The Life Cycle Process Model for Efficient Construction Manager: Conceptual Modelling at the level of Personality and at Micro, Meso and Macro Levels

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Abstract. The problem is how to define the life cycle of an efficient construction manager when a lot of various stakeholders are involved in his activities, when alternative versions of construction management come to hundreds of thousands and when the efficiency changes with the alterations in the personality traits, the micro, meso and macro conditions and the constituent parts of the process in question. Formalized presentation of the research shows how changes in the personality traits, micro, meso and macro environment and the extent to which the goals pursued by various stakeholders are satisfied cause corresponding changes in the value and utility degree of a construction manager life cycle. For that purpose, we need to analyse versions of a construction manager life cycle, because such analysis helps to find an optimal combination of factors related to the personality and micro, meso and macro environment. The more alternative versions are investigated before making a final decision, the greater is the possibility of a more rational end result. Using the available information it is possible to perform the multiple criteria analysis of the components of a construction manager life cycle and to select the most efficient versions. Afterwards, the resulting compatible and rational components are combined into the alternatives of a construction manager life cycle. Following the multiple criteria analysis of the alternatives obtained in this way, the most efficient alternatives can be selected. Strengths and weaknesses of investigated alternatives are also analysed. The facts determining why and to what extent one version is better than the other are also established. All analyses are based on conceptual and quantitative information.

Keywords: construction manager life cycle; personality traits; micro, meso and macro factors; alternatives; multiple criteria analysis; model.

1. Introduction

Many countries around the world (USA, Japan, UK, Finland, Australia, Sweden, Netherlands, Estonia, Lithuania, Spain, Argentina, Chile, Colombia, etc.) take up market-oriented higher education reforms. Econometric, status-attainment, combined and other models are developed to justify such reforms. The University of Salford, Tallinn University of Technology and Vilnius Gediminas Technical University took part in the project "Lifelong University: Modernising Built Environment Higher Education Programmes through Responsiveness" (BELL CURVE) and developed the Life Cycle Process Model of a Market-oriented Higher Education and the Life Cycle Process Model for Efficient Construction Manager.

Universities operating in the UK, Estonia and Lithuania have lots of programmes and specialisations related to built environment. Various countries of the world use catalogues of national qualifications and higher national units. Such catalogues include numerous qualifications and higher national units covering the area of built environment. It is a rather complicated task to compare the knowledge provided by all such programmes and specialisations to the built environment requirements applicable to professionals. Therefore, we shall limit this research to analysis, as an example, of the requirements applicable to the life cycle of construction project management professionals at various levels. There are plenty of diverse project management leader models developed worldwide. Obviously, project managers must satisfy increasingly higher requirements with each step in their careers. The authors of thi paper developed the Life Cycle Process Model for Efficient Construction Manager.

The Life Cycle Process Model for Efficient Construction Manager suggested in this research is based on a presumption that the efficiency of a construction manager depends on many variables at the personality level and at micro, meso and macro level. The presence of specific personality traits and micro, meso and macro level variable factors right away imposes objective limitations on efficient activities of construction project management professionals of various levels. A construction manager, in presence of these objective limitations, tries to perform his/her functions with utmost efficiency within their bounds. Advanced managers, basing themselves on this assertion, are trying to create for themselves rational working environmental and operating conditions in order to achieve the best satisfaction of stakeholders' and own needs. The research aimed to come up with the Life Cycle Process Model for Efficient Construction Manager with the help of the complex analysis of personality traits and micro, meso and macro environment variables affecting the life cycle. Another aim was to give recommendations helping to increase the competitive ability. The research was performed by studying the best global practice and by adapting it to UK, Estonia and Lithuania taking into account their specific history, their level of development, their needs, culture and traditions.

Construction managers cannot correct or alter the micro, meso and macro level variables, but they can go into the essence of their effect and take them into account when realizing various projects. When construction managers know the personality traits and micro, meso and macro level factors that affect their current projects, they can organize their present and future activities more successfully.

This paper is structured as follows: Section 2 analyses the leader models for project management; Section 3 describes the efficient construction manager—conceptual modelling at the level of personality and at micro, meso and macro levels; Section 4 analyses the core competencies; Section 5 describes the five factor model, IQ, emotional intelligence and work performance; Section 6 presents the ability to predict job performance and personnel assessment tools; and the paper ends with some concluding remarks.

2. Leader Models for Project Management

Founded in 1953, FMI provides management consulting and investment banking for the worldwide construction industry. FMI performed project management survey in 2006 (FMI, 2006). In the survey, construction industry executives were asked about the performance of their project managers and their practices in four main areas: technology use, personnel, operations and project coordination.

The results of the FMI Project Management Survey suggest that companies can take steps in their hiring process to improve their chances of getting the right person for the job. The survey results also suggest that part of the problem of finding the right project managers rests in how a company defines the role and, more importantly, how a company defines its project management processes. Companies like to be able to say in their proposals and marketing literature that they deliver on time and within budget. Our research with owners confirms that these are the top two characteristics that owners look for when choosing a contractor. They also look for communication and collaboration skills, integrity, and planning and scheduling abilities. Construction executives, when asked about project management challenges, often highlight these skills. Nonetheless, one inalienable truth about the construction process is that there will be problems during project construction. The following comments from industry executives might sound familiar (FMI, 2006).

For all responses, experience (38%) and communication skills (30%) rated as the most important skills needed by project managers. Companies with over $200M revenue placed a higher value on communication skills (46% vs. 26%) compared to smaller companies (<$200M). Overall, respondents rated financial management as the skill that new candidates lack most when entering the workforce (34%), then communication skills (28%), and experience (23%) with technical skills ranked only 14%.

Larger companies more often said that communication skills were most lacking in new candidates (42%) with financial management skills the next concern on the list (35%). Larger organizations place a greater emphasis on communication skills than on financial management skills, or experience. This reflects the need to communicate with more people and departments in a larger company internally. Other resources available in larger companies fill the gap for lack of financial management skills, technical competency, and experience. Generally, the weakness in skills of new project management candidates reflects a disconnect between universities and contractors. If contractors make it known that they are mostly concerned with technical skills, universities are more likely to turn out graduates strong in technical skills. Universities may respond by adding financial management and communications course materials to the curriculum; however, additional coursework adds time and expense to the attainment of a qualified degree. The alternative for most is to get the training once they enter the workforce through mentoring, on-the-job training, or third-party training programs. The most expensive of these choices is most often the on-the-job method, especially if it means the *student* has to make several costly errors before he or she learns the right way to go about it (FMI, 2006).

According to the FMI Project Management Survey the top five weakest skill sets noted by all respondents were (FMI, 2006):

- Cost to complete and profit projections (21% of responses);
- Time management (12%);
- Closeout skills (11%);
- Communication (written) (10%);
- Change order management (10%).

The top five strongest skill sets noted by all respondents were (FMI, 2006):

- Client/customer relations (35%);
- Understanding the building process (27%);
- Change order management (8%);
- Cost to complete and profit projections (6%);
- Communication (written) (5%).

The good news when it comes to skill sets is that project managers are best at client/customer relation skills, and they understand the building process. These skills are in line with the two traits that contractors place the most emphasis on when hiring project managers—experience and communication skills. At the same time, communication skills and experience are among the top causes for concern for construction executives with their project managers. There is no single area that all project managers are weak or strong in, but most have sufficient building experience to understand the process. If the goal is to create project leaders, then project managers will need a well-rounded set of skills. It is typical that,

over the course of a career, the project managers that become true project leaders increasingly focus on improving their "soft skills," which includes management and leadership skills.

When we examine the ideal project leader model, it appears we are really thinking about three different people with three different skill sets. Companies look most often for project experience when evaluating new project managers, followed by communication skills. Technical skills are assumed for most project managers entering the job market, especially when the requirement is a four-year construction management degree. Little, if any, emphasis is placed on financial management skills, yet that is the area reported as lacking most often when new project managers enter the workforce. In the FMI Project Leader Model, possessing just one skill is not enough, nor it is enough to have skills in all three areas, if one is operating in a vacuum. To be most effective, the true project leader applies all of these skills collaboratively, and mission-critical processes are designed with this in mind (FMI, 2006).

The companies reporting the highest rate of on time/on budget performance place the highest emphasis on communication skills, yet only about 16% of companies overall said that a four-year, non-technical degree was a minimum requirement. That degree likely would produce candidates stronger in the two areas that concern companies the most—communication skills and financial management. It is typical for a company in an industry as technical as the construction industry is to emphasize project experience for new candidates. Project mistakes can be dangerous and costly. It seems that, historically, the general belief has been that a construction firm needs to hire experience and technical skills, and the other, softer, skills will be learned on the job. Often this approach has produced unsatisfactory results, especially if a firm hasn't identified their project management best practices and haven't reinforced the project managers as planner, communicator, and businessperson (FMI, 2006).

It may be noticed that the researchers from various countries engaged in the analysis of leader models for project management did not consider the research object being analysed by the authors of the present investigation. The latter may be described as follows: a life cycle of a construction manager, the parties involved in his construction activities as well as his personality traits, micro, meso and macro environment having a particular impact on it making an integral whole. A complex analysis of the research object formulated was made with the help of new methods for multiple criteria project analysis specially developed for this purpose.

3. Efficient Construction Manager: Conceptual Modelling at the Level of Personality Traits, Micro, Meso and Macro Environment

The research aimed to produce the Life Cycle Process Model for Efficient Construction Manager with

the help of a complex analysis of personality traits and micro, meso and macrolevel factors affecting the manager. Another aim was to give recommendations helping to increase the competitive ability. The research included analysis of the best global research and practice, and its adaptation to the countries participating in the BELL CURVE project considering their specific history, their level of development, their needs and traditions. A simulation was done to gain insight into creating an effective environment for the project manager by interdependent harmonization of personality traits, micro, meso and macrolevel factors.

The new original Life Cycle Process Model for Efficient Construction Manager proposed by the authors of the present investigation considers economical, political, legal/regulatory, technological, technical, organisational, managerial, institutional, social, cultural, ethical, psychological, educational, environmental, emotional and confidence factors (see Figure 1). It also covers personality traits, the conditions of micro, meso and macro environment, and analyses the construction manager life cycle.

Figure 1: Aspects of the construction project management
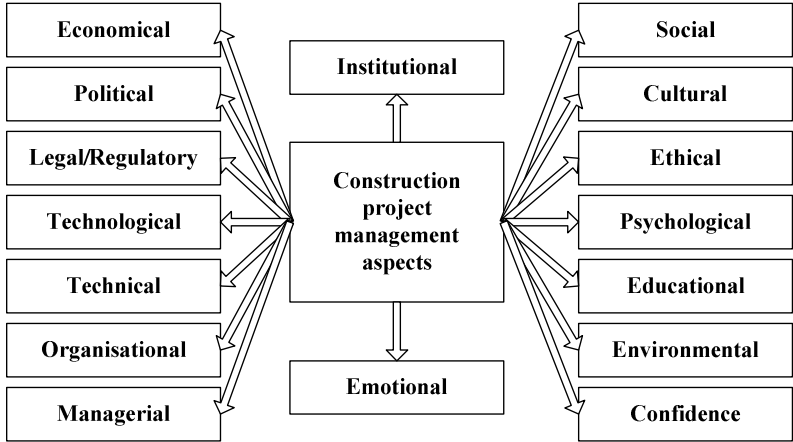
The level of a project manager's efficiency depends on numerous personality traits and micro, meso and macro level variable factors; all these variable factors can be optimised. The main objective of the present Model is to analyse the best experiences in the field, to compare them and to present particular recommendations eventually.

Project managers usually cannot correct or alter their personalities and micro, meso and macro level variables, but they can go into the essence of their effect and consider them in their activities. Project

managers, aware of their own personality and the environment affecting their projects, can organize their present and future activities more successfully.

This research included the following six stages (using the case of Lithuania).

Stage I. Comparative description of universal advanced project managers and Lithuanian project managers (involves analysis of the best global research and practice):

- A system of criteria characterizing project manager's efficiency was determined with the help of relevant literature and experts methods;
- Based on the system of criteria, the present state of universal advanced project managers and Lithuanian project managers is described in conceptual (textual, graphical, numerical, etc.) and quantitative forms.

Stage II. Comparison and contrast of universal advanced project managers and Lithuanian project managers:

- Identifying the global development trends (general regularities) related to project managers;
- Identifying the differences between universal advanced project managers and Lithuanian project managers;
- Determining the pluses and minuses of these differences in case of Lithuania;
- Determining the best practice for Lithuanian project managers based on the actual conditions.
- Estimating the deviation between construction managers' knowledge about the best global practice and their practice-in-use.

Stage III. Development of some of general recommendations helping construction managers to improve their efficiency levels.

Stage IV. Formulation of particular recommendations for construction managers. Each of the general recommendations proposed in Stage III has several particular alternatives.

Stage V. This stage included multiple criteria analysis of the components comprising a project manager's life cycle and selection of the most efficient versions. The compatible and rational components obtained after this stage are combined to make a complete life cycle of a project manager.

Stage VI. Transformational learning and redesigning the mental and practical behaviour:

- Construction managers become aware of and conceptualise their practice-in-use;

- Construction managers become aware of and conceptualise their knowledge of best global practice;

- Construction managers estimate the deviation between their knowledge about the best global practice and their practice-in-use;

- Best practice learning;

- Best practice actions (understanding what the recurring motives caused the initial behaviour of a manager; redesigning the core patterns of managers' thought and behaviour);

- Transformational learning (acquiring new manners of technological, social, ethical and other behaviour, better understanding of how to interact with micro and macro environment) and redesigning of the behaviour.

In order to throw more light on the Life Cycle Process Model for Efficient Construction Manager, we proceed with a more detailed description of some aforementioned aspects of the analysis (core competencies, the five factor model, IQ, emotional intelligence and work performance, ability to predict job performance and personnel assessment tools).

4. Core Competencies

In the global market, modern organizations face high levels of competition. In the wake of increasingly competitive world market the future survival of most companies depends mostly on the dedication of their personnel to companies. Employee or personnel performances such as capability, knowledge, skill, and other abilities play an important role in the success of an organization (Güngör et al., 2009).

Selection of qualified human resources is a key success factor for an organization. The complexity and importance of the problem call for analytical methods rather than intuitive decisions (Kelemenis and Askounis, 2009).

Competencies in organizations can be broadly classified as employee-level and organizational-level. Since organizational-level competencies are embedded in employee-level competencies, the identification of the latter is important for organizations interested in using competencies to achieve competitive advantage (Cardy and Selvarajan, 2006). In addition to the traditional frameworks, which are more suitable for organizations functioning in a static environment, Cardy and Selvarajan (2006) offer two alternative frameworks that can be useful in identifying competencies in a dynamic organizational environment.

A core competency is a specific factor that a business sees as being central to the way it, or its employees, works. It fulfils three key criteria: it provides consumer benefits; it is not easy for competitors to imitate; it can be leveraged widely to many products and markets. A core competency can take various forms, including technical/subject matter know-how, a reliable process and/or close relationships with customers and suppliers. It may also include product development or culture, such as employee dedication (Wikipedia, 2010). Core competencies are the source of competitive advantage and enable the firm to introduce an array of new products and services. Core competencies lead to the development of core products (QuickBMA, 2010). Also the core competencies can be defined as (Wikispaces, 2010) a set of integrated and harmonized abilities that distinguish a firm in the market place.

Competencies could be very diverse. For example, Goleman (2010) has developed the following model of competencies:

- Personal competence: these competencies determine how we manage ourselves:
  - Self-awareness: knowing one's internal states, preferences, resources and intuitions.
  - Emotional self-awareness: recognising one's emotions and their effects.
  - Accurate self-assessment: knowing one's strengths and limits.
  - Self-confidence: a strong sense of one's self-worth and capabilities.
  - Self-management: managing one's internal states, impulses and resources.
  - Self-control: keeping disruptive emotions and impulses in check.
  - Trustworthiness: maintaining standards of honesty and integrity.
  - Conscientiousness: taking responsibility for personal performance.
  - Adaptability: flexibility in handling change.
  - Achievement-orientation: striving to improve or meeting a standard of excellence.
  - Initiative: readiness to act on opportunities.
- Social competence: these competencies determine how we handle relationships:
  - Social awareness: awareness of others' feelings, needs and concerns.
  - Empathy: sensing others' feelings and perspectives, and taking an active interest in their concerns.
  - Organisational awareness: reading a group's emotional currents and power relationships.
  - Service orientation: anticipating, recognising and meeting customers' needs.
  - Social skills: adeptness at inducing desirable responses in others.
  - Developing others: sensing others' developmental needs and bolstering their abilities.
  - Leadership: inspiring and guiding individuals and groups.

- o Influence: wielding effective tactics for persuasion.
- o Communication: listening openly and sending convincing messages.
- o Change catalyst: initiating or managing change.
- o Conflict management: negotiating and resolving disagreements.
- o Building bonds: nurturing instrumental relationships.
- o Teamwork and collaboration: working with others toward shared goals. Creating group synergy in pursuing collective goals.

Project mangers plan, organize, staff, direct, and control the project while being the direct link to the customer. Ultimately, it is the responsibility of project managers to make appropriate trade-offs for time, cost, and performance requirements of the project. They must introduce the right people into the project at the right time to satisfy the project goals and the customer's objectives, etc. (De Korvin et al., 2002).

There is a growing awareness of the relationship between achieving project success and construction project managers' competences. However, the key behavioural competencies involved in the performance domain are dynamic and difficult to identify (Cheng et al., 2005). Many project-based organisations within the construction industry are becoming keenly interested in identifying the appropriate behavioural competencies of the key managerial staff (Dainty et al., 2005).

Crawford (2005) proposed three competency classifications:
- Input competencies refer to the knowledge and skills that a person brings to a job.
- Personal competencies are the core attributes underlying a person's capability to execute a job.
- Output competencies relate to the "demonstratable" performance that a person exhibits at the job place.

According to Ahadzie et al. (2008) construction project managers' performance measures have been conceptualised based on the iron triangle of time, cost and quality and key traits such as leadership, ambitious, aggressiveness. Thus, superior managers do not simply require the knowledge of the requisite behavioural actions but are conscious of how their management style reflects on their actions, and in so doing they learn and develop themselves (Ahadzie et al., 2008).

Interpersonal skills may include leadership skills, verbal and non-verbal communication skills, decision-making, dealing with emotions and stress, conflict management, trust building, negotiating, demonstrating sensitivity to diversity issues, and modelling of the desired behaviour. The application of interpersonal skills may be influenced by the phase of the project life cycle.

5. The Five Factor Model, IQ, Emotional Intelligence and Work Performance

Much has been written regarding project success, and one of the factors contributing to project success is the role of the project managers. Since project success can be enhanced by selecting the most appropriate project managers, Bedingfield and Thal (2008) investigated the role of the Big Five personality traits on project success by surveying project managers. The findings indicate that Conscientiousness and Openness were both good predictors of successful project managers. The results may be useful as one consideration when hiring and selecting project managers. Although the literature is replete with studies regarding project success, there appears to be little information regarding the effect of the project manager's personality, specifically as determined by peer assessments. Therefore, (Bedingfield and Thal, 2008) report the results of an exploratory study to investigate the influence of project manger personality traits, as determined by the Five Factor Model (FFM), on project managers success. Perceptions of both personality and project managers success were analysed using *Student*'s *t*-test, a correlation matrix, and hierarchical generalised linear modelling (HGLM). The results indicated that two of the FFM personality traits, Conscientiousness and Openness, seemed to positively correlate with project managers success. Emotional Stability, another personality trait, was found to be significant with the difference of means test but not the HGLM effort. Finally, the remaining FFM traits, Extraversion and Agreeableness, did not appear to correlate with project managers success (Bedingfield and Thal, 2008).

According to Gottfredson (1997) personnel selection research provides much evidence that intelligence (g) is an important predictor of performance in training and on the job, especially in higher level work. Gottfredson (1997) provides evidence that g has pervasive utility in work settings because it is essentially the ability to deal with cognitive complexity, in particular, with complex information processing. The more complex a work task, the greater the advantages that higher g confers in performing it well. Everyday tasks, like job duties, also differ in their level of complexity. The importance of intelligence therefore differs systematically across different arenas of social life as well as economic endeavor. Data from the National Adult Literacy Survey are used to show how higher levels of cognitive ability systematically improve individual's odds of dealing successfully with the ordinary demands of modern life (such as banking, using maps and transportation schedules, reading and understanding forms, interpreting news articles). These and other data are summarized to illustrate how the advantages of higher g, even when they are small, cumulate to affect the overall life chances of individuals at different ranges of the IQ bell curve. Gottfredson (1997) concludes by suggesting ways to reduce the risks for low-IQ individuals of being left behind by an increasingly complex postindustrial economy (Gottfredson, 1997).

According to Whitman et al. (2009) EI positively predicts performance for high emotional labor jobs and negatively predicts performance for low emotional labor jobs).

The Five Factor Model (FFM) or "Big Five" approach has emerged as the dominant taxonomic approach in the realm of personality research. The increased focus that has been seen with respect to using personality traits for employee selection and promotion purposes has led to a concomitant increase in the need for researchers and practitioners to evaluate the quality and measurement precision of the personality instruments they use to estimate the FFM dimensions (Trippe and Harvey, 2003).

Have you ever wondered why, within your workplace, two individuals holding similar positions, and with similar education, training, and experience, achieve different levels of success? Why, in situations of high stress, one employee soars while another derails? Or why, when you promoted your top performer in one department into another, his performance faltered? It's likely that, in all these situations, emotional intelligence played a large part. Emotional intelligence (EI) refers to the ability to perceive and understand our own emotions, to control them and utilize them positively, as well as to perceive, understand, and respond appropriately to the emotions of others. Put simply, it is the way in which we cope within our surroundings. Within the workplace, EI has proven itself more valuable and more predictive of success than cognitive intelligence, or IQ (Rieschi, 2008).

As human beings, our initial reaction to any stimulus is emotional, followed closely by logic and reason as tempering influences. This doesn't change appreciably when we enter the workplace. One EI theorist described EI as our tactical, in-the-moment response style, while IQ reflects a more reflective or strategic way of thinking and acting. EI theory has effectively put structure and substance around those very essential but somewhat nebulous work traits generally referred to as "soft skills." One highly regarded EI inventory, the BarOn EQi (emotional quotient inventory) breaks EI into fifteen subscales: emotional self-awareness, assertiveness, independence, self-regard, self-actualization, empathy, social responsibility, interpersonal relationship, stress tolerance, impulse control, reality testing, flexibility, problem-solving, optimism, happiness (Rieschi, 2008).

The EI subscales, alone and in combination, impact work performance to greater or lesser degrees, based upon the nature of the job. A salesperson, for example, would benefit from a high degree of interpersonal skill and assertiveness, but may be impeded if he is highly empathetic or socially conscious — these traits may hamper his ability to close the sale, since they may cause him to focus on other factors such as concern for the purchaser's financial circumstance, or true need for the product. A business leader who is high in optimism but low in reality testing and impulse control may

not recognize the risks facing his company, and may make unsound decisions too quickly, with too little supporting data. A police officer requires a high degree of assertiveness, but this skill in combination with low stress tolerance and impulse control could be a disaster waiting to happen. The manager who is high in interpersonal skills yet low in optimism may not be able to motivate his staff to achieve their targets. These examples, although simplistic, illustrate the importance of EI in the workplace, as well as the correlation of certain EI profiles to success in specific career fields (Rieschi, 2008).

Recent and ongoing research by Multi-Health Systems suggests that EI can account for as much as 45 per cent of work success. Preliminary research has now been published which aims to identify optimum EI profiles for various career fields. Armed with this knowledge, it makes abundant sense to incorporate EI as a recruitment tool and as a factor in determining promotions or transfers. Fortunately, unlike IQ, each of us has the ability to improve our EI at will. This means that EI assessments can help to formulate performance-improvement and/or career-progression plans (Rieschi, 2008).

As with any new recruitment or organizational-development strategy the essential starting point is to understand your particular work environment and the EI skills that, on a general level, will predict success. The second step involves assessing the various occupations and career fields within the organization to identify corresponding EI profiles. You can start by identifying and benchmarking your star players. There are a number of well-researched and evidence-based instruments, such as the BarOn EQi, from which to choose. You will then be well positioned to use EI inventories as a component of both employee-selection and employee-promotion procedures. Work scenarios designed to allow you to observe the candidates' EI skills in action can also provide great insight. While EI inventories should never be used as a stand-alone decision-making tool, and should always be interpreted by a trained administrator, they can be counted upon to provide additional, very valuable data for determining — and improving — both person-organization and person-job fit (Rieschi, 2008).

6. Ability to Predict Job Performance and Personnel Assessment Tools

Rothstein and Goffin (2006) analyse the ability of personality to predict job performance, including the Five Factor Model of personality versus narrow personality measures, meta-analyses of personality–criterion relationships, moderator effects, mediator effects, and incremental validity of personality over other selection testing methods. By the 1990s, however, methodological innovations in meta-analysis and the emergence of a widely accepted taxonomy of personality characteristics, the "five factor model" or FFM (i.e., Extraversion, Agreeableness, Emotional Stability, Conscientiousness, and Openness to Experience), spurred a series of meta-analytic studies that have

provided a much more optimistic view of the ability of personality measures to predict job performance (Rothstein and Goffin, 2006).

The conventional personnel selection approaches that are developed on the basis of static job characteristics will no longer suffice (Lievens et al., 2002).

Any test or procedure used to measure an individual's employment or career-related qualifications and interests can be considered a personnel assessment tool. There are many types of personnel assessment tools in human resource management to help organizations make better personnel selection decisions (Personnel Assessment, 2010). These include interviews, job knowledge tests, work sample tests, cognitive tests, and personality tests, Big Five traits, IQ and aptitude testing, group exercises, personality testing and in-tray exercises.

Personnel assessment tools differ in: what they are designed to measure, e.g., abilities, skills, work styles, work values, or vocational interests; what they are designed to predict, e.g., job performance, managerial potential, career success, job satisfaction, or tenure. Tests, inventories, and procedures are assessment tools that may be used to measure an individual's abilities, values, and personality traits. They are components of the assessment process (Personnel Assessment, 2010):

- observations
- resume evaluations
- application blanks/questionnaires
- biodata inventories
- interviews
- work samples/performance tests
- achievement tests
- general ability tests
- specific ability tests
- physical ability tests
- personality inventories
- honesty/integrity inventories
- interest inventories
- work values inventories
- assessment centers.

All assessment tools used to make employment decisions, regardless of their format, level of standardization, or objectivity, are subject to professional and legal standards. For example, both the

evaluation of a resume and the use of a highly standardized achievement test must comply with applicable laws. Assessment tools used solely for career exploration or counselling are usually not held to the same legal standards.

Employees and applicants vary widely in their knowledge, skills, abilities, interests, work styles, and other characteristics. These differences systematically affect the way people perform or behave on the job. These differences in characteristics are not necessarily apparent by simply observing the employee or job applicant. Employment tests can be used to gather accurate information about job-relevant characteristics (Personnel Assessment, 2010).

Some tests can be used to *predict* employee and applicant job performance. In testing terms, whatever the test is designed to predict is called the *criterion*. A *criterion* can be any measure of work behaviour or any outcome that can be used as the standard for successful job performance. Some commonly used *criteria* are productivity, supervisory ratings of job performance, success in training, tenure, and absenteeism. Assessment strategies should be developed with a clear understanding of the knowledge, skills, abilities, characteristics, or personal traits you want to measure. It is also essential to have a clear idea of what each assessment tool you are considering using is designed to measure. Using a single test or procedure will provide you with a limited view of a person's employment or career-related qualifications. Moreover, you may reach a mistaken conclusion by giving too much weight to a single test result. On the other hand, using a variety of assessment tools enables you to get a more complete picture of the individual. The practice of using a variety of tests and procedures to more fully assess people is referred to as the *whole-person approach* to personnel assessment. This will help reduce the number of selection errors made and will boost the effectiveness of your decision-making. This leads to an important principle of assessment (Personnel Assessment, 2010).

Concluding Remarks

The original contribution of this article is as follows:

- The new original Life Cycle Process Model for Efficient Construction Manager proposed by the authors of the present investigation considers economical, political, legal/regulatory, technological, technical, organisational, managerial, institutional, social, cultural, ethical, psychological, educational, environmental, emotional and confidence factors. It also covers personality traits and the conditions of micro, meso and macro environment, and presents the analysis of the construction manager's life cycle.
- In order to increase the efficiency of a construction manager life cycle the Life Cycle Process Model for Efficient Construction Manager for analyzing, modelling and predicting the

development of construction manager was developed enabling the users to achieve better practical results in designing more effective life of construction manager. The Model allows developing tens of thousands of alternative variants for an efficient construction manager life cycle and to select the most rational of them.

- Formalized presentation of the research shows how changes at the level of personality and at micro, meso and macro levels and the extent to which the goals pursued by various interested parties are satisfied cause corresponding changes in the value and utility degree of a construction manager life cycle. With this in mind, it is possible to solve the problem of optimization concerning satisfaction of the needs at reasonable expenditures. This requires the analysis of construction manager cycle versions allowing to find an optimal combination of goals pursued and finances available.

- Based on the analysis of existing neural networks, knowledge, expert and decision support systems and in order to determine most efficient versions of construction manager life cycle a Decision Support System for Construction Manager Life Cycle Analysis consisting of a database, database management system, model-base, model-base management system and user interface is under development.

Literature

Ahadzie, D. K., Proverbs, D. G. and Olomolaiye, P. (2008) *Towards developing competency-based measures for construction project managers: Should contextual behaviours be distinguished from task behaviours?* International Journal of Project Management.

Bedingfield, J. D. and Thal, A. E., Jr. (2008) *Project Manager Personality as a Factor for Success*. In Proceedings of 2008 Portland International Conference on Management of Engineering and Technology: Technology and Innovation Management.

Cardy, R. L. and Selvarajan, T. T. (2006) *Competencies: Alternative frameworks for competitive advantage*. Business Horizons.

Cheng, M. I., Dainty, A. R. J. and Moore, D. R. (2005) *What makes a good project manager?* Human Resource Management Journal.

Crawford, L. (2005) *Senior management perceptions of project management competence.* International Journal of Project Management.

Dainty, A. R. J., Cheng, M. I. And Moore, D. R. (2005) *Competency-based model for predicting construction project managers' performance*. Journal of Management in Engineering, ASCE.

De Korvin, A., Shipley, M. F. and Kleyle, R. (2002) *Utilizing fuzzy compatibility of skill sets for team selection in multi-phase projects*. Journal of Engineering and Technology Management.

FMI Corporation. (2006) *Project Management Survey*, http://www.build-project-management-competency.com/wp-content/uploads/2009/12/FMI-06-Project-Management-Surveyfin.pdf.

Goleman, D. (2010) *Emotional Intelligence,* http://www.cipd.co.uk/subjects/lrnanddev/selfdev/emotintel.htm.

Gottfredson, L. S. (1997) *Why g matters: The complexity of everyday life*. Intelligence 24 1 SPEC.ISS.

Güngör, Z., Serhadlıoğlu, G. and Kesen, S. E. (2009) *A fuzzy AHP approach to personnel selection problem.* Applied Soft Computing.

Kelemenis, A. and Askounis, D. (2009) *A new TOPSIS-based multi-criteria approach to personnel selection*. Expert Systems with Applications, In Press, Corrected Proof.

Lievens, F., Van Dam, K. and Anderson, N. (2002) *Recent trends and challenges in personnel selection*. Personnel Review.

Personell Assessment. (2010) *Personell Assessment*. http://www.hr-guide.com/data/G360.htm

QuickMBA. (2010) *Strategic management. Core Competencies*, http://www.quickmba.com/strategy/core-competencies/.

Rieschi, G. (2008) *Personnel selection and development — the emotionally intelligent way*, http://www.workplace-mag.com/Personnel-selection-and-development-%E2%80%94-the-emotionally-intelligent-way.html.

Rothstein, M. G. and Goffin, R. D. (2006) *The use of personality measures in personnel selection: What does current research support?* Human Resource Management Review.

Trippe, D. M. and Harvey, R. J. (2003) *Item Response Theory Analysis of the IPIP Big-Five Scales.* http://harvey.psyc.vt.edu/Documents/TrippeHarveySIOP2003.pdf.

Whitman, D. S., van Rooy, D. L., Viswesvaran, C. and Kraus, E. (2009) *Testing the second-order factor structure and measurement equivalence of the Wong and Law emotional intelligence scale across gender and ethnicity*. Educational and Psychological Measurement.

Wikipedia. (2010) *Core competency*, http://en.wikipedia.org/wiki/Core_competencies.

Wikispaces. (2010) *Definitions*, http://cct370-w07.wikispaces.com/Definitions.