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Lean talent management: a novel approach for increasing creativity in architectural design firms

Lean talent management

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Abstract

Purpose – Architecture is classified as one of the creative industries worldwide. However, it is plagued with a number of problems that confine its creativity towards developing innovative solutions that fulfil society needs. One of these pressing problems is the lack of creativity due to the non-utilisation of talented architects. The purpose of this paper is to investigate the role of lean talent management (LTM) as a novel approach to increase creativity in architectural design firms (ADFs).

Design/methodology/approach – In order to achieve the above-mentioned aim, a mixed qualitative and quantitative methodology is designed to accomplish three objectives. First, reviewing literature to investigate the concepts of creative industries, motivation, demotivation, talent management (TM), talents utilisation (TU), lean thinking (LT) and lean innovation (LI). Second, presenting and analysing five case studies to explore the integration between TM, LT and LI in real-life context to overcome barriers of creativity. Finally, analysing the results of a survey questionnaire conducted with a representative sample of Egyptian ADFs to evaluate their perception and application of TM as a facilitator for creativity.

Findings – The five barriers of creativity encompassed lack of motivation in ADFs and demotivation and lack of TU in ADFs and Architecture, Engineering and Construction (AEC) industry. TM facilitated motivation and eliminated six demotivating factors. The seventh factor was eliminated through LT. In AEC industry, TU was achieved through LI with five considerations. In ADFs, TU can be achieved through LTM. However, two additional barriers have been identified for further investigation. Egyptian ADFs failed increasing creativity with TM solely. Hence, a LTM framework is required.

Research limitations/implications – Although the study focussed on architecture as a case for creative industries and targeted Egyptian ADFs, the application of LTM is to be applied at any industry that is talent-based although barriers related to the design process could vary.

Originality/value – This paper presents an innovative approach through discussing the integration of lean concepts into TM towards increasing creativity in ADFs. This ideology has received scant attention in construction literature and is the first of its kind in the architectural field. The proposed ideas represent a synthesis that is novel and creative in thought and adds value to the knowledge in a manner that has not previously occurred.

Keywords Knowledge management, Design, Innovation, Architecture, Integrated practice, Novel method

Paper type Research paper

1. Introduction

Creative industries are talent-based businesses and depend heavily on individual creativity (Kong, 2014; Jones *et al.*, 2004). The architectural industry was classified as one of the creative industries worldwide (Cunningham, 2003). It is an integral part of the Architecture, Engineering and Construction (AEC) industry (Kamara *et al.*, 2002). It plays a significant role towards delivering sustainable projects that translate the community needs into designs that specify technical characteristics, functional performance criteria and quality standards. In addition, it aims to complete these projects on time, as specified and in the most cost effective manner to produce a product that matches or exceeds end users expectations (Ahmed and Kangari, 1995; Hudson, 1999; Bowen *et al.*, 1999; Othman *et al.*, 2004). This clarifies the vital role of architectural design firms (ADFs) towards developing creative solutions that address social circumstances and achieve higher order needs. In ADFs, motivation is critical for architects to develop novel conceptual ideas (Oyedede, 2010).



However, demotivation, which is a reduction of morale or spirit in performing certain tasks, is a barrier for creativity even when motivation exists. Demotivation is not a synonym of lack of motivation as the last means reduction of stimulus or drive for an action (Oyedele, 2013). On the one hand, talent management (TM) is one of the novel approaches that enhances motivation, reduces demotivation, achieves mutual benefits and balances work-life commitments (Deery, 2008; Thunnissen *et al.*, 2013; Khalil *et al.*, 2017a). On the other hand, lack of talents utilisation (TU) and fragmentation of the AEC industry raises other barriers that cannot be dealt with through TM solely (Koskela, 2004). Therefore, lean thinking (LT) is of essence to enhance the TM strategy in order to maximise TU and reduce fragmentation since it is based on the concept of maximising values and eliminating wastes (Womack *et al.*, 1996). As an LT approach, people-centred innovation emphasises on people rather than schedules and budgets (Sanders, 2006). It is a novel paradigm shift, which was successfully related to lean project delivery system (Paolillo *et al.*, 2016). Consequently, LT's positive impact on TM is paramount and gives potential integration with TM framework by Bersin (2010). Lean innovation (LI) proposes specific lean principles (LPs) for knowledge-based industries (Agan, 2014), such as architecture. The aim of this paper is to investigate the role of lean talent management (LTM) as a novel approach to increase creativity in ADFs.

2. Literature review

2.1 *Architecture: a creative industry within a large industry*

The first established understanding of the term “culture industry” was by Horkheimer and Adorno (2001), who defined it as an industry in which the produced cultural commodities are standardized for the benefit of monetary gains. The negative perception towards the culture industry was due to the authors’ association of culture with art and human creativity. Their aim was to analyse social circumstances and offer a utopian life manner (Hesmondhalgh, 2013). Later understandings adopted the concept of Horkheimer and Adorno in which a culture industry would be more concerned about developing productions with social meaning. The term was later changed to “cultural industries” in which the plural form includes interconnectivity and complexity of the various sectors of cultural production (Kong, 2014). The term was followed then by the term “creative industries” when it was first coined in the UK by the incoming Labour Government. Creative industries are based on multiple elements (Jones *et al.*, 2004). First, individual creativity, which means production of novel useful ideas in and in multiple manners (Hotho and Champion, 2011) in which it differs from innovation, which means translation of the novel ideas into real products of services (Freedman, 2010). Second, talent and skills in which the first could refer to several meanings based on the perspective of the study. It could refer to individuals’ thoughts that lead to creative ideas, their mastery of abilities and skills, intrinsic gifts or a combination of individuals’ cognitive skills, knowledge, values or developed competencies (Wu *et al.* 2016). Any of the previous directions allow the employee to perform excellently which highlights the demonstration of the definition of the term “talent” in the human resource management (HRM) literature as the human capital (Dries, 2013). Moreover, the potential for job creation, wealth rough exploitation and generation of intellectual property.

As cultural industries were concerned with creating intangible creative contents, as cinematography, multimedia and publishing, creative industries were broad in scope in which they included productions of the cultural industries in addition to tangible cultural and artistic productions (UNESCO, 2006). Therefore, several industries were encompassed including “architecture” as one of those creative industries (Cunningham, 2003). On the other hand, architecture is included within the AEC industry (Kamara *et al.*, 2002) in which the other parties could affect an architectural solution. This adds potential risk of additional needed time and effort to figure out creative solutions that do not contradict with the other parties.

2.2 Creativity in ADFs: between motivation and demotivation

Architecture is considered a technique and an art for designing spaces for human use in which its development is called creative development not innovation as in construction or engineering. The main central purpose of architecture is to change the physical environment in order to carry out certain human activities conveniently and comfortably (Alomar, 2003). However, human needs are highly different due to the diversity of their intangible heritage such as memories, stories and traditions (Bennett *et al.*, 2014; Khalil *et al.*, 2017b). The diversity increases the complexity of the architectural design and highlights the importance of creativity for designing an architecture that satisfies all users, but with no need for luxurious solutions because people living in poverty yet can be satisfied and feel belonging (Tay and Diener, 2011).

Consequently, architectural projects are always novel and complex; therefore, talented architects are required to develop creative ideas for each project to address social circumstances. According to Oyedele (2010), motivation of designers, as architects and engineers, is the knowledge base in which conceptual ideas are developed in a creative manner (Wong and Pang, 2003). Greenberg *et al.* (1995) defined motivation as a set of processes that arouse, direct and sustain the behaviour of human capital in order to attain some goals. According to Amabile (1993), unmotivated employees avoid the workplace whenever the chance was available, expend little effort in their tasks, produce low quality work and exit the organisation for better opportunities whenever possible. Consequently, managers of ADFs should consider motivation as a driver to enhance architects willingness to deliver qualitative designs on time in order to seek developing novel ideas and solutions and to maximise their effort (Oyedele, 2010). Amabile (1988) considered intrinsic motivation is considered a key factor for creativity, extrinsic motivation was considered as neither increasing nor decreasing the extent of creativity unless creativity, instead of efficiency, is considered as part of the reward criteria (Choi, 2004; Prabhu *et al.*, 2008).

While the majority of the literature concentrated on motivation as a key factor for productivity and creativity, little attention has been given to demotivation. According to Ng *et al.* (2004), demotivation is reduction of morale or spirit in carrying out certain tasks while lack of motivation means zero motivation of absence of motivation. Demotivated employees are more likely to egress the workplace at any opportunity, spend little effort in tasks and deliver low quality work (Amabile, 1993). Oyedele (2013) identified seven demotivating factors that could prevent architects' creative development even when motivation exists. First, organisational injustice ranked highest as separation of employees from decision-making process, poor working environment and inadequate rewards were included. Second, the project induced stress ranked second in which poor communication between teams; excessive workload pressure, working excessively long hours and difficulty of understanding idiosyncratic needs of clients were highlighted as sub-factors. Other demotivating factors as poor co-ordination of design team, poor interpersonal skills, perceived career decline, negative leadership behaviour and poor organisational culture were identified (Oyedele, 2013).

In addition, the AEC industry is characterised with its fragmented nature due to being project-based (Hobday, 2000), which causes demotivation as well. Knowledge transfer between architects and engineers leads to a conflict between objectives (Baiden *et al.*, 2006), which leads to either waste of development time or delivery of an inadequate designs since creativity is being obstructed. The decision making in the design process starts by a private or commercial authority issuing the specifications of a project, which is then transferred to the AEC industry in which structural engineers and Mechanical, Electrical and Plumbing (MEP) engineers give engineering recommendations to architects who in turn develop a design with updated specifications returned back to structural and MEP engineers. This cycle between architects and engineers repeats until tender documents are developed to be given to contractors (Knoeri *et al.*, 2011).

2.3 Talent management for enhancing creativity

As managers of ADFs should manage talents in a manner where motivation is enhanced and demotivation is reduced, TM is investigated in this research as a novel approach. A study conducted by Gallardo-Gallardo *et al.* (2015) pointed out that from 2010 onward; more research that is empirical was done. Therefore, previous claims about TM as a phenomenon-driven field of research are exaggerated and hence, the TM strategy is worthwhile to be investigated as an effective approach.

The previously mentioned perception of “talent” as the human capital in HRM literature is known in relative literature as “subject” approach, which means scarce, difficult-to-replace and valuable individual workers. The opposite approach is the “object” approach that refers to the abilities, masteries and commitment of talents (Gallardo-Gallardo *et al.*, 2013). As TM is concerned with managing talents, it is difficult to find a universal definition for TM since its foundation is interdisciplinary with previous research themes as HRM and succession planning. Considering that the previously perceived term “talent” was in HRM literature, HRM was concerned with allocating right individuals in the right positions on the right times (Jackson and Schuler (1990) while succession planning is a systematic effort followed by organisations to ensure leadership continuity in key positions as well as individuals advancement (Rothwell, 1994). On another hand, TM focussed on managing supply, demand and flow of talents through the human capitals engine (Pascal, 2004). However, it was blamed for following procedures of its predecessors, but in a slightly different manner (Lewis and Heckman, 2006). The strategic talent management (STM) successfully distinguished TM from its predecessor. It solved the issue of categorising employees within the organisation through the emphasis on identifying key positions in the organisation with a potential for success. Thereafter, a talent pool of high performing and high potential incumbents is developed. The outcomes of STM would be work motivation, extra-role behaviours and organisational commitment (Collings and Mellahi, 2009).

TM philosophies have two main tensions. The first is concerned with the inclusive or exclusive focus on talents (Lewis and Heckman, 2006). An exclusive-subject approach means targeting certain group of high potential and/or high performing employees while inclusive-subject approach is targeting all employees to fulfil their potential (Thunnissen *et al.*, 2013). The second tension is concerned with the origin of the term “talent” and its understanding in which a talent is perceived as innate or acquired construct. Meyers and van Woerkom (2014) concluded four philosophies of perceiving talent: the “exclusive-stable”, “exclusive-developable”, “inclusive-stable” and “inclusive developable. The stable philosophy is concerned with individuals with stable characteristics while the developable philosophy depends on potential and measurement factors that lead to future growth. Therefore, the talent lifecycle representing relationship between talents and their organisation and consisting of attracting, acquiring, on-boarding, training, developing and retaining talents (Schiemann, 2014); would differ accordingly based on the second philosophical tension.

According to Thunnissen *et al.* (2013), TM has an effective role towards achieving mutual benefits at individual, organisational and societal levels from both economic and non-economic perspectives. At the individual level, the economic value is achieved with provision of financial rewards and ensuring a secure job. Non-economic value is achieved through provision of challenging and meaningful tasks in which sense of accomplishment is achieved through meeting personal interests. At the organisational level, the economic value is achieved through profitability and sustaining survival at harsh economic conditions while non-economic value is achieved through organisational flexibility and labour productivity. At the societal level, the economic value is achieved through facilities provided by the organisations and increased demand for talents (Boudreau and Ramstad, 2005); while the non-economic value is achieved through adhering to norms of stakeholders and

considering social legitimacy. Therefore, arguments about potential conflicting goals due to the focus on one part of the organisation instead of the whole are eliminated or reduced with TM (Guthridge *et al.*, 2006; Martin and Schmidt, 2010). Long-working hours, poor payments, educational mismatch and poor career development lead to job burnout in which creativity is prevented (Blase, 1982). TM has an ability of balancing work-life commitments, enhancing retention and achieving competitiveness in organisations, which enhances creative development (George, 2007; Deery, 2008).

2.4 Lack of talents utilisation and lean thinking

Lack of TU (LTU) is defined as lacking adequate fitting of talents' skills and capabilities or lack of adequate training (Koskela, 2004; Ramesh *et al.*, 2008). It affects capturing and transferring knowledge, which is paramount for creativity, improved business performance and client satisfaction (Kamara *et al.*, 2002). The failure to capture and transfer the knowledge of the project leads to the increased risk of "reinventing the wheel", impaired project performance and wasted activity (Siemieniuch and Sinclair, 1999). Thereafter, LTU should be prevented in ADFs and within the AEC industry in order to increase creativity. People-centred innovation is a paradigm shift based on a concept that people not schedules, budgets or methods deliver projects (Sanders, 2006), which highlights the need for TU. A recent study by Paolillo *et al.* (2016) stated that integration of people-centred innovation, TM strategy in case, with "Lean" could allow novel ideas to flood. The term "lean" was encapsulated within the Toyota Manufacturing System in an attempt to eliminate wastes, such as LTU, and maximise delivered value. The term "lean thinking" (LT) became the common term for describing the application of the lean production concepts outside manufacturing (Womack and Jones, 1996). Consequently, potential integration of lean with TM is developing upon findings by Khalil *et al.* (2017a) that TM is paramount in enhancing motivation and reducing demotivation.

2.5 Integrating lean with talent management in the AEC industry

In LT, activities are classified as value-adding activities, supporting value-adding activities and non-value-adding activities in which LPs eliminate the last (Hines and Rich, 1997). In the context of knowledge-based, high in complexity and high in novelty environment as architecture, traditional approaches of eliminating waste activities does not guarantee adding value. In fact, adding more activities in this case could lead to adding greater value since the environment is non-traditional (Browning and Sanders, 2012). Considering as well that the AEC industry is fragmented in nature (Hobday, 2000), integration of lean concepts should consider the environment of ADFs as well as the relation between them and engineering and construction parties. The five LPs are specifying value of customer, identify value stream of all actions required to transform a service, make the value flow through eliminating stoppages, let the customer pull through delivering on-demand from customers and pursuing perception (Womack and Jones, 1996). In order to integrate lean with TM, Bersin (2010) has developed a comprehensive framework of TM in which Table I presents potential lean approaches for each TM stage. Reviewing the table concludes that lean-integrated TM focus on achieving customer value, which is the need for complex creative solutions. Hence, TM needs to be lean-integrated to achieve this goal.

Regarding the lean learning environment, which is critical in ADFs, LI is a concept based on working efficiently with knowledge by doing the right things, doing them right and better all time. LI is based on team effort and collaboration (Agan, 2014). It has differentiated principles, defined in Table II, which should be part of the process as a whole by top management, project managers and most importantly the knowledge workers (Claus and Henrik, 2011). Therefore, adoption of LI principles has great potential for maximising utilisation of talents in the design process for potential of creativity enhancement. However, unintentional adoption of LPs

TM stages Bersin (2010)	Lean approach
Talent strategy and business alignment	Teece (2010) stated that a business strategy should be something more than a logical manner of carrying out a business as it should meet customer needs and be non-imitable. The author highlighted a successful case in which a business strategy was difficult to imitate when it was supported by lean and innovative logistics, which enhanced competitiveness as well
Workforce planning	Rothwell <i>et al.</i> (2012) mentioned that some employers struggle with how to achieve best results and need to increase productivity while reducing costs. However, a traditional approach to achieve that focuses on the work process and the way work is done, but scant to no attention is given to measure outcomes desired by customers. Employers were encouraged to follow a lean but agile approach
Capability and competency management	Parry <i>et al.</i> (2010) highlighted that many researches lacked identification of core competence linked to customer value, which should have resonance with lean principles in order to achieve customer value
Talent acquisition	Van Duren <i>et al.</i> (2015) conducted a research in which it was concluded that application of lean maintained customer and candidate satisfaction at above 90 per cent. In addition, operating in a culture of continuous improvement provided additional benefits
Talent development and mobility	Lean leadership is an essence for achieving continuous improvement for the lean system since it is considered the median between toolbox lean and the learning (Dombrowski and Mielke, 2013). Rothwell <i>et al.</i> (2012) highlighted that succession management is tactical based on managers' daily efforts to prepare people for future, which should be redirected to rely on periodical talent review to develop people for future challenges. Career management, which is the process individuals take to develop, implement and monitor career goals and strategies (Greenhaus <i>et al.</i> 2009), as well as their performance management, should foster this objective with lean strategies
Total rewards	Although lean rewards received scant attention, its role in optimising investment of resources and achieving satisfaction of talents is paramount
Learning and capability development	This stage is supported by several lean concepts. Integrated Project Delivery (IPD) is a concept based on collaboration of people, business structures and practices in order to develop a process that connect talents together towards better optimisation of project outcomes, reduced waste and enhanced client value (American Institute of Architects, 2007). Target Value Design (TVD) and Set-Based Design (SBD) are used for IPD to enhance collaborative efforts among various stakeholders. They depend on designing based on detailed estimate rather than estimating from a detailed design as well as allowing additional design effort to proceed and comply with certain specifications instead of the fragmented point-based design approach (Macomber and Barberio, 2007; Singer <i>et al.</i> , 2009). This concept is similar to "Obeya", which is a form of project management used in Toyota as part of its lean production system to reduce departmental thinking (Aasland and Blankenburg, 2012), which assures the value of LT as similar to its root in production. The Last Planner System (LPS), which offers systematic process for planning in the AEC industry, is one of the methods for applying lean techniques for increasing planning reliability, improving design workflow and increasing production performance. Even that the processes in the AEC industry are variable, the LPS was successful in improving the workflow (Ballard and Howell, 2004)

Table I.
Potential integration of lean with TM

in knowledge-based industries, architecture in case, will create a gap since it affects the process of knowledge creation (Tyagi *et al.*, 2015). Consequently, adoption of LPs in ADFs, which is knowledge-based, high in novelty and high in complexity requires different considerations to avoid that gap. First, lean should be integrated at least disruption times. Second, system's complexity should be understood before improvement takes place. Third, improvement should

LI principles	Explanation	Source
Gemba	A Japanese word that means “the place where truth is found” and refers to understanding what occurs in real-life through experiencing the issue before deciding how the problem can be solved	Imai (1997)
Front loading	An increment of knowledge level at the beginning of the project in which high novelty is needed since critical decisions are made in early stages. It is achieved through using more resources in the beginning	Claus and Henrik (2011)
Visual management	A technique designed so that working individuals who are not familiar with the process details, can understand it easily with visual elements	Claus and Henrik (2011)
Time boxing	An allocation of a fixed time period for every activity to improve productivity, especially in such knowledge-based environment that requires continuous learning	Voehl and Harrington (2016)
One-piece flow	A sequence of transactional activities or a product through the process in which one element is handled at a time	Breyfogle III (2007)
Takt	A regular and predictable rhythm of delivery of requirements for the company and the team of the project. It reduces stress and frustration while enhancing improvement and feedback	Claus and Henrik (2011)
Prototyping	A testing for a process of a concept to evaluate it through developing a tangible artefact, not an abstract description	Beaudouin-Lafon and Mackay (2003)

Table II.
Lean innovation principles

not be on an activity or a process in isolation. Fourth, waste and value should be reconceptualised and measured as a whole. Finally, extensive adoption of lean would lead to negative results as it affects the knowledge creation (Browning and Sanders, 2012).

The previous discussion highlighted the stages of TM and potential integration of LT. As some stages received much attention in literature, some received little attention with few details and other stages received not attention before. It highlights the novelty of the research area and that further research for each step is needed.

3. Research methodology

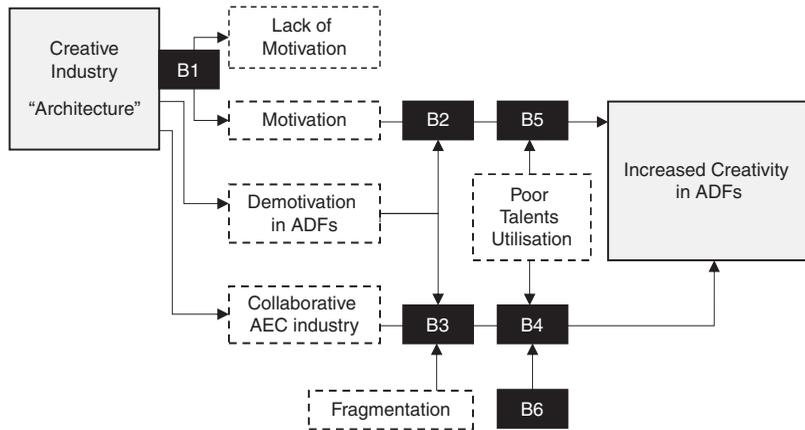
As the aim of this paper is to investigate the role of LTM as a novel approach to increase creativity in ADFs, a mixed qualitative and quantitative methodology is designed to achieve the above-mentioned aim through accomplishing three objectives:

- first, reviewing literature to investigate the concepts of creative industries, motivation and demotivation, TM, TU, LT and LI;
- second, presenting and analysing five case studies to explore the integration among TM, LT and LI in real-life context to overcome barriers of creativity; and
- finally, analysing the results of a survey questionnaire conducted with a representative sample of Egyptian ADFs to evaluate their perception and application of TM as a facilitator for creativity.

The reasons for using multiple methods are twofold as they can create enhanced assurance in which the variances are not method-related, but trait related. Moreover, each method is more suitable for certain purpose as case studies are more suitable in the exploratory stage of the research while the survey questionnaire is more suitable to test the need for the developed theory (Gimenez, 2005).

3.1 Model development

Based on the reviewed literature, a model with potential barriers of increasing creativity in ADFs was developed, as shown in Figure 1 with barriers listed in Table III and how each



Source: Developed by: Authors

Figure 1. Preliminary model of facilitators for increasing creativity in ADFs with potential barriers

Barrier No.	Barrier description	Case studies	Survey questionnaire
B1	Motivation enhance creativity in ADFs while lack of motivation prevents it	●	●
B2	Demotivation prevents the role of motivation to enhance creativity	●	●
B3	Fragmentation of the AEC causes demotivation that prevents creativity	●	●
B4	Poor talents utilisation prevents role of the solution that reduces fragmentation in the AEC industry	●	
B5	Poor talents utilisation prevents role of the solution that enhances motivation and reduces demotivation in ADFs	●	
B6	Lack of integrating lean innovation principles acts as a barrier for knowledge transfer	●	

Table III. List of barriers

barrier is being investigated in the case studies and the survey questionnaire. Some barriers prevent the influence of solving a preceding barrier as B2 and B3 occur after the existence of B1 while B4 occur after B3 and B5 occur after B2. Therefore, all barriers should be solved in order to reach an increased and optimised creativity in ADFs and if one barrier is failed to be solved, ADFs cannot optimise creativity.

3.2 Case study design

Yin (2013) has developed a case study design approach in order to construct validity through correct measure for concepts and reliability that is defined as repeatability of operations of the case study. The validity is achieved through using multiple sources of evidence, match patterns, build explanations and using replication logic instead of sampling logic in case of multiple case studies, as in this research. Moreover, the multiple case studies approach is preferred because it increases the external validity. Reliability is achieved through using a case study protocol, which is defined as a standardized agenda for researcher’s line of inquiry for each case. Zucker (2009) proposed a common case study protocol that guides the methodology. First, purpose and rationale were achieved through the aim of this research to investigate LTM role for increasing creativity in ADFs. Second, case study design was achieved through following the approach by Yin (2013) to enhance reliability and validity. Third, data collection was achieved through a field case

study and multiple online cases. Fourth, full description of cases is achieved in Section 4. Fifth, focussing the analysis to the purpose was achieved through a common criterion of analysis. Sixth, analysing findings based on purpose and rationale are achieved through descriptive tables covering all cases. At last, establishing rigour is achieved through giving credibility to authors' case studies.

3.3 Survey questionnaire sampling, measurement instrument and distribution

Sample size calculation for the survey questionnaire, Equation (1), has 50 per cent distribution, 95% confidence level and 5 per cent margin of error. The total population encompassed 44 registered ADFs at the Egyptian Engineers Syndicate, Cairo region by 2016 in which the true sample (TS) was calculated as shown in Equation (2):

$$\text{SSC} = \text{Distribution of } 50\% / (\text{Margin of error } \% / \text{confidence level score})^2, \quad (1)$$

$$\text{TS} = (\text{SSC} \times \text{Population}) / (\text{SSC} + \text{Population} - 1). \quad (2)$$

The TS resulted with a sample of 40 ADF and considered no bias. However, a copy of the survey questionnaire was sent to the total population of 44 ADFs to build a comprehensive overview about TM strategy implementation in Egyptian ADFs. The survey questionnaire was sent electronically to the ADFs by contacting them at first through their formal e-mail addresses or directly calling them depending on the available contact information.

In the survey questionnaire, two types of questions were used. First, the close-ended questions in which the respondents are allowed to select a single response of (yes/no) or rating the response on the Likert scale from 1–5. Second, open-ended questions in which respondents were given the opportunity to express thoughts. Open-ended questions allow unanticipated findings to be explored and permitted richness of details and self-expression (Baker, 1994).

4. Case studies

The first three cases include international ADFs that indicated adoption of TM strategy or matching criteria. The fourth case study is an international project that was successfully delivered through LT and LI with emphasis on TM. The last case study is observed by the authors of this research in a local Egyptian ADF in which its name is not mentioned for privacy purposes.

Case Study No. 1 (CS1): Snohetta Architects aim to enhance identity, sense of place and relationship to the inhabited physical spaces. Its talents are appreciated in which social values are promoted through provision of a multifunctional lunch table to be used at any time for any purpose to enhance bond between co-workers. They use a strategy entitled "Trans-positioning" where talents switch roles to understand others' opportunities and potentials. Snohetta Architects consider creative development as an essence of achieving term aim. Creativity is achieved through workshops where it can be generated from any unexpected participant. Examples of creative projects by Snohetta Architects are Bibliotheca Alexandria, King Abdul-Aziz Centre for World Culture (KACWC) and San Francisco Museum of Modern Art expansion (Snohetta Process, 2016). The firm was ranked the first innovative architectural firm in 2010 for KACWC (Tischler, 2011).

Case Study No. 2 (CS2): Bjarke Ingels Group (BIG) share a belief in which utopian architecture is highly beyond traditional boxes. The firm integrates living, leisure, working and parking with a distinct overlap between pragmatic and utopia (Bjarke Ingels Group, 2016). BIG's talent strategy assigns each talent to what fits his/her capabilities best, eliminates need for competition between talents, providing enjoyable working environment and allows direct communication (Fisher, 2015). The design approach at BIG is called

“Bigamy” theory in which several elements that do not fit together are considered to form new genre. One of the projects by the BIG, the Mountain, mixed the language of high rise buildings with dwelling units with gardens, which was considered a creative approach that met the needs of the inhabitants (Wallis, 2016).

Case Study No. 3 (CS3): DP Architects (DPA) aim to deliver architecture of excellence. The firm considers the built environment, human experience and spirit. DPA’s talent strategy attracts fresh graduate since hiring foreign talents cost 30–60 per cent extra money for employment pass, funds 30 per cent of study cost for talented undergraduates, provides training at DP Academy in addition to in-house training, retains talents through “DP DNA” and “PHD Philosophy”. The first allows each individual to grow and find own talent in the company while the last stands for purpose, hunger and drive to ensure each talent has a sense of purpose not following the motion of job requirements. Work-life commitments are balanced through the provision of a yacht with minimal fees for family members’ hangout or free for building relations with co-workers (Majid, 2014). The TM strategy led the firm to win the Best Company to Work For in Asia in 2015 (DPA clinches, 2015). River Safari Park in Singapore was innovatively delivered regarding environmental and cultural aspects that it won Green Mark Platinum Certificate (Yan and Lim, 2015).

Case Study No. 4 (CS4): California Pacific Medical Centre (CPMC) manages a portfolio of lean projects as the Cathedral Hill Project. Its objective was to stay functional at earthquake times with its 13 stories above and below grade on its sloped site. CPMC encouraged using the “Five Big Ideas” that encompass collaboration, managing network of commitments, increasing the relatedness between the participants of the project, linking learning and action together and at last optimising the project as a whole, which was achieved with set-based design and Integrated Form of Agreement (IFOA). The first design is counter to the point-based design in which activities work in parallel and not in a sequential manner while IFOA encourages participants to put risk for the project’s success (Parrish *et al.*, 2008). Smithgroup Architects, Degenkolb structural engineering firm and Herrick steel fabricator each adopts a TM strategy respectively (Knight, 2015; Degenkolb, 2004; Herrick Corporation, 2016). During the initial phase, white boards were used to illustrate different structural systems for transferring knowledge easily among participants. A physical model helped realizing the exact complexity of the chosen Viscous Damping Wall solution. The solution was never applied in the USA and was considered a creative solution. The structural detailing was required during the design phase. The MEP team and the architect were asked for just estimations to eliminate waiting or over processing wastes (Parrish *et al.*, 2008).

Case Study No. 5 (CS5): firm “X” is a local ADF in Egypt that has significant contribution. The firm shares with the development of old communities as well as new cities in Egypt. Firm X adopts a TM strategy that is developed upon an EQT system, developed by the firm, which stands for ethics, quality and time. It is an agreement and part of the contract to be signed by the talents when they are hired. Ethics are concerned with their country and the workplace time is concerned with fast project delivery. Quality is concerned with the developed solutions and related documents and drawings for architectural projects. The system is based upon rating the talents over a pre-made checklist. Creativity has a noticeable percentage in their system. The cumulative grading for all criteria points results with a letter grade that represents how each talent followed the EQT policy and it is marked on monthly basis. Higher letter grade results in higher bonus, but when a talent receives “C” grade three times, the talent would be released from the firm, which applies as well for unethical behaviours. Firm “X” acquired the talents just after their graduation where they find their potential, developed themselves and built required skills within the firm. Everyone shapes the workplace and an outdoor space is provided for recreation. TM strategy is meant to manage all individuals.

A summary of how the case studies showed potential solutions for the previously mentioned barriers as represented in Tables IV–VI.

5. Survey questionnaire summary

One the one hand, methods of scientific enquiry are subject to limitations in which with the control of experiments in a laboratory comes an artificiality that raises questions regarding generalisability of outcomes and results. On the other hand, surveys allow scholars to explore a phenomenon with samples that represent a population about whom generalisation can be made (Visser *et al.*, 2000). Out of the total population of registered 44 ADFs, only 36 ADFs responded and fully completed the survey questionnaire. It represented a response rate of 81.8 per cent. As Babbie (1992) stated as a rule of thumb a percentage of 50 per cent is considered adequate and McNeil and Chapman (2005) and Gillham (2000) stated that a percentage between 30–40 per cent is accepted, the response rate in this research is considered relatively high enough to be relied upon. All respondents held professional

Barrier No.	Proposed solution	CS1	CS2	CS3	CS5
B1	TM drives motivation over lack of motivation	Trans-positioning	Yearly shared rewards and fitting talents to best roles	DP DNA and PHD philosophy	Bonus on monthly scoring and building skills in the firm
B2	TM reduces demotivation	The multifunctional group table	Enjoyable working environment	Free/minimal fees yacht booking	Gardens and shaping working environment

Table IV.
Case studies solving B1 and B2

Barrier No.	Proposed solution	CS4
B3	LT reduces fragmentation and demotivation of the AEC industry	Set-based design, which is highly associated with LT (Bastos <i>et al.</i> , 2016), reduced fragmentation and potential demotivation from poor coordination of architectural, structural and MEP design teams
B4	LI principles maximise utilisation of talents through enhancing knowledge acquisition and reducing potential wastes	Gemba, prototyping and front loading were successfully implemented early in the project to add additional resources and knowledge. Visual management through white boards were successful in building easy communication among different parties about the novel idea for the structural system. One-piece flow was achieved through set-based design, which achieved the Takt principle that ensured rhythm of delivery without over processing or missing details. Time-boxing principle was successfully implemented at design phase only, but not execution
B6	Adhering to considerations while adopting lean in knowledge-based environments	Considerations of adopting lean concepts were encouraged by the five big ideas in order to not end with counter results when interrupting the knowledge flow

Table V.
CS4 solving B3, B4 and B6

Barrier No.	Proposed solution	CS5
B5	Maximise utilisation of talents through lean performance management ^a	Using EQT evaluation criteria to manage performance and provision of adequate training to maintain high performance of talents

Notes: ^aLean recruiting was achieved with the inclusive TM strategy while lean learning management was successfully achieved in CS4 solving B4 to increase the TM strategy

Table VI.
CS5 solving B5

positions to have their responses considered. The first section of the survey questionnaire encompassed information about respondents, out of the 36 respondents, 21 were architects, 4 were project managers, 3 were owners or chairmen, 2 were general managers, 2 were team leaders, 1 was a CEO, 1 was a general director, 1 was an HR manager and 1 was a construction engineer. Therefore, validity and reliability is considered and a generalised conclusion from analysed data could be developed.

The second section of the survey questionnaire encompassed close-ended questions including dichotomous, multiple choice and Likert scale questions. A total of 83 per cent of the 36 ADFs highlighted their perception about the TM strategy, Figure 2. However, only 56 per cent of the 36 ADFs stated their adoption of a TM strategy. 47 per cent of the firms who adopted a TM strategy followed an inclusive/developable philosophy. On another hand, 31 per cent followed an exclusive/developable approach. The other percentages represented the stable philosophy. A total of 69 per cent of the firms who adopted a TM strategy concentrated on the non-economic perspective. In total, 81 per cent of the firms who adopted a TM strategy stated that TM strategy helped in balancing employees work-life commitments.

The third section encompassed close-ended and open-ended questions. A total of 86.1 per cent of the 36 ADFs highlighted their perception of architecture as a creative industry, Figure 3. A total of 72 per cent of the 36 ADFs indicated their firm's intention in developing creative architectural projects. In total, 64 per cent of the 36 ADFs stated that architects have high level of commitment and energy, 17 per cent indicated that architects are demotivated and 19 per cent indicated existence of lack of motivation. In total, 30 per cent of ADFs who develop creative solutions follow extrinsic motivational strategies, 27.5 per cent depends on intrinsic motivation while 42.5 per cent depends on employees personal traits. Respondents who mentioned that their firms have creative development were asked to present examples of creative projects. However, the majority of the firms lacked a true creative proposals and projects that are different from conventional buildings. In total, 37 per cent of respondents whose firms did not seek creative development mentioned that the stressful nature of projects is the barrier, 32 per cent mentioned lack of freedom in day-to-day work, 32 per cent mentioned miscommunication between individuals, 21 per cent mentioned resistance to change and 11 per cent mentioned lack of restrictions for design styles.

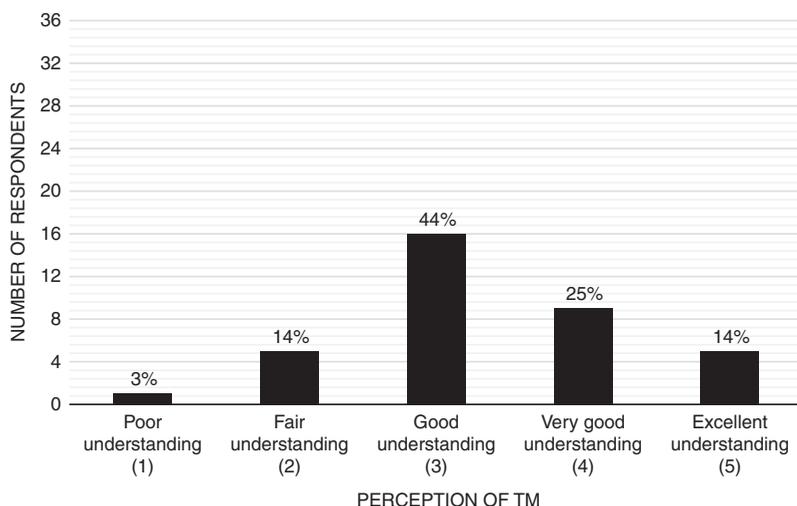
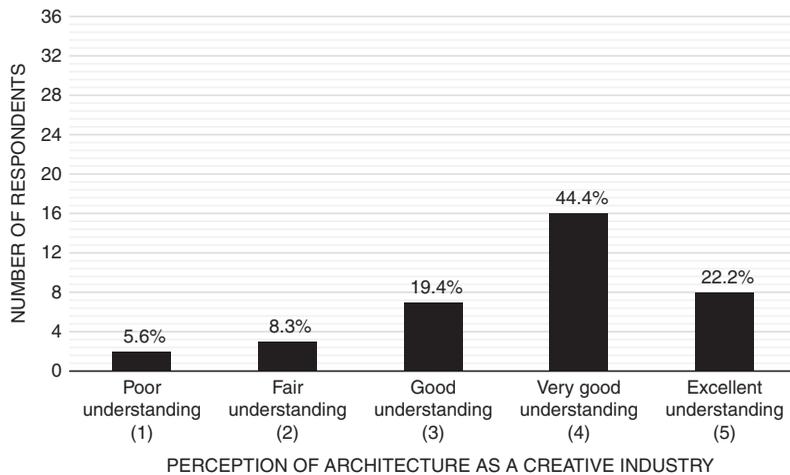


Figure 2. Respondents scoring of perception to TM



Lean talent
management

Figure 3.
Respondents scoring
of perception to
architecture as a
creative industry

6. Analysis and findings

Based on the case studies findings, a LTM model is developed as shown in Figure 4. A summary of how each barrier was eliminated and potential barriers that require future investigation is represented in Tables VII and VIII, respectively. Adoption of TM eliminates lack of motivation as it drives motivation directly through its STM approach. In CS1, CS2, CS3 and CS5, an inclusive TM strategy was used. Although it may seem contradicting with the STM, motivation could be prevented if only a certain key position was considered, which could be the explanation regarding the inclusive-adopted philosophy. The highest two demotivating factors were eliminated successfully with TM. Project induced stress was eliminated in CS1, CS2, CS3 and CS5, through recreational facilities to ensure a work-life balance while the yearly shared rewards in CS2 reduced the organisational injustice. Other demotivation factors as poor interpersonal skills were eliminated as in CS5 and poor

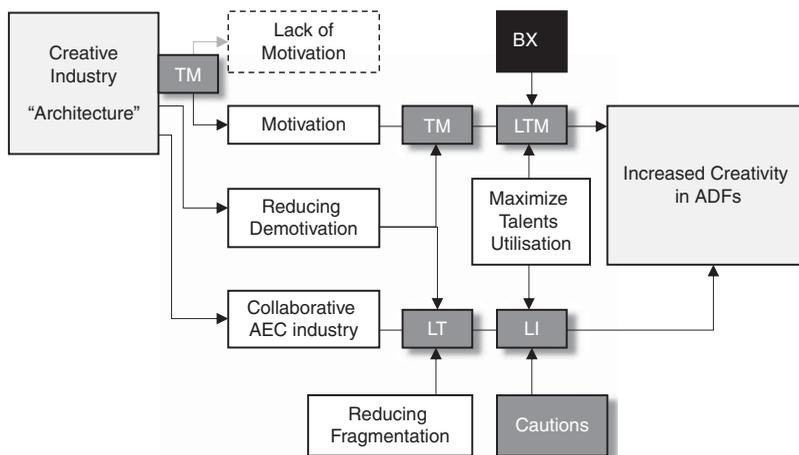


Figure 4.
Lean talent
management model

Source: Developed by: Authors

ECAM

Barrier No.	Solution	Notes
B1	TM	Motivation is enhanced and lack of motivation is eliminated in ADFs
B2	TM	Balance of work-life commitments reduces demotivation in ADFs
B3	LT	SBD, IPD, TVD and LPS are lean methods that create a enhances the flow in AEC industry, which reduces demotivation as well
B4	LI	Learning, the final stage of TM, is highly influenced by LI principles to foster creativity
B5	LTM	Lean-integrated TM enhances the strategy at its seven stages, which optimises utilisation of talents and eliminate waste of skills
B6	Adoption cautions	The five cautions of adopting LI principles ensure enhancement and continuity of the knowledge-based process

Table VII.
Solved barriers

Barrier Name	Sub-barriers	Description
BX	BX1 BX2	Conflict between STM and lean concepts Scant to no research is available regarding the integration of lean concepts with total rewards

Table VIII.
Unsolved barriers

organisational culture as in all cases. However, poor co-ordination of design teams was eliminated as in CS4 through LT, which is discussed in following parts.

It was found that motivation achieved by TM and demotivation eliminated by TM cannot guarantee creativity in ADFs since TU could act as another barrier. Several lean approaches were discussed to maximise TU. First, lean recruiting could be achieved through the STM, but the inclusive TM strategy could act as partial barrier in order to resolve the lack of motivation barrier. This situation is highlighted as additional barrier under (BX) for potential investigation. Lean performance management was highlighted in CS5 as explained through the EQT system. It maintained high performance and encouraged creative development at the same time. Rewarding talents and releasing others based certain criteria was in fact a lean approach that eliminated any wasted talents who are not keen to utilise themselves. The last lean approach, lean learning management, was highlighted in CS4 the LI principles encouraged learning in a manner that is suitable for ADFs' nature, which is knowledge-based and high in complexity and novelty.

Although TM enhanced motivation and reduced demotivation, another factor that emerged from the relationship between architectural, engineering and construction industries acted as a barrier as well. The fragmentation of the AEC industry caused the demotivation or poor coordination of multidisciplinary design teams. It prevented essential collaboration that ensures optimum performance by each industry to achieve the objective of the AEC industry of delivering innovative projects. CS4 highlighted how LT was privilege in reducing the demotivation caused by fragmentation. It presented how the set-based design, which is counter to the traditional demotivating point-based design, successfully reduced any potential wastes in the process including waiting, over processing, overproduction or rework. Its concept was based on asking for lean requirements from other department to maximise the performance of all departments. Only information that is critically required was being asked for.

LI principles are of essence for the environment in ADFs. CS4 showed a different understanding of LT in such environments. Additional activities were added in the beginning, which could be considered as wastes in other industries. However, it helped in reducing potential wastes at late stages of the project. Visual management helped as well

in reducing fragmentation of the AEC industry, which was addressed with set-based design. The visual management LI principle enhanced the role of LT in reducing the fragmentation through building easy communication. Set-based design, which was previously discussed, successfully achieved LI principles as Takt and one-piece flow. There was a rhythm of delivery and each part was being worked at in parallel through a collaborative environment in the three sub-industries of the AEC industry. The sixth barrier (B6) was mentioned to prevent successful implementation of LI principles if the mentioned considerations for adopting LT and LP in general in such industries were not applied and considered. This barrier was solved through the application of the considerations as it does not require further research to identify the considerations. Hence, talents in the AEC industry would be maximally utilised.

Regarding the analysed collected data from the survey questionnaire, although a low percentage of the ADFs in Egypt adopt TM, those who successfully adopted it were able to achieve motivation and reduce demotivation. Intrinsic and extrinsic motivational strategies received same amount of importance. Most of them have considered an inclusive TM strategy, which indicates existence of additional barrier. However, none of the lean concepts was indicated. This explains the reason behind lack of differentiated creative examples provided in the open-ended questions although 86.1 per cent showed perception of architecture as a creative industry and 72 per cent asserted on having creative development. It could be concluded that talents are not fully utilised or the fragmentation of the AEC industry prevents creative development. In either case, the need for integrating lean with TM is paramount. Not only the lean concepts should be integrated, but also the TM strategy should be integrated in the beginning because only 15 firms out of the 36 ADFs have integrated TM and mentioned having creative development. On another hand, 11 ADFs seek creative development without implementing TM.

7. Conclusion and recommendations

Creativity is the essence of creative industries that are concerned with delivering novel ideas while considering social circumstances. The architectural industry could be classified as one of the highest industries that should consider the social circumstances when delivering novel solutions. Several barriers were identified that prevent creativity in ADFs. They included lack of motivation, demotivation, fragmentation of AEC industry and LTU. As there were seven demotivating factors, TM was privilege in solving six of them. The seventh demotivating factor was fragmentation of the AEC industry, which led to poor coordination between the multidisciplinary design teams and was solved with LT. LTU was through LTM and LI principles. B6 is ready to be solved with the considerations of adopting lean concepts in ADFs. However, two additional barriers, BX1 and BX2, were identified with potential negative impact even after integrating LTM. In addition to the below-mentioned recommendations for future research, policy makers should develop a baseline for the integration of LTM in ADFs through developing programs to enhance awareness about the differentiated creative development in ADFs that did not achieve such development.

7.1 Recommendations for future research

Having reviewed the literature regarding influence of TM, LT and LI, under the term LTM, on solving barriers of creativity in ADFs, analysing case studies to investigate the solutions in a real-life context and analysing data collected from a survey questionnaire to investigate extent of need to integrate LTM in Egyptian ADFs, this research presents a set of recommendations. The following set of recommendations has been developed to help

researchers build on the developed LTM model or researching relevant parts that require independent and scoped research:

- researching potential drivers that could have an influence towards fostering creativity in ADFs or within the AEC industry;
- investigating the contradiction between STM and the inclusive TM strategy, as the seventh barrier, in achieving motivation while not considering lean recruitment;
- investigating the integration of lean concepts with total rewards of talents since it received scant attention;
- conducting a field study to investigate the impact of LTM in ADFs as a novel approach for enhancing creativity; and
- developing a framework for LTM in order to integrate it as a novel approach in ADFs, or other talent-based creative industries, to increase creativity for enhanced consideration of building users' social conditions.

Yet importantly, investigating additional barriers related to a specific creative industry other than architecture is an essence. Such barriers would not be talent-related as TM is inclusive for all creative industries, but each industry could have exclusive barriers. Such investigation should overcome the limitation of this research.

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