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Impact of the Quality Management practices on the Innovation in Republic of Iraq Organizationsusing Six Sigma

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Abstract: This study aims to discuss the relation among total quality management (QM) practices and innovation. A research conceptual framework has been developed on this relationship. The outcomes demonstrate that a set of QM practices has a positive relationship through process management with a wide range of innovation. It was discovered that procedure management directly and decidedly identifies to radical, incremental, and administrative innovation. The findings also reveal that the value of an individual QM practice is tied to other QM practices. This study attempts to explore and fundamentally reviewed the association between lean six sigma, item and process advancement to check whether lean six sigma projects bolster or impede improvement. A discussion on the QM practices in service organization is presented and conceptual framework and model are proposed.
Keywords: QM practices, Relationship, Service organization, Innovation.

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I. INTRODUCTION

The literature reviews which discuss the relationship between Quality Management and Innovation show that there are two distinct outcomes that the relationship is negative and positive. Antony et al., 2015, display that there are a lot of reasons distinctive perspectives are come about like: how the build been conceptualized and Quality Management influences affects innovation or innovation affects quality management means the direction of the relationship. The vast majority of the published articles managing the relationship between Quality management and innovation describe quality management as more dimensional build (Prajogo et al., 2004). Others inspect the impact of quality management as a one build on innovation (Vijandeet al., 2007).

More of published articles tried the relationship between Quality management and Innovation discovered blended outcomes situated in (repetitive), the practices of Quality management looked contain: leadership (Prajogo and Sohal 2004), Product and Service design (Song et al., 2011), Strategic Planning (Prajogo and Sohal 2004), Santos-Vijande and Alvarez Gonzales 2007), employee involvement (Hung et al. 2001) customer focus(Prajogo and Sohal 2004, Hoang et al 2006), Process management (Benedetto et al., 2008, Zeng et et al. 2015) Training (Hoang et al. 2006, Kim et al. 2012), Benchmarking (Silva et al. 2014), data and reporting (Kim et al. 2012).

1.1 Lean Six Sigma

Customers demand and competitors increased the pressure on organization to have a high value for their products and services, the challenge is to have a high quality fast delivered and lower cost product and services (George, 2002) this challenge lead organizations to implement Lean Six Sigma as a quality improvement methodology and management strategy to raise their market share and gain more profit (Arnheiter and Maleyeff, 2005). Lean Six Sigma is a technique for business procedure which upgrades the procedure execution to build consumer loyalty and enhance the primary concern results (Snee, 2010).

Both Lean and Six Sigma have strategy for project management; six sigma utilize the project management with an enhancement plan while lean utilize the project management with an execution plan by relegated groups (Salah, Rahim and Careterro 2010).

1.2 Six Sigma

Six Sigma is a procedure for business enhancement that aims find to remove the reason for abandons in business process, the basic achievement components of executing six sigma projects are identified with the management duty and association in the supporting framework, understanding the strategies of six sigma, preparing and devices and strategies (Henderson and Evan 2000). During usage stage, six sigma project take after an efficient philosophy called DMAIC, The approach comprises of five stages each letter in DMAC speak

to a stage D-Define, M-Measure, An Analyze, I-Improve C-Control. DMAIC is a model and guide for six sigma project amid the application by considering the five stages when the six sigma project begin it expect that the arrangement is obscure generally there is no need the task simply will execute the arrangement the determination of six sigma instruments and procedures depends on the idea of the issue and its level of unpredictability.

All in all the six sigma extends keep going for 3 months to a half year, basically the undertaking won't have indistinguishable inspiration from the team players on the off chance that it takes over a half year, likewise there is a plausibility of administration changes in this period which could influence the six sigma project execution when the issue needs more than which could influence the six sigma project execution when the issue needs more than this time , the task can be separated into littler task (Naslund, 2008).

1.3 Lean

Japan experienced troublesome occasions after World War II; the nation had a many problems including the high rate of joblessness and poor markets. As outcomes to these conditions; Lean an orderly approach was destined to exile the waste. Lean came to react to the Japanese condition around then it used the acts of the car and material enterprises (Holweg, 2007), Lean substantiate itself as a system that is fit for helping assembling and administration projects in fulfilling client by giving an on-time conveyance, high caliber and minimal effort items. As per (Staats, Brunner and Upton 2011), the objective of lean is to diminish human exertion, stock, time conveyance to react property to the market request. Lean contributes straightforwardly to the business methodology of association. It additionally enhances the authoritative competitive (Chen, Li and shady 2010).

Several studies of research contend that Lean and Sigma ought to be consolidated for enhancing business fundamental and benefit development, According to (Salah, Rahim and Carretero, 2010). The mix of the two systems lean and six sigma empower companies to conquer the inadequacies of both on the grounds that everyone finishes the other. Lean six sigma steadily improves the quality of items and serves and the dependability of the procedure (Artheiter and Maleyeff, 2005). Likewise, the incorporation of the two methodologies prompts waste decrease, process changeability and subsequently accomplishing the business procedure change (Bendell, 2006). A few investigations characterize the apparatuses of the two systems independently and the run of the typical ill instruments of both (Antony E Escamilla and Caine 2003; Pepper and burning through 2010, Salah.Rahim and Carretero 2010, Drohomeretski et al. 2014).As indicated by (Salah, Rahim and Carretero 2010) The authoritative culture is basic to strategy as the way of culture figures out which procedure is more reasonable than the other, and the less approach ought to be all encompassing to represent to a few kinds of societies inside the association to end up constant change culture (Antony, Setijono and Dahlgand 2014).

II. LEAN SIX SIGMA AND INNOVATION

Antony, Setijono and Dahlgared 2014, have led on subjective research to investigate the relationships between lean six sigma and innovation between UK companies they choose ten diverse companies in working in both assembling and serves, the majority of the vast organizations and working both locally and all inclusive with an alternate affair of Six Sigma execution running for 3-12 years.In this study they proposed seven key component of Lean six Sigma that prompting development, there is Explorative critical thinking, mentorship key project determination, recommendation framework for representatives belt framework standardization, esteem introduction and process management.In this quantitative study, we will look at the connection between these merits and innovation.

As indicated by (Kwak and Anbari, 2004) understanding Six Sigma, rule merits obstruction, and entanglement expands the requirements for tutoring, instructing and preparing and in addition it empowers companies to help their key objectives. Mentorship is a one – to – one process that empowers individuals to learn and assemble their aptitudes and takes a more drawn out term contrasting and instructing. Mentorship is a basic piece of Toyota Kata when the TPS mentorship challenges the understudy to influence radical to perform in a procedure (Liker and Rother, 2011).

Value adding is a center idea of lean administration, the esteem is an aftereffect of doing things right, the consequence of enhancing quality speed and cost that accomplishes higher clients fulfillment maintenance and referrals and thus to development and productivity (Arther, 2007).

The traditional model of critical thinking expect the issue ID and finding are organized procedures taken after by usage of arrangement, however in reality a large portion of the issue displayed to issue solver are badly organized issue. In the event that the issue – unraveling process brought about misidentification of the issue, personnel analyze and the little arrangement it would create another issue and increment the cost of disappointment (MacDaffine, 1997), table 1 shows various models of the critical thinking process.

Table 1: Various models of the critical thinking process

Model	Problem-solving steps	Reference
Osborn-parne	1-Messfinding 2-fact finding 3-problem finding 4-idea finding 5-solution finding 6-Acceptance finding	Evan 1997
March and Simon	1-problem identification 2-diagnosis 3-solution Generation 4-Implementation	MacDuff 1997
MacDuffin	1-problem Definition 2-Problem analysis 3-Selection of solution 4- Testing and evaluating of solution 5-Routinization.Develop new routine	MacDuffin 1997

Furthermore, the aptitudes and attributes that they ought to have so as to partake viably in the achievement of the project have been discussed in (Antony et al 2014). As per (Harl, 2001) the Black Belt training courses, incorporate likelihood hypothesis, Mathematical insights, numerous regression, design of analysis the dark belt must be "scaled down analyst" to unequivocally perform in his part in the project. A person with different belt positioning is the person who will lead and screen the undertaking, foundation of the belt framework is fundamental to extend

III. RESEARCH HYPOTHESIS

This study endeavors to answer the topic of is Lean Six Sigma projects cultivate or prevent the advancement. The estimates of the examination are:

H1a: Lean Six Sigma is emphatically identified with the incremental product innovation.
H1b: Lean Six Sigma is emphatically identified with the extreme product innovation.
H2a: Lean Six Sigma is decidedly identified with the incremental procedure innovation.
H2b: Lean Six Sigma is decidedly identified with the extreme procedure innovation.

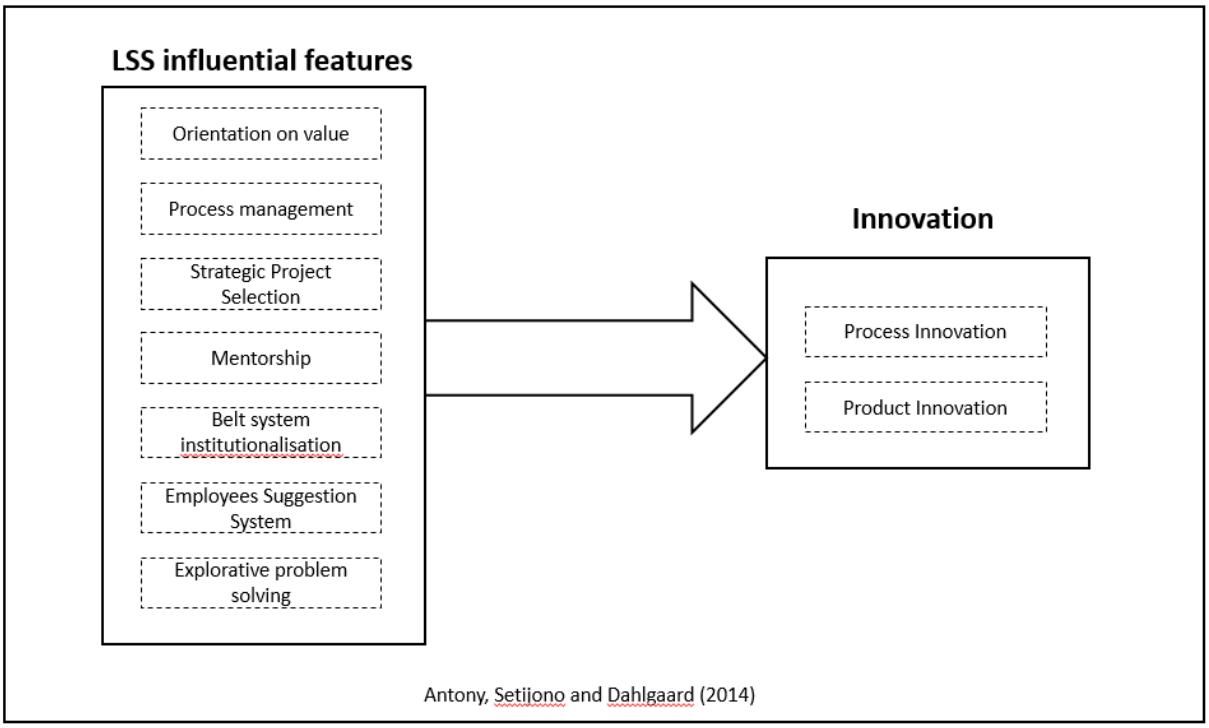

Figure 1: Research model

IV. RESEARCH DESIGN METHODOLOGY

4.1 Construction of survey instrument

The important literature has been looked into to obtain the proportion of each develop. Proportions of innovation were adjusted from crafted by (Kim et al. 2012). New measures were produced to survey Lean Six Sigma merits, keeping in mind the end goal to make new things, the creator audited both scholarly (e.g. Predomo-Ortiz et al. (2006), Prajogo and Sohal (2003)), and expert productions (e.g. Harry and Crawford (2005), this is a direct result of constrained experimental investigations on the connection between Lean Six Sigma and development. The recently created things have been sent to two specialists in the field of Lean Six Sigma them two are Master Black Belt Six Sigma (MBB), intelligibility, materialness and exactness, in light of their input the instruments were modified further to guarantee understandability and legitimacy.

The things of the study were estimated on 5 Points Likert scales, connected with "strongly agree" = 5, and "strongly disagree = 1. Instrument comprises of two segments, the first is about statistic data area incorporate the size and area of the organization, Six Sigma term of execution, vital data about the participants, their instruction level, span of involvement, preparing on Lean Six Sigma, in the event that they got, industry type.

4.2 Data Collection

The study objective sample is the Republic of Iraq organizations working in both service industries and manufacturing, the sample was looked over the index of the Local Participant Community (LMC) of the American Society for Quality, the review participants included Quality Managers, Operations Managers with Lean Six Sigma mindfulness, Master Black Belt, Black Belts and Green Belts, the underlying target test was 439 people. The participants were requested to answer the study inquiries through messages via emails. The study intended to be an electronic review. In view of (Dillman's, 2000), plan technique, messages with the review connect were sent four times to the chose test. An aggregate of 108 reactions were gotten, bringing about around a 24% reaction rate.

The last sample was split into two gatherings, in light of getting dates. The early gatherings comprised of 81, the individuals who sent their reaction before forward email, the second gathering comprised of 28 the individuals who sent their criticism after the fourth email (Armstrng and Overton, 1977). The aftereffect of the t-test showed that there were no huge contrasts amongst late and early reactions in regards to Lean Six Sigma qualities and Innovation composes.

4.3 Descriptive statistics

The results and data analysis of the targeted sample demonstrated that greater part of participant are from Baghdad (74) representing (68%) of whole sample, next is Basra (19) participants, figure 2 display the distribution of participant over Republic of Iraq.

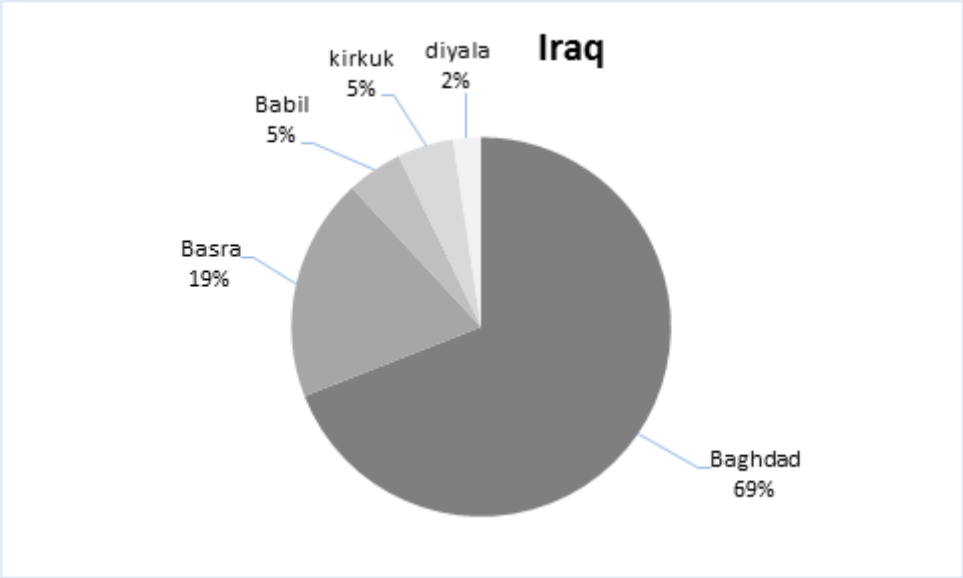

Figure (2) Participants over Republic of Iraq

As to kind of industry where organizations work in; different sorts of companies were taken an interest in the overview including human services, counsel, oil and gas, training, manufacturing, government and others, the most astounding number of participants were from medicinal services industry (31) participants, appearing (28%) of the sample, at that point producing industry (25) participant, appearing around (23%), likewise oil and gas industry took an interest in the review as it is one of the principle project in Republic of Iraq, there were 17 participant, appearing around (15%) of the sample, the rest of the participants were from discussion (11) appearing (10%), instruction (10) speaking to (9%), and others like saving money protection and budgetary services(8) appearing (7%). Figure 3 demonstrates the circulation of the businesses over the participated sample. The vast majority of the participant were Six Sigma Green Belt (SSGB) 46 participant, additionally there were (27) Six Sigma Black Belts (SSBB), (12) Operations Supervisors,(13) Quality Managers, (7) Operations Managers and (4) Master Black Belts, we acknowledged the response from operations managers and supervisors as they got preparing on Quality Improvements and (or) Lean Six Sigma, and they have adequate mindfulness on Lean Six Sigma procedures.

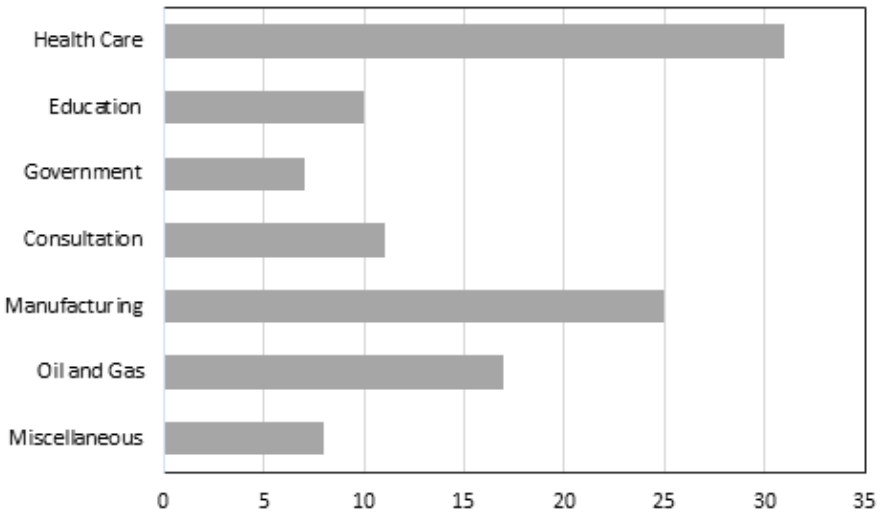

Figure 3: Industries covered

V. DATA ANALYSIS METHODS

In this study we will look at the relationship between Lean Six Sigma and Innovation, this investigation is utilizing the proposed Lean Six Sigma Features by (Antony, Setijono and Dahlgaard 2014). Various relapse examination is utilized, the free factors are: Orientation on esteem, process administration, Strategic LSS venture determination, Institutilized "belt" structure, Mentorship, Employee Suggestion System, and Explorative critical thinking, though the needy factors will be the extreme item advancement, incremental item development, radical process development and incremental process development. Factual analysis has been connected by utilizing IBM Statistical Package for the Social Sciences Software form 23. Pearson connection has been utilized to test the connection between autonomous factors (every one of them) and the needy variable (every one of them) (Schumacker, 2015).

5.1 Reliability and Validity

Reliability analysis of the estimations size of both Lean Six Sigma and advancement has been assessed, for this reason; Cronbach Alpha was ascertained, the outcomes indicate worthy level of inside consistency, all qualities acquired were higher than 0.6 (Jones and James 1979). Factor loading for everything in all scales was considered to assess the build legitimacy. In this investigation the basic stacking esteems was ascertained on an estimation of 0.5. As demonstrated in table 1, informative supplement 1, with the exception of eliminated products, all things of the scales stacked in qualities higher than this esteem. Likewise specialist tried the factor fittingness for clarifying the information so we got the level of clarified difference connected with factors found that all variables more noteworthy than half in all scales, so every estimation factor is fitting to clarify the information.

5.2 Analysis of Hypothesis

The relationship between Lean Six Sigma merits and Innovation types was confirmed by correlation analysis, based on Pearson's test as appeared in table 2, the correlation matrix between factors demonstrates the covariance and relationship among all factors in the study.

Table 2: Relationship between variables correlation significant at 0.05 levels

No.	Variables	1	2	3	4	5	6	7	8	9	10	11
1	Orientation on Value	1										
2	Process Management	0.547	1									
3	Strategic LSS Project Selection	0.562	0.247	1								
4	Instituutilised "Belt" Structure	0634	0.265	6.42	1							
5	Mentorship	0.741	0.381	0.714	0.755	1						
6	Employee Suggestion System	0.855	0.512	0.241	0.311	0.457	1					
7	Explorative Problem Solving	0.756	0.803	0.384	0.589	0.561	0.612	1				
8	Radical Product innovation	0.447	0.744	0.236	0.374	0.442	0.723	0.468	1			
9	Incremental Product innovation	0.501	0.765	0.405	0.206	0.476	0.788	0.795	0.265	1		
10	Radical Process Innovation	0.321	0.776	0.338	0.367	0.514	0.884	0.351	0.823	0.354	1	
11	Incremental Process innovation	0.355	0.534	0.476	0.442	0.653	0.872	0.682	0.223	0.764	0.462	1

VI. DISCUSSION AND RESULTS

Analysis and findings of the relationship between Lean Six Sigma and Incremental/radical Product/Process development demonstrate that solid connection is existing between the two ideas. All the relationships are sure the majority of them are huge, demonstrating the high process ability between the gatherings of the two thoughts. The vast majority of the speculation of this investigation were upheld, the outcome affirm that the proposed Lean Six Sigma features are encouraging development. In spite of the fact that the outcomes in table I demonstrate that all relation of the factors in the study are sure, there are evident solid relation between worker recommendation framework and a wide range of advancement incremental and radical, the outcomes demonstrate that they are extraordinary in their exploratory power.

Likewise the outcomes demonstrate that procedure administration is emphatically bolster development, which affirm a few studies in the field of Quality Management practices and advancement connections (Hoang et al. 2006). The results additionally demonstrate the effect of actualizing mentorship inside task on the procedure advancement which essentially clarifies the nearness of development execution in the Lean organization as mentorship is one of the Lean standards.

VII. CONCLUSION

This study endeavors to add to the information by filling the hole in the literature on the most critical quality upgrades approach: Lean Six Sigma project and its association with Innovation. In view of the author's best information; this is the main experimental study in the LSS-advancement relationship. The discoveries of this study affirm the proposed attributes of Lean Six Sigma proposed by (Antony, Setijono and Dahlgaard 2014). Concentrating on the quality change strategies like Lean Six Sigma project is vital for the long haul achievement. The seven merits of Lean Six Sigma were found to impact development. These features are extremely bland over different project, so the effect of these merits could be diverse in various industries, areas and most likely societies.

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