Evaluating the Application of Lean Six Sigma in the Creative Industry: The Case of a Spanish Company in an Islamic Country

Evaluando la aplicación de Lean Six Sigma en la Industria Creativa: el caso de una empresa española en un país islámico

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Abstract: The presence of cultural, creative and experiential projects in several Islamic countries evidences that the characterization of their main dimensions in diverse operational processes is a very interesting research question. From a comparative perspective, the application of Lean Six Sigma in the context of cultural institutions and organizations shows the usefulness to intervene on certain variables at different levels of management performance. This paper aims: 1) to describe the characterization of Lean Six Sigma as a set of techniques providing positive outcomes in the creative industry; and 2) to evaluate empirically the main dimensions for success of these core processes at a museum in an Islamic country. Firstly, this research describes a review of those approaches and secondly a rigorous managerial process is presented and validated. The results and conclusions of this research are relevant in decisions of cultural policy, but also on the operational practice and management theory in the scope of this study.
Keywords: Creative Industry; museum; business process; Lean; Six Sigma.
Resumen: La existencia de proyectos culturales, creativos y experimentales en diversos países islámicos refleja que caracterizar sus dimensiones principales en los procesos operativos es una interesante pregunta de investigación. Desde una perspectiva comparada, aplicar Lean Six Sigma

en instituciones y organizaciones culturales evidencia la utilidad de intervenir en ciertas variables, a distintos niveles de gestión. Este trabajo tiene como objetivo: 1) caracterizar Lean Six Sigma como un conjunto de técnicas que proporcionan resultados positivos en la industria creativa; y 2) evaluar empíricamente las dimensiones principales para el éxito de estos procesos centrales en un museo de un país islámico. En primer lugar, esta investigación describe una revisión de esos enfoques y, en segundo lugar, se presenta y valida su proceso de gestión. Los resultados y conclusiones de este estudio resultan relevantes en las decisiones de política cultural, pero también en la práctica operacional y la teoría del *management* en el alcance de este estudio.
Palabras clave: Industria Creativa; museo; proceso de negocio; Lean; Six Sigma.

1. INTRODUCTION

The existence of museums is an important pillar of the cultural and economic system in both developing and developed countries. Ahmad et al. (2013) point out that this kind of creative industry is one of the most important cultural industries worldwide and their relevance in economy and society has been growing since the last two decades. For example, in Paris The Louvre Museum evidenced in 2000 about 6.1 million of visitors, in 2011 approximately 8.8 and 10.2 in 2018 (Pallud and Straud, 2014; Causevic and Neal, 2019).

There are several reasons for this increased interest in cultural industry (as part of the new economy, Campos, 2016; Sánchez-Bayón, 2017, 2018 & 2019); specially, in museums, such as providing new creative space for community, supporting intangible, social resources and improved quality of life for citizens and visitors, among others. In 2009, the European Union financed a study highlighting that cultural institutions are related to creativity and innovation (KEA European Affairs, 2009).

In terms of symbolic and iconic representations, museums are adequate objects showing how to serve to the community, both tourists and natives (Bjerregaard, 2015). It is known that aesthetics is the most important criteria for differentiation in museum experiences, however museums are reinforcing design for commercial purposes in order to facilitate preferences to visit the cultural sites, that is, visitors and tourists represent attractive segments to be linked to museums (Causevic and Neal, 2019).

Recently, satisfaction of consumer preferences or any aspect of the Islamic economies on the development of diverse paradigms is showing a

great interest in Business discipline. For example, the focus of business and commercial processes in institutions oriented to experiential events justifies an investigation of the mean of information technologies, operational processes and communication systems in cultural contexts (Dela Santa and Tiatco, 2019).

Cultural tourism is a significant phenomenon evidenced from the development of museum industry. In practical terms this means that many Muslim and non-Muslim countries are trying to attract the tourist's market by providing the products, destinations and facilities to cater their preferences and needs (Ch'ng et al., 2019; Napp et al., 2016). However, in this area a shortage of theoretical and managerial publications is appreciated.

Based on evidences of business process improvements in cultural institutions, this manuscript presents the implementation of Lean Six Sigma methodologies in the context of a relevant Islamic museum. In this paper, we have focused on an experiential context considering several aspects that describe the dimensions of experience at the National Museum in Muscat, Oman (NMO), a modern museum in an Islamic country. This paper describes an exploration related to the design and implementation of commercial processes in this institution.

Essentially, this research intends to describe the application of operational methodologies in order to reduce the existing gap between diverse steps in business processes. Our specific objectives are the following:

1) to characterize the Lean Six Sigma methodology as a set of techniques providing positive outcomes in the creative industry; and
2) to evaluate the main dimensions for success of these core processes in an Islamic country, in empirical terms.

Additionally, the implementation of this techniques is oriented to improve operational processes by eliminating unproductive activities and tasks, innovate in working methods and, obviously, in order to increase agility reacting to rejections and complaints.

The case study described in this paper presents the assignation by the Ministry of Culture in Oman to five firms, including a Spanish company. Moreover, the project was awarded to these companies but in turn each of them has outsourced some activities to other institutions. Each of these firms had their particular staff and employees. It is relevant to notice that outsourcing can cause "white spaces" (that is, the spaces between different process phases) if more organisations are linked in the

operational and commercial processes. Moreover, each firm comes from a different environment with employees from diverse countries.

As an instrument for analysis, in this paper the Lean Six Sigma methodology is implemented. Additionally, in this manuscript a guidance on process innovation is described.

The outline of this research is the following. The contextual and conceptual framework considering academic literature is exposed in the next section. Details and design of the methods and materials are described in the third section. Specific findings and discussion are highlighted in section number 4 and finally conclusions, managerial and theoretical contributions are exposed in the fifth part of this paper.

2. CONTEXTUAL AND CONCEPTUAL FRAMEWORK

2. 1. Business processes in cultural contexts

Recently, several authors point out that the most important aspects for managing museums are to gain sustainability and reduce costs (Camarero et al., 2015; De Backer et al., 2014; England and Miller, 2016; Lo et al., 2019).

According to Han et al. (2018) and He et al. (2018), several studies highlight the importance to characterize the experiments described in the literature and the tools used for evaluating those experiments. For example, several authors (Entradas et al., 2016) point out that the different information systems, technologies and the Internet impact on the manner that clients experience with museums, in terms of the use of Information Technologies, Virtual Reality solutions (Proietti et al., 2015), Quick Response (QR) code technologies (Rich, 2016; Ruiz-Alba et al., 2019) or diverse devices to transform customer experiences in public spaces.

Given the presence of different cultures and structures in organizations and institutions, some of the processes, activities and tasks to be implemented are analysed because their application requires to observe diverse systematic steps.

Specifically in a Islamic cultural context related to business process, museums represent an important opportunity to study in comparative terms a commercial context on which researchers has focused (Recuero et al., 2019). The importance for cultural institutions to increase incomes and revenues, improve their benefits and transform their models towards

experience-focused practices has led to highlight a visitor orientation in order to make these institutions accessible to tourists and visitors.

Moreover, this customer orientation in Islamic countries intends to bring culture closer to consumers' demands and expectations (Adamides and Karacapilidis, 2006; ITC, 2015; Samori et al., 2016).

According to several authors (Sevilla et al., 2017; Su and Teng, 2018; Tyszczuk and Smith, 2018), it is clear that attractive museums will affect behavior and lead visitors to these institutions, but studies in Management Sciences have not reported this particular finding in detail.

In terms of the application of commercial and business processes methodologies in cultural contexts, the PMC (Process Management Cycle) methodology is presented. This methodology requires to implement the following specific actions at museums (Hammer and Champy, 1993; Martinez et al., 2018) among others:

- Do it right the first time.
- React to rejections, inspection and repair.
- Gain confidence to organizational change.
- Align with other commercial processes.
- Analyze relationships with several processes.

Recently, many managers in cultural institutions have evidenced a great interest in technologies applied to leisure industries (Causevic and Neal, 2019). However, several investigations show the existence of contradicting opinions between "traditional" approaches to exhibitions at museums and "interactive" technology techniques for visitors ((Dela Santa and Tiatco, 2019; Entradas et al., 2016; Ruoxi and Zhang, 2019; Sciurpi et al., 2015). Lean Six Sigma practices are a relevant tool for managing at museums and cultural industries (Martínez et al., 2018; Pallud and Straub, 2014).

2. 2. Lean Six Sigma as a tool for improving business processes

Lean Six Sigma is a methodology mostly used in diverse disciplines, for example in Operations Management and Engineering (Martinez et al., 2018). Initially, several authors often considered the concept of Lean Six Sigma linked to the analysis and use of experimental systems. However, nowadays practice evidences that this methodology is still predominant (Martinez et al., 2018; Napp et al., 2016).

Recently, we are appreciating an inclination towards more human-based approaches based on collaborative knowledge, networking and diffusion among employees (Martinez et al., 2018; Recuero et al., 2019).

Additionally, applying business models at cultural institutions have been highlighted as an interesting question, in particular oriented to commercial process modelling as an effective action for change in organizations (Ch'ng et al., 2019). The implementation of processing modelling has caused advantages and opportunities to several institutions, however the models applied tend to be reported during commercial processes and referred to reengineering activities; that is, they rarely support the implementation of the processes.

The characterization of procedures to design and apply several Lean Six Sigma methodologies at museums is oriented to improve organizational performance (Camarero et al., 2015; Martinez et al., 2018). Moreover, recently there is an increasing interest to make operational systems more flexible and provide support using different techniques (Tyszczuk and Smith, 2018). For example, in terms of the importance of the security system in showcases at museums, the National Museum of Oman evidences 247 showcases and approximately 3,000 security devices. In comparative terms, in Madrid the Spanish Archaeological Museum had 337 showcases in 2014 (MAN, 2014).

This manuscript aims to describe a case study in order to serve as a contextual and conceptual framework of reference at museums and other cultural institutions. According to Sciurpi, Carletti, Cellai and Pierangioli (2015) describing the particular experience of "La Specola" Museum in Florence, some environmental conditions such as temperature and energy were not acceptable for the preservation of exhibitions. For this reason, implementing Lean Six Sigma techniques was particularly relevant in order to reinforce some environmental and contextual conditions that can affect to the exhibits and showcases.

3. METHODOLOGY

3. 1. Scope of study

Oriented to evidence the two specific objectives of this research, the improvement of the operational process in NMO was analyzed by means of the coordination, studying the commercial activities and using some indicators related to the number of errors identified in showcases.

The National Museum of Oman is the most important museum in the Middle East, it represents 4000 m2 located in Muscat. It has 247 showcases of 22 models, approximately 7,000 exhibited objects and interactive devices are showed. Within the Exhibition Area of this museum, there were identified three processes: Showcases, Furniture and Objects-Content (that is, information and objects).

An important aspect to take into account is that the three processes work together, but two of them (Showcases, Furniture) are required to complement the third one (Objects-Content).

The Spanish company participated working in two areas: 1) the construction of the museum and 2) the exhibition. The operational process related to the construction of Exhibition evidenced continuous adjustments until the construction of the building was finished.

3. 2. Sources and research procedure

In terms of sources and research procedure, the Ciclo de Mejora de Procesos by Berenguer and Ramos (2008) grounded in Hammer and Champy (1993) was applied due to its flexibility and versatility. This methodology is an eight-step process defined on DMAIC (that is, Define, Measure, Analyze, Improve and Control), two additional steps (or phases) from introduction to control and finally, a final one related to training. Obviously, this process has defined several actions and tasks into sequential phases ending in a quality control (final step or phase).

Evaluating the improvements implemented in this research, several Key Performance Indicators (KPI) were used: 1) Approval of showcases / Total; 2) Showcases with errors inspected / Total; 3) Showcases without connection box / Total.

Additionally, a mapping including all processes was elaborated and the main KPI were defined to evaluate the degree of inefficiencies and satisfaction. The number of approval of showcases was measured in percentage / Total, in this research.

Also, some criteria focused on reducing the degree of dissatisfaction was considered. A systematic study was made of all the processes identified according to the three operational alternatives: Showcases, Furniture and Objects-Content (see Table 1).

- Customer satisfaction (level of service).
- Customer dissatisfaction (number of problems causing dissatisfaction).
- Extrapolation to different projects.
- Opportunity for improvements

Table 1. Key criteria on dissatisfaction.
Source: own elaboration

4. RESULTS

Initially, this project at NMO considered a huge number of activities and tasks. Given the diversity of organizational structures and cultures involved, many actions to be carried were implemented weakly due to bureaucratic reasons. For example, previous to implement some actions, the manager did not coordinate the execution of the processes.

Table 2 shows the main variables to manage and also the objectives and purpose to reach when the improvements on the processes at NMO were implemented.

Table 2. Variables to manage, objectives and purpose to reach

Variable	Objectives and purpose
Speed	To eliminate activities not-adding value, such as numerous inspections at the NMO
Agile	Reactions to rejections, to repair and learn to do the first
Alignment	To improve the interaction between among employees
Innovation	To improve some operational techniques and introduce novelties

Source: own elaboration

Initially, when the Spanish firm started the process of installation, the number of showcases in the NMO was 247, At the beginning of this improvement process, only 11.3% of the showcases were approved, 72% of them had errors and a number of 45 showcases were identified.

Finally, after the Lean Six Sigma methodology was implemented, 41.7% of the showcases were approved, only 2.3% of them had errors and 14 showcases were recorded (see Table 3 for details).

Table 3. Summary of results

KPI	Initiation of the process	Forecasting	Final results
Approval of showcases	11.3%	60.7%	41.7%
Percentage of showcases with errors	72%	5%	2.3%
Showcases without connection box	45	15	14

Source: own elaboration

5. CONCLUSIONS

In particular, this paper aimed to describe the application of Lean Six Sigma techniques related to security processes at the National Museum of Oman, located in Muscat. Particularly, in this manuscript we have identified some variables playing an active role in a cultural environment, such as a museum but our findings can be generalized to other contexts.

In this manuscript, our contributions related to conceptual and managerial foundations are oriented to improve diverse operational processes when managers and directors implement diverse activities. Some indicators such as reduction of errors, customer satisfaction and opportunities for improvement are of special relevance in order to facilitate the operational coordination at museums.

Regarding to the specific objectives described in this manuscript, our findings reinforce the importance to monitor certain indicators managing different cultural institutions. In the next paragraphs we present the main conclusions, limitations, managerial implications and further research.

Understanding this investigation as a repositorial framework of knowledge with application to similar cultural contexts is the main contribution of this manuscript, considering the specific aspects of each environment in particular. This repository includes different experiences captured by agents and organizations as findings and best practices. Moreover, these results contribute to reinforce the value proposition of museums in terms of different aspects regarding the three processes in Furnitures, Showcases and Content-Objects. The specific key indicators here described highlight the importance of certain management tools in order to intervene on certain operational domains.

Additionally, some relevant aspects to consider in terms of limitations are the following: for example, in this research we appreciated the difficulty to manage actors derived from diverse cultures and of course the different visions of the firms involved in the construction of this institution.

Managing the standard of quality of services represent a challenge in the management of cultural events and institutions. The repository of knowledge generated by this research facilitates the generalization of these results and findings serving as a reference for extrapolation of these results to further research.

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