation definition

As with the first case, central and relative to this current research is the definition of innovation within the small and medium sized enterprises within the digital business sector context. This is considered the AT Object, “the ‘raw material’ or ‘problem space’ at which the activity is directed, and which is moulded or transformed into outcome” (Engeström 1993, p. 67). Within second case interviews the word ‘innovation’ is used many times. A word cloud (see figure 18 below) has been produced to demonstrate the words used within the context of innovation⁵⁹.

⁵⁹ It should also be noted that the word innovation itself is commonly used in the data in relation to its own definition,

Nuances to the innovation definition	Example Comments from Case Study 2 Interview Data
Not always new, but innovative relative to the organisation.	<i>"... it doesn't even need to be a new idea ... a new idea to that organization, so, it's what's innovative for that culture."</i>
Doing something differently.	<i>"... different ideas ... that they could apply." And "something new, different".</i>
A daunting process that can make organisations afraid.	<i>"I think people think that innovation is a big scary word."</i>
An enabler of competition.	<i>It can "improve our performance so we can compete on a more even footing with larger firms".</i>
Responding to the need of the client.	<i>"... we ... collaborate ... with our clients in understanding their problems and creating bespoke solutions to these."</i>

Table 24: Post Case Study Two, Nuances to the Innovation Definition

These themes are drawn out further in the analysis that follow, but a nuanced definition of innovation in small and medium sized enterprises within the digital business sector, based on the data considered, is as follows:

'Innovation activities are relative to the organisation, not necessarily something entirely new, but contextually an act of creation through doing something differently, generally in the form of new creative services, technologies, practices, processes, products, and ideas. It is generally incremental, in response to collaboration with the market and business communities, in response to market feedback and understanding customer need. Although organisationally daunting it is acknowledged as an enabler of competition.'

This definition, induced from the literature and the data in the two cases and the survey, can be considered a contribution to knowledge in relation to innovation in small and medium sized enterprises within the digital business sector contexts and will be discussed within the conclusions chapter. That said, as discussed in the contributions, there are many definitions of innovation that compete, and it should be highlighted that the core contributions that will be outlined are relative to the key strength of the research, that being development and use of the Activity Theory to explore the obvious and more obscure dimensions of organisational

innovation in small and medium sized enterprises within the digital business sector. This means that this definition although interesting is potentially less of a valuable contribution.

Focussing now on the second case study, in the sections that follow below, an analysis, viewed through AT is presented that examines further how small and medium sized enterprises within the digital business sector innovate.

8.1.2 Relational analysis: AT Tools to AT Object

Through analysis of the interviews within case study two, factors linking AT Tools to the AT Object (that being innovation) have now been examined. Engeström (1993, p. 67) defines AT Tools as the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. The analysis of the previous chapters has built on the pilot through consideration of the survey data, and this has been reflected in the output a first iteration framework of enabling activities that small and medium sized enterprises within the digital business sector (see Figure 17). Furthermore, this process has nuanced further the definitions of the category of innovation enabling AT Tools. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances these categories and actions. The analysis and associated implications for small and medium sized enterprises within the digital business sector employing these AT Tools and related actions are now further considered, supported, and contrasted within the second case study data in the following ways:

1. In relation to supporting capacity building through leaning small and medium sized enterprises should:
 - a. Develop reflective practices to past failures⁶⁰ – this case finds this to be a strong innovation enabler saying, “*In the past we have been slow to go digital with some of our service ideas and failing to go digital early has been a missed opportunity*”

⁶⁰ Research diary note: Reflection was a process that is clearly embedded within the organisation, and was discussed throughout, including the formalised processes that they had put in place to document their reflection, They were very excited about the use of their ‘lessons learned’ logs which featured in their scheduled meetings and also were based upon client feedback.

for us all to build a new sustainable, resilient future product and open us to new clients and perhaps improve our performance so we can compete on a more even footing with larger firms.” So, reflection has enabled agility in practices, and for example spark engagement with mechanisms to support innovation faster, so they say, “... this is why we have been faster to engage with the schemes like the HE innovation workshops that we’re doing, to see if we can create something new, different.”

- b. Collaborate with competitors to learn from their working practices⁶¹ – in this case collaboration with competitors has been ideas based through watching *“what our competitors are doing and if we think it is interesting, we note it down in our Good Ideas OneNote, and work at using this with our own spin”* where collaborating in idea sharing does *“... provide opportunity to meet people and learn new things...”* and *“... create opportunities that helped us innovate.”*
- c. Engage with organisations supporting small and medium sized enterprise innovation – within the interview data they say *“... we worked with the business growth hub and did their Spark to scale program. I have already said how useful it is to get outside of your business for the day and that helped us get other perspectives into the business.”* And *“... these organisations like Business Growth Hub made us pivot in the way that provided closer solutions to our clients’ problem as the one-to-one support would act as the client for the business and we really began to think differently in how we would get a better understanding of the client and better address their needs”* leading to tangible innovations in processes and services⁶².
- d. Access support from public sector and educational establishments to absorb knowledge through knowledge exchange⁶³ – the case discusses a knowledge exchange scheme as an enabler of innovation saying, *“And then yeah, this AI*

⁶¹ Research diary note: This theme was discussed a number of times within the interviews, and although they did not collaborate on product and service development, having a process to share ideas through a network of competitors had led to the introduction of new products and services.

⁶² Research diary note: The interviewee was clearly enthusiastic about this; as with the pilot this had been very important in their organisational ability to be innovative and had resulted in creation of new products and services.

⁶³ Research diary note: The data subject was excited about the possibility of knowledge exchange, but throughout discussed how although they continually try to innovate with the support of universities it is more likely that the idea will become a product or service through their own development or private sector support.

course that you are leading as well, that has really helped us to spec out the idea that we have and understand what we need to do better in launching this idea.”

- e. Actively research new ideas and solutions that answer the needs of the customer⁶⁴
 - the case discusses their active research process that supports ideation and solution generation saying, *“Research and Development process is more of a discursive process, where we all contribute to ideas, we discuss and filter these down to things we will test internally or try with clients, and that improves the final implementation. Actually, it’s an iterative process our R&D because we really focus on the idea and the testing as a co-creation with the client.”* And *“... we have an active research process that is built into how we operate with us all researching and contributing ideas”*.
- 2. In relation to innovating through developing resource to support capacity building:
 - a. Invest in people, although it possible that this investment does not always involve financial investment⁶⁵ – the case interviews say that *“We do invest in people as a priority.”* But often that investment is through trust, where their *“whole way of working is about trust certainly internally within the company. We have a culture where we have confidence that the team will take decisions for themselves anyway, and I can sense check if necessary.”*
 - i. Make financial investments in training that enables absorption of knowledge⁶⁶ – within the data it says, *“we hire based on the personality of the person and carrying on to the value of training which you mention, we can train specific competencies or outsource very specific training if that is something that we need internally or have identified as necessary for a client”*.

⁶⁴ Research diary note: Case study two is very excited about the research had invested massively in resources that support research, and had built a process where the team would contribute good ideas through a shared resource.

⁶⁵ Research dairy note: Case study two was clear that trusting the team created agility leading to faster innovation processes.

⁶⁶ Research diary note: Case study two was very excited about the person and less the skills they have, as these can be trained or if necessary out-sourced; they really stressed the need to identify the right person over anything else. We also had several conversations about Stuart Sinek and TEDx and how they agreed in hiring for attitude.

- b. Create an investment plan for future innovation⁶⁷ – case study two finds that investment plans can have some flexibility although they need to be in place, saying, “*we don’t have a formal investment plan, but we are ready to invest if something is clearly going to give us value, so we put our effort into idea generation and development of these ideas to a point where they can be prototyped and will invest when the idea becomes really clear*” and that early investment means “*often getting something that you can see won’t do what it will potentially do in a year, and as SMEs you really want it to work and deliver quickly, especially since we are agile in how we act*”.
 - c. Invest in equipment and adopt early to allow innovation ahead of the market⁶⁸ – case study two discuss investment in software solutions saying “... *we did that immediately and that has really helped us communicate and complete innovation tasks. So, for specific things we will get on board immediately, and for others we will wait*” showing that for specific things that will improves a particular process or service they know they need to be agile.
- 3. In relation to creating networks to support capacity building:
 - a. Engage with network events to create opportunities to collaborate⁶⁹ – the case study data discussed how they “... *actively talk and share ideas and we have created really valuable relationships bases on sharing openly...*” which in turn “... *does create an extended word of mouth effect, and then in the future we do get to work with new people for who we create something new.*”
 - b. Create and develop platforms for conversations with customers and engage with network opportunities. – the case study data did discuss how they had created a number of platforms, but mainly engaged with their customers and network opportunities through “... *LinkedIn ...*”.
 - i. Leverage networks to access resources or collaborations which enable splitting costs, learning about the market, or generating capital for future

⁶⁷ Research diary note: Case study two was clear about being an SME allowed you to be agile in relation to planning and this they felt was an advantage and also allowed them to invest at the right time to support their innovation.

⁶⁸ Research diary note: It was clearly important to case study two to invest in equipment, but necessarily early, so as to ensure that this investment gave them the fullest return in relation to enabling them to innovate.

⁶⁹ Research diary note: The case study was actively engaged in talking and sharing ideas across their network, which they agreed led to extended word of mouth and new clients for who they do new things.

investment⁷⁰ – the case study discusses that they “... *don’t though manage to successfully collaborate in a way that allows us to split costs.*” That said, they do successfully learn about the market where, “... *ideas that we have got from our networks either through events or through platforms like LinkedIn have been used in our discussions and these have led to us creating something new*”.

4. In relation to capacity building through strategic working with organisations offering support for SME innovation:
 - a. Engage with public sector organisations offering training (one-to-one support and masterclasses)⁷¹ – the case study discusses the value of public training having other benefits that enable innovation, such as “... *like widening your networks, and often I think it’s more the relationships ...*” But public sector training has allowed innovation to occur through “... *listening to people speak about a topic in the industry you work in. If you free your brain up this way, listening to what they say even if it’s disconnected, you can contextualise that into a solution for a problem that you have, or you could adapt what they have done to fit our problem, although we often work with the private sector after to finalise a product or service innovation.*”
5. Demonstrate and discuss the support you receive to your networks to leverage their organisation social capital⁷² – within the pilot study data this was anecdotal, but is supported by the interviews of case study two which say, “*We also do, moving to engaging customers through platforms talk to our clients and this is useful because we showcase together what we have done, and it does create an extended word of mouth effect, and then in the future we do get to work with new people for who we create something new*”.
6. In relation to capacity building through strategic innovation planning:

⁷⁰ Research diary note: The case study was clear that a shared resource can be an idea and this enabled them to achieve aspects such as learning about the market and the eventual creation of new products and services.

⁷¹ Research diary note: The case study was clear that training through the public sector had led them to idea generation and meeting others from their sector; at the time of the interviews the case was engaged in a knowledge exchange scheme organised and led by the researcher. They did though say throughout the interviews that to complete their innovations meant that they needed to either take the process further in house or to the private sector.

⁷² Research diary note: This pilot case idea was clearly supported in case study two.

- a. Plan strategic investments to align to your overall business strategy⁷³ – their business strategy is centred around agility in solving problems for clients so investment can be “... more ad-hoc in when we rapidly progress an idea to an actual implementable solution. So, we often have the idea developed to the point of being able prototype but have not had the client need that acts as a catalyst to getting these things done, and then by understanding the client needs we know that we have to do that now, as that will allow us to solve their problem.”
 - b. Plan strategic collaborations that enable reduction of risk⁷⁴ – reduction of risk through collaboration is something that they don’t achieve: “We haven’t really managed to successfully collaborate in ways that reduces risk”, but they have developed internal process that mitigate this through continuous learning saying, “...everything is a risk and doing anything new for ourselves might actually fail. We try to develop our new products and services iteratively anyway, so there are periods that we do fail and rapidly pivot towards the fix having learned.”
7. In relation to capacity building through organisational re-evaluation of process:
- a. Formalise an innovation strategy⁷⁵ – case study two find that you need formalities but can be flexible in your approach to these and they allow you to be more agile in response to the market, saying, “...we do have formalities, but an actual strategy document is interesting, as we have this ongoing document of good ideas that we implement. I think that what we don’t have is dates, because often we speed up stuff because there is a need in our organisation, or we need to solve a problem for a client.”
 - b. Create feedback loops to communicate with users of your products and service to better understand their needs⁷⁶ – in the case study data it is also clear that creating feedback loops have enabled innovation, with the interviews saying “We do

⁷³ Research diary note: Case study two talked an number of times about how they had panning processes in place although this was agile and more responsive to when a client needed a particular solution.

⁷⁴ Research diary note: Throughout the interviews we discussed the need for formalities that avoided systemic blocks and how collaborations were generally through idea sharing and internal continuous learning processes.

⁷⁵ Research diary note; From all the interviews it was firstly clear that there should be a strategy for innovation, and case study two did have this in place, but they had built in significant processes to speed up processes in response to the need of clients to deliver relevant products and services.

⁷⁶ Research diary note: This was clearly very important to the data subject – this is also reflected in the pilot case and survey data.

though have a clear process for understanding our clients through feedback and innovating because of this. We always have a lessons' learned part of our status report, we ask for feedback and run diagnostics. Then we have meetings about different scores for different questions and implement changes where there are opportunities to improve. And these impact our successful project completion."

These implications for small and medium sized enterprises within the digital business sector have been carried through to a clear set of recommendations. This has allowed finally through this analysis a series of categories of actions, with suggested actions within these categories that small and medium sized enterprises within the digital business sector can implement to raise capacities and support their innovation in relation to harnessing the AT Tools discussed to be produced below. Furthermore, it has nuanced the definitions of the category of innovation enabling AT Tools as viewed through an AT lens. These AT Tools and actions that enable innovation are visualised in the below diagram:

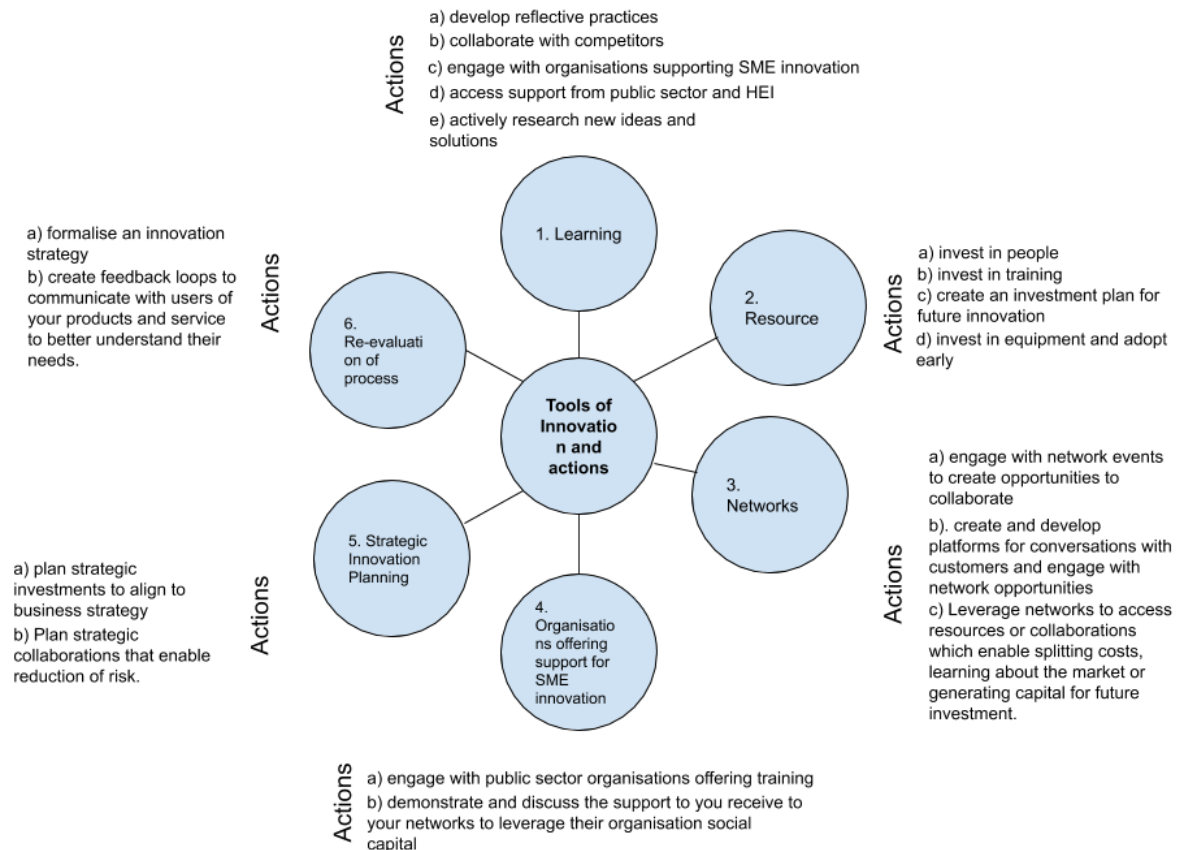


Figure 19: AT Tools and actions that enable innovation in small and medium sized enterprises within the digital business sector.

8.1.3 Relational analysis: AT Subject to AT Object

The analysis of the previous chapters examined the series of ownership characteristics that small and medium sized enterprises within the digital business sector ownership demonstrate that could increase their success in completion of innovations, built from the implications of pilot through the survey data, that have now been reflected in the first iteration framework (see Figure 17). Furthermore, this has nuanced the definitions of the category of innovation enabling owner characteristics. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances demonstration of these ownership characteristics.

The analysis and associated implications for small and medium sized enterprises within the digital business sector in relation to valuable owner characteristics are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Demonstrate commitment to innovation – the interview data supports the need to demonstrate commitment to innovation, which they have done through implementation of “... *lots of processes to support our continuous improvement*” and also because of this the team as a whole “... *share that commitment to our good ideas and progressing these*”.
2. Take thought out risks⁷⁷ – the case study two data finds that all innovation is a risk, but that experience allows them to assess the level of risk, for example in “... *low level risks that are based on sharing best practice but do lead to new ideas for products that we implement so these types of collaborations that are ideas based are really valuable*”. Also, they clearly believe that being risk averse is block to completion of innovations and

⁷⁷ Research diary note: Case study two was very considered about risk and not risk adverse having built a number of processes in to place to develop co-created products and services with their clients, choosing to fail-fast rather and reiterate.

they say they are “*not risk averse in anything we do, actually the opposite and that has helped us to be more innovative*” and that “*tech-based solutions that we can bring in early will fail first time, but the failure is part of the learning. Also, with our clients often they need to make a radical change and being fast in failing means we get to a better solution for them that has already been tested within their business and evolved through interacting with them*”.

3. Make use of past work experience⁷⁸ – there is a clear link innovation success to drawing on past experience, with interview data saying “*Past experience has really enabled our innovation successes. So, obviously listening, and understanding the problem you’re trying to solve and then thinking creatively about how to solve this, has been solved faster by pulling from experience, and knowing how you solved a similar past problem.*” But also, that problems are rarely unique where “*... as a team we’re really multi-disciplined, and I worked businesses, different cultures and lots of different types of people, and actually that is something that I want in people working here. It also means I don’t see that many a new business problem, as in stuff that I have never seen some flavour of that problem before*”, and it is clear that hiring people with lived experiences enables faster innovation.
4. Demonstrate positivity in attitude to the business – Ownership demonstrates positivity through their culture where their “*... whole way of working is about trust certainly internally within the company. We have a culture where we have confidence that the team will take decisions ...*”. Also, they find that demonstrating positivity within networks “*... encourages others to see us as trustworthy and this means people are prepared to share information with us*” and that they approach client relationships positively and “*... trust the client to be on the same page, so that we know we are all working towards the same results*”.

This analysis has outputted a series of attributes of ownership characteristics that small and medium sized enterprises within the digital business sector leverage to raise their capacities to innovate viewed through an AT lens that has been nuanced through the 3 stages of data

⁷⁸ Research diary note: Had many discussions about past experience allowing problems to be solved faster and new products and services to be created.

collection and literature inquiry. These innovation enabling characteristics are visualised in the below diagram:

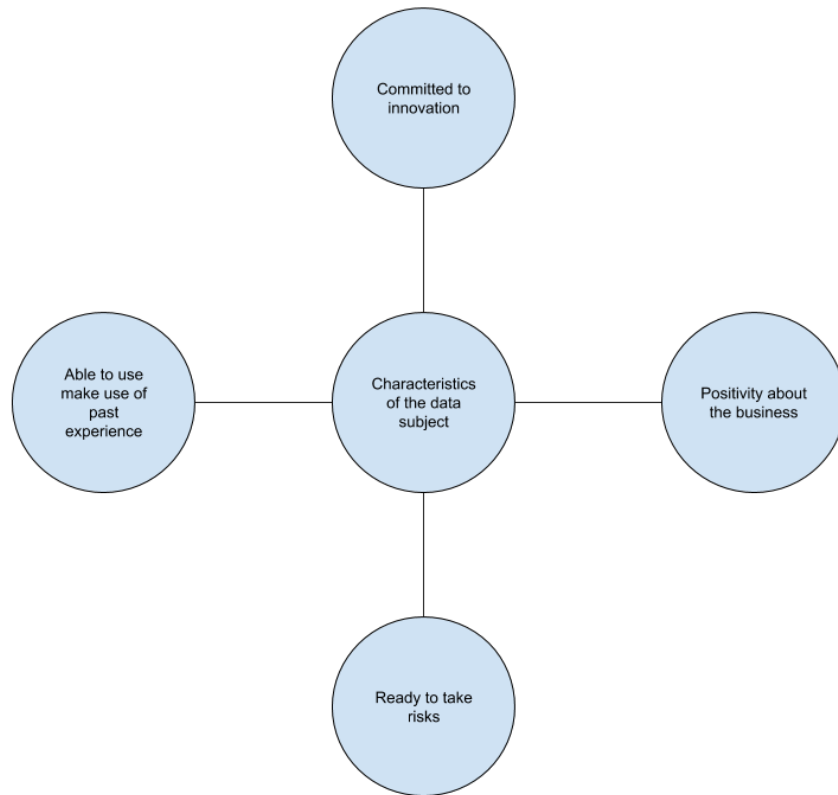


Figure 20: Subject characteristics that enable innovation in small and medium sized enterprises within the digital business sector.

8.1.4 Relational analysis: AT Rules to AT Object

Returning to the definition of AT Rules: these are defined by Engeström (1993, p. 67) as “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*”. The analysis of the previous chapters has produced a series of AT Rule actions, with suggested actions that small and medium sized enterprises within the digital business sector could implement to increase their success in completion of innovations that have been reflected in first iteration framework of the previous chapter (see Figure 17). Furthermore, it has nuanced the definitions of the category of innovation enabling AT Rule actions. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances AT Rule actions.

The analysis and associated implications for small and medium sized enterprises within the digital business sector in relation to the alignment between AT Rules and the AT Object (completion of innovation objectives) are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Identify and create meaningful relationships and collaborative network relationships of value and leverage resources – the case interviews discuss this in detail, and they actively create relationships, and collaborate in idea sharing where they “... *actively talk and share ideas and we have created really valuable relationships bases on sharing openly. So, the ideas that we have got from out networks either through events or though platforms like LinkedIn have been used in our discussions and these have led to us creating something new*”. Also, that development of relationships leads to future opportunities through people moving where “... *relationships are a way that people find us, people who’d had work done, or I had worked with them. So, they have been at senior level in an organization I knew or other people in the team knew, and they’d moved on to another company and they knew about our set up and brought us in. So often someone moves to another company, and they take you with them, and they recommend you inside the organization ...*”
2. Implement a formal process for managing innovation (which is inclusive of formal steps such as IP protection and R&D, team, and supplier management) – within the data it is agreed that there needs to be some levels of formality, where they say “... *we have as I said formalities. We have a very clear communication strategy that includes formal meetings, and project establishment structures such as the way in which we form our aims and objectives. Also, we have clear methods to reiterate our strategies quickly based on feedback loops that we have put into place. So, for us is clear that having these practices have really helped us to achieve our innovation aims and doing things faster.*” But for some processes it is possible for agility to “... *subcontract things like IP protection as we don’t have the skills in house*” and that business operators they are open to maximising skills inhouse and outsource tasks.
3. Create methods to communicate with and generate ideas from the end user.

- a. Test ideas and leverage feedback from end users – the data shows that this has been a clear enabler of innovation where “... *clients often they need to make a radical change and being fast in failing means we get to a better solution for them that has already been tested within their business and evolved through interacting with them*” where their “... *Research and Development process is more of a discursive process, where we all contribute to ideas, we discuss and filter these down to things we will test internally or try with clients, and that improves the final implementation*”. Also process for gathering feedback and diagnosing this rapidly develops their services and products where they “... *get feedback though SurveyMonkey or run diagnostics in house with the client stakeholders. We get them to work through a set of questions and we run diagnostics and about certain issues that we all had. Then we have follow-up meetings talking about the results for different questions and identify opportunities to improve. Then we push this back into our client solutions*”.

Finally, this analysis has produced a series of AT Rule actions that small and medium sized enterprises within the digital business sector can employ to increase their capacities to innovate, nuanced through the three stages of data collection and analysis and literature inquiry.

Furthermore, it has nuanced the definitions of the category of innovation enabling AT Rules as viewed through and AT lens. These AT Rules and actions that enable innovation are visualised in the below diagram:

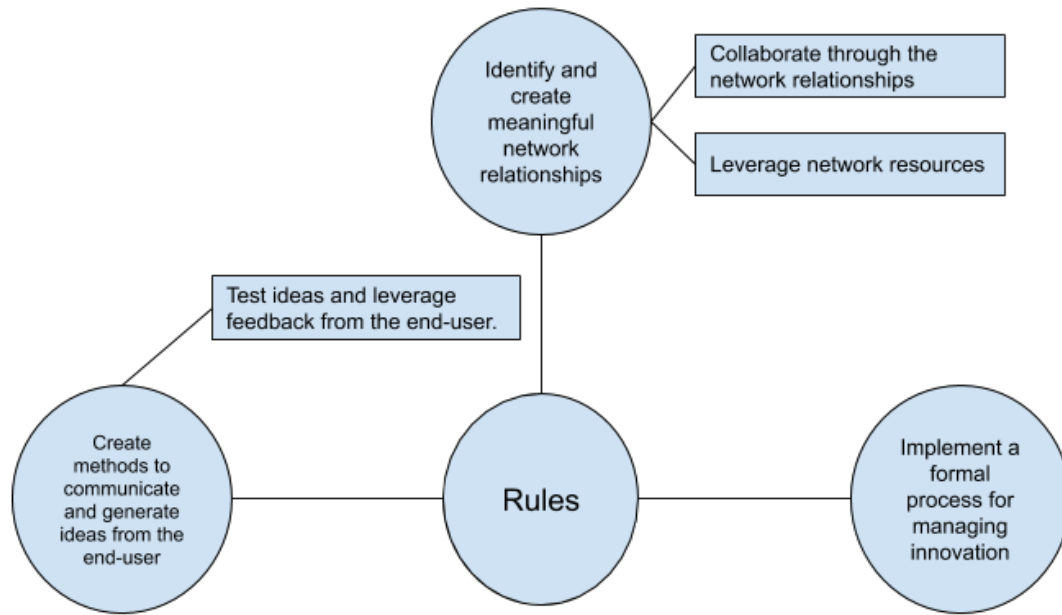


Figure 21: Visualisation of AT Rules that enable innovation in small and medium sized enterprises within the digital business sector.

8.1.5 Relational analysis: AT Community to AT Object

Returning to the definition of the AT Community within AT: this has been defined as “multiple individuals and/or subgroups who share the same general object”. The analysis of the previous chapters has produced a series of AT Community connections that small and medium sized enterprises within the digital business sector can source and foster to increase their success in completion of innovations (reflected in Figure 17). Furthermore, it has nuanced the definitions of the category of innovation enabling valuable AT Community connections. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances valuable AT Community connections for small and medium sized enterprises within the digital business sector.

The analysis and associated implications for small and medium sized enterprises within the digital business sector in relation to the relationship between the AT Community sharing

innovations and the AT Object (completion of innovation objectives) are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Create links to and engage with universities – the case data indicates that they know that this is important saying “... we try to do with universities fail but we keep trying. I like working with academics and actually I really enjoyed doing that guest lecture that we did ...” and that “... what I would say is that universities have been great in helping us sort out our ideas into something that we can prototype, and really understand the technologies that will sit behind it. We haven’t got to a stage of this becoming a product through collaboration, but it’s moved us further along the design process and we’re clearer about what the solution will look like. It’s something that we need to continue to do though and even though it never really leads to definite things, so far, we know it might do and there is potential.” They also worry about universities have a real-world disconnect: “From our perspective universities are disconnected from business aims but they appear to be getting better at this.”
2. Create links to and engage with innovation supporting public sector organisations – this has been discussed above but continuing from university collaboration conversations they discuss how “... we’ve talked about university collaborations just now and they are as you know, something we like, we keep trying to do them, but they don’t really lead to much, although we want them to. We have had more success with some organisations as you know like Business Growth Hub. Business growth hub and their Spark to scale program led us to be more open minded and think differently. And they also encouraged us to look at alternative partnerships and courses, so my business advisor was doing stuff with Salford so that helped us join the dots into doing this AI course as well. And they also really helped us think clearer about methods of understanding our clients better, and we have pushed that back into our feedback loops and product and service development ...”
3. Create links to and engage with banks and exploit networking opportunities as well as finance – this has enabled opportunities where their “... bank has pushed us towards some of the networking opportunities that have allowed us to be more innovative. As I discussed above, our introduction to the Business Growth Hub came as a suggestion

through our bank manager, and we're exploited the Chamber of Commerce network too as part of their advice. And these things have led us to extend our networks and introduced us to new clients who we have introduced innovative solutions to."

4. Create links to competitors and collaborate strategically – as discussed above, the case find that success is driven by idea sharing that has been fed-forwards into product and service development, where they say where “... *this has been a success is really in sharing knowledge that we have discussed in the team or with clients and then iteratively tested with a pivot to that context. We have had to engage in this too though and be relatively open in our approach to sharing which was complicated at the beginning. But it has also allowed people in our networks to trust us, and we have as I said had value from this that had led to innovation, change and something new.*”

Finally, this analysis has produced a series of AT Community connections that small and medium sized enterprises within the digital business sector can develop to increase their capacities to innovate, with the values that they offer. Furthermore, it has nuanced the definitions of the category of the innovation enabling AT Community as viewed through and AT lens. This is visualised in the below diagram:

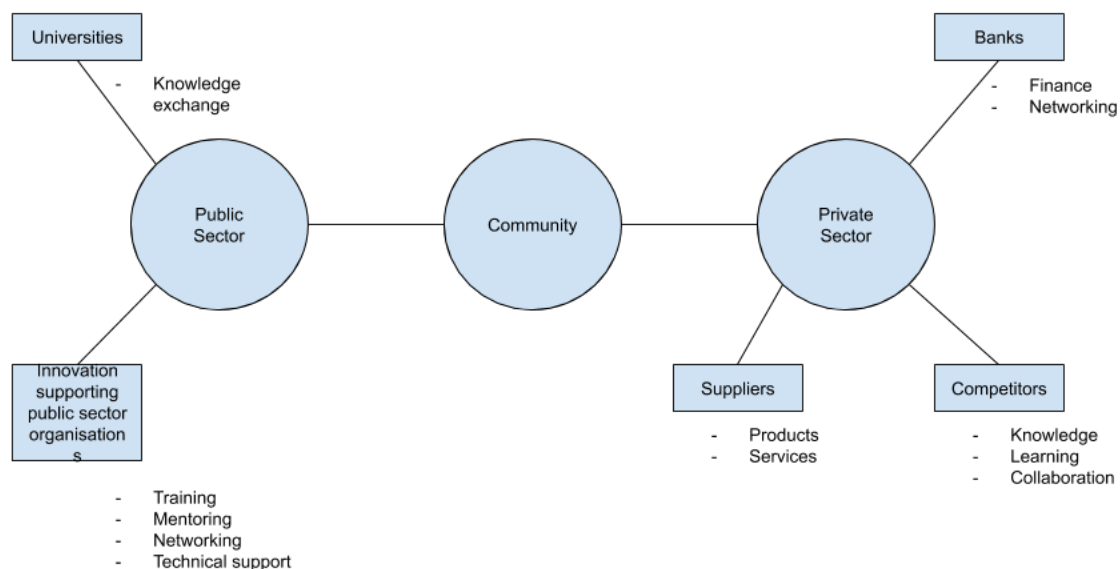


Figure 22: AT Community connections that small and medium sized enterprises within the digital business sector can develop to increase capacities to innovate.

In this analysis it should be noted that only the pilot case study and literature talked about the value of collaborating on products and service with suppliers, and that in case study two the value of collaboration with competitors comes from active idea sharing that leads to the implementation of innovative ideas.

8.1.6 Relational analysis: AT Division of Labour to AT Object

Returning to the AT definition of the Division of Labour as “*both the horizontal division of tasks between the members of the community and to the vertical division of power and status*”. The analysis of the previous chapters produced a structure for how labour can be divided that small and medium sized enterprises within the digital business sector can follow to increase their success in completion of innovations (reflected in Figure 17). Furthermore, it has nuanced the definitions of the category of an innovation enabling structure for the AT Division of Labour. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances a structure for the AT Division of Labour in small and medium sized enterprises within the digital business sector.

This section will analyse associated implications for small and medium sized enterprises within the digital business sector in managing team dynamics in the process of innovating and related actions which are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Create a hierarchical structure within the team – although there is a structure in place, they have avoided being over hierarchical. “*We’re low on structure as you know. I think a true hierarchy might have stopped us being innovative. People certainly know I am in charge but our creativity and ability to bring new solutions into place have really come from ... [how we] ... co-create internally and with clients, we are ok with the iterative process and failing faster on route to a better solution.*” And this “*... continuous improvement process ... approach has really helped us be more agile, so we can be really responsive to the clients*”.

2. Have a plan for innovation– As with the literature and the pilot study, case study two are flexible and agile in how they progress ideas: *“... we do have a plan, like we’re progressing things, but it is more free form and sometimes we accelerate things that we have planned as we work with a particular client, and we find a better way to respond to what they are asking for. It’s not really an innovation strategy but a conscious decision to continuously improve. There’s also two things, so innovating for our clients which we’re having to do all the time, and that is something we have a process for and that is co-creative and continuous, so doing this is our plan.”*
3. Complete innovations through reflecting on capabilities of the team – Reflection is enabler in that enables case study two to know when to seek help and absorb knowledge from external organisations: *“We do it most when have something hit the Good Ideas document, but we will only be able to take it so far. So, an example at the moment is that we don’t have the skills in house to develop the AI product on a data science level. We know what we want, and we can certainly help with the specification and how the user will benefit from it. But we aren’t data scientists and perhaps we also will need to create training data we have learned, which we need to subcontract, which on reflection is something we can steer but not actually do. Basically, we do reflect, and it allows us to understand who we need to work with to better develop an idea, for example with the university at the moment, or with another organisation that might support us in a process or with a technology.”*
4. Define team tasks and roles – Case 2 has defined team roles and says, *“We have defined roles and tasks. So, for example we have all got individual projects with clients, which we all feed into with ideas, and we incorporate our good ideas log into these. And we all have project management skills although we approach things in different ways”*. But like other processes, with tasks they have these within their project documentation as the progress they act in an agile manner and *“... if we have a gap, we step into roles to support each other in the completion of an innovation task”, and “... we are doing this constantly throughout our formal meetings which we have weekly and this flows through our planning documents and the formalities like how we define projects”*.
5. Manage completion of tasks within the team – case two have formalities in relation to the management of tasks, so there are *“... processes that we have formally put into place to*

manage the scope of our projects. So, I have said we have our weekly meetings, and in there we do discuss the tasks that are outstanding towards implementing our solutions internally or with the client. And at that stage we readjust as a team and if necessary, we support the process towards completion. So this is a conscious decision to manage the processes ...”, but as discussed before these have been designed so as to “... do things in an agile manner, and act as and when it will produce the best effect”.

Finally, this analysis has produced a structure for how labour is divided that small and medium sized enterprises within the digital business sector can employ to increase their capacities to innovate. Furthermore, it has nuanced the definitions of the category of an innovation enabling AT Division of Labour as viewed through and AT lens. This is visualised in the below diagram:

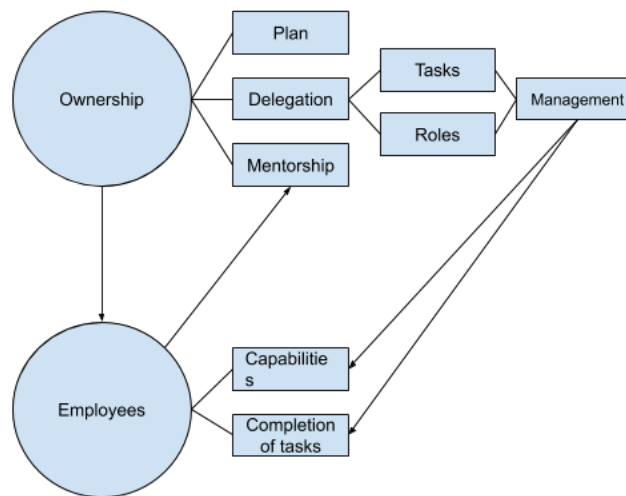


Figure 23: AT Division of Labour in completion of innovation in small and medium sized enterprises within the digital business sector.

It worth noting that employee mentorship is discussed throughout the case studies and is a theme that has emerged through the process analysis. Within case study two interviews there are clear discussions of acting through sense checking rather than over-managing processes, but within the pilot case the owner clearly felt that mentorship was essential and an active process that leads to innovation through trust and team agility.

8.2.1 AT Tools: mediating artefacts to the innovation process

As discussed in chapters 6 and 7 above, Engeström (1993, p. 67) considers AT Tools the “*physical and symbolic, external and internal tools (mediating instruments and signs)*” within the research investigation. The below analysis considers the alignment of AT Tools to the AT Subject (discussed in section 6.2.2) and the AT Community (discussed in section 6.2.3). Within the following analysis various contradictions, a characteristic of AT, arise that nuance understanding of how innovation happens in small and medium sized enterprises within the digital business sector. This section will continue from the consideration in chapters 6 and 7 and will nuance conclusions though the data of case study two.

8.2.2 Relational analysis: AT Subject to AT Tools

The analysis of the previous chapters produced a series of recommended AT Tools and actions that small and medium sized enterprises within the digital business sector ownership can take to increase their success in completion of innovations (reflected in Figure 17). Furthermore, it has nuanced the definitions of the category of innovation enabling AT Tools. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which small and medium sized enterprises within the digital business sector can employ these AT Tools to raise their capacities to innovate and support their innovation.

The analysis and associated implications for small and medium sized enterprises within the digital business sector employing these AT Tools and related actions are nuanced, supported, and contrasted within the second case study data in the following ways:

1. The subject should be open to adoption of AT Tools – the interview data has provided support and nuance within case study two for their openness to the adoption of the identified AT Tool. The nuance in relation to this can be seen above, in that they

collaborate with competitors through ideas, and similarly leverage network ideas; see above discussion⁷⁹.

2. The subject when implementing innovation should reflect on the process - “... *we have had success through our reflective practices which are built into how we operate really, so as a continuous improvement, and this is something that has been part of our innovation success*”. And, similarly, they have linked reflection to completion and learning to complete innovation processes faster saying, “*Reflection has really helped us complete our innovation goals, and every week, and continuously we are reflection on our process. In our status reports we have formalised reflection so we reflection to the lessons learned log and share that with our client, and then we get them to reflect and contribute, and this allows us to do things faster in the future*”⁸⁰.
3. The subject should develop personal skills to network – the case states that this has been essential, saying, “*The skills that we have developed in relation to completing innovations are that we have learned to discuss what we are doing and to be more open in our network in the discussion of ideas, as these have led to us transferring these into our own practice and pivoted these to fit ourselves or our client. The other thing is that as we have said, we don’t necessarily see innovation as something that hasn’t been done before, but actually in our case it can be that we move it forwards in a way that fits better with the people that benefit from it, so us or our clients*”.
4. The subject should use past experience to assess risks and commit to strategic investments – it is clear within case study two that they draw heavily on experience and managing risk and building processes that support and mitigate this, saying, “... *we’ve seen most problems in a form or another, and there is rarely a completely uniquely new business problem. And also, what we have learned from these situations in relation to risk is that it is ok to take risks on the way to a final solution, and that has helped us create an iterative process of continuous improvement. Also, what we have learned too is that we can be more ad-hoc in when we rapidly progress an idea to an actual implementable solution*”.

⁷⁹ Research diary note: Idea sharing that leads to an innovation is a repeated theme.

⁸⁰ Research diary note: A note regarding the active nature of the research through Action Case and reflection is that as part of the interviews case study two say of the process that “*it’s helped us think about things that we do really well, and we’ve been doing more of them over the course of the time we’ve been talking!*”

Finally, this analysis has produced a series of behaviours that small and medium sized enterprises within the digital business sector ownership that they can employ to increase completion of innovations. Furthermore, it has nuanced the definitions of the category of an innovation enabling behaviours as viewed through and AT lens. These recommended behaviours are visualised as below:

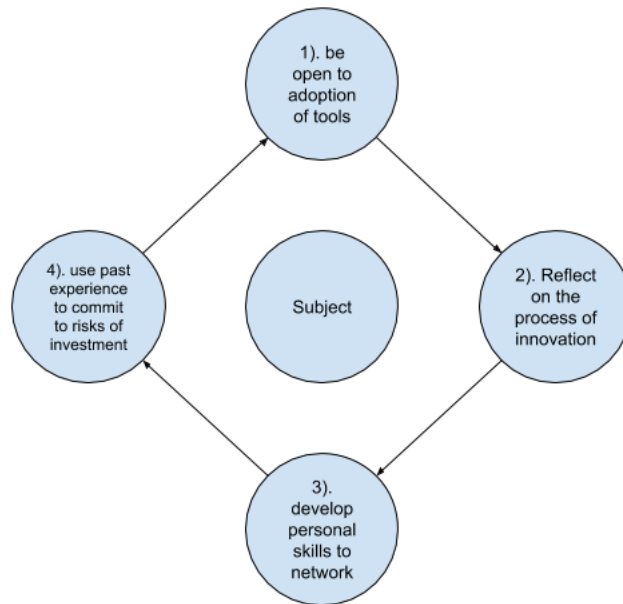


Figure 24: The subject and the leveraging of innovation enabling AT Tools.

8.2.3 Relational analysis: AT Community to AT Tools

The analysis of the previous chapters has produced a series of AT Community actions that small and medium sized enterprises within the digital business sector ownership can demonstrate within the AT Community to increase their success in completion of innovations (reflected in Figure 17). Furthermore, it has nuanced the definitions of innovation enabling AT Community actions. Continuing from this previous chapter where conclusions from the pilot case study have been aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and further nuances valuable innovation enabling AT Community actions for small and medium sized enterprises within the digital business sector.

The analysis and associated implications for small and medium sized enterprises within the digital business sector employing innovation supporting AT Community actions are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Strategically working with HEI (within the public sector AT Community) can enable innovation and business growth – it is interesting that as the data from this case has already indicated that working with universities “... *has contributed to completing goals, but not directly. We develop ideas and develop what we will need to do to prototype our idea, but it hasn’t through a number of attempts been delivered through that partnership*”⁸¹.
 - a. Working with HEI is a bridge to relevant private sector support – “*So, actually though the processes of working with HEI has helped us to meet people who can take it to a point where it can be developed into a real product or service*”. It is only in the literature and pilot case that these are clearly linked to that collaboration, whereas with case study two, it is connectivity and learning that leads to innovation through a later connection⁸².
2. Create processes to communicate the strategy with the AT Community sharing innovations to:
 - a. Enable the AT Community to rapidly innovate – this is clearly something that has enabled innovation in case study two, with them saying “*We have a number of clear process that we have put in place to communicate or strategy to innovate inside the team and with clients. Within the team it has created a shared responsibility for creating value and driving change within the team, and with the clients it has created a co-creative process that matches the solution with their*

⁸¹ Research diary note: The case study, and several other Digital Business SME the researcher has been in contact with discuss the issues with working with universities, and an example within the case study data is that they say “*It’s something that we need to continue to do though and even though it never really leads to definite things, so far, we know it might do and there is potential. From our perspective universities are disconnected from business aims but they appear to be getting better at this*”.

⁸² Research diary note Case study two was really excited about working with HEI, but frustrated by the inability to convert, but excited about how when they do so they meet other relevant businesses that help them to innovate.

needs. This has certainly been a driver of successful innovation in our organisation”.

- b. Share resources with the AT Community – case study two have clearly developed these and process to share these so as to generate innovation through *“centralised resources that we share, and all contribute too internally and we push this into the shared the summaries of feedback, so the status reports that we create, so they can see what we have contributed and also see what they have provided as feedback to us which has contributed to the solution. Actually, sharing resources is a big thing that we do, and that also includes knowledge, so we regularly share idea in the community that are improved through communication. And we do the same with the clients and within the team. We have been clear to set up shared documentation that feeds through and acts as an idea catalyst through to the client that also contributes through the sessions that we run or diagnostics that we do with them. I know this has led all the way through from generation of ideas through to implementation of new solutions”.*
- c. Clarify communications – this is strongly supported in case study two where they say this is something they *“do constantly, as in that we meet, and we nuance internally our solutions within the team, but similarly we take this out to our clients, and we meet regularly and redefine what it is that we are trying to do, through the running of activities that we analyse or the analysis of diagnostics that we do with the client. And though this process we create something more fitting, and because we develop our solutions iteratively, often failing fast and co-collaboratively which means one of the best ways we have achieved innovation is through iteratively clarifying our communications”.*

Finally, this analysis has produced a series of actions that small and medium sized enterprises within the digital business sector ownership can employ within the AT Community to increase completion of innovations. Furthermore, it has nuanced the definitions of the category of an innovation enabling AT Community actions through an AT lens. These actions are visualised as below:

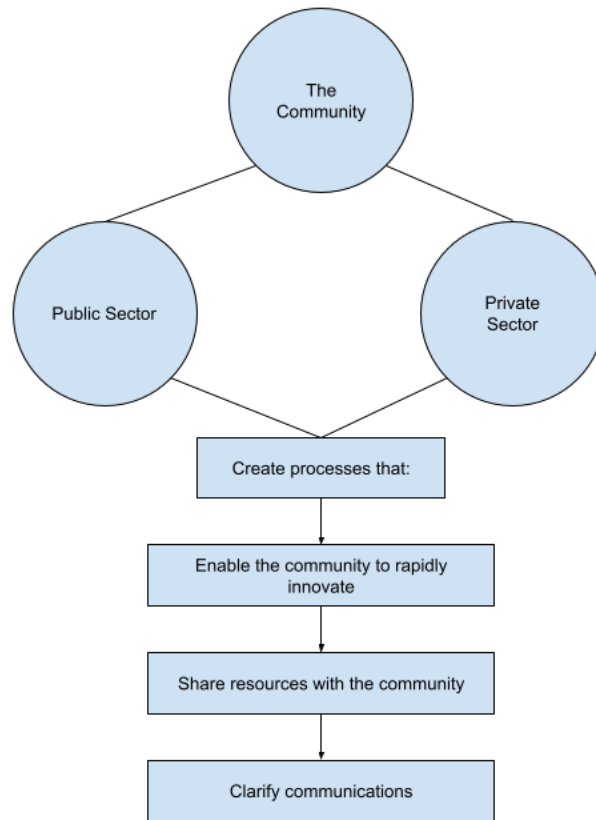


Figure 25: The AT Community and the leveraging of innovation enabling AT Tools.

As discussed above, public sector communities are discussed and identified in the literature inquiry and pilot case study, whereas case study considers these to be opportunities for sharing ideas within networks that lead to the implementation of innovation internally and with clients.

8.3.1 AT Subject: the individual's perspective

Restating the discussion of the previous two chapters, as discussed, Engeström defines the subject as (1993, p. 67) *“the individual or subgroup whose agency is chosen as the point of view in the analysis”*. The below sections consider the alignment of the AT Community to the AT Subject in the completion of innovations and in the AT Rules applied to achieving success in the implementation of innovation with implications from the pilot study nuanced in response to the second case study.

8.3.2 Relational analysis: AT Community to Subject

As stated above, the AT Community are defined by Engeström (1993, p. 67) as “*multiple individuals and/or subgroups who share the same general object*”. The analysis of the previous chapters produced a series of implication for SME ownership and relationships within the AT Community sharing innovations (reflected in Figure 17). The following analysis considers the AT Community and its relationship to the AT Subject. The analysis and associated implications for small and medium sized enterprises within the digital business sector ownership and relationships within the AT Community sharing innovations are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Identify AT Community members offering values and attributes that create an environment that raise capacities to innovate.
 - a. Trustworthiness – this quality is widely discussed and the notion that you “... *build trust with them, so they are more likely to share*” which in turn leads to innovative practice and “... *working with new clients where we have innovated with solutions to their problems*”. And that within the business they “...*have enough trust that people are autonomous*”.
 - b. Previous knowledge of ways of working – the case discusses previous team knowledge as an enabler of competing innovations saying, “*we’ve seen most problems in a form or another, and there is rarely a completely uniquely new business problem*” and how the “*team is knowledgeable and how we all have past work experience and this allowed us to innovate*”⁸³.
 - c. Shared commitment to innovation – the owner of the case study two business discusses how “... *the whole team knows that I am committed, and they share that commitment to our good ideas and progressing these*” and this shared way of working is reflected in their internal practices and ability to “... *design new ideas with our users*”.
2. Foster human relationships with the AT Community – the case study talks about developing relationships with AT Community members leading to opportunities to

⁸³ A repeated theme within the case study two research diary observations is that interview data stressed that solutions and problems are often not unique, and that ability to solve these rapidly is a function of experience.

innovate, for example saying, “... *relationships are a way that people find us, people who’d had work done, or I’d worked with them. So, they’ve been at senior level in an organization I knew or other people in the team knew, and they’d moved on to another company and they knew about our set up and brought us in. So often someone moves to another company, and they take you with them, and they recommend you inside the organization*”.

Finally, this analysis has produced a series of actions that ownership of small and medium sized enterprises within the digital business sector can employ within the AT Community to increase completion of innovations. Furthermore, it has nuanced the definitions of the category of an innovation enabling AT Community actions through an AT lens. These relationship between the AT Community and AT Subject, with attributes and values are visualised as below:

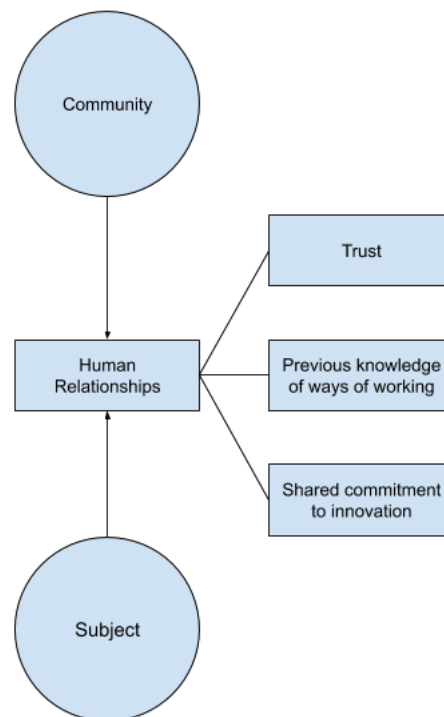


Figure 26: The AT Subject and the AT Community within the process of enabling innovation

8.3.3 Relational analysis: AT Rules to AT Subject

The analysis of the previous chapters produced a series of actions that small and medium sized enterprises within the digital business sector ownership can demonstrate within the AT Community to increase their success in completion of innovations (reflected in Figure 17). Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances further innovation enabling AT Rules in small and medium sized enterprises within the digital business sector in the following ways:

1. The subject needs to have or develop skills enabling identifying networks, leveraging advantage from these and creating sustainable relationships for collaboration – case study two supports this, saying “... *we use these networks successfully to leverage ideas, which we have been really successful at doing. We have used it really to create relationships where we share ideas and then build trust and then we have had lots of success with people feeling able to share things, ideas. And then these ideas have been good, and we’ve discussed them and implemented these. These have certainly led to completion of innovation goals*” and that “... *then in the future we do get to work with new people for who we create something new*”.
 - a. The subject needs to realise the benefits through early adoption of digital tools that support the AT Rules of innovation discussed above – case study two can be late in adoption and adopts tools based on need internally or with clients saying, “... *we often adopt later than others because for us it doesn’t always even need to be a new idea. It’s just maybe new to our organization, innovative for our culture, or for our clients. We often pivot ideas, things that we have heard about and then we do these either for ourselves or clients*”.
2. The subject should demonstrate their knowledge of their industry space within networks to enable the creation of sustainable relationships for collaboration – case study two support this saying, “... *value comes in the relationships that you have with people or being seen to have these relationships. Like, through this you build trust and demonstrate that people trust you and we know that helps people share things*” and “... *it does create new client opportunities and it’s useful for us if we need to generate finance or get*

involved with particular project to be able to show how we are a trusted partner and that we have people that we have delivered successful change for”.

3. The subject should maximise their knowledge of the industry space in their communications with the end user – case study two supports this as innovation enabler saying they have been *“... engaging customers through platforms talk to our clients and this is useful because we showcase together what we have done, and it does create an extended word of mouth effect, and then in the future we do get to work with new people for who we create something new”.*
 - a. The subject should implement and create value through feedback loops to communicate with the end user and where there are digital tools supporting that they should realise the benefits through early adoption – this is supported in case study two where the interview data says *“We do though have a clear process for understanding our clients through feedback and innovating because of this. We always have a lessons’ learned part of our status report, we ask for feedback and run diagnostics. Then we have meetings about different scores for different questions and implement changes where there are opportunities to improve”* and that they have *“set up shared documentation that feeds through and acts as an idea catalyst through to the client that also contributes through the sessions that we run or diagnostics that we do with them. I know this has led all the way through from generation of ideas through to implementation of new solutions”.*
4. The subject should develop project management skills for managing innovation internally within the organisation and within their external relationships – this is clearly supported in case study two with the interview discussing how they have created iterative process for the management of projects that have enabled completion of innovations, saying they have a strategy *“... that includes formal meetings, and project establishment structures such as the way in which we form our aims and objectives. Also, we have clear methods to reiterate our strategies quickly based on feedback loops that we have put into place. So, for us is clear that having these practices have really helped us to achieve our innovation aims and doing things faster”.*

Finally, this analysis has produced a series of actions that small and medium sized enterprises within the digital business sector ownership can employ within the AT Community to increase completion of innovations. Furthermore, it has nuanced the definitions of the category of an innovation enabling application of AT Rules by the AT Subject through an AT lens. These relationships between the application of AT Rules and subject are visualised as below:

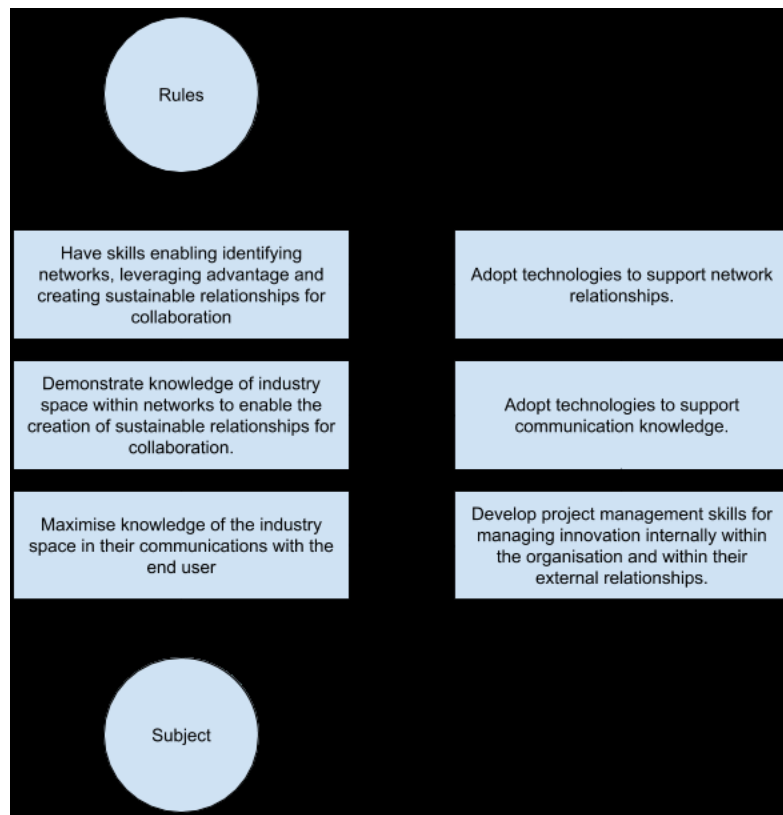


Figure 27: The AT Subject and application of AT Rules within the process of enabling innovation.

8.3.4 Relational analysis: AT Division of Labour to AT Subject

The analysis of the previous chapters produced recommendations for managing team dynamics and the AT Division of Labour that small and medium sized enterprises within the digital business sector ownership can implement to increase success in completion of innovations (reflected in Figure 17). Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances further innovation enabling recommendation for the AT Subject and AT Division of Labour.

The analysis and associated implications for small and medium sized enterprises within the digital business sector owner/operators managing team dynamics and the AT Division of Labour within innovation are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Create a formal team structure that enables team motivation⁸⁴ – this is clearly supported in the case study data as an innovation enabler where they say *“We have a structure but it’s increasingly flexible, and obviously there is a power relationship, but it has never been something we have stressed. And as I have said before it removes the traditional hierarchical structure of lots of businesses. I think it actually helps us achieve innovation goals faster”*.
2. Project management practices should be applied with the team – there are clear formalities in place that are shared across the team that enable innovation completions, saying *“We have a very clear communication strategy that includes formal meetings, and project establishment structures such as the way in which we form our aims and objectives. Also, we have clear methods to reiterate our strategies quickly based on feedback loops that we have put into place. So, for us is clear that having these practices have really helped us to achieve our innovation aims and doing things faster”* and *“we are doing this constantly throughout our formal meetings which we have weekly and this flows through our planning documents and the formalities like how we define projects”*.

Finally, this analysis has produced a series of roles that small and medium sized enterprises within the digital business sector ownership can take to increase completion of innovations. Furthermore, it has nuanced the definitions of the category of subject role actions through and AT lens. The relationship between the AT Division of Labour and AT Subject are visualised as below:

⁸⁴ Research diary note: Case study two talked extensively about processes that they had created that support agility which has been reflected in the recommendations of this thesis.

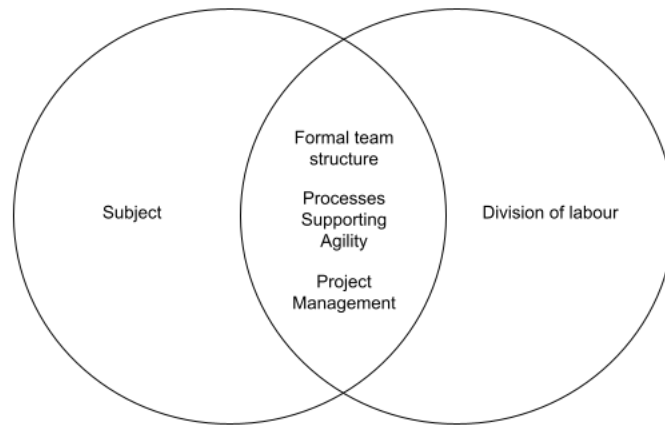


Figure 28: The AT Subject and AT Division of labour within the process of enabling innovation.

8.4.1 AT Community

As discussed in the previous chapters, Engeström defines the AT Community as (1993, p. 67) “multiple individuals and/or subgroups who share the same general object”. The following section will consider the AT Community and its relationship to the AT Rules of innovation and the AT Division of Labour, both of which have been discussed in the earlier sections of the report. Implications will be realigned to second case study data.

8.4.2 Relational analysis: AT Rules to AT Community

The analysis of the previous chapters produced recommendations for the application of AT Rules within the AT Community that small and medium sized enterprises within the digital business sector ownership can provide to increase success in completion of innovation (reflected in Figure 17). Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances further innovation enabling recommendation for the application of AT Rules within the AT Community.

The analysis and associated implications for small and medium sized enterprises within the digital business sector employing the identified innovation AT Rules within the AT Community are nuanced, supported, and contrasted within the second case study data in the following ways:

1. Leveraging the network through the AT Community enables creation of future relationships for business growth – case study two clearly support this as an enabler of completion of innovations, saying “... *the ideas that we have got from our networks either through events or through platforms like LinkedIn have been used in our discussions and these have led to us creating something new. We also do, moving to engaging customers through platforms talk to our clients and this is useful because we showcase together what we have done, and it does create an extended word of mouth effect, and then in the future we do get to work with new people for who we create something new*”⁸⁵.
2. Project managing the innovation processes within the AT Community demonstrates commitment to creating and maintaining relationships – the case study data talks about how demonstrating commitment creates a shared community of team commitment, saying “... *the whole team knows that I am committed, and they share that commitment to our good ideas and progressing these*”.
3. Involving the end user enables the creation of relationships with potential and other user bases – this is evidenced further in the case study data which says that “... *relationships are a way that people find us, people who’d had work done, or I’d worked with them. So, they’ve been at senior level in an organization I knew or other people in the team knew, and they’d moved on to another company and they knew about our set up and brought us in. So often someone moves to another company, and they take you with them, and they recommend you inside the organization*”.

Finally, this analysis has produced a series of recommendations for application of AT Rules within the AT Community that small and medium sized enterprises within the digital business sector ownership can take to increase completion of innovations. Furthermore, it has nuanced the definitions of AT Community and AT Rules, and how these interact viewed through an AT lens. The relationship between the application of AT Rules and the AT Community and their enabling of innovation are visualised as below:

⁸⁵ Within the researcher’s diary the interviews and observations of case study two indicated that they had strong belief that the sharing of ideas had impact on the completion of actual innovation ideas, either internally or externally with clients, and that the network was a key enabler of this happening.

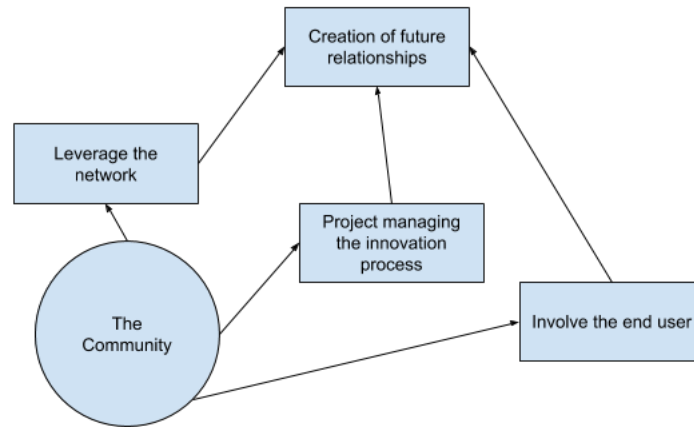


Figure 29: The relationship between the application of AT Rules and the AT Community and their enabling of innovation.

8.4.3 Relational analysis: AT Division of Labour to AT Community

The analysis of the previous chapter produced recommendations for the AT Division of Labour within the AT Community that small and medium sized enterprises within the digital business sector ownership can put in place to increase success in completion of their innovations (reflected in Figure 17). Furthermore, it has nuanced the definitions of the AT Division of Labour within the AT Community and how this can be applied. Continuing from this previous chapter where conclusions from the pilot case study aligned to the literature with reference to the survey data, the analysis below demonstrates the ways in which the data from case study two supports and nuances further innovation enabling recommendation for the application of the AT Division of Labour within the AT Community.

The analysis and associated implications for small and medium sized enterprises within the digital business sector in relation to the AT Community and AT Division of Labour are nuanced, supported, and contrasted in the following ways:

1. The AT Community benefit from a power structure that defines how the labour will be divided – this is discussed in case study two with the data saying *“We have a structure but it’s increasingly flexible, and obviously there is a power relationship, but it has never*

been something we have stressed. And as I have said before it removes the traditional hierarchical structure of lots of businesses. I think it actually helps us achieve innovation goals faster. We have a process where we are discussing ideas and developing our solutions iteratively and continuously, and in there we have removed a lot of the need to overly sense check that means that when we fail, we quickly bring in changes that fix the issue. And the trust aspect that we have for each other has really enabled us to do things in a more agile manner, as we all take responsibility for when we go wrong with a solution for a client, and we quickly learn and incorporate the changes that we need to make that help us get closer to the end of the project. We know that this has allowed us to do things faster”. That said, this contrasts the pilot data where structures are far more flexible, although is necessary to have a structure, saying the owner “... prefer a system where I will back them if they want to sense check something ...” but the team don’t need “... permission to do something and signing things off because it’s a block to doing things and learning from it, and anyway if messing up means you learn and do things better next time”⁸⁶.

- a. The AT Community require the allocation of tasks contributing to completion of innovations – in case study it supports the need to define tasks although the structure that supports this can be more flexible, saying “... *We have defined roles and tasks. So, for example we have all got individual projects with clients, which we all feed into with ideas, and we incorporate our good ideas log into these. And we all have project management skills although we approach things in different ways. I would not say we define tasks either, but within the team we discuss our projects and if we have a gap, we step into roles to support each other in the completion of an innovation task*”.
- b. The AT Community share a purpose in completion of tasks contributing to completed innovations – once again this is supported within the case study data saying, “... *the whole team knows that I am committed, and they share that commitment to our good ideas and progressing these*”.

⁸⁶ Research diary note: The need to balance structure and creative flexibility is clearly important and of excitement to the interviews of case study two – they never state there should be no structure, and have one, but use their flexibility as an enabler of agility in their innovation tasks.

Finally, this analysis has produced a series of recommendations for application of the AT Division of Labour within the AT Community that small and medium sized enterprises within the digital business sector ownership can put in place to support capacity raising and innovation. Furthermore, it has nuanced the definitions of the application of the AT Division of Labour within the AT Community through an AT lens. The relationship between the AT Division of Labour and the AT Community is visualised as below as a closed circular relationship with these factors in constant interaction:

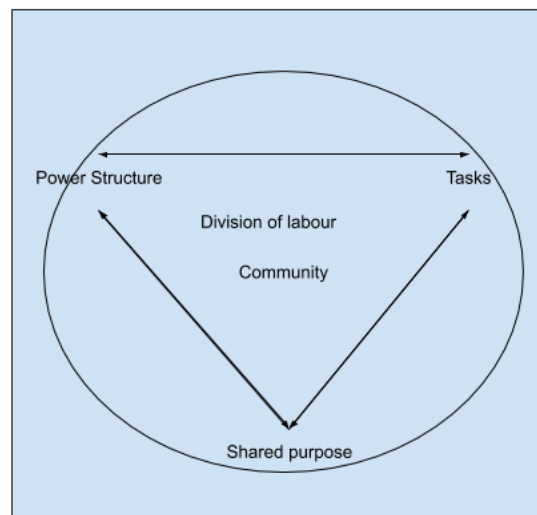


Figure 30: The circular relationship between the AT Division of Labour and AT Community.

8.5.1 AT Outcome to AT Object

As discussed in the past two chapters, the AT Outcome is a function of the AT Object which is to ‘innovate’ - as such this analysis is unilateral, considering actual impacts of the process of innovation and success in completion of innovations. As with the previous chapters discussion of innovation AT Outcomes in case study two are visualised as a word-cloud below:

certainly led to completion of innovation goals. And we have used physical and virtual relationships in the same way. But that also means we have had to share ideas to get ideas back”.

- Better addressing the business environment and increased competitiveness in new markets – case study two discusses how completion of innovations lead to being able to *“improve our performance so we can compete on a more even footing with larger firms”.*
- Advantageous contradictions and unexpected outcomes, for example, marketing innovations were created through the process of innovating – case study two draws out how they iteratively improve their solutions which they are quickly able to repurpose and pivot to new client contexts, saying *“... the final implementation and sometimes that creates a new service or product that we can roll out with minor pivots to a different client”.*

This adds nuance to the understanding of innovation AT Outcomes and outputs a set of valuable and tangible real-world outcomes that small and medium sized enterprises within the digital business sector can benefit from through the completion of their innovations. Furthermore, within the data of case study two there is significant alignment to these valuable AT Outcomes of completed innovation processes. Finally, this analysis has produced several outcomes that small and medium sized enterprises within the digital business sector benefit from post-innovation implementation visualised below that have been identified in the three stages of data collection and analysis:

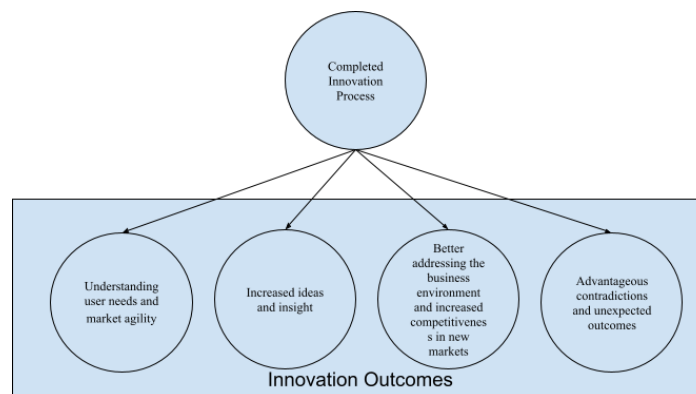


Figure 32: Innovation outcomes identified in the three stages of data collection and analysis

8.6.0 Conclusion to case study two analysis and closure of data collections

At this stage this current research will close before progressing to the final chapters of this work which will summarise the results. To this stage this current research has yielded several contributions which have been identified and nuanced through the literature, pilot study case, survey and second case study. The categories of capacity raising and innovation supporting activities have emerged, viewed through the lens of AT, and been contextualised through the three phases of data collection; this in turn has outputted a series of enablers for successful support of capacity raising and innovation in small and medium sized enterprises within the digital business sector contexts; these are visualised at the end of the chapter sections above. The key contributions are summarised as follows:

1. A nuanced definition of innovation for small and medium sized enterprises within the digital business sector context – this can be summarised as: *‘Innovation activities are relative to the organisation, not necessarily something entirely new, but contextually an act of creation through doing something differently, generally in the form of new creative services, technologies, practices, processes, products, and ideas. It is generally incremental, in response to collaboration with the market and business communities, in response to market feedback and understanding customer need. Although organisationally daunting it is acknowledged as an enabler of competition.’*
2. Definition of AT Tools of innovation and actions that can be taken to raise capacities to innovate and drive success in completion of innovations – these are visualised in Figure 17: AT Tools and actions that enable innovation in small and medium sized enterprises within the digital business sector (see end of section 8.1.2).
3. Definition of SME ownership characteristics providing positive value in enabling raising capacities to innovate – these are visualised in figure 18: Subject Characteristics that enable innovation in small and medium sized enterprises within the digital business sector (see end of section 8.1.3).

4. Definition of AT Rules that should be applied to enable innovation – these are visualised in figure 19: Visualisation of AT Rules that enable innovation in small and medium sized enterprises within the digital business sector (see end of section 8.1.4).
5. Definition of valuable AT Community connections that business operators can create to raise capacities to innovate and the values that they offer – these are visualised in figure 20: AT Community connections that small and medium sized enterprises within the digital business sector can develop to increase capacities to innovate (see end of section 8.1.5).
6. Definition of how innovation projects tasks are divided within the team – this is visualised in figure 21: AT Division of Labour in completion of innovation in small and medium sized enterprises within the digital business sector (see end of section 8.1.6).
7. Understanding of not only the process of innovation within their context, but the tensions and contradictions that arise through implementation, where the value of AT has revealed some of the unconscious enabling activities. These are discussed in the analysis above, but can be summarised as follows:
 - a. For business operators to increase their success in completion of their innovations through leveraging AT Tools they need first (see figure 22, end of section 8.2.2 in this document):
 - i. To be open to implementation of AT Tools.
 - ii. To reflect on their innovation processes.
 - iii. To develop their networking skills.
 - iv. To use past experience to understand and commit to risk and investments that enable innovation.
 - b. For the AT Community sharing the same innovations business operators should create processes that enable faster reaction to innovation tasks, share resources and ensure that communications are clear in relation to tasks and innovations (see figure 23, end of section 8.2.3 in this document).
 - c. Business operators can enable innovation through fostering human relationships within the AT Community base on trust, their previous knowledge of their ways

- of working and their shared commitment to innovation (see figure 24, end of section 8.3.2 in this document).
- d.* SME operators can unlock innovation opportunities through the application of AT Rules (see figure 25, end of section 8.3.3 in this document).
 - e.* SME should create a formal team structure that defines roles and tasks for the AT Community sharing the same innovations (see figure 26, end of section 8.3.4 in this document).
 - f.* The applications of AT Rules within the AT Community enable creation of future relationships for collaboration that raises SME capacities to innovate (see figure 27, end of section 8.4.2 in this document).
8. Definitions of the application of the AT Division of Labour within the AT Community through an AT lens resulting in series of recommendations for application of the AT Division of Labour within the AT Community that small and medium sized enterprises within the digital business sector ownership can employ to support capacity raising and innovation (see figure 28, end of section 8.4.3 in this document)
9. Insight into the outcomes of completion of innovations. Within the three data collections values created by completion of innovations have been highlighted (see figure 30, end of section 8.5.1 in this document):
- a.* Understanding user needs and market agility.
 - b.* Increased ideas and insight.
 - c.* Better addressing the business environment and increased competitiveness in new markets.
 - d.* Advantageous contradictions and unexpected outcomes
10. Definition of activities and actions that enable small and medium sized enterprises within the digital business sector to support capacity raising and innovation (initially visualised in figure 15, end of section 7.6.2 in the preceding chapter of this document) are nuanced within the above chapter in which dimensions and recommendations for the framework of activities are broken down in the visualisations that are listed just above and discussed in the narratives of this and the previous two chapters.

11. In section 8.6.1 below a figurative diagram (see figure 31) sets out recommended activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector that demonstrates how the AT analysis has nuanced implications and the framework of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.

8.6.1 Diagram of activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.

The diagram that has been produced below recalls the visualisation produced at the end of the previous chapter that suggested key actions that small and medium sized enterprises within the digital business sector can employ to raise capacities to support their innovation. In this version, the framework has evolved to include priorities that reflect the data of the 2 case studies and survey data.

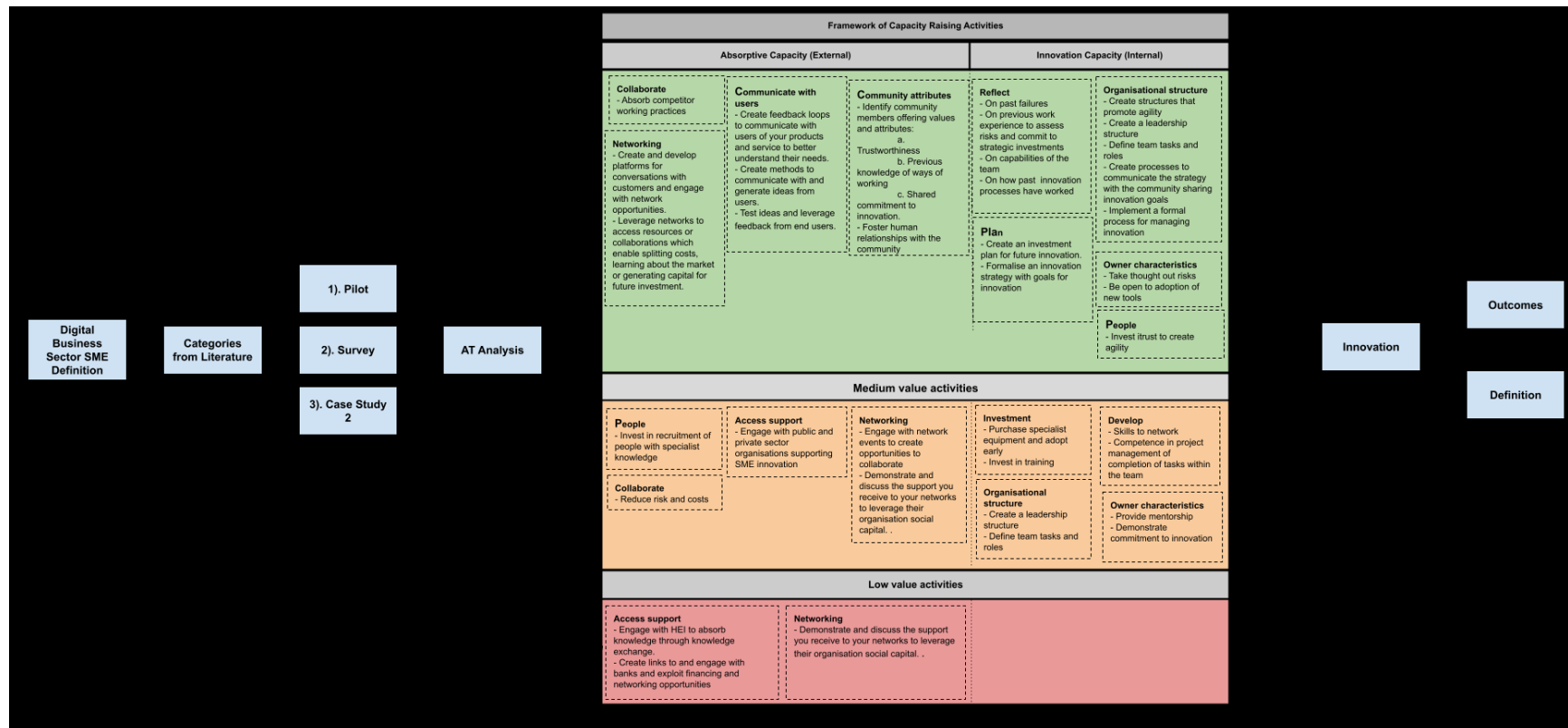


Figure 33: Diagram visualising elements of the framework acting as enablers supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector.

In relation to positioning of the elements above, final ranking is undoubtedly impacted by the pandemic, and how this may have affected processes of data subjects – for example, elements would potentially move up and down in rank outside the pandemic context. An example above is investment in people with specialist knowledge is arguably high value, though found less so during the data collection, potentially as a function of the pandemic. That said, the use of Activity Theory to explore the obvious and more obscure dimensions of organisational innovation in non-pandemic contexts may result in a different positioning.

Having completed this stage, this research will move towards completion through the following steps:

1. Chapter 9.0, the penultimate chapter, will consider research findings, contribution, and validation. As part of this chapter a final framework will be outlined where the nuanced implications from this second case study and the complete data collection will be reflected and validate the final framework as well as an updated figurative diagram that updates that which sets out recommended activities supporting capacity raising and innovation for small and medium sized enterprises within the digital business sector.
2. Chapter 10.00, the final chapter, will draw final conclusions to this thesis which are inclusive of research limitations and avenues for future research.

9.0 Research findings, method, and validation

9.1 Introduction

This chapter provides a discussion of research findings and methodological validation where the research design employed is also examined concluding in how it delivers research findings that are trustworthy, transferable, and authentic. This chapter will start with a detailed discussion of research findings.

9.2.0 Main findings

The empirical findings of this PhD thesis show how the processes of innovation in small and medium sized enterprises within the digital business sector contexts can be analysed and contributes in relation to understanding how small and medium sized enterprises within the digital business sector innovate. Through its AT lens:

1. It examines and highlights how this innovation happens in small and medium sized enterprises within the digital business sector and their contexts.
2. It backward engineers the processes to output a framework of activities that supports capacity raising and innovation.

As discussed, this current research has been examined in relation to Activity Theory (AT), used as a lens through which to view innovation-driven organisational change and management of innovation processes in small and medium sized enterprises within the digital business sector. This descriptive theoretical framework has considered small and medium sized enterprises within the digital business sector and their activity systems, and highlighted their complex natures such as team dynamics, attitudes, other elements within the system beyond just consideration of single actor, thus capturing consideration of the environment, the history of the person considered, culture, role of tools applied, motivations, and the complexity of real-life activity. During this current research inclusive of two cases and additional survey data it has

been found that AT can be applied to provide rich qualitative analysis of small and medium sized enterprises within the digital business sector and their contexts. This moves us into this current research and its findings that can be summarised follows.

This current research has nuanced a definition of innovation within small and medium sized enterprises within the digital business sector and found that it is '*generally in the form of a product, service, or process and is incremental, driven by people within the business, and in response to market feedback and understanding the customer need*'. That said, there are many definitions, and the researcher accepts that this definition is rapidly changing and may be influenced by the Covid-19 pandemic too.

These core results are relative to the novel development and use of the Activity Theory and how it is used to explore the obvious and more obscure dimensions of organisational innovation of small and medium sized enterprises within the digital business sector. This current research finds:

- That AT tools and actions can be employed to raise capacities and support innovation, and identified six AT system Tools⁸⁷ (Learning, Resources, Networks, Organizations, Strategic Innovation Planning, and Re-evaluation of Processes) that small and medium sized enterprises within the digital business sector can take to raise capacities and support their innovation.
- That characteristics of ownership (the AT Subject) of small and medium sized enterprises within the digital business sector, such as commitment to innovation, risk readiness, and past work experiences, raise capacities and support innovation within the AT innovation system. This current research has also identified that a positive attitude towards the business supports innovation through internal agility of teams and external trust, idea sharing, client engagement, and collaboration generation.

⁸⁷ Remembering how in AT analysis, these AT Tools can be many things, being "*physical and symbolic, external and internal tools (mediating instruments and signs)*" Engeström (1993, p. 67).

- The study found that there are 3 main AT system Rules⁸⁸ that can be employed to support innovation in these companies, and application of these AT Rules are drivers of innovation in the small and medium sized enterprises within the digital business sector considered:
 - Implementing a formal process for managing innovation.
 - Creating methods for communicating and generating ideas from end-users
 - Identifying and creating meaningful network relationships.
- The research finds that small and medium sized enterprises within the digital business sector should create an AT Community of diverse networks with both public and private sector organizations to absorb knowledge and to support innovation, such as engaging with university support to test and prototype ideas and creating links to and engaging with banks to exploit networking opportunities that they present. The conclusion is that small and medium sized enterprises within the digital business sector should actively engage in these ways to achieve prototyping of ideas and eventually actual innovation.
- The analysis has found that small and medium sized enterprises in the digital business sector need to develop a team structure but should avoid overt hierarchical structures that can affect agility. This means that management should be flexible and discursive, and base decisions on reflection to drive continuous improvement and support innovation.

That said, it is the following results that are perhaps the most interesting in that they are clearly aligned to a key value of AT research, and this current research specifically, in that it reveals obscurity of processes, such as formal and informal interactions with innovation processes, highlighting their tacit, unofficial, solutions to their organisational problems which lead to innovation. As they progress towards the end of the list, they are increasingly focussed on revealing this obscurity. The analysis found:

- That small and medium sized enterprises in the digital business sector have been able to raise their capacities and support innovation through unconscious attitudes towards openness to adoption, reflective practices, personal networking skills, and reflection on

⁸⁸ Rules being in a AT system sense “*the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system*” Engeström (1993, p. 67)..

past experience to risks and investments, when it comes to using identified AT Tools. These findings reveal the obscure and unseen nature of behaviours that can be demonstrated by ownership to support innovation processes.

- That small and medium-sized enterprises in the digital business sector believe that by creating processes that support the AT Community as it innovates, allows the AT Community to share resources, and clarify communication about shared innovation, they can increase capacities and support innovation. These findings reveal the obscure and unseen nature of processes can be developed and implemented by ownership to support innovation.
- That for the development of AT Community⁸⁹ human relationships depend on trust, previous knowledge of working together, and a shared commitment to innovation, and that this is a bilateral need amongst all AT Community members. These findings reveal the obscure and unseen nature of attributes that can be demonstrated by small and medium-sized enterprises within the digital business sector ownership, and sought from AT Community members, to support innovation.
- That small and medium-sized enterprises within the digital business sector ownership take actions within the AT Community, based on how they have operationalized the above identified and discussed AT Rules, to raise capacities and support innovativeness. These actions include developing or utilizing existing skills to identify relevant networks for creating sustainable relationships for collaboration, supporting these relationships through technology, demonstrating knowledge of the industry space within networks, communicating their knowledge to networks of end-users, and developing project management skills internally and externally that are supported by technology. These findings reveal the obscure and unseen nature of actions that are shown to be innovation-enabling and are achieved through application of identified AT Rules.
- That small and medium-sized enterprises within the digital business sector need to create a formal team structure that enables team motivation, whilst also promoting flexibility and agility. Additionally, there needs to be project management practices to enable

⁸⁹ With the AT Community being the “multiple individuals and/or subgroups who share the same general object” Engeström (1993, p. 67).

innovation to be successful. These practices should be designed to promote flexibility and agility, but also include formalities to enable understanding the progress of projects. These findings reveal the obscure and unseen nature of how team dynamics should be managed to raise capacities and support innovation.

- That small and medium-sized enterprises within the digital business sector have been able to raise capacities and support innovation by leveraging the wider network of the AT Community, project managing AT Community innovation processes, and involving the end user. These actions have enabled creating future relationships where they have innovated, demonstrated commitment to creating and maintaining relationships within the AT Community and enabled creation of relationships with potential user bases. These findings reveal the obscure and unseen nature of how the interaction of AT Rules with the AT Community enables small and medium-sized enterprises within the digital business sector to raise capacities and supports their innovation, and in relation to actions/behaviours that small and medium-sized enterprises within the digital business sector can implement to support innovation and growth.
- That small and medium-sized enterprises within the digital business sector have managed their AT Community and AT Division of Labour⁹⁰ to raise capacities and support innovation by creating a power structure that defines how labour will be divided for the benefit of the AT Community, managing task allocation towards the completion of innovation, and helping develop a shared purpose in completing innovation development tasks. These findings reveal the obscure and unseen nature of the needs of the AT Community in managing small and medium-sized enterprises within the digital business sector and their innovation.
- The analysis finds that as a method AT research can reveal (AT relative) outcomes of small and medium sized enterprises within the digital business sector and their innovation. In this case the research has demonstrated its value in revealing obscure and

⁹⁰ With the Division of labour being “*both the horizontal division of tasks between the members of the AT Community and to the vertical division of power and status*” Engeström (1993, p. 67).

unseen outcomes within this sector, that the operators of the businesses themselves may not have been aware of⁹¹.

In sum, and the most important core findings of this analysis find that as a method AT research can reveal the obscure and unseen nature of the management of small and medium sized enterprises within the digital business sector and their innovation. It is, in fact, the strength of this current research in that it has developed and used Activity Theory effectively to explore these obvious and more obscure dimensions of organisational innovation.

9.3.0 Methodological evaluation and validation

This current research has been at all times essentially constructivist in nature. Within this current research the world has been interpreted to account for socially constructed (Berlin 1987), not concrete entities; the researcher's role has been to construct the world as the research participant sees it (Ratner 2006). It is aligned to Lincoln & Guba (1985, p. 37) where *“multiple constructed realities that can be studied holistically; inquiry into these multiple realities will inevitably diverge (each inquiry raises more questions than it answers)”*. It has been supported through a design based in Guba & Lincoln (1985) and their Naturalistic Inquiry, conducted by the researcher within natural settings; these research contexts have been central to the meanings induced, where *“the knower and the known are inseparable”* (Lincoln & Guba 1985, p.37) and research has been carried out within their contextual *“natural setting”* as their *“realities are wholes that cannot be understood in isolation from their contexts”* (Lincoln & Guba 1985, p.39). With this current research considering small and medium sized enterprises within the digital business sector, the research has been conducted throughout within their ‘natural setting’ increasing focus upon the participants and their individual points of view, whilst identifying and contextualising meaning from these⁹². Aligning with Guba & Lincoln (1985), this research adopted entirely qualitative researcher-centred methods with data collected from all participants

⁹¹ Furthermore, by considering more data (in the future – see discussion regarding future research in the following chapter) has the possibility to provide a greater level of nuance in relation to obscure and unseen outcomes of innovation in small and medium-sized enterprises within the digital business sector (and potentially other SME contexts).

⁹² It is noted that both case studies were impacted at stages by the Covid-19 pandemic, where for a time everyone's natural environment became virtual. That said, at other times the research was conducted at office locations too.

primarily via prolonged, in-depth interviews involving active, opposed to passive, listening. Information analysis techniques used were those of Lincoln & Guba (1985) to ensure working hypotheses were grounded in data collected. Furthermore, throughout this current research the researcher has built upon tacit knowledge using Naturalistic Inquiry aligned methods of interviews, research diaries, observations, and survey analysis born from the data gathered as part of the data collection. These methods were successfully employed in an iterative cycle that contained the four expected elements discussed, these being:

- *Purposeful sampling* – this was used to firstly to avoid poor quality data and intellectual credibility issues as well as secondly to answer the research questions, considering variables in relation to cases considered based on the researcher's knowledge of the area of study, available literature and in response to evidence from the research journey itself. Furthermore, adoption of a purposeful, as opposed to convenience or theoretical, sampling has ensured the most relevant participants' views and understandings were represented in this research, whereas theoretical sampling techniques would have required information analysis prior to purposeful selection of further participants.
- *Inductive analysis* – qualitative data collection and analysis techniques have been employed and where this inductive analysis aligns to interpretivist research paradigm of this current research which accepts that "*reality is socially constructed*" (Mertens 2014, p.12); furthermore, it aligns to understanding how it is "participants' view the situation that is studied" (Creswell 2014 p.8). In this current research observation has been the starting point towards detection of patterns that have enabled development of a framework that has been nuanced to a more developed iteration at project completion where finally conclusions and contributions have been outlined (Bryman 2008; Trochim et al. 2015).
- *Grounded theory development* – this current research has developed substantive theories that 'emerge', having been *induced/grounded* in the data of the data collections of the research process (Lincoln & Guba 1985; Charmaz 2006). This has created "*indeterminacy rather than seeking causality*" and given "*priority to showing patterns and connections rather than linear reasoning*" (Charmaz 2006, p.126), acting as a "*replacement concept for causality*" that is "*mutual simultaneous shaping*" in situations

with blurred boundaries, as are the contexts of the small and medium sized enterprises within the digital business sector, distinguishing cause and effect where in these contexts “*everything influences everything else, in the here and now*” (Lincoln & Guba, 1985, p.151). Furthermore, although after data collection to further focus the literature was revisited, conclusions were (mainly) formed after this being firmly grounded in primary data which aligns to Guba & Lincoln (1985) and the constant comparison technique.

- *Emergent design/next-step decision making* - this current research has throughout adapted to new ideas, concepts, and findings that have arisen while during this qualitative research. This aligns to the *grounded theory development* that is discussed above. Furthermore, these iterations continued until new data stopped emerging and the theory stabilised⁹³. The researcher has throughout engaged in member checking to ensure views are fairly represented (results and transcriptions were shared and discussed, for example within the screenshot in Appendix A 12:13); throughout, to enable members to understand the applicability of the research within their contexts, a case study report was created, in effect the drafts of the relevant chapters. Finally, trustworthiness of results has been critically reviewed by data subjects from within the study, continually carried out by the researcher throughout the duration of the research, which has been reflected in the final outputs of the research, a result of the action case hybridism, and in turn will be discussed as a contribution to methods in the chapter that follows, has provided flexibility within the research to collaborate with data subjects and transform knowledge generated into theory and practice. Finally, the researcher’s use of a research diary includes his reflections of data collection phases including tentative underlying meanings, that have been reflected in final research conclusions and deliverables.

At all stages, ‘Humans’ (in fact, the *human* researcher himself uniquely) have collect data (Lincoln & Guba 1985) and this interaction of humanity has enabled revealing these multiple constructed realities of research participants. In this current research, the researcher has been the sole ‘human instrument’ investigator in interaction with research participants and thus placed to

⁹³ Although the researcher acknowledges that time/research constraints brought the research to an end, and there is always an argument about how much data is too much or too little.

realise and holistically study constructed realities of research participants. Furthermore, the Action Case method reflects:

1. How research drives organisational change, built on Lewin's change model (Lewin 1958), the basis of the action research method (Lewin 1946).
2. Growing understanding through active research processes (Braa 1995).

In this current research this aligns clearly to how “*every act of observation influences what is seen*” (Lincoln & Guba 1985, p.39), where the researcher always has been the primary data-gathering instrument that has been understanding, responding to, and describing the complex nature of small and medium sized enterprises within the digital business sector context. Within this current research participants had their unique points of view and co-produced research processes, having a role negotiating outcomes; action case has been used as a method to focus and identify contextualised meaning from these points of view (Green 2000), co-creating a reconstruction of this meaning from these multiple realities (Guba & Lincoln 1989). This current research considered multiple cases and so credibility, transferability, and dependability, in terms of authenticity of findings has been established through replication logic⁹⁴. Multiple action case studies are fitting (Vidgen & Braa 1997) and have enabled successful:

1. Real-time intervention aligned to developmental projects such as this, that brings researchers and relevant people within the research process⁹⁵.
2. A duration has had the potential to be typically shorter than action research allowing for multiple cases to be considered an enabler of increased credibility, dependability, and authenticity of results⁹⁶.
3. Reduced research complexity by focusing on single data collection methods sequentially for each case and has been able to increase value from each research stage.
4. Rich real-life context and opinion of people relevant to the study have also been considered at all stages of the research.

⁹⁴ As is also common with multiple case study design.

⁹⁵ As is the case in this current research where the deliverable of the project is co-production of a framework of enabling activities supporting capacity raising and innovation in Digital Business Sector SME

⁹⁶ That said, the case studies considered retained the detailed nature of Action Research.

This current research has analysed activities supporting small and medium sized enterprises within the digital business sector and their innovation. This research has involved detailed consideration of SME case contexts; application of action case allowed the researcher “*to delve deeply into a topic and to understand thoroughly the answers provided*” (Harrell & Bradley 2009, p. 27) and proved value as a method for observing complex phenomenon involving confidentiality and interaction with human data subjects. The action case method has successfully enabled the researcher to retain distance from the case being considered and reduce bias; this has mitigated issues of management of relationships between researcher and data subjects. Finally, the action case strategy observations have retained suitable ethics with all participants comfortable within the research process whilst allowing detailed consideration of data subjects and their activities.

To ensure that this current research is “*immediate, insightful, and applicable in practice*” (Reeves et al. 2008, p.634), Activity Theory (AT) has been applied to the interpretation of results where interview data and survey free text have been coded to align the categories of capacity raising and innovation supporting activities to elements of the AT model, and to the relationship between AT elements to track how these interact. By viewing the cases of small and medium sized enterprises within the digital business sector innovation processes through AT, this research has developed a framework of enabling activities that can raise capacities and support small and medium sized enterprises within the digital business sector and their innovation. This aligns to active research methods, such as those that have been employed in this current research – for example where Lewin (1951) discusses how in research “*there’s nothing so practical as good theory*” (p.169) where theory is a lens through which to interpret results and enable output of relevant practical conclusions. This current research has collaborated with data subjects where results consider activities, opinions, and internal organisational understandings within the case small and medium sized enterprises. The active research method has enabled a deeper understanding of the phenomenon whilst maintaining a process that creates both scientifically rigorous and impactful results.

This current research may be considered by those with both positivist and interpretative beliefs. In this current research Guba & Lincoln's (1989) authenticity criteria and Lincoln & Guba (1985) trustworthiness criteria have been used as mechanisms to support these readers in understanding the research value, trustworthiness, authenticity and to maintain notions of interpretivist theoretical perspectives. In this current research triangulation has been repurposed to supporting credibility and dependability where there have been three phases of data collection that have been triangulated as part of the analysis to support research credibility. Research credibility, transferability, dependability, confirmability of results has been considered further through member checking, reflexivity and the triangulation discussed above. These have been further supported by the researcher developing intimate familiarity with the contextual setting and topic, which is a central tenet of interpretivist research Lincoln & Guba (1985, p.301), achieved in this current research through:

1. 'Prolonged engagement' - where the researcher has invested significant time to be "*orientated to the situation*", being open to multiple influences and being someone who is trusted.
2. 'Persistent observation' - where the researcher has focused in detail on characteristics and elements relevant to the inquiry.

The researcher has maintained his "*detached wonder*" (Lincoln & Guba 1985, p.304), through fostering his awareness throughout⁹⁷. Furthermore, the application of Action Case discussed above has been used as a tool that has enabled both situational orientation and observation, whilst maintaining distance and detachment in clear alignment with these criteria.

The rigor of final outcomes for this current research has also been achieved through consideration of four authenticities (Lincoln & Guba 1985, p.304; Shannon & Hambacher 2014):

⁹⁷ A "*great step toward prevention*".

1. *Ontological*⁹⁸ – throughout the data collection and case study reports data subjects became aware of the complexity of their innovation system and their role in it. The continuous and prolonged engagement with the interview process, including discussion of underpinning literature led to understanding and insights that were developed. Throughout the data subjects' words are quoted within the case reports, and furthermore, these data subjects made personal growth statements as part of what was a prolonged and engaged dialogical conversation.
2. *Educative*⁹⁹ – throughout the data collection and case study reports data subjects became increasingly awareness of others within their innovation systems, and this is evidenced in their words and as part of the conversation between them and the researcher where data subjects have made statements indicating understanding of others involved in their innovation.
3. *Catalytic*¹⁰⁰ – throughout the data collection and case study reports there is evidence of how the actions of data subjects evolved as part of the research process – for example, there are clear times when the case study data subjects discuss what they have done since previous interviews. Throughout, as they evolved, findings were disseminated to the data subjects, and this allowed them to make changes to processes throughout as the research progressed. The results and finding have evolved as a co-constructive process, and with both case studies there were follow-up activities, where we discussed how to implement new plans in between interview sessions.
4. *Tactical*¹⁰¹ – throughout the data collection and case study reports within the cases there is evidence of a redistribution of power where the data subjects were treated as co-researchers within their own contexts. Throughout outcomes were negotiated through returning case study reports for member checking. Data subjects clearly perceived within the process that they have power to change and did make changes to understanding of data and processes between sessions, including tactical changes in their innovation systems.

⁹⁸ Whereby “over time, everyone formulates more informed and sophisticated constructions and becomes aware of the content and meaning of competing constructions”.

⁹⁹ Through which participants gain understanding and tolerance of perceptions of others within the research.

¹⁰⁰ Providing sufficient motivation of participants to want to act.

¹⁰¹ That which empowers participants to act.

9.4 Conclusions to this chapter

This chapter has provided a discussion of research findings and methodological validation where the research design employed has been examined demonstrating how it delivers research findings that are trustworthy, transferable, and authentic. In the chapter that follows Final conclusions are presented inclusive of research contributions, research limitation and a discussion of areas for future research, after which this thesis will be complete.

10.0 Conclusion

10.1 Final conclusions

This chapter will conclude this current research, discussing how it fulfils its aim which was, “*To develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory*”. It firstly will consider contributions and finish with a discussion of limitations and areas for future research.

10.2 Research contributions

Consideration is given to how this current research contributes within the IS research space and the novel value of this work in this section. Current academic research finds that innovative small and medium sized enterprises share characteristics central to their capacities to innovate (Gronum et al. 2012; Keizer et al. 2002); these include owner characteristics, integration in business networks and with their end users, as well as internal organisational support and processes in place that create conditions for innovation. Furthermore, academic and industry consideration has been given for many years to supporting and fostering the SME innovation process and capacities to do so (OECD 2000; Bakhshi et al. 2011; GOV.UK 2022) and, furthermore, to growth. That said, there has been less attempt made to understand how this innovation happens, through examination of activities and processes are required for this innovation to succeed. This current research responds and contributes to this space, providing what can be considered a detailed ‘*Mesa-analysis*’ that aligns with the qualitative nature of this current research; it looks inside the process of the innovation activities of small and medium sized enterprises within the digital business sector for data that examines the innovation system, explores its details, and gives a rich picture nuancing an answer to the primary research question: *How do small and medium sized enterprises within the digital business sector innovate?*

Analysis provides a deep qualitative understanding of activities and contradictions within the activity systems of small and medium sized enterprises within the digital business sector revealing the obvious and more obscure dimensions of their organisational innovation. Through the series of data collections that was inclusive of literature, pilot case, survey and finishing with the second case study, the researcher has, through an AT lens, created a set of smaller “*mesa*” descriptions, which have led to the outputting of specific and detailed recommendations and form the elements of the project framework. The following sections will consider how answering the question has been achieved sequentially through the three primary data collection phases as follows:

1. Firstly, from the pilot case study, the interview data was tracked to the Activity Theory dimensions to provide a rich understanding of how the pilot case has innovated and to examine the processes that have led to completion of their innovations.
2. Secondly, the survey data was then tracked to the Activity Theory dimensions to provide a nuanced and richer understanding of how the surveyed SMEs had innovated and to examine the processes that have led to completion of their innovations, and these were realigned to the literature to create a clearer picture of the complete process.
3. Finally, the case study two data was tracked to the Activity Theory dimensions to provide a rich understanding of the processes that have led to completion of their innovations.

10.2.1 Thesis contribution to knowledge.

This three-stage approach discussed above has broken down adopted innovation processes in small and medium sized enterprises within the digital business sector to provide a qualitative response to the first research question, (*How do small and medium sized enterprises within the digital business sector innovate?*). The literature consideration identified a definition of innovation in SME as *predominantly incremental in response to the needs of customers* – this current research empirically has nuanced a definition of innovation within small and medium sized enterprises within the digital business sector context, this being: *‘Innovation activities are*

relative to the organisation, not necessarily something entirely new, but contextually an act of creation through doing something differently, generally in the form of new creative services, technologies, practices, processes, products, and ideas. It is generally incremental, in response to collaboration with the market and business communities, in response to market feedback and understanding customer need. Although organisationally daunting it is acknowledged as an enabler of competition.'

That said, innovation definitions are numerous, and this should not be considered a central contribution. Instead, the core contributions are relative to the key strength of the research, that being development and use of the Activity Theory to explore the obvious and more obscure dimensions of organisational innovation in small and medium sized enterprises within the digital business sector; and these can be summarised as follows:

1. The analysis has revealed new knowledge about AT Tools of innovation and actions that can be taken to raise capacities and support innovation in small and medium-sized enterprises within digital business sector contexts and how the analysis process of viewing innovation in small and medium-sized enterprises within the digital business sector through an AT lens defines their AT Tools (see the diagram at the end of section 8.1.2 of this document). The process of AT research breaks down the core innovation AT Tools as (1) Learning, (2) Resource, (3) Networks, (4) Organisations offering support for SME innovation, (5) Strategic innovation planning, and (6) Re-evaluation of process; there are also identified specific actions which Digital Business Sector can take to raise capacities and support innovation in small and medium-sized enterprises within digital business sector.
2. This AT research contributes to understanding the obscure and unseen nature of SME ownership characteristics¹⁰² that raise capacities and support innovation in small and medium sized enterprises within the digital business sector (see the diagram at the

¹⁰² This is a focus area of business research that considers how that innovative SME share characteristics central to their capacities to innovate (for example Gronum et al. 2012; Keizer et al. 2002) including owner characteristics (see also research by O'Regan et al. 2006, Teirlinck & Spithoven 2013 and, Lin & Lin 2016).

end of section 8.1.2 of this document). It identifies a new characteristic that increases capacities and supports innovation, which is demonstrating positivity in attitude towards the business. This characteristic was supported by data from all three collections. Internally within the organization, positivity is linked to agility of teams. Externally, positivity increases trust, sharing ideas, clients, and collaboration generation, resulting in innovation. It highlights how hidden previous work experience and related professional capacities developed by ownership raises capacities and supports innovation specifically in small and medium-sized enterprises within the digital business sector contexts, and as a function of this how they design appropriate innovation strategies¹⁰³. It also reveals how hidden and obscure attitude towards risk and taking risks by owners raises capacities and supports innovation¹⁰⁴. Furthermore, it shows how hidden aspects such as owner commitment to innovation activities directly impacts the firm's innovation capacities¹⁰⁵.

3. This research reveals hidden and obscure AT Rules that raise capacity and support innovation in small and medium sized enterprises within the digital business sector (see end of section 8.1.4 of this document). Analysis of small and medium sized enterprises in the digital business sector through an AT lens shows that capacity is increased, and innovation is supported through implementation of these the obscured AT Rules¹⁰⁶. The clear implication from the data is that capacity is raised, and innovation supported through implementation of these AT Rules in small and medium sized enterprises within the digital business sector.
4. This research creates reveals hidden and obscure knowledge about community connections that small and medium sized enterprises in the digital business sector can create to increase capacity for innovation and support innovation (see diagram at end

¹⁰³ This is an area of focus discussed of relevance in SMEs by Romijn & Albaladejo 2002, Dziallas & Blind 2019, Rampa & Agogu  2021; Forsman 2011, Hadjimanolis 2000, Romijn & Albaladejo 2002, Zahoor & Al-Tabbaa 2020, and Maietta 2015).

¹⁰⁴ This is an area of focus and contributes to knowledge of this specific SME sector and the research space of SMEs, according to authors such as Gronum et al. 2012; Crupi et al. 2020; Arias-P rez et al. 2021.

¹⁰⁵ This is an area of focus and contributes to knowledge of this specific SME sector and the research space of SMEs, according to authors such as Hadjimanolis 2000, Mendoza-Silva 2020 and Hwang et al. 2020.

¹⁰⁶ This research breaks down the core innovation AT Rules as (1) Identify and create meaningful relationships and collaborative network relationships of value and leverage resources, (2) Implement a formal process for managing innovation, (3) Create methods to communicate with and generate ideas from the end user, (4) Test ideas and leverage feedback from end users.

of section 8.1.5 of this document). The study revealed that these community relationships offer hidden benefits such as collaboration on products and services with suppliers and competitors, and active idea sharing¹⁰⁷ accompanied by the hidden associated benefits that fostering these community relationships offer.

5. This current research provides new and obscured knowledge of how innovation projects tasks are divided within the teams of small and medium sized enterprises within the digital business sector (see diagram at end of section 8.1.6 of this document), and how SME can optimise how innovation tasks are divided to ensure innovate success, through supported by mentorship and not over-managing processes so as to promote trust and agility¹⁰⁸.
6. This current research provides new knowledge of small and medium sized enterprises within the digital business sector and their process obscurity, including formal and informal interactions with their innovation process¹⁰⁹; that demonstrates how AT can be used to reveal the created tacit, unofficial, solutions to organisational problems which lead to innovation¹¹⁰ – this is both a contribution to knowledge and methods and is also discussed in point section 10.2.2 below. The application of AT analysis has enabled new knowledge about the hidden and obscure processes of innovation, tensions, contradictions, and how unconscious capacity raising and innovation is supported by these hidden activities (refer to chapter 8, section 8.6.1).
7. This current research provides new hidden and obscure knowledge of how tasks are shared with the community that share the same innovation goal. In turn, it shows how the AT Division of Labour in sharing tasks with the AT Community can through its AT lens generate a series of recommendations that digital business sector ownership can employ to support capacity raising and innovation (see the diagram, figure 28, found at the end of section 8.4.3 in this document).

¹⁰⁷ This is an area of research discussion in relation to how innovative SME share characteristics central to their capacities to innovate (Gronum et al. 2012; Keizer et al. 2002) including their relationships (see also research such as O'Regan et al. 2006, Lasagni 2012, Pittaway et al. 2004, Lin & Lin 2016 and Prasanna et al. 2019).

¹⁰⁸ These are areas of academic research interest, for example Chesbrough 2003, Damanpour 1991, Tidd & Bessant 2020, Grama-Vigouroux et al. 2020; Teece et al. 1997; Teece 2007; Teece 2020.

¹⁰⁹ These are areas of academic interest for researchers such as King & Ockels 2009 and Canik et al. 2017.

¹¹⁰ An area for which Macpherson & Clark (2009) found a need to be addressed.

8. This current research through its AT lens provides new knowledge in relation to hidden and obscure outcomes of completion of innovations (see figure 30, end of section 8.5.1 in this document) in small and medium sized enterprises within the digital business sector.
9. This current research provides new knowledge of seen and unseen activities and actions that enable small and medium sized enterprises within the digital business sector to support capacity raising and innovation that form the dimensions and recommendations for the framework of activities visualised in, *'Figure 33, Diagram visualising elements of the framework acting as enablers supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector'*, above.

In relation to point 9 above positioning of the elements in the final framework, the final ranking is undoubtedly impacted by the pandemic, and how this may have affected processes of data subjects – for example, elements would potentially move up and down in rank outside the pandemic context. This was mentioned below the diagram itself, but an example is investment in people with specialist knowledge is arguably high value, though found less so during the data collection, potentially as a function of the pandemic. That said, the use of Activity Theory to explore the obvious and more obscure dimensions of organisational innovation in non-pandemic contexts may result in a different positioning, and the application has provide what is in effect the core contribution of this thesis, this being development and use of Activity Theory to explore the obvious and more obscure dimensions of organisational innovation.

10.2.2 Thesis contribution to theory.

This thesis offers an innovative analytical and methodological approach contributing to consideration of AT within small and medium sized enterprises within the digital business sector context, a theory that has spanned multiple fields of research emerging as a theory for understanding change and development in work and social activity (Miettinen et al. 2012). The process of conducting this current research has answered the second research question: *How can*

Activity Theory be used to examine innovation process of small and medium sized enterprises within the digital business sector?

This analysis, defined by its Activity Theory lens, as part of a qualitative research, does not count activities, but instead captures the process and the contradictions that arise through lived experience of innovation in small and medium sized enterprises within the digital business sector and their contexts, representing a clear contribution to theory as follows:

1. This current research contributes to IS research, considering small and medium sized enterprises within the digital business sector context systematically, with data that can be collected, filtered, and processed to understand the phenomenon of innovation within that context. Typically, as with IS literature there is a definitive boundary made up of elements such as users, processors, storage, inputs, outputs, and network that forms the activities within the AT activity system. The data collection viewed through an AT lens, has focussed on how innovation mediates change, and how the processes of innovation implementation impact small and medium sized enterprises within the digital business sector. It has exploited analysis of data in relation to activity systems, examining emergent contradictions in work activities, which can be addressed through or arise through the innovation implementation process (see Allen et al. 2013). As discussed, AT has not been specifically applied to this context, and contributes to AT research as an appropriate theoretical lens within diverse inter-professional contexts (Leadbetter et al. 2007; Daniels 2007; Daniels et al 2013), and in this current research Digital Business Sector SME. Application of AT as a theoretical lens through which to view the process of innovation in small and medium sized enterprises within the digital business sector has also provided a response to the question “*What activities support capacity raising and innovation in small and medium sized enterprises within the digital business sector?*”; the analysis of this current research has resulted in definitions and recommendations that are summarised in chapter section 8.6 above and which will drive the thesis contributions to practice, with the ability to impact how and why small and medium sized enterprises within the

digital business sector should conduct activities to enable capacity raising and success with their innovations.

2. The AT theoretical lens has revealed answers about small and medium sized enterprises within the digital business sector and their obscurity, including formal and informal interactions with their innovation process (an identified need in research such as King & Ockels 2009; Canik et al. 2017). Application of AT as a theoretical lens has highlighted how actors within the innovative process considered have created tacit, unofficial, solutions to their organisational problems which lead to innovation (for which Macpherson & Clark 2009 found a need to be addressed).
 - a. This current research has advanced the research position of Cash et al. (2015) that emphasised how through AT it would be possible to analyse unconscious data such as organisational culture and internal organisational support, and demonstrated how AT can reveal these and such obscure parts of small and medium sized enterprises within the digital business sector and their innovation process – these are revealed with the data collection (and the researcher sees this as a valuable future focus for research after the closure of this current research).
3. AT has been shown to be applicable to research in a novel context – this contributes to the theory where AT has already been seen to have significance as a framework that enables both observations and interviews in complex environments (Cash et al. 2015; Hasan & Kazlauskas 2014) allowing researchers to conduct multi-dimensional analyses (Cash et al. 2015; Hasan & Kazlauskas 2014), in this current research considering the context of small and medium sized enterprises within the digital business sector.

10.2.3 Contribution to practice.

As discussed in this thesis, this current research contributes to addressing a contemporary dilemma for the UK, in that it must address the mind-set of UK SME and their attitudes to innovation, and in so doing enable increased growth ambition that may generate jobs and stimulates productivity. The process of conducting this current research has provided a response to the third research question: *What activities support capacity raising and innovation in small*

and medium sized enterprises within the digital business sector? This thesis contributes to practice in the following ways:

1. Figure 33 (*Diagram visualising elements of the framework acting as enablers supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector*) provides a practical contribution; it recalls the visualisation produced at the end of chapter 7 that suggested key actions that small and medium sized enterprises within the digital business sector can employ to raise capacities to support their innovation. In this new version, the diagram has evolved to include priorities that reflect the data of the 2 case studies and survey data. This can be used by small and medium sized enterprises within the digital business sector as an empirically developed tool through which they can elevate capacities and support their innovation. There is also a discussion of this within the future research section of this document below and the researcher's plans to consider the framework relevance within other contexts.
2. It addresses the need within academic research and wider business contexts to identify intangible factors – attitudes, dispositions, aspirations, behaviours, or past-experience of small and medium sized enterprises within the digital business sector contexts - as much as access to tangibles such as finance and skills (Theodorakopoulos et al. 2015; Nyfoudi et al. 2022). This current research outputs actions that small and medium sized enterprises within the digital business sector can employ that enable raising of their “*absorptive capacity*” (Cohen & Levinthal 1990; Moilanen et al. 2014) and “*innovation capacity*” (Boly et al. 2014; Forsman 2011; Szetto 2000) which in turn unlocks successful completion of innovation. In section 8.6.0 – Conclusion to case study two and the data collection, above, a function of the theoretical lens of this research, has outputted the key findings that make up the framework that fulfils the research aim, *to develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory*. This output and the analysis of this current research reveal these hidden intangible factors as well as tangible actions that can be carried out to raise capacities and support innovation in small and medium sized enterprises within the digital business sector.

10.2.4 Methodological contribution.

1. This current research contributes methodologically through a novel combination of methods where the use of the hybrid nature of Action Case research, combining research diaries, case studies, and a survey to examine AT application has not been carried before with this context of business.
2. This current research contributes to through a novel use of NVivo in the coding of AT research. In this current research the following system was followed:
 - a. Elements of AT were created as principal nodes (QSR NVivo Help 2022a), as well as the node list structured on the categories of capacity raising and innovation supporting activities in SME contexts, which were repositioned relative to the AT elements as sub-nodes of the AT Element principal nodes.
 - b. The coding process provided the emerging definitions of the activities that are part of the AT elements and form the final framework.
 - c. The coding process, through coding of relationships between nodes (QSR NVivo Help 2022b) also mapped and highlighted the relationships that are present within AT.
 - d. Coding carried out at the individual node and relationships between node references level followed the structure as below to map to the AT model which is a new method designed as part of this current research:
 - i. Unilateral (for example, *AT Object relationship to AT Outcome*) 
 - ii. Multilateral (for example, *AT Tools relationship to AT Subject*) 

This research finds that this is an effective method for the exploiting NVivo to map and analyse AT research and that this represents a contribution to methods.

10.3 Research limitations

Sadly, there are limitations within all research, and although the researcher has taken care to avoid significant limitations through development of the research design, data collection and

analysis stages of this current research investigation, there are still some overall limitations which are explained below:

- Firstly, this research was also conducted in a global pandemic and that must be noted as is a limitation that has affected completion of many doctoral studies, with fewer PhDs having been conducted in this 2-year period for that reason. For a period, the workplace of these SMEs became their homes and digital communications was the natural method of all people carrying out research – in fact, at the start the pandemic, whilst the situation was rapidly changing the researcher paused the research process and continued when things were more reflective of a ‘new normal’, and the emerging design of the survey was in fact a function of the pandemic as discussed below. There is little doubt that the COVID-19 pandemic has had a substantial impact on the field research conducted during the duration of this current research, as it did for many other research studies conducted at the same time. Here and in other countries implemented lockdowns and travel restrictions to prevent the spread of the virus, made it difficult for the researcher to conduct fieldwork in person; at times, data collection phases were postponed because either the researcher himself or the research participants themselves were unwell or their team and business operations were disrupted. Furthermore, the survey data design within this current research study arose because of the need to collect data at a distance during a time of complex change and confusion. This also blurred definitions of *what is* and *what is not* the workspace; the research methods consider how the knower, the known, and the research context itself have a constant interaction with and influence the results generated, and that if this study were repeated now in post-lockdown times, the results and contributions would be potentially different. That said, they would be equally valid, as they are drawn from a strong conceptual framework, and the research has demonstrated the ability to synthesise findings and provide an appropriate toolkit for future research.
- Sampling issues can occur when probability sampling method are used to select a sample, but where that sample may not reflect the appropriate population concerned resulting in ‘*sample*’ or ‘*selection*’ bias. In relation to the survey data although the majority surveyed were randomly selected small and medium sized enterprises within the digital business

sector located through SME forums, others were purposefully sampled contacts of the researcher¹¹¹. Furthermore, the case studies sample that formed the interview investigation initially self-selected themselves as they had already been part of university knowledge exchange schemes and were known to researcher. Finally, in relation to the survey specifically and the sampling options available, it was difficult to select '*typical cases*' in all cases, especially in relation to where they were through located through Northwest small and medium sized enterprise forums on LinkedIn, as discussed within the sampling options in the methodology, due to attaining basic limited knowledge of each organisation during the gathering of the survey data.

- The interview investigation was limited to two small and medium sized enterprises within the digital business sector and their organisations. A larger sample of small and medium sized enterprises within the digital business sector in the interview phases may have provided a more accurate account of the population. Whilst this may have been more representative of the population, the two case studies considered were considered in significant detail with a method that involved '*Prolonged engagement*', and where the researcher invested significant time to be '*orientated to the situation*', being open to multiple influences and being someone who is trusted, as well as '*Persistent observation*', where the researcher focused in detail on characteristics and elements relevant to the inquiry.
- The interviews occurred as a longitudinal study; however, a cross-sectional study may have produced differing results. This research was conducted using an iterative approach, where the researcher visited, at times digitally, each organisation on multiple occasions. An alternative to this approach could have included single visits with intense data gathering to investigate the phenomena, although this would have also required significant redesign of methods¹¹².

10.4 Future research

The following section will present the areas for future research envisaged for the researcher that have emerged through the research process.

¹¹¹ The researcher is a business academic, with a background in the Digital Business Sector community.

¹¹² Although this is an interesting direction for future studies.

Firstly, it is envisaged from this work that there are several papers that can be produced as outputs of this thesis, with the below as initial suggestions:

1. A paper that is focussed Activity Theory and how it can be used to explore the obvious and more obscure dimensions of organisational innovation in small and medium sized enterprises within the digital business sector. This would focus on presentation of results and the framework that fulfils the aim of this current research. This paper will contribute to my academic space and IS research in general by placing a definitive boundary around the phenomenon of innovation activity systems of small and medium sized enterprises within the digital business sector.
2. A paper that focusses on combination of methods, these being the hybrid nature of Action Case research, with research diaries, case studies, and surveys. The paper would focus on developing guidance for field research that reduces bias but where participants and their points of view contributed to production research processes in the output of practically valuable frameworks for operation within a context being considered. This combination of methods could be presented as transferable to multiple research contexts and as a cross-disciplinary method through which to gather and analyse qualitative data.
3. A potential paper focused on the use of Computer Assisted Qualitative Data Analysis (CAQDAS). This paper would look at effective methods for the exploiting systems such as NVivo to map and analyse IS through tracking data to element of models of research, which would contribute a novel methodological paper.

Secondly, not all aspects of the AT research and the element of the AT model produce equal levels of valuable and insightful contributions. Recalling '*Figure 1: Activity Theory Model (Engeström 1987)*', found in an earlier section of this work it would be a valuable piece of research to focus on elements of the model which have the possibility of revealing the more obscure activities of the organisation being researched. This would allow the researcher to concentrate on interactions between the AT Community, the AT Division of Labour and the AT Outcome as a possible piece of research – in these sections, and also dependant on the scale of the organisation there are clearly opportunities to focus specifically on what was a strength of the

research in a more specific way, that being use of AT to explore both specific obvious and obscure dimensions of organisational innovation. This is an area of study that could also be carried out in various scales of business, and it would be a valuable study to understand the level of obscurity that exist in both small and larger scaled business contexts.

Thirdly, in relation to transferability, a comparison of results between sectors of small and medium sized enterprises could be carried out, or equally applied to comparable businesses within other countries. A point made early in this thesis is that innovation is relative to contexts so there are clear opportunities to carry out research into other sectors and in other countries that will produce valuable insights into obscurity that exists in these. It is envisaged that a valuable method to do this would be to take the final framework through a series of sectorial workshop environments where SME from various sectors repositioned framework dimensions, and contributed nuancing factors as co-creation of the framework that specifically considers their contexts, to develop a generalised understanding of cross-sector innovation activities and priorities.

Finally, as discussed above within the limitation, a faster cross-sectional study with a connected but redeveloped method could be carried out to compare and contrast results that have been produced in this current research and to see how this impacts the nature of a framework that could be developed for small and medium sized enterprises within the digital business sector contexts or other relevant groups of businesses.

10.5 Closure of final conclusions and this current research

Having presented contributions, limitations, and areas for future research, this current research is now concluded, having demonstrated how it fulfils its aim which was, *“To develop a framework of activities supporting capacity raising and innovation in small and medium sized enterprises within the digital business sector, viewed through the lens of Activity Theory”*.

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12.0 Appendix A

The literature revealed two areas where there is the potential to apply AT in the future, although they sit slightly outside of the scope of this current research – that said, within the analysis there elements of both organisational culture and institutional support that are naturally captured within the data collection.

12.1 Elements of Organisational Culture that research has indicated could be analysed through AT.

As part of the initial phase of this current research the researcher gave consideration to the ways in which AT could be used as a lens through which to view organisational culture. Within businesses that innovate there can be a need to define a culture that is capable of continued ongoing innovation. Founders of organisations that disrupt are often believed to have been simply born with creativity, whilst others are not. Creation is supposedly driven from the right-hand side of the brain, and the suggestion is that some people are genetically creative in their abilities. Yet how do organisations develop this a culture that is creative, innovative and cognitively right sided? More so, are other business cultures “*left-brained*” - driven by logical, linear thought, with little or no ability to think creatively? Could left-brained culture be a UK SME impediment?

These assumptions have been challenged by both Christensen (Dyer et al. 2011) and Duggan & Mason (2011) who argue that creativity addresses both parts of brain and can be developed. Kahneman (2011) has also discussed this, terming them as:

- **System 1** - fast, intuitive, instinct, and;
- **System 2** - slow, thinking, logic.

Duggan & Mason in *Strategic Intuition* (2007) combine Systems 1 and 2 and presents Strategic intuition as a combination of existing ideas that “*works the same way in art as it lies in other fields. Innovation comes through creative combination, by bringing past elements together in a*

new and useful way.” (Duggan & Mason 2007, p. 152) It has nothing in common with intuition. *“Strategic intuition is the opposite: it is thinking, not feeling.”* (Duggan & Mason 2007, p. 1).

He argues creativity can be developed through techniques, like:

- *Wishing Techniques* - responding to self-analytical questions about what the final solution should look like and backward engineering from this.
- *Image Streaming* - With closed eyes describe images and actions seen before, interpreting them like dreams.
- *Sensory Involvement Techniques* - these involve different sense descriptions like sound and colour in the analysis of tasks.

In effect, techniques such as these address the subconscious to envisage new combinations. Does this not make sense in relation to classic examples of innovations? iPhone, Google search, and others were created or formed of old ideas in better combinations. Many organisations have moved to their next innovation without inventing from scratch, instead putting together new combinations - Pixar, iMac and iPod could be considered examples.

Furthermore, Christensen (Dyer et al. 2011) has presented research based on the interviews with one hundred inventors of ground-breaking products and services and suggested that the generation of innovative business ideas comes through “associational thinking” or “associating” which aligns with Strategic Intuition of Duggan & Mason (2011). He finds that *associating* is an ability to make connect areas of knowledge, industries, geographies, and is an often-taken-for-granted skill amongst innovators (Dyer et al. 2011, p. 41) This ability to *associate* he finds is connected to “*discovery*” skills; these are behavioural skill of questioning, observing, networking and experimentation (Dyer et al. 2011, p. 41).

Unlike Duggan, Christensen outlines and correlates thinking processes with behaviour. He argues that ability to generate innovative ideas is not solely a function of the mind, but a function of behaviour (Dyer et al. 2011). His argument is that through changing of behaviour, addressing proper actions by questioning, observing, networking, and experimenting, organisations can increase their creative impact. This raises questions:

- Why do some organisations engage these four skills more so than others?
- Why do some organisations have this courage to innovate?
- What is it that makes them able to challenge the status quo through risks that drive change?

Christensen's model suggests that to improve abilities in the generation of innovative ideas the practice of associational thinking is necessary as is frequent engagement in the four behavioural skills.

Many organisations may accept their current methods, and even cling to their routines, but Christensen suggests that those that are disruptive are in fact *“innovators”* who *“see many things as “broke”. And they want to fix them.”* (Dyer et al. 2011, p. 25).

That said, this current research has come to be focussed on activities that enable innovation, and although some element of this is captured in this research almost without intention, organisational culture is not the primary consideration.

12.2 Elements of Institutional Support that research has indicated could be analysed through AT.

As part of the initial phase of this current research considered the ways in which AT could be used as a lens through which to view the value of aligned institutional support. Examples of aligned institutional support can be seen in contemporary, innovative organisations. Netflix has

created, for example, a culture that is continuously innovative. Their seven disruptive values are as follows (Hastings 2018):

- Values are what we Value
- High performance
- Freedom and responsibility
- Context, not control
- Highly Aligned, Loosely Coupled
- Pay Top of Market
- Promotion and Development

Through this, they recruit, promote and drive development of nine behaviours and skills, one of which is the ability to innovate. So as to find ways to continually disrupt their market innovative thought is organisationally essential so as to (Hastings 2009):

- Reconsider problems and find solutions.
- Challenge assumptions and suggest better approaches.
- Generate new ideas.
- Minimise complexity and encourage simplification.

In relation to this current research, this has raised some future questions for research about how crucial is an organisational culture (see Appendix A:9.1) and aligned institutional support within SMEs that encourages innovation?

That said, this current research has come to be focussed on activities that enable innovation, and although some element of this is captured in this research almost without intention, organisational culture is not the primary consideration.

12.3 Historical Application of AT

This current research will examine how AT can be used to further understand innovation in SMEs. As discussed, recent academic consideration of AT has spanned multiple fields of research emerging as a theory for understanding change and development in work and social activity (Miettinen et al. 2012). It has in recent years been applied in the fields of:

- Organisation (Engeström 2000);
- Management (Jarzabkowski 2003);
- Social psychology (Blunden 2010);
- Education (Roth & Lee 2007); and,
- Human Computer Interaction and IS design (Kuutti 1999; Nardi 1996).

In relation to this current research, how could it be used to provides insights into As such, it has become relatively accepted as a contemporary social theory for both the framing of studies and generation of insight. Furthermore, contexts for its use have cut across public sector organisations, complex organisational contexts, disaster response, education, health and ICT development. As such, scholars have also considered AT with philosophies and theories such as critical realism (Allen et al. 2013), institutional theory (Ogawa et al. 2008), complexity theory (Hasan et al. 2010) and structuration theory (Canary & McPhee 2009) in order to generate novel insights.

Marx identified two pivotal issues with social theory:

"The chief defect of all hitherto existing materialism ... is that the thing, reality, sensuousness, is conceived only in the form of the object or of contemplation, but not as sensuous human activity, practice, not subjectively". (Marx 1845, p. 1)

And conversely:

"Hence, in contradistinction to materialism, the active side was developed abstractly by idealism -- which, of course, does not know real, sensuous activity as such." (Marx 1845, p. 1).

Cultural-historical theory of activity was initially used by a group of post 1920s and 1930s Russian psychologists who looked to the Feuerbach theses as an approach to increasing understanding and enabling transformation of human life. Basic concepts were formulated by Vygotsky (1896-1934), founder of this school of thought. Vygotsky found that 1920s psychology was dominated by two unsatisfactory orientations:

1. Psychoanalysis.
2. Behaviorism.

Vygotsky and colleagues, Luria and Leont'ev, formulated a new theoretical concept to respond to this situation: the concept of artifact-mediated and object-oriented action (Vygotsky 1978, p. 40). Core to their theoretical concept is that: An individual never reacts directly to the environment, instead the relationship between human agent and objects of environment is mediated by cultural means, tools and signs. This means that human action can be visualised as a *tripartite* structure (see figure below).

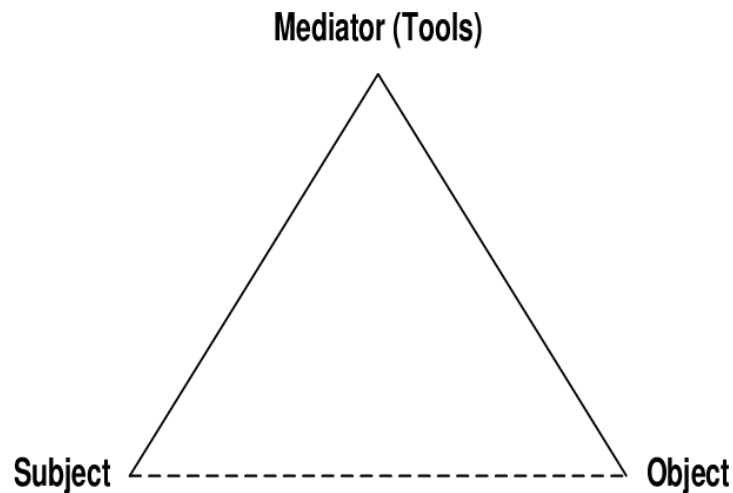


Figure 34: Vygotsky's 1978 AT Model

According to Vygotsky, language use begins as an interaction between an adult and a kid that involves shared behaviours and communication, and it eventually internalises to become a tool for child cognition and activity management. Due to Vygotsky's discovery that "Social ties or human relationships genetically underpin all higher functions and their relationships," cultural development in children manifests itself twice or on two planes (Vygotsky 1978, p. 163). It seems:

1. Interpsychologically - in interaction between people.
2. Within the child as an intrapsychological achievement.

In the 1930s Luria further developed this through research of historical transformation of human psychological functions under influence of changing psychological tools. Luria (1976) showed how written language and logical mathematical skills provided in school teachings had significant influence on how people categorised objects in their environment.

Activity theory has seen three theoretical developments. The first was centred on Vygotsky, who developed the idea of mediation. Social relationships and human-to-human mediation were not theoretically included in the triangular model action in earlier works (see Vygotsky's 1978 Model

above). The paradigm separating out communal activity from individual action needed to be evolved in order to achieve this unification. Leont'ev improved the model after concluding that division of labour was a key step in the development of mental abilities. The human object-oriented activity theory developed by Leont'ev used Marx's conception of labour as its model. He found that, mediated by tools, work is *"performed in conditions of joint, collective activity (...)* *Only through a relation with other people does man relate to nature itself, which means that labour appears from the very beginning as a process mediated by tools (in the broad sense) and at the same time mediated socially."* (Leont'ev 1981, p. 208). Second generation activity theory is derived from Leont'ev. In order to highlight the distinction between individual action and collective activity, Leont'ev (1981, p. 210-213) utilised the example of a "primal collective hunt." The three-level model of activity proposed by Leont'ev is based on the distinction between activity, action, and operation.

1. The upper level of collective activity is driven by an object-related motive.
2. The middle level of individual (or group) action is driven by a known goal
3. The bottom level of automatic operations is driven by conditions and tools of the action at hand.

That said, Leont'ev augmentation of Vygotsky's model was finally visualised by Engeström (1987, p. 78) - see figure below.

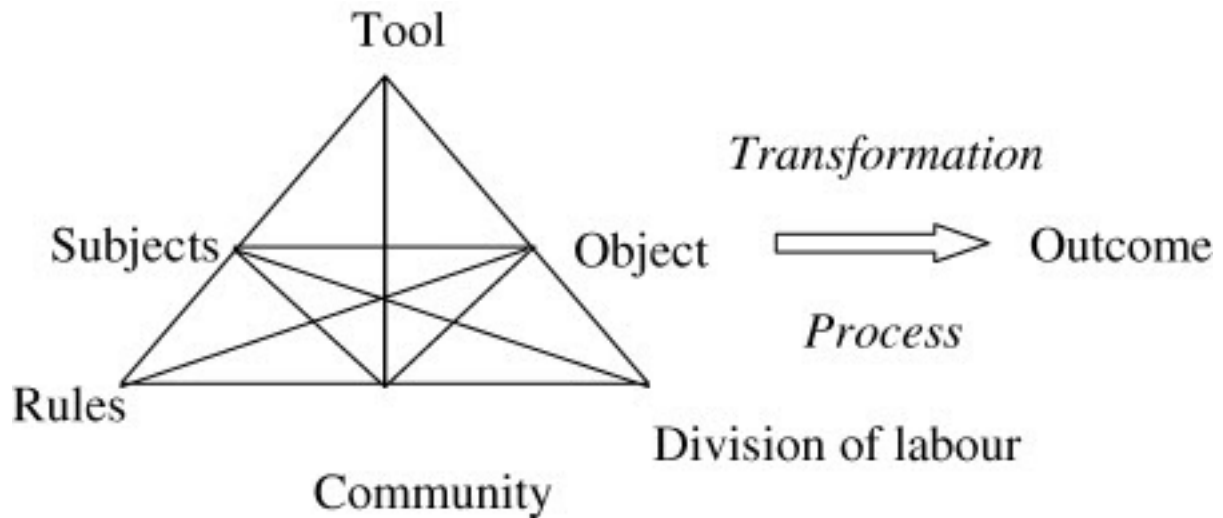


Figure 35: Engeström 1987 AT Model

Kaptelinin explains the origins and functions of Activity Theory, and value in examining the culture of workplace dynamics. In life, subjects have needs. In order to perform actions to satisfy the need, activity needs to take place. Within the realm of activity, a subject works with others and uses tools to perform specific actions to meet that goal. Activity Theory examines the relationships and influences of the people and tools required to perform the specific action.

12.4 Innovation AT aligned interview questions

Start the interview by discussing and defining what the innovation activity is for the person being interviewed and resolve any questions.

Goals

1. What are the different roles of the people involved in this innovation activity? What is your role in this innovation activity?

2. Can you take me step-by-step through the process of how you completed your role in this innovation activity, and tell me how this process varied from other times you have innovated?
3. How have you been able to tell when you have successfully completed each innovation?
4. How do you think now that these higher-level innovations could have been achieved differently?

Contradictions

1. What contradictions are there between these innovation goals?
2. What contradictions might there be with innovation goals from other activities you or others in your organisation are involved in?
3. How could you/have you resolved these contradictions?

Tool use

Discussion of tools used in the innovation activity: “I will now ask you a series of questions about the tools you use in this innovation activity. Tools include all sorts of artefacts such as pencils and paper, the notes we take, the theories behind them, and more traditional technology tools. So, in this specific innovation activity a tool could be ... or ...”

1. What tools did you use in this innovation process and what for?
2. What other tools did you use or could you have used in this innovation activity?
3. Did you have access to all these tools?
4. How were the tools integrated/combined with other tools that were used in the innovation activity?

5. Which tools did you use when, and how did you organise using them?

Working with others

1. How were these tools used and shared with others?
2. How did you divide this innovation activity between people, and at which points did you have to wait for them to complete their work?
3. What were the explicit or implicit rules, norms and procedures influencing/affecting how you worked together?

Internalisation

1. How have the tools used affected how you think/reason about the innovation activity, and how much of the activity did you perform (in other ways/manually) without these tools?
2. How hard did you find it to make use of the tools you had access too, and what should have been easier?

Externalisation

1. How did you deal with problems in this innovation activity when they became too complex to manage in your head?
2. How did you use representations of your work - documents, notes, software, and talking etc. - to collaborate and coordinate with others involved in the activity?
3. How have you externalised your processes for simulation (so everyone understands the process)?

Transition

1. How did the tools support the transition between subconscious and conscious use?

Help

1. When things went wrong, how did / could your tools help you express these problems and request help?
2. How did the activity system provide help to other people?
3. What knowledge is there about the tools (other than that provided by using the tools), and how could you get access to it?

Life cycle

1. How did your tools fit into your innovation workflow?
2. How did your tools shape how you worked towards this innovation, and what you could do/produce as the final outcome?

Change

1. What new things could have been possible through introduction of a new tool?
2. How would contradictions have changed between target actions and higher-level goals?
3. How might your working environment have changed, for example people, technology, rules, work as a result of new innovation supporting tools?
4. What could you have done differently with better support within the new innovation system?

- How have your previous innovations affected how you performed this innovation activity? When you introduced new tools in the past, how did this affect the innovation activity?

Attitudes

- What are your attitudes towards this innovation, and how have you seen them changing over time?

12.5 Summary table of academic definitions of innovation

Author	Definition
Mohr (1969)	A function of interaction amongst: ● motivation to innovate; ● strength of obstacles against innovation; and, ● availability of resources for overcoming those obstacles.
Utterback (1971)	An invention which has: ● Reached market introduction in the case of a new product, or first used in a production process, in the case of a process innovation.”
Roberts (1988)	Combination of: ● Invention; and, ● Exploitation.
West (1990)	● Intentional introduction and application of ideas, processes, products or procedures, within and relevant to a: ○ Role; ○ Group; or, ○ Organisation. ● Designed to benefit associated/connected individuals, groups, organisation or wider society.
Nohria & Gulati (1996)	A perceived, by the manager of the innovating unit, new: ● Policy; ● Structure; ● Method; ● Process; ● Product; or ● Market opportunity.

Dosi (1998)	Identification, trial, development, imitation (considering the similarities of similar and new functionalities to create value and business advantage) and adoption of: • New products; • New production processes; and • New organisational set-ups.
Damanpour (1991)	Adoption by an organisation of a new: • Internally generated or purchased device; • System; • Policy; • Program; • Process; • Product; or, • Service.
Porter & Stern (1999)	Transformation of knowledge to: • New products; • Processes; and, • Services.
Van de Ven, et al. (1999)	A process for development and implementation of a new idea.
Boer & During (2001)	Creation of a new combination of: • Product; • Market; • Technology; and, • Organisation.
Drucker (2002)	Change creating a new performance dimension.
Rogers (2003)	A perceived as new by an individual or another unit of adoption: • Idea; • Practice; or • Object
Bessant et al. (2005)	Core renewal process for achieving growth and survival within an organisation considering: • Product; • Service; and, • Process.
Hobday (2005)	New firm, world or marketplace levels of: • Product; • Process; or, • Service.
OECD (2005)	Implementation of new or significantly improved: • Product - good or service; • Process; • Marketing method; or, • Organisational method in: ○ Business practice; ○ Workplace organisation; or, ○ External relations.

Carlson & Wilmot (2006)	● A process of conversion of idea to customer value generation. ● Driver of sustainable profitability for an enterprise.
Lafley & Charan (2008)	Conversion of a new idea into: ● Revenues; and ● Profits.
O'Sullivan & Dooley (2008)	● The process of making changes that can be in nature: ○ Large scale; ○ Small scale; ○ Radical; or, ○ Incremental. ● Changes are made to: ○ Products; ○ Processes; and, ○ Services ● Introduces something new to an organization that: ○ Adds value to customers; and; ○ Contributes to knowledge of the organisation ● A combination of creativity and exploitation
Baregheh et al. (2009)	A multi-stage process of organisations to 1). Advance, 2). compete and 3). differentiate themselves in their marketplace that transforms ideas into: ● New/improved products; ● Services; or, ● Processes.
Bledow et al. (2009)	Development/intentional introduction by individuals, teams, and organisations of: ● New ideas; and, ● Useful ideas.
Crossan & Apaydin (2010)	● Can be both: ○ Process; and, ○ Outcome. ● In relation to a “<i>value-added novelty in economic and social spheres</i>” Crossan & Apaydin (2010, p.1155), includes: ○ Production; ○ Adoption; ○ Assimilation; and ○ Exploitation ● Renewal and enlargement of: ○ Products ○ Services ○ Markets ● Development of new production methods. ● Establishment of new organisational systems of management.
Raynor (2011)	Change that eliminates need to compromise through use of an existing solution, described by the author as “...a change that breaks trade-offs.” (Raynor 2011, p. 168).
Kahn et al (2012)	A new: ● Idea; ● Method; or

	● Device. The act of creating a new: ● Product: or, ● Process. Evolutionary work to bring an idea/concept to its final form.
Kumar (2012)	A viable offering that is: ● New to a specific context and time; and, ● Creates both user and provider value.
Trott (2012)	● Combination of: ○ theoretical conception ○ technical invention ○ commercial exploitation ● Management of activities involved in process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment.
McKinley et al. (2014)	A significant depart from prior product, service, or production process architectures creating any new: ● Product; ● Service; and, ● Production process.
Plsek (2014, p. 12)	Implementation that is both: 1. Directed/planned; and, 2. Creative.
ASQ (2022)	Delivering new customer value in the marketplace through conversion of new concepts/knowledge to new: ● Products; ● Services; and, ● Processes.

Table 25: Summary table of academic definitions of innovation

12.6 Disruptive Innovation

Disruption, as a word, is derived from the Latin disruptionem (nominative disruption); “a breaking asunder”, from dis “apart” and rumpere “to break” (Dictionary.com 2022).

Table 9.2 below summarises literature that defines disruptive innovation:

Author	Definition
Christensen: ● Christensen (Bower &	Christensen’s definition has evolved - record of these evolutions is in chronological order:

Christensen) (1995) • Christensen (1997) • Christensen (Christensen & Raynor) (2003) • Christensen cited in Yu & Hang (2011) • Christensen (2013) • Christensen cited in Robles (2015)	• Work from bottom-up beginning life as less valuable and rich in features than alternatives in current market, but at a better price with inferior quality (Bower & Christensen 1995). • Was originally defined as technology but expanded to include innovation (Christensen 1997). • Not all innovations are disruptive, even those that are revolutionary (Christensen & Raynor 2003). • Considers technology, product, process and service (cited in Yu & Hang 2011, p.402). • Often driven by outsider organisations and entrepreneurs, rather than market-leaders (cited in Yu & Hang 2011). • Business environment of market leaders does not allow pursuit of disruptive innovations in early stages, because unprofitable and development take resources away from sustaining innovations needed to compete against competition (Christensen 2013). • For businesses can result in lower gross margins, smaller target markets, simpler products and services. These may not appear as attractive as existing solutions (cited in Robles 2015, p. 123). • Transforms complicated, expensive services and products into things so simple and affordable that you and I can use them (cited in Robles 2015, p. 123).
Kim & Mauborgne (1997; 2005)	• Challenge bottom-up disruption occurring gradually. Entrants fulfil unmet needs in existing, mature categories by coming from multiple directions. These focus on values proposed by different products and services. • Central in disruption is “<i>value innovation</i>”: it drives both differentiation and low cost, in effect, creating value for buyers, companies and employees and opening up new and uncontested markets. • This does not to compete but makes competition irrelevant through disruptive strategy. This strategy raises and creates market value whilst reducing or eliminates less valued market features. This disruption creates value through innovation eliminating the need to offer new goods at reduced costs. • Challenges Porter’s (1985) concept that businesses are low-cost or niche.
Von Hippel (2005)	The innovation paradigm has shifted to democratic and increasingly user-led. End-users are increasing developing disruptive innovation to solve their problems.
Assink (2006)	Disruptive innovation can include “<i>significant societal impact</i>” (Assink 2006, p.5).
Markides (2006)	Disruptive innovation includes both technological and business model innovation.
Frattoni et al. (2012)	Not implemented by market-leading companies because initially not profitable, higher risk and uncertainty associated with outcomes of technological development.

McGrath (2013)	Without a method to predict when something will disrupt, because is an iterative process occurring with time, with a beginning, middle, and end and disruption life-cycle.
Downes & Nunes (2014)	• Disruption attacks existing markets not just from top, bottom, and sides, at the same time. • Products tied to exponential growth and failing costs of new technologies. • Offerings can be simultaneously better, cheaper, and more customised for not just one group of users, but many groups. • Identifies four phases in disruption: 1). The singularity, 2). The Big Bang, 3). The Big Crunch and 4). Entropy.
Paetz (2014)	Disruptive, innovative, organisations that are still inferior to incumbents gain market advantage through competing with non-consumption whilst changing existing market values; these improve until they become the incumbent.
Webster (2014)	As also found in Von Hippel (2005), users innovate and solve their own problems. Users are driven do this at their own expense.
Chen et al. (2016)	Disruptive innovations are increasing affordable and deployable in both small and large organisations.
Schneider (2017)	Disruptive innovation can take longer to develop than by the conventional approach and the risk associated to it is higher than other more incremental or evolutionary forms of innovations; but once deployed in the market, it achieves faster penetration and higher degrees of impact on established markets.

Table 26: Summary of definitions of disruptive innovation.

Academically, when we speak of disruption, most academic papers refer to Christensen's (1997) work which set the concept of disruption theory and created the term "*disruptive technology*" that "*covers innovation not only in technology, but also in product, process and service. In subsequent studies, the term disruptive technology has been replaced by disruptive innovation*" (cited in Yu & Hang 2011, p.402). It is perhaps worth considering within any definition of disruptive innovation that it not just technology that should be considered, but factors such as product, business model and service. Furthermore, scholars have suggested even finer categorisation, for example, disruptive innovation that includes both technological and business model types (Markides 2006).

Christensen found that *“a disruptive innovation is an innovation that transforms the complicated, expensive services and products into things that are so simple and affordable that you and I can use them.”* (cited in Robles 2015, p. 123). This definition indicates how disruption happens incredibly frequently. Therefore, it is necessary to consider searching in-depth for causes and explanations of disruptive innovations. Moreover, it seems necessary to consider the characteristics of businesses that consciously chose to disrupt:

“The characteristics of disruptive businesses, at least in their initial stages, can include: lower gross margins, smaller target markets, and simpler products and services that may not appear as attractive as existing solutions when compared against traditional.”
(Christensen cited in Robles 2015, p. 123).

Top-down conceptions of innovation as the initial step, as proposed by Porter's (1985) theory, are challenged by disruptive innovation. According to his theory, businesses can only gain a competitive advantage through innovation using one of three "generic" strategies. These strategies all employ top-down strategies, in which businesses should either differentiate their goods and services to command a higher price or maximise product efficiencies to enable them to sell for less. The third generic strategy differs from the first two strategies mentioned in that it concentrates on a specific market segment by providing goods and services that are either low cost or high value without the option of combining these.

In contrast, Bower & Christensen (1995) assert that disruptive organisations frequently operate from the bottom up. In this, he contends, how the second stage of disruption innovation theory, disruptive innovations start out as significantly less valuable and feature-rich than alternatives that the current market supports, but at a significantly better price — at least for those who are willing to accept lower quality.

Disruptive innovations build new markets and value networks that eventually disrupt those that already exist. They also displace well-established market leaders in terms of alliances, products,

and enterprises. Bower & Christensen provided the first definition and analysis of the phenomena (1995). However, "major societal impact" has also been acknowledged as a type of disruptive innovation in recent years (Assink 2006, p.5). However, even advances that might be categorised as revolutionary are not always disruptive. For instance, because early cars were expensive luxury items that did not disrupt the market for horse-drawn carriages, they were not disruptive inventions when they were introduced in the late 19th century. The transportation market virtually stayed unchanged until the 1908 introduction of the more affordable Ford Model T. (Christensen & Raynor 2003). Because mass-producing vehicles altered the transportation market, unlike the first thirty years of automobile production, this was an example of disruptive innovation. Additionally, just because something is novel does not guarantee that it will generate disruption across the entire spectrum of disruptive innovation.

As a result, although there are outliers like Apple and Google, disruptive breakthroughs are typically created by outsiders and entrepreneurs rather than by market-leading corporations already in existence. Academic research has observed a shift in innovation paradigms, which reflects this democratisation of innovation (Von Hippel 2005; Christensen 2013). The conventional wisdom holds that innovators would pinpoint user demands and then utilise that information to create a solution that bridges the gap. They then safeguard their design and make money through commercialization. However, we are currently witnessing a rupture of this conventional approach. It is suggested that a new innovation paradigm exists that is democratic and becoming more user directed. Users in this scenario innovate and deal with their own issues. Even pushed to do this on their own dime, people (Von Hippel 2005). Market leaders' operating environments prevent them from pursuing disruptive innovations when they first appear because they are not initially profitable enough and because their development could divert limited resources from sustaining innovations (which are required to compete with the current competition) (Christensen 2013). However, once it is implemented in the market, a disruptive process achieves a much faster penetration and higher degree of impact on the established markets. A disruptive process can take longer to develop than by the conventional approach and the risk associated with it is higher than the other more incremental or evolutionary forms of innovations (Schneider 2017). These new paradigms, such as the iBeacon, Raspberry Pi, and 3D printing, which have effectively democratised innovation for all organisational levels as

disruptive technologies, are becoming more and more accessible, deployable, and inexpensive in both small and large organisations (Chen et al. 2016). In fact, market leaders frequently refrain from pursuing disruptive innovations because they are initially unprofitable and because the results of technological advancements carry significantly higher risks and uncertainties (Frattoni et al. 2012).

In the third stage of disruption theory, Kim & Mauborgne (2005) dispute this bottom-up idea of incremental disruption with a novel strategy where new players fill gaps in established, mature categories by approaching them from novel angles. These concentrate on the variety of values that various goods and services offer. Value innovation is a key component of the Kim & Mauborgne (2005) blue ocean approach, which was first introduced in a previous article (Kim & Mauborgne 1997). Value innovation simultaneously promotes differentiation and cheap prices, which benefits customers, businesses, and employees while creating new, untapped markets. Instead of competing, value innovation seeks to eliminate it through radical shifts in strategy. By increasing and adding value for a market, this technique simultaneously decreases or eliminates less valuable features or services for that market. In essence, it reduces the need to provide the new good at a lower price by generating value through innovation. Porter (1985) is challenged by value innovation and his assertion that profitable businesses are either low-cost or specialised. Instead, it contends that value that transcends traditional market segmentation and offers both value and lower cost can be attained through innovation. Hill (1988) reaffirms this idea and criticises Porter's model because differentiation may be a way for businesses to cut costs. He also suggests that a mix of differentiation and low costs may be required for businesses to establish sustained competitive advantage.

However, has disruption—or, to be more precise, digital disruption—entered a fourth stage of innovation? For instance, Downes & Nunes (2014, p. 6) present their theory of Big Bang Disruption in which:

“The new disruptors attack existing markets not just from the top, bottom, and sides, but from all three at once. By tying their products to the exponential growth and falling costs of new technologies, their offerings can be simultaneously better, cheaper, and more customized—not just for one group of users, but for all customers. This isn’t disruptive innovation. It’s devastating innovation.”

This multidimensional disruption is also further discussed by Paetz (2014) in his book *Disruption by Design*, where he suggests new dimensions of value are created that the old product category or business model is unable to address through satisfaction of unmet or underserved needs. These dimensions are new in nature: they often serve benefits like simplicity, convenience, accessibility, significantly lower price, or ease of use, but can also include breakthrough innovations that redefine whole product category. Paetz (2014) finds that disruptive innovations will generally appeal to a new user or one with less demands when it is first introduced, but with they evolve to a level that they satisfy mainstream consumers, and often are available at a lower price than the older class of “better” traditional alternatives.

This multidimensional nature of disruption adds depth and highlights the limitless nature of digital. In considering different definitions of disruptive innovation in reference to both technologies or business models, an initial definition could be perhaps that: Disruptive innovations can be tools, technologies, behaviours, processes or business models that change their consumers in terms of developing new behaviour and different expectations through the new values created, whilst serving them better, for a more affordable price and with rapidity, which thus changes both competition and environment.

Downe & Nunes (2014) have attempted to characterise this technology mitigated phase of disruption, terming it as “*The Singularity*”, where people and organisations are driven to try multiple experiments that often seem both odd and unpromising. This in effect leads to unencumbered development, where now “*thanks to the sudden adoption of Big Bang Disruptors, time to market now regularly exceeds time in market*” (Downes & Nunes 2014, p. 109).

Furthermore, since experimentation has reduced in cost and risk of failure has lowered, the chances of turning an idea into a market or business model disruptor has increased.

They find that *Big Bang Disruptors* do not follow traditional rules of competition and do not see their competitors as competitors, because they do not share their ethos or feel that they are targeting the same customer segments that traditionally demand premium alternatives.

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They find that *Big Bang Disruptors* do not follow traditional rules of competition and do not see their competitors as actual competitors, not sharing their ethos or targeting of the same customer segments that traditionally demand premium alternatives.

Their theory suggests there are three characteristics define *Big Bang Disruptors*:

1. **Undisciplined Strategy:** These disruptors can now be developed to enter the market simultaneously better and cheaper, and already more customised than products and services of incumbents. Traditionally, strategic planning focused on only one “*market*”

discipline” - that is, to offer products either better or cheaper in nature than those of competitors, or those that are customised for a niche market segment.

2. **Unconstrained growth:** Online connectivity mitigates rapid information exchange, across all segments, so that there is instant access to intelligence about new products and services, with much provided by other users. These disruptions exhibit winner-to-take-all results and short lifespans. Thus, there is little point carefully timing marketing campaigns addressed to different customer groups over a controlled product release. Today two consumers have gradually replaced the classic bell curve of Rogers (1962: 2010): those that are 1). trial users, and 2). all other user. In effect this means that the adoption curve is now closer to a vertical line which drops to nothing when saturation occurs or there is a new disruption.

3. **Unencumbered Development:** These disruptions are rarely result of expensive proprietary R&D. In fact, innovators will by nature trial multiple low-investment cost experimentation that is supported, if and when necessary, through third-party infrastructure. Tests are by their very nature carried out directly in the marketplace, with real users that collaborate, co-create and fund the evolution, which is in effect an human-centered approach. For incumbents “*the Singularity*” is potentially the stage with the greatest risk. Aubry et al. (2015) found that 74% of organisations responded and adapted to a disruptive innovation two years after introduction to the market, whilst 38% of incumbents responded to the emergence of a disruptive innovation after four years. By this phase the disruptive innovation has started to become mainstream and so there is increased risk that a value chain could be replaced by a more disruptive organisation. The big Crunch phase occurs once the market saturation is achieved, with the disruptor entering a mature state and from which the level of innovation becomes increasingly incremental. Big bang phase value decreases. Finally, in entropy disruptors ignoring the Big Crunch phase salvage value by fusing assets together through disruptive experiments that launch new disruptors. Some incumbents, at this phase need to develop road maps to relocate to more promising markets in order to bring the project to the next Singularity. Their research suggests a framework for response to disruption innovation and how to be strategically part of the

disruption.

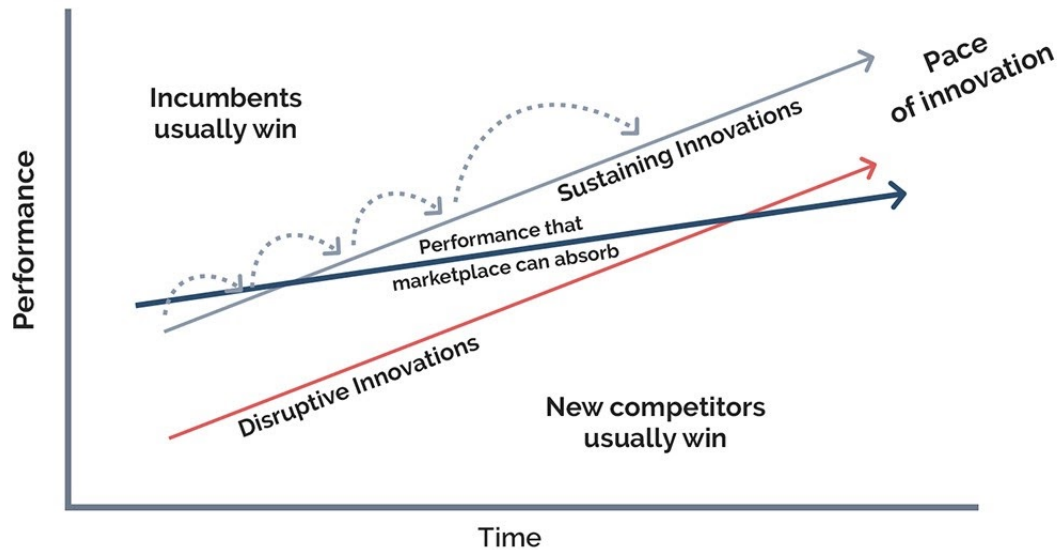


Figure 36: Adapted by the author, from Paetz's *Disruptive Innovation Model* (Paetz 2014)

Paetz (2014) disruptive innovation model, which he adapted from that of Christensen (2013), above (figure 9.3) illustrates that even challenger organisations with innovations that are still inferior to those of incumbents will gain market advantage through competing with non-consumption whilst at the same time changing existing market values, which improve with time until they become the incumbent. That said, there is no precise method to predict when something will happen that disrupts, because it is an iterative process that occurring with time, with a beginning, middle, and end and its own disruption life-cycle (McGrath 2013).

Returning for clarity though to Christensen's most recent redefinition of "*disruptive innovation*" (Christensen et al. 2015), he reiterates that it describes a process whereby smaller, less resourced, organisations successfully challenge established incumbents. Phases of disruption occur as follows:

1. Incumbents improve products and services for their customers, exceeding needs of some segments and ignoring others.
2. Disruptive entrants that successfully target overlooked segments, gaining foothold by delivering more-suitable functionality, often at a lower price.
3. Incumbents, driven by raising their profitability in segments with a higher level of demands, do not tend to respond vigorously to disruptive entrants.
4. Disruptive entrants move into higher market segments by delivering performance and values that the incumbents' mainstream consumers require but preserving advantages that drove early success and adoption.
5. Disruption has occurred when adoption of the disruptive entrants' innovation occurs in volume displacing the previous method within the market.

In 2015 Christensen has reflected this in this revisit of his disruptive innovation model so in this newest version of the model contrasts are drawn between:

1. *Product performance trajectories* - these are represented by the red lines which show how products and services improve with time.
2. *Customer demand trajectories* - these are represented by the blue lines which show customer willingness to pay for performance.

In this model we see how:

1. Incumbents introduce higher quality products or services, shown in the upper red line, which satisfy the higher market segments but which overshoot and fail to address needs of the lower and mainstream.
2. An opening is created for disruptive entrants to find "footholds" in the less profitable segments that are being neglected by incumbents.

3. These “disruptive” entrants, following the lower red line labelled “*Entrants disruptive trajectory*”, improve innovation performance and move into higher market segments, where higher profitability can be achieved and where they challenge and eventually displace dominant incumbents.

Nonetheless the theory of disruption remains, with much academic criticism. Lepore (2014) for example challenges Christensen’s sources as “dubious” and his logic as “questionable.”

Furthermore, King & Baatartogtokh (2015) found it lacking in substance with little predictive power, cautioning reliance on such a “simple” theory.

Note about this body of literature: this section of literature was written at a time when the author had a drastically different focus for his research, where it was his belief, that was faulty that SME, inclusive of Digital Business SME were by nature able to innovate disruptively. The idea of the research at that time was to view the theory of disruption through the lens of activity theory will provide further definition through the understanding activities and processes that occur in implementation of disruptive innovation in SMEs, and forming a contribution to knowledge, in turn creating a framework allowing SMEs to innovate disruptively in the future. Through the research journey and the literature enquiry it became evident that this was not a type of innovation that was common in SME; their innovation, in fact, is generally incremental and in response to needs of their market.

12.7 Search of the Department for Business, Energy & Industrial Strategy (BEIS) website for term innovation (July 2017)

Tell us what you think of GOV.UK

[Close](#)

[Take a short survey to give us your feedback](#)

Search results for

innovation



Filter by:

17,784 results found

Organisations

- ☐ Closed organisation: Department for Business, Innovation & Skills (2,799)
- ☐ Department for International Development (1,707)
- ☐ Foreign & Commonwealth Office (1,074)
- ☐ Cabinet Office (864)
- ☐ Department for Communities and Local Government (734)
- ☐ Innovate UK (709)
- ☐ HM Treasury (647)
- ☐ Prime Minister's Office, 10 Downing

Innovate UK

Innovate UK

The home of **Innovate UK** on GOV.UK. **Innovate UK** is the UK's **innovation** agency

Apply for innovation funding

Use this service to apply for government-backed **innovation** funding for your business

Energy Innovation

The government's energy **innovation** programme and guidance to apply for available funding

Innovation in regulation

4 April 2017, Collection, HMT, FSA, HCA, BEIS

Plans showing how departments and their regulators are ensuring that their approach to regulation supports **innovation**.

Funding for innovation in renewable energy

12.8 Search of the Department for Business, Energy & Industrial Strategy (BEIS) website for term innovation (June 2022)

Topics

Government activity

Q

[Home](#)

Search

Innovation

Q

Topic

Content type

Updated

29,073 results

Subscribe to feed

Sort by Relevance

Innovate UK

The home of **Innovate** UK on GOV.UK...

Updated: 7 February 2022

Innovator visa

Apply for an **Innovator** visa if you've been endorsed for a business idea: eligibility, documents, extend or switch, bring your family.

Overview

You can apply for an Innovator visa if: you want to set up and run an...

Knowledge of English

You'll usually need to prove your knowledge of the English language when...

Eligibility

Before you apply you need to have your business or business idea assessed...

Documents you'll need to apply

When you apply you need to provide an 'endorsement letter' to show that an...

12.9 NVivo export of Innovation sentences and contextual words.

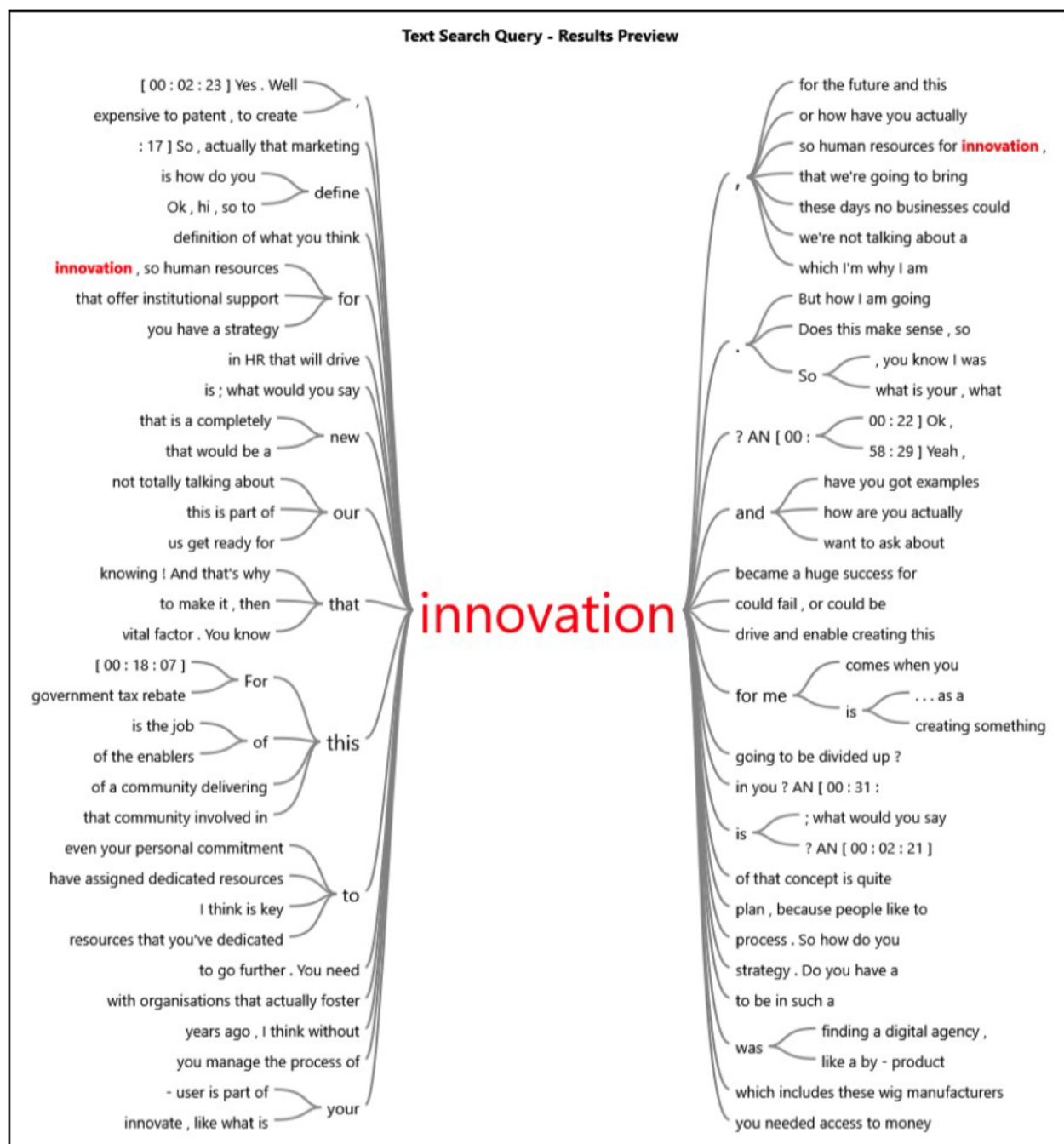


Figure 37: NVivo export of Innovation sentences and contextual words.

12.10 Word-count frequency Digital Business SME definitions of Innovation.

Word-Count	word
22	new

8	Innovation
8	services
8	ways
7	people
7	processes
6	business
6	products
5	ideas
5	things
5	way
4	better
4	can
4	clients
4	create
4	creative
4	customer
4	improve
4	innovation
4	needs
4	process
4	value
3	best
3	bring
3	client
3	collaboration
3	deliver
3	develop ng
3	done
3	drive
3	exist ng
3	make
3	market
3	practice
3	technology
3	well
2	Ability
2	across
2	always
2	approach
2	change

2	communities
2	creating
2	current
2	customers
2	development
2	different
2	experience
2	finding
2	fix
2	get
2	growth
2	industry
2	innovative
2	keep
2	learning
2	Look ng
2	making
2	meet
2	office
2	ones
2	positive
2	problem
2	problems
2	product
2	remote
2	requirements
2	result
2	safety
2	service
2	solve
2	something
2	thinking
2	tools
2	trends
2	understand
2	Understanding
2	understanding
2	vision
2	whilst
2	work

2	working
1	ability
1	access
1	add
1	additional
1	address
1	adds
1	agility
1	ago
1	ahead
1	Also
1	Apple
1	Application
1	applications
1	apply
1	around
1	assessment
1	asset
1	authentic
1	available
1	badly
1	base
1	based
1	Based
1	becomes
1	benefits
1	bespoke
1	box
1	brainstorming
1	broader
1	chances
1	changes
1	Circumstances
1	cloud
1	collaborative
1	come
1	comes
1	Coming
1	commercial
1	commitment

1	communicate
1	competitive
1	completely
1	complex
1	compose
1	constant
1	consultancy
1	consume
1	consumer
1	cont nual
1	cont nually
1	cont nuously
1	core
1	creation
1	Creativity
1	critical
1	curiosity
1	delivering
1	demands
1	detrimental
1	Development
1	Digital
1	digitalise
1	direct
1	Disrupting
1	driven
1	drives
1	economy
1	efficiencies
1	efficiency
1	efficient
1	emerges
1	empower
1	enhance
1	enhances
1	Evolution
1	evolution
1	exceed
1	exigency
1	expensive

1	exploit
1	fabrics
1	faster
1	feedback
1	finance
1	Finding
1	flipping
1	forced
1	forefront
1	forms
1	forward-think ng
1	frame
1	friendly
1	frustrat ng
1	furniture
1	gains
1	got
1	greatest
1	guests
1	harder
1	head
1	help
1	heretofore
1	home
1	Identifying
1	imagination
1	imagined
1	impact
1	impacting
1	implement
1	improved
1	improvement
1	Improving
1	improving
1	inclusion
1	innovating
1	insights
1	inspire
1	internal
1	introduce

1	keeps
1	key
1	knitting
1	knowledge
1	known
1	lack
1	last
1	leading
1	leads
1	lease
1	less
1	leveraging
1	lfe
1	like
1	lives
1	mach ne
1	Making
1	many
1	match
1	mean ngful
1	means
1	meet ngs
1	method
1	might
1	mindset
1	months
1	mostly
1	music
1	Music
1	must
1	networking
1	New
1	nobody
1	Novel
1	novel
1	now
1	offerings
1	offers
1	old
1	openness

1	operational
1	opportunities
1	order
1	outside
1	Particularly
1	parts
1	performance
1	place
1	platforms
1	principle
1	profitability
1	Providing
1	provocation
1	push
1	quality
1	quo
1	rail/transport/construction
1	rarely
1	redefine
1	regards
1	relationship
1	rem nder
1	renewed
1	requires
1	research
1	respond
1	response
1	responses
1	review
1	revisit
1	robust
1	saying
1	scale
1	serve
1	six
1	skills
1	solutions
1	solving
1	someone
1	somet mes

1	somewhat
1	somewhere
1	Spotify
1	status
1	Streaming
1	strongly
1	suite
1	systems
1	take
1	target
1	team
1	tech
1	techniques
1	technologies
1	textiles
1	think
1	Thinking
1	tied
1	time
1	today
1	together
1	tomorrow
1	tool
1	traditional
1	tra n ng
1	trend
1	Trying
1	try ng
1	unearth
1	unique
1	unrestricted
1	Upholstery
1	velocity
1	WFH
1	will ng
1	worded
1	Work ng
1	works
1	world
1	year

12.11 Research diary example page

Meeting 1 - 15/05/2019

- Passionate about the end-user and market
- Innovates through creation of new products address the end-user
- The end-user is central to the process
- Innovating with languages of platforms to address the end-user
- Talks a lot about people involved in family terms
- Innovates to move ahead of the competition
- Innovation is about creating something new
- Innovation through packaging
 - Eco-friendliness
 - CSR, ~~Microsoft~~ Foundation, Brand Equity
 - Reusable materials
- Owner characteristics
 - The entrepreneur who you invest in is a person and their idea is separate
 - The past history of the entrepreneur helps shape the way that business performs and how the business innovates
 - Resilience is essential
 - Grateful for opportunities
 - Respect
 - Respect is key to networking
- Networking - says this is the most important skill
 - Treat business and network like family
 - Finding opportunities
- End-user as part of the innovation
 - Understands their needs through past experience
 - Grows understanding through finding ways to communicate with them
- Strategic working with organisations
 - Always selects these organisation carefully based on shared values
 - Wants to understand their values and how they will help foster innovation
 - Sparc/Business Growth Hub
 - Values in such organisations such as 1-to-1 support and masterclasses
- Strategic Innovation Planning
 - Has a clear endpoint
 - Timescale
 - Team
 - Incentives
- Organisational structure
 - Team and owner
 - Leverages the university student cohort to create team value while remaining agile

12.12 Survey data collection introductory message

Innovation within your business

Thank you for completing these questions which are part of a research into business innovation at Salford Business School.

These questions will help define what innovation means to your business and understand how your business has innovated.

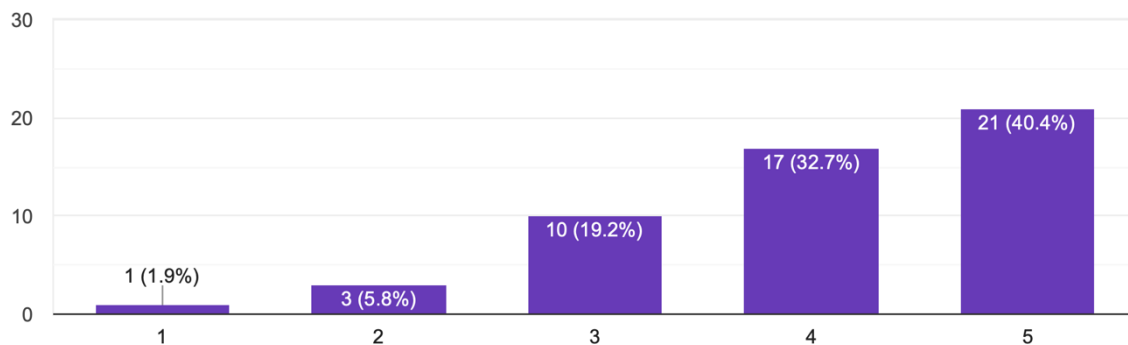
This first section will try to define what innovation is within in your business - please indicate how much you agree with the statements below and there is a free-type box for your to enter your own short definition of innovation.

Figure 38: Survey data collection introductory message.

12.13 Survey data

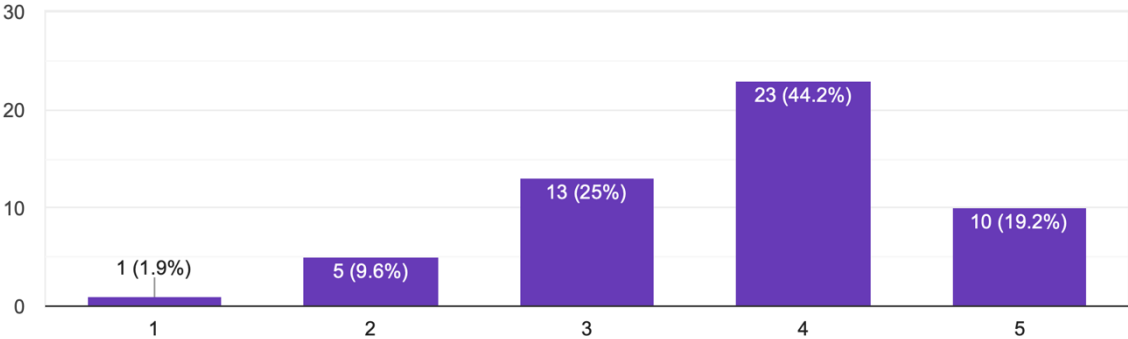
Innovation is creation of a new product or process

52 responses



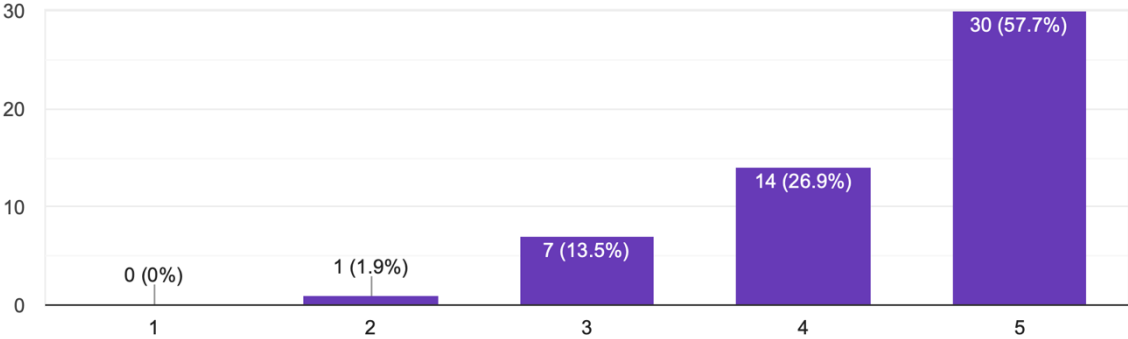
Innovation is a response to customer needs and feedback

52 responses



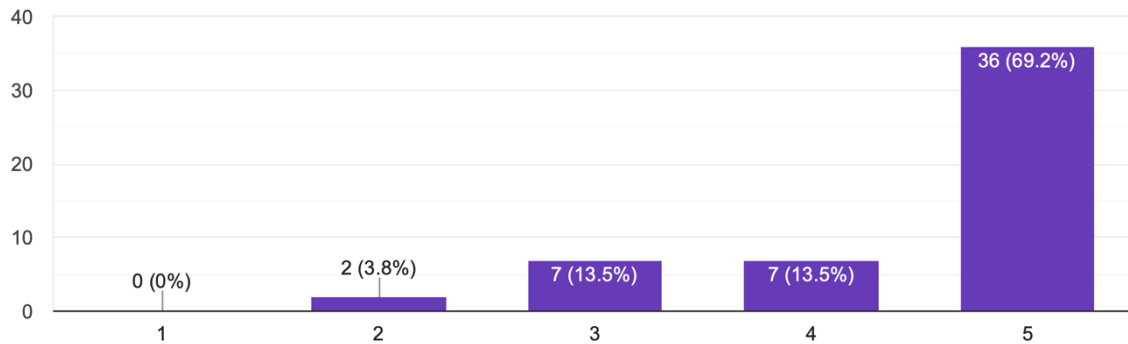
Innovation is central to business growth and evolution

52 responses



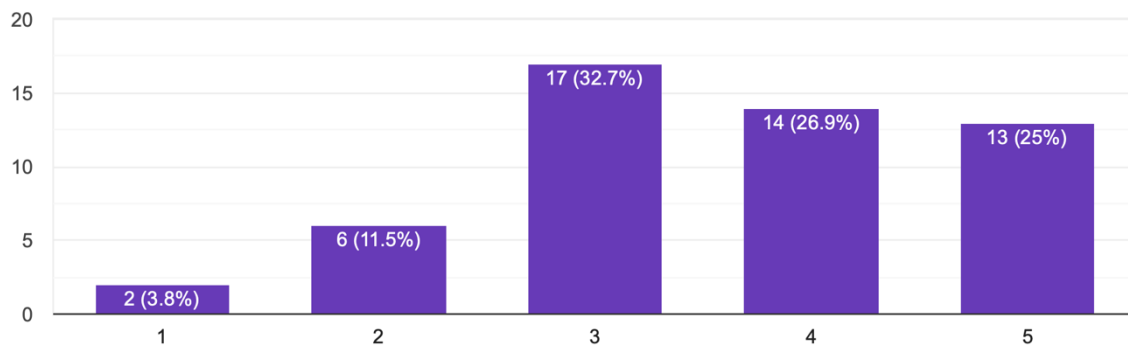
Innovation requires organisational commitment

52 responses



Successfully innovating requires access to public and/or private sector organisations to access resources such as skills, networks and finance

52 responses



Individual definitions of innovation

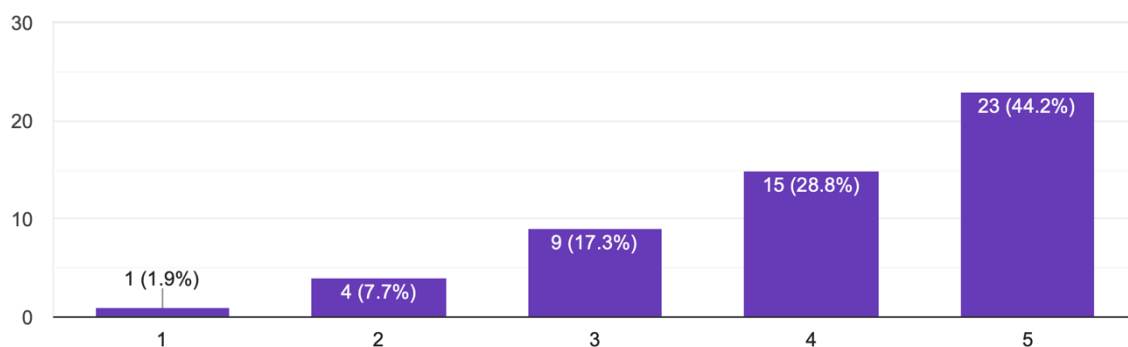
1. Innovation in regards to my business would be the process in which I create and apply textiles and fabrics to furniture to create something completely bespoke to a customers needs. The process of machine knitting for Upholstery is innovative as it has rarely been done before
2. Ability to continuously review the way the business works by networking, collaboration and openness to ideas to introduce novel processes, services and products.
3. Making life better
4. Creativity: a new approach or understanding. As well as a change in practice.
5. Identifying new, meaningful ways to frame problems, so that people can understand what they are trying to fix
6. Innovation is the constant push to improve the way things are done and it is tied strongly to having a forward-thinking mindset

7. Innovation emerges as you bring together communities of people to understand and respond to their needs. It is a collaborative approach, which requires commitment and skills to do well and benefits from broader inclusion of people and knowledge
8. Novel applications of sometimes old techniques. The drive to solve a heretofore expensive or frustrating problem for someone
9. developing new responses to the requirements of customers and communities
10. Application of learning from experience to continually exceed current industry best practice
11. agility, velocity at scale across people, technology and process to drive growth
12. Looking at opportunities from trends and feedback and the creation of products and services to match
13. "a new method or product that becomes a new practice somewhere in the world"
14. Coming up with new ways to communicate, being unrestricted in thinking and willing to take chances on new ideas
15. The brainstorming and development of new services to meet the needs of our target market
16. I compose music. For me, innovation would be to redefine the way that people consume it. Streaming platforms (Spotify, Apple Music) were somewhat innovative, but detrimental to people like me.
17. collaboration across all parts of the business operational, customer, finance, people and technology to deliver value
18. Thinking outside the box to meet the demands of the client for today and tomorrow
19. Our greatest asset
20. innovation comes in different forms, it can come from creative ideas, changes in process to tools and technology that make efficiencies in the work place or unearth insights to bring into our understanding
21. New thinking, positive provocation, flipping ideas on their head, curiosity
22. Disrupting the status quo
23. Based on core principle of creating new solutions
24. Innovation must deliver improvement. It should address, solve a problem. At its best it drives the economy and can make commercial gains, whilst impacting the lives of many.
25. Innovation is not only creating new products or processes but finding new ways of improving existing ones. And doing them better than any current, available market offerings. As well as making them less complex and consumer friendly.
26. Improving the performance of the products we make, developing new products for customer requirements and developing new, more efficient ways of working and making things.
27. Ability to bring something new which enhances or adds additional new value to a business relationship
28. Finding new ways to add value to our own services to improve our service to clients.
29. Working in the creative industry means that innovation is key to my business. It's how I get ahead of the trends and keep on trend. I have a saying "If you do what you have always done, then you get what you have always got." That might be badly worded but it's a reminder to keep innovating.
30. Doing things in a way that is authentic and in response to a creative vision

31. The ability to change and being at the forefront of the market. Innovation is vision. Understanding what is out there or in our imagination that would have a positive impact to the team or the guests.
32. Particularly in the last six months- we have had to revisit existing processes and implement new and different ways of doing things. This has been driven by WFH and lack of direct access to clients. A year ago we could not have imagined remote meetings - cloud collaboration - or home working. Circumstances have forced us to think harder and work faster. As a result, we have not renewed the lease on our office suite and we are now a remote business. Our processes are more robust (they have to be because nobody is in the office to 'fix things' all the time). As a result our profitability is better and our customer service is improved... Innovation for us has mostly been around learning to exploit the tech we have better...
33. Innovation is finding creative ways to improve and enhance existing services and create new ones. Also delivering services in a new way.
34. Looking at new ways of doing traditional processes and product development in order to best serve the customer needs
35. continual assessment leads to evolution and innovation
36. Trying to improve quality of what I deliver, to create products to inspire
37. Development of new internal systems and processes and new services for our client base
38. It is the tool that keeps you competitive.
39. Providing research consultancy services and training that offers unique value to the clients
40. Understanding how we can further digitalise safety critical processes in rail/transport/construction to drive safety and efficiency for the client whilst solving known problems
41. Evolution of ideas based on experience and exigency.
42. leveraging leading tools and technologies to help empower Digital growth for our clients

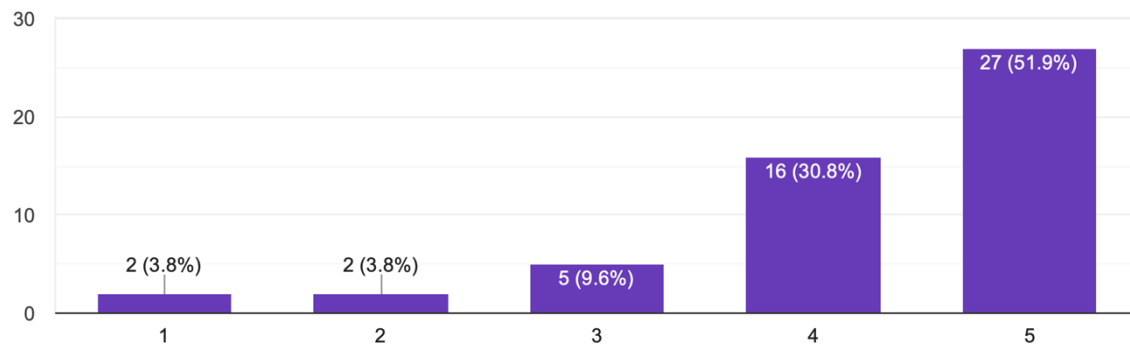
We have learned to innovate from our failures

52 responses



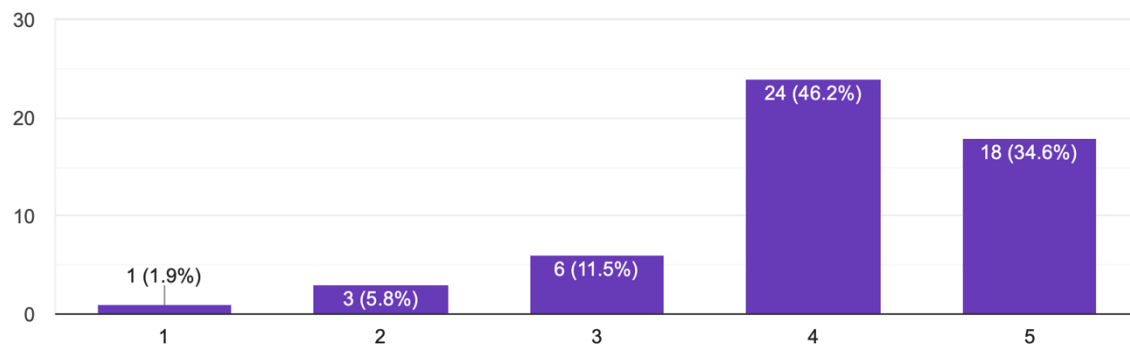
We have learned to innovate from customer feedback

52 responses



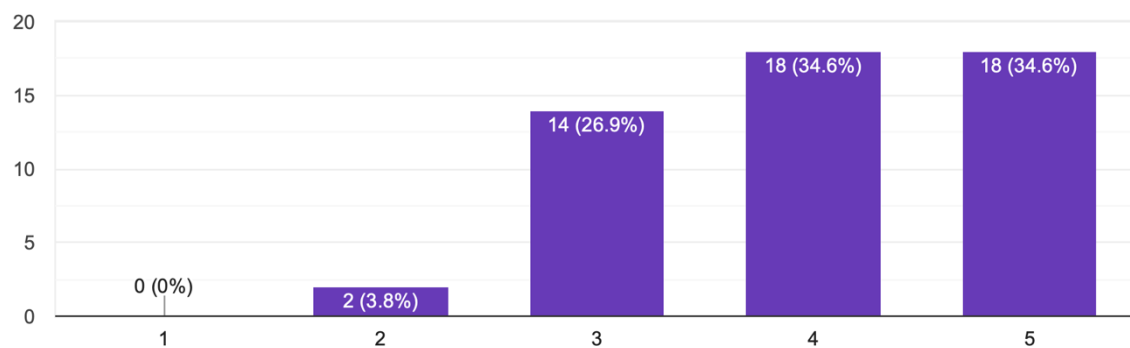
We have learned to innovate from testing the market with new products

52 responses



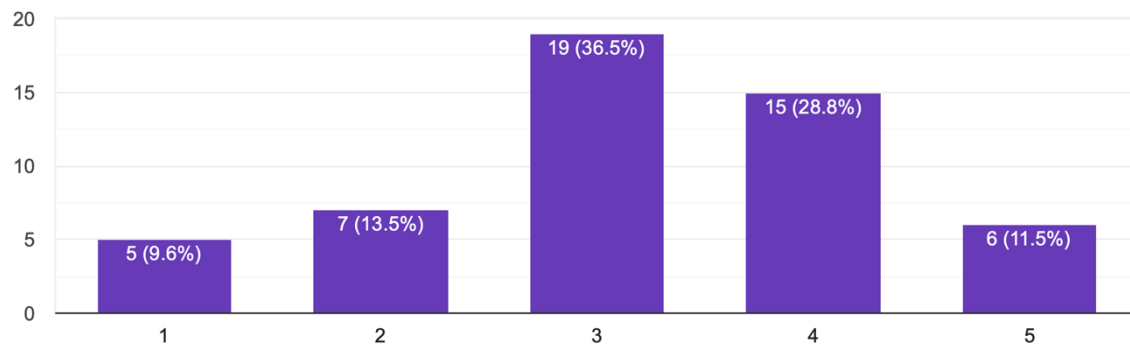
We have learned to innovate by reflecting on our business capabilities

52 responses



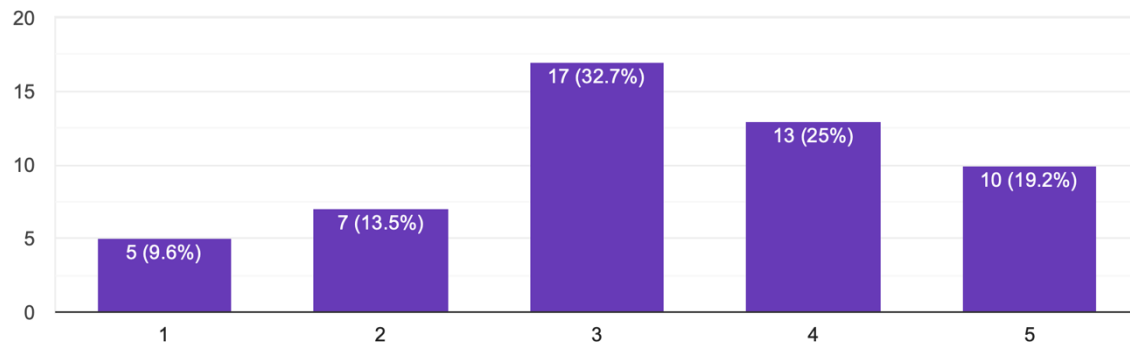
We have learned to innovate from external organisations that offer support

52 responses



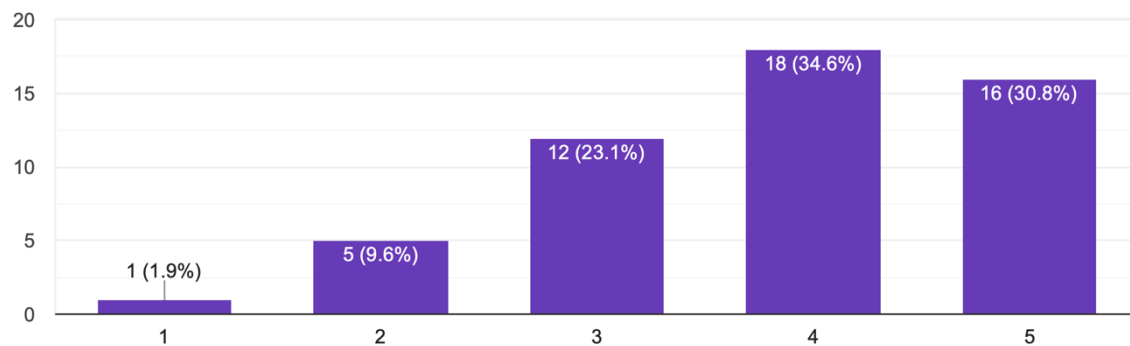
We have learned to innovate from looking at our competitors

52 responses



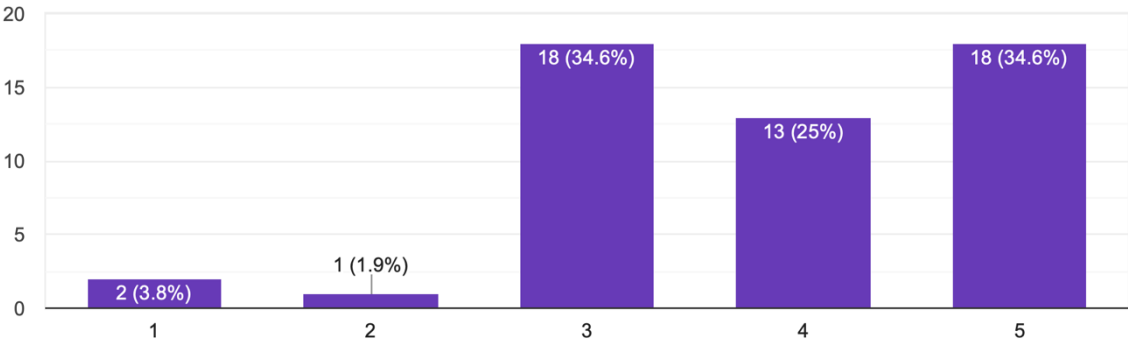
We have always actively researched new products and services to introduce to our customers

52 responses



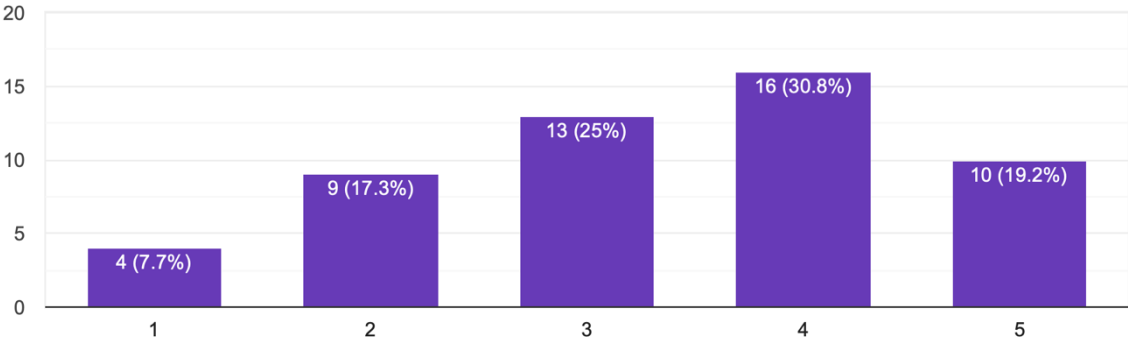
Innovations have been made possible through investing in people

52 responses



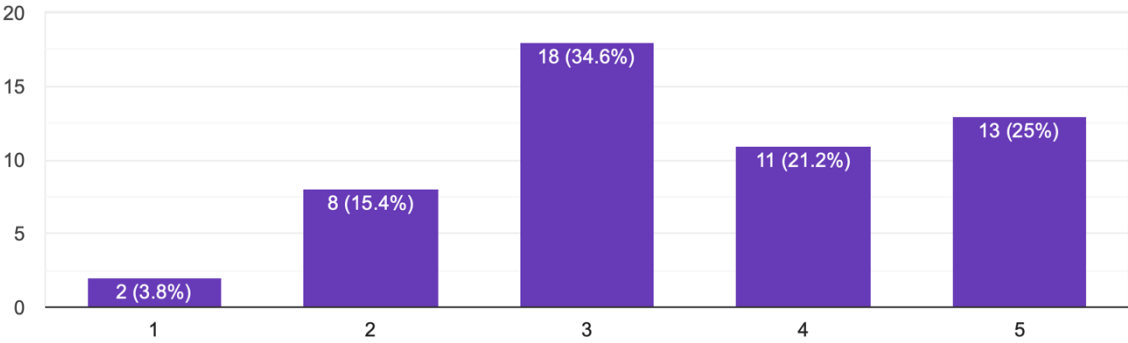
Innovations have been made possible through investing in equipment

52 responses



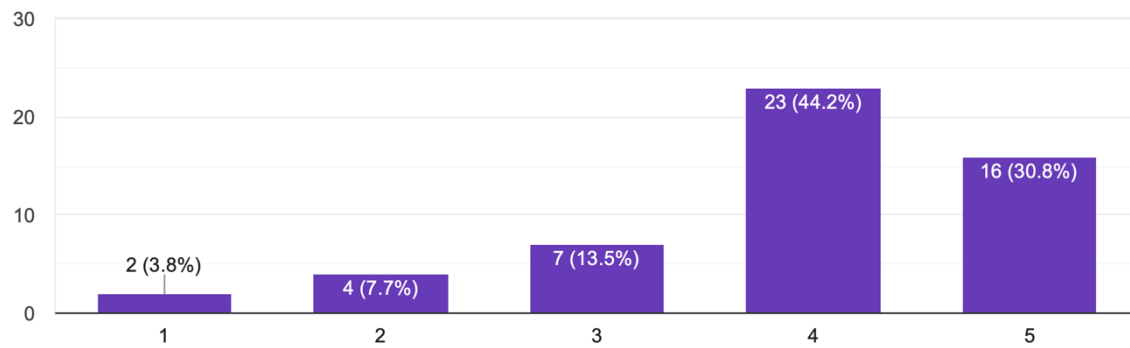
Being part of a business network has helped us to innovate

52 responses



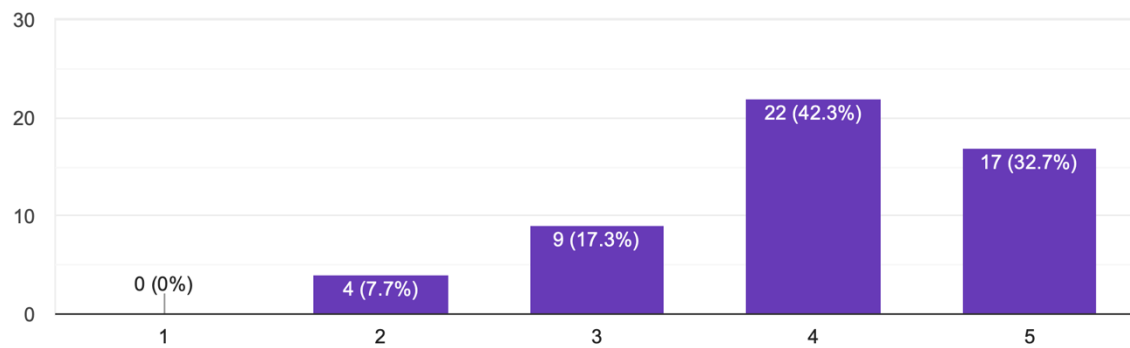
Working collaboratively with other organisations has helped us innovate

52 responses



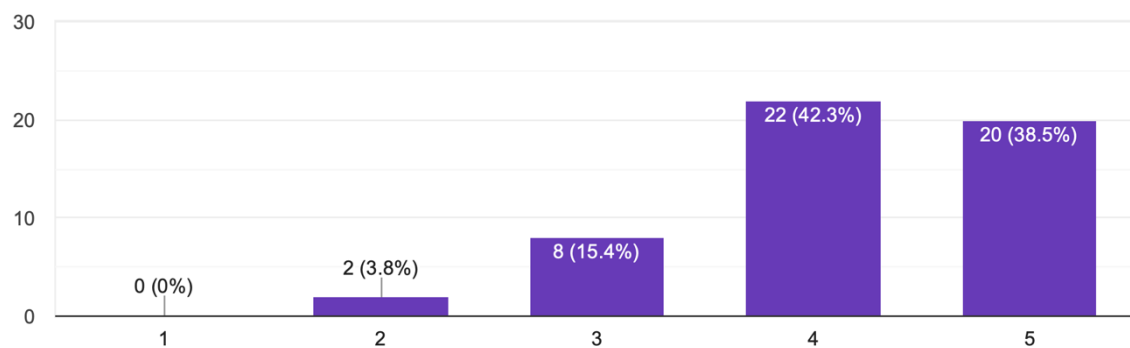
We are always planning so as to create new innovative products and services

52 responses



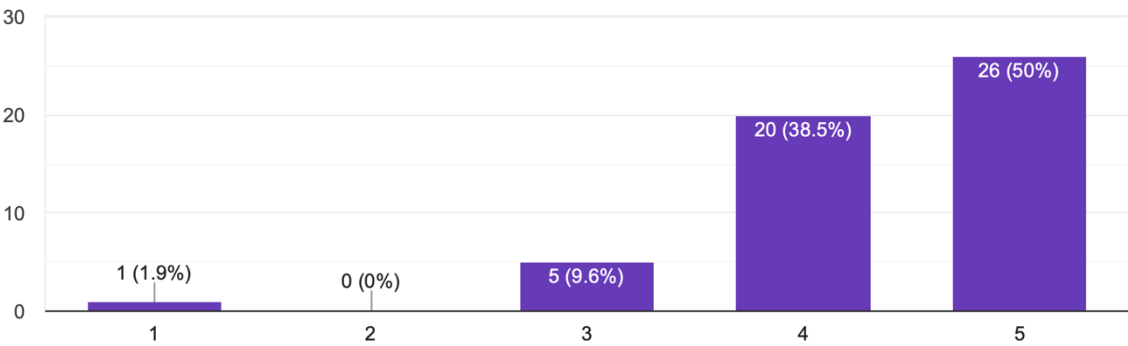
Re-evaluating our processes have helped us to innovate

52 responses



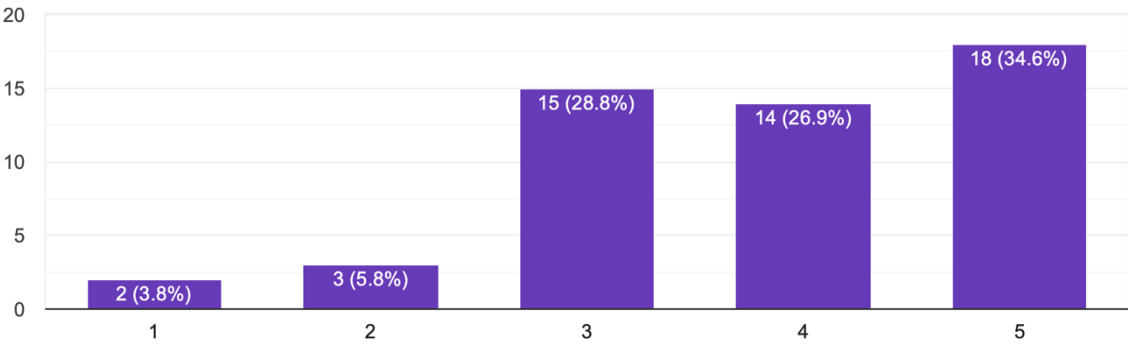
Our attitude to work and past work experience has helped us to innovate

52 responses



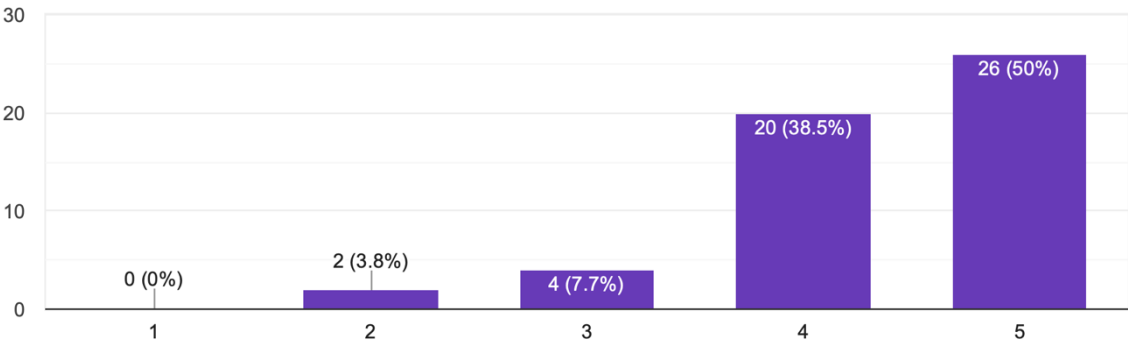
We have project management skills that have been essential to our innovation.

52 responses



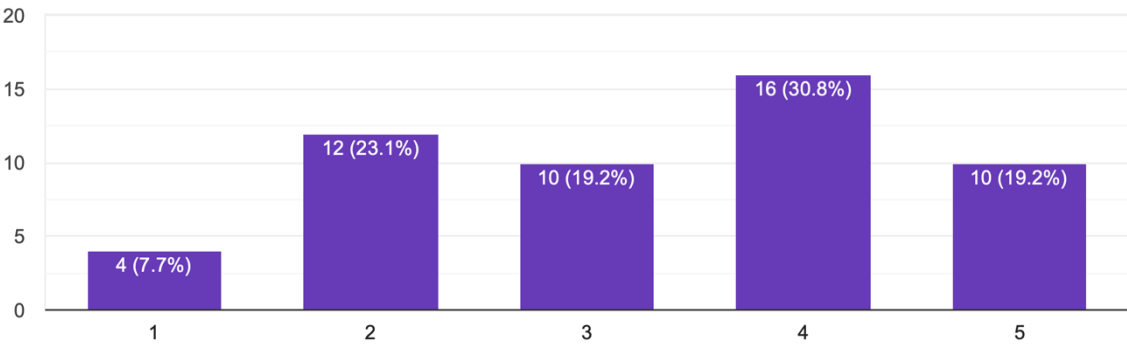
Regular communication with our customers has helped us innovate

52 responses



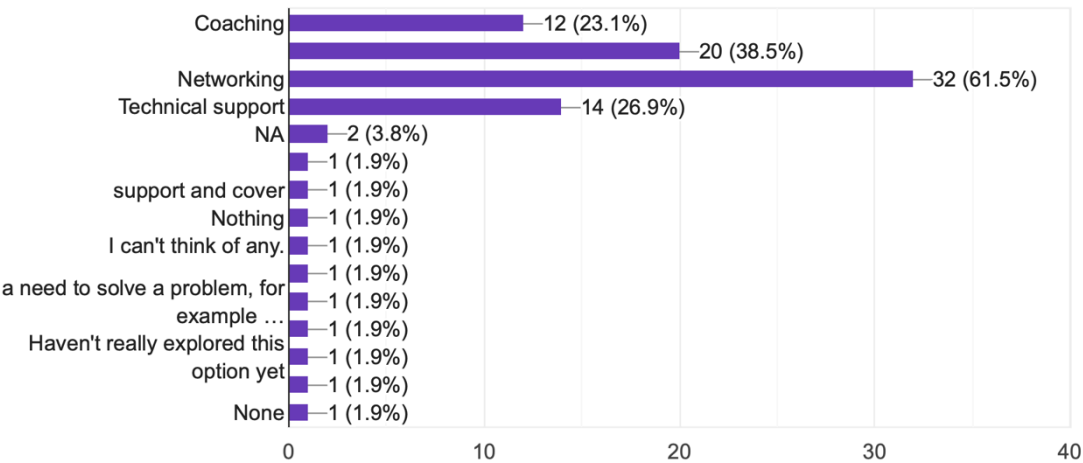
Working with public sectors organisations (such as educational or state funded organisations) has helped us innovate

52 responses



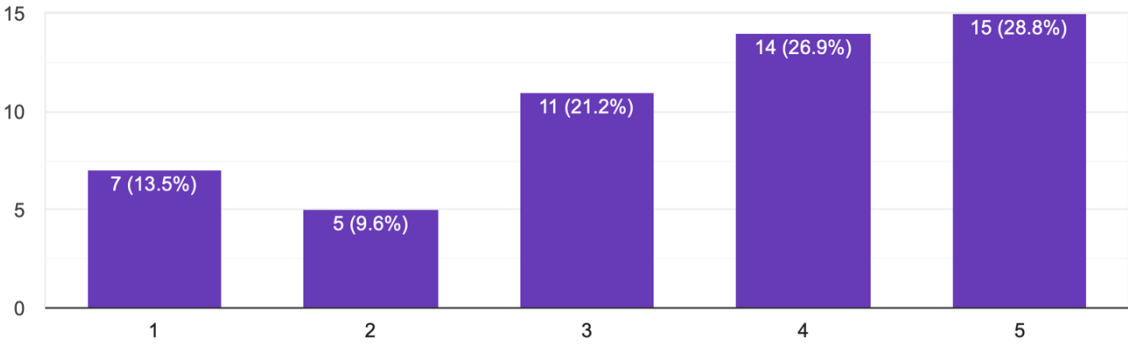
What help from the public sector has helped you to innovate?

52 responses



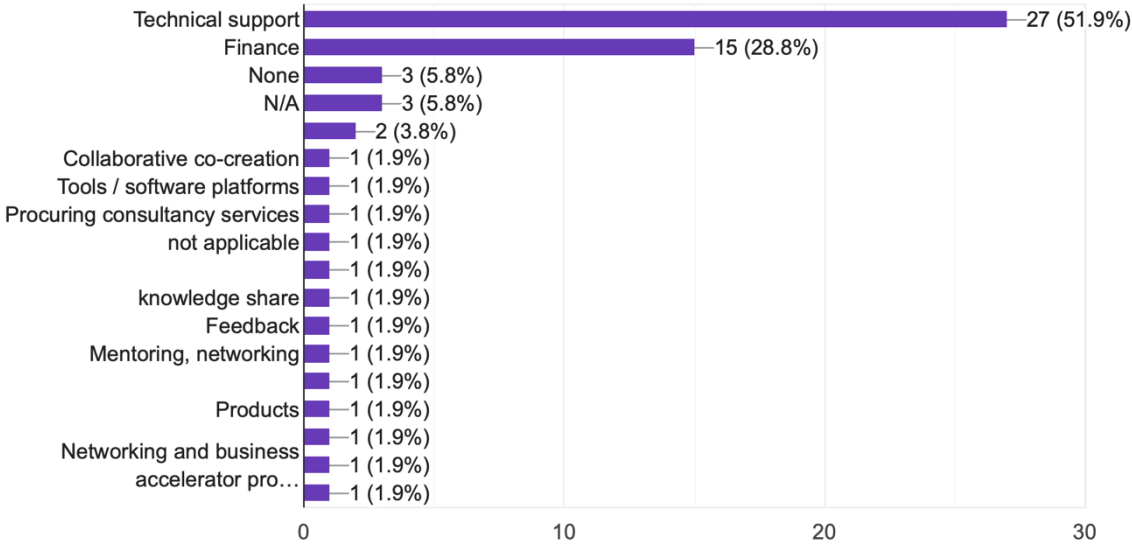
Working with private sectors organisations (individuals and companies for profit) has helped us innovate

52 responses



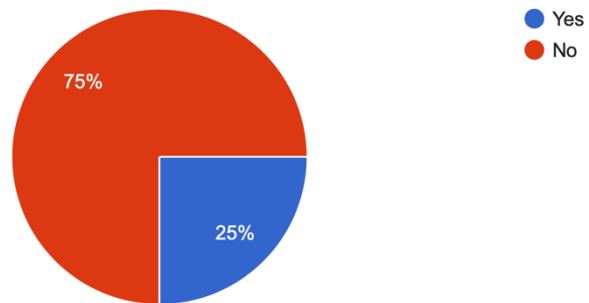
What help from the private sector has helped you to innovate?

52 responses



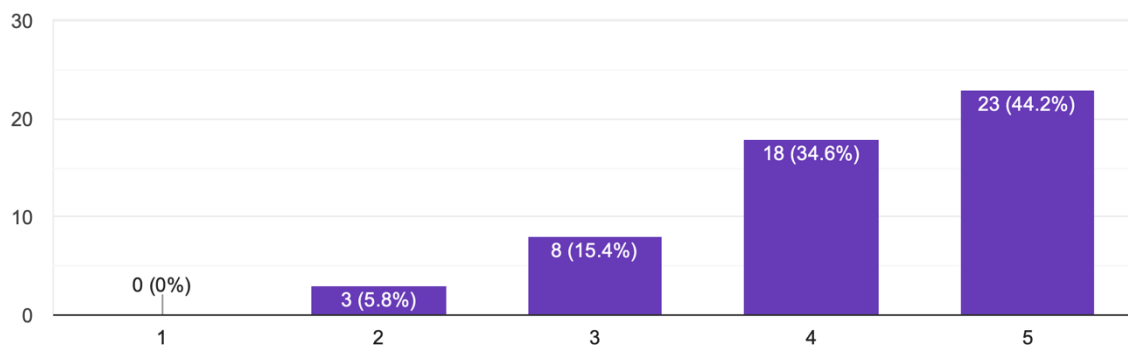
Are you the sole employee/team member within your business?

52 responses



Having a team within a business helps you to be more innovative

52 responses



12.13 Screenshot example of member checking process

From: [REDACTED]
Date: Wednesday, 29 May 2019 at 22:05
To: Dron Richard <R.M.Dron@salford.ac.uk>
Subject: Re: Meeting next week:

Hello Richard,

Thank you for sending this through – I have read through and I think you have captured everything. It has also been really useful as I am starting to think about do more of the things that we have discussed, and I have now go a new idea for a collaboration with a competitor.

Talk to you next week,

[REDACTED]

From: Dron Richard <R.M.Dron@salford.ac.uk>
Date: Tuesday, 28 May 2019 at 18:05
To: [REDACTED]
Subject: Re: Meeting next week:

Hi there,

Attached is the transcript of our last meeting – are you ok to check that I have understood everything

Rich

13.0 Appendix B

13.1 Confirmation of Ethical Approval



Research, Innovation and Academic
Engagement Ethical Approval Panel

Doctoral & Research Support
Research and Knowledge Exchange,
Room 827, Maxwell Building
University of Salford
Manchester
M5 4WT

T +44(0)161 295 7012

www.salford.ac.uk/

8 February 2019

Richard Dron

Dear Richard,

RE: ETHICS APPLICATION SBSR1819-14: A framework of factors enabling SME absorptive and innovation capacity building through the lens of activity theory.

Based on the information that you provided, I am pleased to inform you that your application SBSR1819-14 has been approved.

If there are any changes to the project or its methodology, please inform the Panel as soon as possible by contacting SBS-ResearchEthics@salford.ac.uk.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'David Percy'.

Professor David F. Percy
Chair of the Staff and Postgraduate Research Ethics Panel
Salford Business School

13.2 Interview consent form

Interview Consent Form:

Research project title: A framework of activities supporting Digital Business SME innovation capacity building.

Research investigator: Richard Dron

Research Participants name:

As part of this current research, each case-study interview will take around an hour. I don't anticipate that there are any risks associated with your participation, but you have the right to stop this or any interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research undertaken from UK institutions require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read the accompanying information sheet and then sign this form to certify that you approve the following:

- the interview will be recorded, and a transcript will be produced.
- you will be sent the transcript and given the opportunity to correct any factual errors.
- the transcript of the interview will be analysed by Richard Dron as research investigator.
- access to the interview transcript will be limited to my, Richard Dron, and academic colleagues and researchers with whom he might collaborate as part of the research process.
- any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed.
- the actual recording will be kept for a limited time during the duration of this research and destroyed after project completion.
- any variation of the conditions above will only occur with your further explicit approval.

All or part of the content of your interview may be used:

- In academic papers, policy papers or news articles.
- On our associated website and in other media that we may produce such as spoken presentations.
- At other feedback events.
- In an archive of the project discussed above.

By signing this form I agree that:

1. I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time;
2. The transcribed interview or extracts from it may be used as described above;
3. I have read the Information sheet;
4. I don't expect to receive any benefit or payment for my participation;
5. I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality;
6. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

Printed name

Participant's signature

Date

Researcher's signature

Date

Contact Information

This research has been reviewed and approved by the University of Salford Business School Ethics Board. If you have any further questions or concerns about this study, please contact:

Name of researcher: Richard Dron

Full address: Maxwell Building, 43 Crescent, Salford M5 4WT

Tel: 0161 295 5000

E-mail: r.m.dron@salford.ac.uk

You can also contact Richard Dron's supervisors: Dr Marie Griffiths and Dr Yun Chen

Full address: Maxwell Building, 43 Crescent, Salford M5 4WT

Tel: 0161 295 5000

E-mail: m.griffiths@salford.ac.uk and y.chen@salford.ac.uk

What if I have concerns about this research?

If you are worried about this research, or if you are concerned about how it is being conducted, you can contact the Chair of the University of Salford Business School Ethics Committee, Maxwell Building, 43 Crescent, Salford M5 4WT (or email to SBS-ResearchEthics@salford.ac.uk).

13.3 Participant Information sheet

Research project title: A framework of activities supporting Digital Business SME innovation capacity building.

Who am I and what is this study about?

My name is Richard Dron. I am a lecturer and researcher in Digital Business at the University of Salford Business School. This current research is looking to develop a framework of activities supporting Digital Business SME innovation capacity building. It is envisaged that the output of

the project will be a framework of best-practice activities to raise Digital Business SME capacities to innovate. This research is being undertaken as part of my PhD qualification.

What will taking part involve?

There will be a series of interviews that will take around an hour each. The research will be ideally carried out within your working environment and will consider how you innovate. The interview will be recorded, and a transcript will be produced.

Why have you been invited to take part?

You and your business have been selected because you are a Digital Business SME. Through my work within Salford Business School, I have become aware of your business and its relevance to my research.

Do you have to take part?

Participation is completely voluntary, and you have the right to refuse participation, refuse any question and withdraw at any time without any consequence whatsoever.

What are the possible risks and benefits of taking part?

I don't anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time. The benefits for your organisation are that as part of this research we may be able to identify areas where you could enhance your capacities to innovate.

13.4 List of achievements

Journal Publications

Downing, J., Gerwens, S. and Dron, R., 2022. Tweeting terrorism: Vernacular conceptions of Muslims and terror in the wake of the Manchester Bombing on Twitter. *Critical Studies on Terrorism*, pp.1-28. (4*)

Chadwick, S., Fenton, A., Dron, R. and Ahmed, W., 2021. Social media conversations about high engagement sports team brands. *IIM Kozhikode Society & Management Review*, 10(2), pp.178-191. (2 *)

Downing, J. and Dron, R., 2020. Theorising the 'Security Influencer': Speaking security, terror and Muslims on social media during the Manchester bombings. *new media & society*, p.1461444820971786. (4*)

Leigh, J., Vasilica, C., Dron, R., Gawthorpe, D., Burns, E., Kennedy, S., Kennedy, R., Warburton, T. and Croughan, C., 2020. Redefining undergraduate nurse teaching during

the coronavirus pandemic: use of digital technologies. *British Journal of Nursing*, 29(10), pp.566-569. (1*)

Downing, J. and Dron, R., 2020. Tweeting Grenfell: Discourse and networks in critical constructions of British Muslim social boundaries on social media. *New media & society*, 22(3), pp.449-469. (4*)

Book Section

Fletcher, G, Dron, RM and Gimeno, MD 2021, 'The single silo university' , in: Excellence in university leadership and management : case histories , Academic Conferences International.

Griffiths, & Dron, R. (2020). Enabling organisational change: Co-creation, co-production and co-consumption. In *Strategic Digital Transformation* (1st ed., pp. 165–173). Routledge. <https://doi.org/10.4324/9780429020469-19>

Fletcher, Griffiths, M., & Dron, R. (2020). What to plan and when to make decisions with data. In *Strategic Digital Transformation* (1st ed., pp. 132–139). Routledge. <https://doi.org/10.4324/9780429020469-15>

Conference and Workshop Items

Leigh, JA , Vasilica, CM , Dron, RM , Davis, D and Etherington, S 2020, Developing digitally capable graduates , in: Education 4.0: Our Next Phase to Curriculum and Assessment Design International Virtual Series, 9th July- 26th August 2020, University of Hong Kong (Online).

Leigh, JA , Vasilica, C and Dron, RM 2020, Developing digitally capable graduates : a webinar for Gulf University Bahrain , in: Paradigm Shift in Higher Education Under COVID-19 Pandemic: Experience and Challenges, 5th-6th July 2020, Global webinar for Gulf University Bahrain. Item not available from this repository.

Fenton, A , Chadwick, SM , Dron, RM and Ahmed, W 2018, Talking about sports brands - how our social media conversations reveal what we say , in: EASM 2018 - The European Sport Management Conference : Managing Sport in a Changing Europe, 5-8 September 2018, Malmo, Sweden.

Online

Downing, J. and Dron, R. (2018). Incendie de la tour Grenfell à Londres : quand Twitter réfute fake news et islamophobie. [online] The Conversation. Available at: <https://theconversation.com/incendie-de-la-tour-grenfell-a-londres-quand-twitter-refute-fake-news-et-islamophobie-98352> [Accessed 9 Feb. 2022].

Downing, J. and Dron, R. (2018). Grenfell Tower: how Twitter users fought off fake news to honour Muslim heroes. [online] The Conversation. Available at: <https://theconversation.com/grenfell-tower-how-twitter-users-fought-off-fake-news-to-honour-muslim-heroes-98059> [Accessed 9 Feb. 2022].