Role of Operational Excellence in Construction Industry: A review

Chen Zhang, Yong Zou

***Abstract*— Operational excellence is imperative in organizational management that ensures better results in terms of customer satisfaction, cost efficiency, productivity and innovation. The construction industry faced numerous challenges witnessed especially in the finally decades of the twentieth century. The main challenge was the problem of under-performance upon investigation was realized that problems like bureaucracy, ineffective tender measures, lack of team management skills along with lack of futuristic innovative plans. Operational excellence has been proven to be working in variety of industries such as manufacturing, but there is lack of operational excellence studies in construction industry. This paper provides models of operational excellence and challenges that scholars are facing within construction industry.**

***Index Terms*— Operational Excellence, Construction, Modeling.**

I. INTRODUCTION

The construction industry in any country is a cornerstone of the economy since progress necessitates the building of things be it houses, roads, dams or monuments. Since there is always something for the stakeholders of this industry, it is understandable to think that the industry is always in a boom. Ironically, this is often not the case and this is evident in the final decades of the twentieth century when stagnancy pervaded the industry. Companies were under-performing and the expected turnover left much to be desired. Mismanagement along with construction projects that went awry was a daily occurrence. The need for a model of operational excellence was thus evident and this revolution started with the input of individuals like Sir Michael Latham (1994) and Sir John Egan (1998) whose ideas changed the way the industry applied itself in terms of efficiency and innovation. This revolution touched the industry in other countries and the globalization of the world also encouraged them to adopt models that will enhance customer satisfaction, cut cost, cut wasteful processes in terms of managing resources and materials. Global warming as a reality also affected the way in which business had been conducted in this industry since there was the search for models that could encourage healthy and environmental friendly practices that still ensured optimal productivity.

The construction industry therefore looked outside itself to adopt operational models that were already in practice in other disciplines to enrich themselves. The models that fall within the realm of operational excellence were taken into practices though challenges like technological impetus and efficient management made it a slow process. Today, some of the best operational excellence models are applied by a majority of the companies within the industry to a successful degree. This is helped many companies to yield better results financially, create a more effective team, manage resources effectively and experience growth. Thanks to research and development, the industry is using more cost efficient and environmentally friendly practices which is operational excellence at its best.

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II. OPERATIONAL EXCELLENCE MODEL

Operational excellence as a model for the construction industry is simple and effective as evident in it straightforward suppositions and processes. All it entails is that operations along the value chain should be adequately managed in a way in which customer value becomes central. There is also the necessity for cost reduction which enables the company to gain a competitive edge. When all activities within the organization's management strata produce value and are efficient, it is the optimal point of operational excellence. There are many models applicable within the construction industry geared to achieve operational excellence. To know that a particular model is an operational excellence model, it must align to the following; reduce cost, increase the reliability of business processes, decrease working capital but increase productive results, and equally shorten cycle times in order to be able to respond to client demands in a more flexible and efficient manner. Customer satisfaction is the goal of operational excellence yet industry productivity, growth and sustainability are also its hallmarks. The examination of the excellence models projected by stakeholders and scholars within construction industry is an attempt to bring forth the best operational excellence model. This is attained in degrees which is why there is the clarion call for the unification of the best of these models to produce the most efficient operational excellence apparatus.

In a manual titled "Operational Excellence: Only the Best is Good Enough" Lunendonk posits a vision of operational excellence that could serve the construction industry in terms of customer satisfaction and growth. This study is essentially an attempt to draw attention to the potential solutions that can generate development and growth in the construction industry among others. As an example, there are studies regarding safety performance improvement in construction industry via operational excellence (liu et al. 2015; liu et al. 2017). Operational excellence is pertain to the growth of any company because of its decisive and competitive edge as it goes beyond just manufacturing but touches all the facets of operation like marketing and designing. There is also the examination of the six major factors that make up operational excellence as a model and these are strategy, organizational and workflow management, competence and skills, culture and leadership and systems and information technology. The four steps to success that the operational excellence model

projects like planning and setting goals, preparing and creating the basis, paying attention to the pilot phase as well as rollout methods and further development come into examination. This goes to emphasize that there are no small or big processes following the model of operational excellence, all aspects must be followed systematically to yield the best results.

Brain Rains (2015) opines that operational excellence is not a destination but a journey, a constant quest for perfection. According to him, this can only be achieved through operational discipline. For this to be possible, Rains quotes the definition of operational discipline posited DuPont Sustainable Solutions "the deeply rooted dedication and commitment by every member of the organization to carry out each task the right way every time" (qtd in Rains 14). The importance of operational discipline in the construction industry cannot be over emphasized since it ensures reliability and decreases risks of accidents that can be disastrous and costly in terms of human and material casualties.

Thurairajah et al (2011) are focused on the construction industry in the UK which they opine is great at is best but still underachieving. There are several issues that contribute to this underachieving problem some of which include unreliable profitability, lack of research and development, a shortage of skills and a fragmented construction industry at large (p 9). These researchers take a survey of reports in the UK construction industry between 1994 and 2004 and posit that there was the need to improve industry performance through particular regulations that will optimize operational excellence. The model they use in their analyzing is a juxtaposition of the Egan Model of 'constructing excellence' alongside other models that have been posited as an attempt to improve the culture, attitude and working practices of the industry.

Two stakeholders have worked tirelessly for the improvement of operational excellence in the British setting in order to achieve best results and they are Sir John Egan and Sir Michael Latham. Latham focused on the improving the performance of the construction industry in the UK, through team building and the efficient utilization of human resources that reduces costs and enhance productivity. This particular stakeholder surveyed the views of the different groups that make up the construction industry in order to attain holistic view some of which include contractors, as well as major public and private clients. According Latham, the promotion of operational excellence within the industry will begin from knowledgeable clients, a comprehensive project and contract strategy, a fair tender procedure, teamwork, and the creation of a design checklist and related documents. This report was published in July 1994 and got a lot of critical acclaim considering the fact that no one had examined the industry as a whole in an attempt to construct and effective operational model hitherto. The importance of collaborative teamwork and thinking became an additional facet to operational excellence and this served the industry well in terms of allocation and utilization of resources thereby stemming waste.

Although Latham's critique was instrumental to the construction industry's revolution, it did not address all the problems. This is why Egan's model was imperative to complete the problem solving that the previous model had started. The necessity for 'constructing excellence' was the major concern of this expert. The intention was to yield best results in terms of 'improving and achieving world class performance" (Thrairajah 2011 p 2) for the construction industry as a whole. In a manifesto titled "Rethinking Construction" Egan endorsed the ideas of Latham but moved further to explore the different methods through which collective improvement of performance could be attained through the application of best practice. Client leadership was therefore central as in the case of the Latham model along with the trust in human competence in achieving excellence in design, quality, sustainability and customer satisfaction in the industry. As a way of conclusion, Egan also called for a production based philosophy in the construction industry. By implementing all these elements, operational excellence will be attained because results will be innovation, productivity, best practices and engagement.

Through these two groundbreaking critiques, the British government under the supervision of Treasury Secretary in 1999 launched a campaign called "Achieving Excellence in Construction" to revamp the construction sector. The agenda of this campaign was to put together a set of modalities that was intended to ensure sustained improvement in construction, attaining best results as well as a method of renovation. There were equally targets set to monitor growth and excellence in the industry and these included partnerships and cultivation of long term relationships among industry stakeholders along with reducing administrative bottleneck in financial decision making. A critic like Kanji (2002) observes that this campaign was the hallmark of the evolution and modernization of the construction industry in the UK.

Other models of excellence abound in the industry and one is the European Foundation for Quality Management (EFQM) Excellence Model which equally has an agenda to promote operational excellence. This model was based on the hypothesis that customer satisfaction was the driving force of any business since it will lead to improvement in design and practice. This model evaluates customer satisfaction as the main parameter of accessing excellence and productivity in this industry. Balanced results and process orientation are adopted by this model in order to investigate the major factor. In the opinion of Porter and Tanner (1998) customer satisfaction as a yardstick to evaluating excellence was feasible since organizations and business that are noted for this trait often have a high degree of prosperity rates along with greater trade outcomes. With this goal in mind, the construction industry will be forward thinking in terms of innovation and adopt better technological methods, better partnership terms with better teamwork and operational methods. Great leadership will be the overall element that will ensure the realization of these grand ideals of excellence through customer satisfaction. Kanji (2002) believes that leadership pertains to the behavior of all managers in terms of drive and team encouragement that can yield the best results. Managers who can inspire their teams usually see more productivity and save the company resources.

Operational excellence is not only a British or European preoccupation but an American one as well. The Malcolm Baldrige national quality award was instituted in 1987 as a means of rewarding operational excellence. This award nominating body looks for construction companies that show inclination for performance excellence and competitiveness improvement and knowledge sharing on successful performance strategies and its benefits. A company that constantly improves develops recommendations on growth

which is something that other companies within the industry that benefit from. This award body has seven criteria that nominated companies must abide by in the quest for performance excellence and these include; leadership, strategic planning, customer and market focus, process management and business results. In this regard, the crucial role of top management to create and attain roles along with values and systems comes in handy. By encouraging the incessant quest for performance enhancement external orientation as important attributes to growth.

Kulatunga, Amaratunga and Haigh (2006) have equally made a contribution in terms of evaluating methods to optimize performance in the British construction industry through excellence models. These researchers assert that the review of literature in the field has shown that despite the adoption of all the incredible models put in place to ensure operational excellence, the industry is still under-performing. There are so many challenges that the construction industry is currently facing and these include changing market needs of consumers, health and safety fears, growing concern on sustainable work practices and new government regulations among others. In the face of these new problems, the industry has to adopt new practices that are consumer friendly, healthy, environmentally friendly and technologically savvy. Research and Development (R&D) is the model posited by this trio as the means to achieving excellence as also been acknowledged by other specialists like Fairclough (2002), and Hampton and Brandon (2004). The application of the R&D model has been evidenced by the focus on programs and investment strategies that foster research and development. Every sector faces challenges which come as a result of change in perspective and customer needs, this is the same with the construction industry. These challenges are equally an opportunity for growth and development attainable through the adoption of the stipulations posited by the Research and Development (R&D) Model that cuts across practices in the global construction worldview to promote the most efficient practices.

Fairclough (2002) reiterates that research into innovative mediums of construction will lead to the golden age of excellence that the British construction industry is aspiring for. He goes further to name the different areas in which this should focus on. The development of new products as well as processes and the provision of skills necessary to make use of ideas and lessons acquired through research. Learning about new methods to doing things does not help if there are no provisions for the implementation of the said skills. Fairclough (2002) illustrates how lessons learnt from operations with more advanced technological and environmentally friendly methods can be implemented into the British construction industry with little challenges since the knowledge has already been tested and proven efficient in other places. This is in conjunction to an opinion previously made by Paulson (1975) and the efficiency of this model has been time tested.

A National Council publication equally lays emphasize on the importance of the Research and Development model to advancing and improving methods and operations within the US construction enterprise. The imperative to adopt valued R&D activities as a means of improving growth through application was of paramount importance. This call was made against the backdrop of evidence that other countries were making better choices in implementing new ideas that encouraged operational excellence in the construction industry more than the US. This was costing US construction companies more, while customer satisfaction was minimal while on the global stage, some of these countries with more innovative methods had monopoly of the market.

Laing (2001) is another scholar who as explored the challenges faced by the UK construction industry that has impacted on the attainment of operational excellence. Some of these factors to this critic are environmental while others are as a byproduct of globalization. Laing (2001) lists these eight points which are the influence of global trends and competition on methods, design and material, greater need for standardization and prefabrication, health and safety concerns, the need for more efficacy in risk management, the necessity of innovative materials and construction techniques, the desire for sustainable development and work practices, the need for long term planning, development, revival of construction methods with sufficient provisions in terms of transportation, social services, trainings and jobs, and the concern about issues like life cycle performance of buildings in juxtaposition to original cost. These concerns are varied and numerous, yet an industry that is innovative and growth efficient consider them as milestones that must be met in order for the industry to supersede its current state into an era of optimal operational excellence. These challenges are therefore forcing innovation as the industry now looks out for construction and operational practices that are cost efficient, innovative and time serving in order to compete with the global construction scene.

Thompson (2005) in “Business Excellence: Lessons for the Construction Industry” makes some valid propositions that can enhance operational excellence in the industry. This researcher observes that the construction industry faced many end of era problems in the last decades of the twentieth century which included inefficiency, waste and lack of innovation. These problems were escalated by outside factors like bureaucratic bottleneck and more. According Thompson (2005), it was thanks to the innovative ideas of Latham (1994) and Egan (1998) that this industry was shown a way forward. Through the ideas of these thinkers, efficiency, innovation, profitability and productivity became aligned with the construction industry again. This lead to a new golden age for the British construction industry as it became one of the highest economic strong points of the nation at large. Thanks to these new ideas, innovative and efficient methods were cultivated and customer satisfaction along with global competitiveness became possible.

Incidentally, Thompson (2005) believes that other problems have now cropped up in the construction sector that somehow impairs business excellence which still need to be addressed. One of such challenges is the proliferation of a million models of operational or construction excellence that sometimes conflict in terms of application and practice. This befuddles the minds of some practitioners and even leads to cases of underperformance in the industry. Thompson (2005) thus, feels that it is imperative for the industry to work on a holistic model of excellence that will truly enhance business excellence rather than the Babel of models that currently run rampant within the industry. In her literature review, this scholar examines the popular models that are currently considered as basis of this industry’s advancement which include ISO 9001, the European Foundation for Quality Management (EFQM), Excellence Model and the American

Baldrige Model and the Business improvement methods like Total Quality Management (TQM), Business Improvement Review (BIR) among others (Thompson 2005 p 21). The examination of all these models in an attempt to find a holistic mean is essentially this scholar's contribution to the field and it is something that should be explored further for the sake of improvement and operational excellence.

One company stakeholder that has made some great strides in providing a pathway for the future of operational excellence in the construction industry is Accenture. This company is known for its high performance statistics and innovative prowess within the industry which has given them the status to contribute potentially beneficiary excellence models that will benefit the industry at large. One of such break through ideas is their take on galvanizing on "the new microeconomic environment" that has great possibilities of growth and profitability for companies that can position themselves constructively in this new landscape. For this to become feasible, construction companies must be "exceptionally agile, efficient and customer-focused to compete successfully with increasingly powerful emerging-market players and to achieve high performance in the construction markets of the future" (Accenture 2015 p. 4). Every business wants to be profitable and have a long term impact, yet, globalization as a reality has posed challenges for some companies who find it difficult to compete in the vast pool of the global marketplace. But there is also something for everyone if smart thinking is taking into consideration, and Accenture lends this to the industry by encouraging companies to focused on the micro opportunities and being on target in order to benefit from the opportunities and make provisions for the future.

Karim, Marosszeky and Kumaraswamy (2005) have researched the construction industry in Australia and its contribution to operational excellence in the field. These scholars use models like the ISO 9000 and the organizational effectiveness model to assess the place of the home industry in terms of efficiency, customer satisfaction and innovation. After a survey of the practices within the industry, these scholars opine that a considerable variation has been witnessed in relation to specific quality related outcomes. Their projected solution to this conundrum is the creation of a best practice implementation model that will guarantee quality construction outcomes like customer satisfaction and adaptability. From the observation of these scholars, the construction market in Australia is profitable yet, there is the necessity of better practices in order to attain operational excellence which will ensure that the industry is operating at its optimal. This view is echoed in Thompson (2005) as this researcher calls for the creation of holistic operational models that will serve the industry better.

The necessity to achieve world class standards of cost, quality and timelessness cannot be overstated. This is why the construction industry should find operational excellence models that unify to solve these problems for the global industry and so must work for everyone at least to varying degrees. From an observation of the European, continental, Australian and American scholars and more whose opinions have enriched this research, the call for this unification is clear. This is also very significant at this point in time because, the global status of the world makes it difficult for companies within the industry that cannot compete with other international counterparts to succeed. Thompson (2005) insists that British companies within the industry as well as those in other parts of the world must set up operations that enable them to compete with other counterparts anywhere, research to adopt healthier and environmentally healthy as well as innovative methods, train managers and staff to meet the standards of the total quality management model that enhance efficiency, curbs waste and upgrade productivity. Thompson (2005) is on point though she is echoing the opinion of other scholars like Dale, Cooper, and Wilkinson (1997) who upon witnessing the end of era struggles of the British construction industry called for a change in operations and perspective to management. They saw the global market as a rich opportunity of learning and rejuvenation for the home construction industry despite the fact that many thinkers viewed it with dread. It is thanks to the ability to embrace change that business sectors remain relevant and profitable to the nation and this is evident in the construction industry and the boost that operational models of excellence bring.

Oakland (1990) equally makes a contribution to the quest for an operational excellence model within the construction industry in particular and business corporations in general. As an instrumental contributor to this pursuit, he conceives a model that explores the different facets that make up excellence in terms of operation in the industry. Quality, competiveness, and customers as well as understanding and building the quality chains as well as quality management, assessing needs and exploring models and frameworks that are guarantors of operational excellence. John Oakland is credited as one of the scholars who have done outstandingly in terms of working out a model of operational excellence for the construction industry and other related management fields.

Coleman and Douglas (2003) pays attention to the ISO 9000 model of operational excellence and questions what the future holds for companies that apply this mode of operation. This is a pertinent inquiry because forward thinking is pivotal to the operations and growth of any company within any industry. The ISO 9000 model is one that many companies in the construction sector are enamored with, making this inquiry very important to stakeholders of the industry. Coleman and Douglas (2003) reiterate that the ISO 9000 model is a basic model for operational excellence that lays the ground rules of efficiency to any outfit. Yet, there is the need to adopt a higher model which will gel seamlessly with the basic ISO 9000. To the duo, European Foundation for Quality Management (EFQM) is the best model to incorporate since its criteria of implementation are clearer than many others. To these scholars, companies that start up with ISO 9000 before graduating to more complex models like European Foundation for Quality Management (EFQM) attain more optimal results in the long run in terms of customer satisfaction, cost efficiency and production growth. This is operational excellence in practice and the task of adopting two models, one that is an upgrade of the other should not be too heinous for any company with these objectives in hindsight.

Since the global construction industry is looking for operational excellence in order to optimize results, Middle Eastern stakeholders also share their views in this light. According to Ali, Al-Sulaihi and Al-Gahtani (2013), operational excellence models are ideal for measuring performance in the construction industry in Saudi Arabia. They start off by examining the factors that have pushed the

construction industry in this country to seek operational excellence majors and these are similar to those that inspire British and American companies to embark on the quest. These include slow economic growth, high competition and restricting attempts in the construction industry. After a survey of some of the big companies that are actors within the industry, these scholars observed that the traditional financial measures that have acted as regulating forces within the industry are now obsolete and contribute to the degeneration in the industry. Another pertinent finding was the need to enhance customer satisfaction, safety, business efficiency, and effectiveness of planning. This is why operational excellence models have become important to the construction industry in this country since they wish to meet the optimal result plans of the global industry.

Xiaochun Xing (2010) in a Masters dissertation comments on the measures that the construction industry can achieve operational excellence. The maturity model is what this young scholar submits as a solution to the industry's attainment of operational excellence. This is because it covers a wide "spectrum of dimensions of the content… with many auditable stages of each dimension in the quest for professional excellence" (Xing 2010 p 12). The maturity model is therefore a great outlet because it has shown more results in terms of development, efficiency and growth. This model has also enticing because it incorporated different models within operational excellence to project concepts that are easy to implement and utilize.

Some luminaries like Latham and Egan worked on propositions that were tentatively seen as constructing excellence measures. This was meant for the British construction industry but the effectives went beyond these boundaries as other nations starting adopting and implementing models that could make the industry more productive and efficient. The models that have been discussed have been used in the construction industry for decades yet most of them were business models based for corporations in general. This is why scholars like Oakland (1990), Coleman and Douglas (2003) and more, figure in this discourse even though they are in the field of management and IT. This goes to show that, the construction industry has to become more interdisciplinary in outlook in other to benefit from the best methods of operation that will help them to meet their millennial goals effectively. The objectives that the construction industry must meet in order to be optimal in terms of operational excellence have been underscored by the different thinkers and this include customer satisfaction, cost efficiency, waste minimization, effective management and teamwork along with innovative methods of construction that are healthy and environmentally friendly. Some models of operational excellence are viable to different individuals within the industry in terms of outfit and environment but all have potential albeit to different degrees. There is why some scholars like Thompson (2005) and others, have rather called for a unification of all the models of excellence projected and promoted by different participants in the field. This is an idealistic call that if implemented it will make things more efficient and universal for the industry. Even so, the models that abound are still helpful in enabling companies meet their goals and there is the possibility of graduating from one to another within the company's growth suggests the limitations of a current application.

III. SUMMARY

The fact that experts and consultants willing to help companies within the industry to effectively and effortlessly adopt these models as their outfit determines is also an added boon. Operational excellence is good for business and the construction industry is growing daily thanks to its readiness to incorporate and utilize the best of these models. Based on the researchers that have been conducted in this field.

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