

Lean Philosophy: A step towards improving the management of hotel supply chain

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Abstract

Effective hotel supply chain management has burgeoned as a potentially valuable means for achieving competitive advantage and improving organizational performance. Competition between hotels has recently expanded to include competition between supply chains. Major businesses around the world have realized the value that lean management philosophy can bring to their supply chains. Lean is a systematic approach that is presently argued to be adopted to optimize the entire supply chain management by eliminating wasteful activities (time, effort and materials), increasing product flow efficiency, reducing inventories, and enhancing customer fulfillment and satisfaction. The aim of the current study is two-fold. Firstly, it aims to assess the current level of awareness about lean management within the hotel sector in Egypt, as a point of reference to evaluate the readiness of this sector to implement the lean concept in the management of their supply chains. Secondly, it further attempts to propose a framework to facilitate the implementation of lean in the management of hotel supply chain. A quantitative methodological approach of a questionnaire has been conducted with senior managers in five-star and four-star hotels in Egypt. Findings indicated that hotels in Egypt are somewhat aware of the terms like, for example, lean management, lean thinking, or lean principles, though more emphasis is needed on how to effectively implement lean tools in the management of hotel supply chains. Lean awareness status differed between five-star and four-star sub-segments. Overall, the results indicated that the hotel sector in Egypt has an adequate level of readiness to implement lean supply chain management (LSCM). It was shown that hotels already have in place certain practices that support this philosophy. Finally, a four-phase framework for effective LSCM implementation has been proposed.

Keywords Lean management, lean thinking, supply chain management, hotel sector, Egypt.

Introduction

A supply chain is often viewed as an organized network of facilities and activities that connects stakeholders (suppliers, manufacturers or nucleus organizations, distributors and end customers) together and links each organization's inputs to its outputs (Hussain et al., 2016). The objective is to satisfy the customer needs by providing a product or service of high quality at a reduced cost and in a timely manner by ensuring the continuous flow of materials (Duarte, 2013). Supply chain management (SCM) has proved to be one of the most influential developments in business management and has gained significance for enhancing customer satisfaction and improving organizational competitiveness. In the future, the basis of competition in the hotel industry will revolve around supply chain developments (Hong et al., 2018). However, despite the remarkable growth of service supply chains, including the hotel sector, they are currently experiencing critical challenges that may confine their future potential. These challenges include globalization of manufacturing operation, pressures to produce safe and high-quality products, competitive pressure for shorter lead times, changing preferences and expectations of the customers, and technology advancement (Al-Aomar and Hussain, 2017). At the same time, the needs to eliminate and reduce wasteful activities (time, effort, and materials) increase the complexity of supply chains and post more challenges to modern SCM. These challenges affect the hotel supply chain in various ways, resulting in new requirements on SCM (Duarte, 2013). At present, hotels are paying particular attention to ameliorate the

quality levels while diminishing the overall costs and fulfilling their customers' needs. Due to the extremely competitive environment, hotels are forced to adjust their SCM from traditional ones with high inventory to a leaner operation with low inventory in order to enhance the overall productivity and efficiency levels (Shah and Ganji, 2017). The achievement of these objectives lies in managing two important keys, namely: waste elimination and flexibility enhancement. These two objectives significantly increase overall efficiency and responsiveness by reducing operating costs and enforcing continuous improvement. With the emerging acknowledgment of the significance of SCM, the notion of the lean supply chain has been proposed. These practices have been implemented in the manufacturing marketplace for years as Lean Management (henceforth, lean) (Rauch et al., 2017).

Since its adoption by Toyota, lean has been adopted successfully by several companies across a variety of economic sectors. Lean has helped many companies to effectively plan and manage their resources and develop operational trends and better waste reduction strategies (Shah and Ganji, 2017). According to recent studies, the implementation of lean principles has empowered the firms to be more customer-oriented, flexible, profitable and competitive (Fu et al., 2017; Hong et al., 2018). The existing literature provided evidence that indicates the significant connotation between lean implementation and operational performance improvement (Marodin and Saurin, 2013). Generally speaking, lean practices and principles focus on reducing waste and processes variability, providing an improvement in the overall performances of the operations, and rendering value to the end-customer at the lowest possible costs (Shah and Ward, 2003). Yet, most prosperous companies have had a bargaining chip towards the expansion and linkage of their internal processes improvement with external customers and suppliers (Tortorella et al., 2017). Hence, it is evident that supplier-customer integration plays an important role in improving competitiveness in the organization's onsite and offsite spheres (Frazzon et al., 2015). This concept perfectly aligns with the classical SCM definition, since it outlines goods flow across fabrication and dissemination chains from supplier until the final user (Power, 2005).

Consequently, the principles of lean are assimilated with the combinatorial approaches of the supply chain to counterpoise the pressure of increasing competitiveness for shorter lead times, lesser costs and superior quality (Cudney and Elrod, 2011). Lean supply chain management (LSCM) has protruded as a significant organizational initiative to eliminate waste and improve operational efficiency across the entire supply chains (Al-Aomar and Hussain, 2017). As explained by Vitasek et al. (2005), the LSCM notion includes uphill, downhill and lateral partners producing goods, services or other value-adding activities. Aligned with this integrated LSCM vision, the entire flow from raw materials to final customer is regarded as an integrated lean supply chain. This integration can manage demand volatility and uncertainties of lead time while creating consistency and reliability in products supply (Tortorella et al., 2017).

LSCM focuses on how the firms can significantly optimize their supply chain performance by eliminating non-core processes (waste). Waste is measured not only in raw materials but also in human resources, time, movement, production, and even creativity (Warcup, 2015). The lean model requires workforce reduction, space allocation, balanced energy usage, higher system flexibility, and the use of standardized components (Duarte, 2013). The value is maximized through full coordination between all parts of the supply chain more intensely than in traditional management initiatives. This coordination adds value not only to the companies involved, but also to the external partners such as suppliers, shareholders, and customers.

LSCM have invariably been applied in the manufacturing for over four decades. It is only recently that the trend has emerged to extend the lean principles into the management of supply chain (Ugochukwu et al., 2012). Academics and practitioners argued that the area of SCM reached a critical stage where the widespread application of lean principles might become a dominant approach to the strategies and tactics of the hotels in the future (Marodin and Saurin, 2013). It has been claimed that with waste minimization and higher flexibility, effective LSCM can be a major source of competitive advantage for hotels where competitive advantage may be sought via practices such as reduced inventories, minimized wastes, dominated lead times and energy, controlled impractical human efforts, lower costs, and mutually-beneficial suppliers interaction and collaboration (Xu and Gursoy, 2015). A review of relevant literature on LSCM has revealed that, unlike other service areas, research on the adoption of lean principles on the management of hotel supply chain is still at the development stage (Dora et al., 2014). There are just a few and not well-documented cases for the implementation of lean in this sector (Rauch et al., 2016). To the best knowledge of the researcher, no substantial studies have been conducted to further explore the benefits and challenges associated with the applications of lean thinking in SCM, particularly from the hoteliers' perspective. Therefore, conducting research on how to improve the management of hotel supply chain based on lean principles is a highly salient topic. In addition to knowledge contribution, the findings of the study will reveal the presence, extent and awareness of lean thinking within the hotel sector in Egypt and the perceived difficulties and benefits that associated with lean implementation in the hotel sector. Findings from this study can provide an academic perspective on leanness so that proper strategies and plans can be formulated to promote widespread application in the hotel sector. Thus, the research problem can be formulated by answering the following questions

What is the level of lean awareness and recognition in the hotel sector in Egypt?

Are there any significant differences in lean awareness between five-star and four-star hotels?

What is the potential for lean implementation in the hotel sector in Egypt?

What possible benefits and challenges are associated with the implementation of LSCM?

In order to answer these questions, the following objectives were pursued

To assess the level of lean awareness and understanding within the hotel sector in Egypt.

To evaluate the readiness of the hotel sector in Egypt to implement the lean concept in the management of their supply chains.

To explore the hotel managers' perceptions of the benefits and challenges related to the adoption and implementation of LSCM.

To propose a framework that facilitates the implementation of LSCM.

The remainder of this paper is structured as follows. A theoretical background is presented sections describing the research methods, the validation procedures, the results, and discussion follow. The paper ends with a conclusion, implications, limitations, and directions for future research.

Literature review

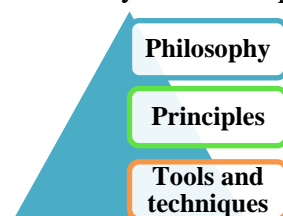
The lean concept

The starting point of lean activities can be traced back to the Toyota Production System (TPS) and was created by Taiichi Ohno at Toyota Motor Corporation. This system was emphasized on the effective utilization of the resources through level scheduling to help companies achieve more with less human effort, time and cost (Dettmer, 2008). From that point forward, TPS has persistently developed and turned out to be known in the West,

initially as just-in-time (JIT) production. Afterward, it was advanced as lean production or lean thinking (Duarte, 2013). Actually, there is no generally accepted definition of the lean concept. Instead, there is a great variation of what lean is and what areas are appropriate for its implementation within the organization (Shah and Ganji, 2017). However, in an attempt to give a clear definition of the lean concept, some contributions of researchers in this field should be presented. For example, Bruce et al., (2004) defined lean as an integrated system that involves continuous improvement to stimulate productivity and enhance quality through processes that add value to the product/service. In the same vein, Shah and Ward (2007) explained that lean can be comprehended as a management strategy that defines the methods for improvement and optimization of the production system focusing on identification and elimination of waste and reduction of the variability from demand to supply. Further, Wong et al., (2009) defined lean as an approach to maximize customer value by controlling the volume of wastes through the effective utilization of human and process design elements. Other practitioners defined lean as an applied model of substantive techniques that perform the required tasks in the process while maintaining the minimum of activities that do not add value to the end-customer (Rajenthirakumar et al., 2011). Similarly, Ugochukwu et al. (2012) pointed out that lean is a management approach that attempt to organize the human activities to deliver more added values to customers while eliminating waste inside and afar organizations value chain. It is an approach to monitor and control the waste inadvertently generated by a specific process to accomplish cost lessening, quality and proficiency optimization with less exertion (Borges Lopes et al., 2015).

By reviewing the preceding literature, it can be concluded that there are alternate perspectives on the emergence of the lean concept. For example, Hines et al. (2004) emphasized that lean has two levels: strategic and operational. The authors argued that the strategic level is customer-centered and encompasses the five lean principles or lean thinking. This level addresses value creation issues and a better understanding of customer needs and requirements and has unrestrained applications. Whereas, the operational level involves lean tools and addresses the waste reduction issues that apply mostly to the shop-floor level. Based on these two dimensions, Pettersen (2009) categorized four approaches to lean. The four categories are toolbox lean (practical and operational); becoming lean (practical and strategic); leanness (philosophical and operational); and lean thinking (philosophical and strategic). To realize the preferable of the lean concept, it can be categorized into three levels as shown in Figure (1).

Figure (1): Three layers of lean perceptions



Source: Stentoft Arlbjørn et al. (2011)

The higher level in Figure (1) can be described as the core philosophy of lean, which is to achieve the maximum efficiency in operations at the base cost and with almost no waste. Therefore, those activities that have no value from the customer's viewpoint are eliminated in order to enhance quality, lessen costs and increase flexibility. Lean philosophy focuses on how the firms can significantly optimize their business processes by eliminating of

wasted resources in the process. Waste can be defined as any activity, which does not create any value for the customer or product. In the supply chain, waste is generated through the disgraceful data stream, the flow of materials and funds into the system (Rauch et al., 2017). According to the lean philosophy, wastes can be classified into seven types: Over-demanded production, waiting time, transport, extra-processing, inventory, extra motion, non-utilized talents, and poor quality waste (defects). The types of waste listed are only the evident portion of wastes within the food supply chain and the production processes, and there can be other considerable wastes referred to as invisible wastes that need to be recognized. All these types of waste should be eliminated from the system after it becomes lean (Shah and Ganji, 2017). To eliminate wastes, organizations need not only to detect the resulting symptoms but also to find out the root causes of the wastes (Melton, 2005). As indicated by the Lean Enterprise Research Center, it is expressed that only 5% of all the processes compile value, whereas 35 % of them are basilar for non-value added and surprisingly, 60 % of commonalty processes compile no value to the organization and customers. For such posture, waste minimization mechanisms would be decisive for organization progressions. Accordingly, the waste and value must be plainly recognized; a lean imitative structure should be settled that encompasses the effective involvement of senior management, as well as, the development of human resources to provide both practical and facilitation of improvement events (Shah and Ganji, 2017).

The second level of lean perceptions is constituted by the five principles which developed by Womack and Jones, (1996). The lean philosophy is organized around five core principles:

Determine value from the customer perspective: Find out what customers are seeking to get from the product/service. Organizations must thoroughly understand the expectations and requirements of their customers and design their products/services, processes, and methods accordingly (ultimate customer end).

Specify the value stream: Determine the value stream in all activities and processes that the products go through from suppliers down to the end customer. Elimination, whenever possible, of those activities that consume time, resources, or space without adding any value to the end customer.

Establish process flow tracking system: Effective organization and tight sequence of the value-creating system to avoid delays. The smooth flow of product/service towards the end customer (process re-engineering thru elimination of unneeded processes).

Pull from the customers: Focus only on what the customers require or need (customers trigger the production). This reduces production time and inventory costs as well as increases the transparency of the supply chain and reduces uncertainty.

Seeking perfection: Incessant improvement of the system. Avoid and solve the problems when they occur. This principle includes quality attributes and the provision of producing what the customers want, in a timely manner, at an appropriate price, and with the minimum waste. As the value is determined, the value streams are selected, wasted activities are eliminated, and flow and pull are introduced, the process begins again and it continues until a perfect state of value is created with minimal waste (lean optimization continues until each process is 100% value added).

These five principles were formerly progressed for the benefit of manufacturing settings and can be implemented in various settings such as service and food industries (Shah and Ganji, 2017). For example, many healthcare and constructing organizations around the world are increasingly applying lean methods, and similarly, the tourism and hospitality sector is increasingly interested in these methods (Rauch et al., 2017).

The third level of lean perceptions consists of various detailed proven tools and techniques that focus on effectively eliminating waste and improving flow. Each tool/technique needs to be customized and refined according to the specific needs and requirements of each organization (Cudney and Elrod, 2011). Some of the widely recognized lean tools/techniques are summarized in Table (1).

Table 1: Some of the widely recognized lean tools/techniques

Tool	Description
Poka-yoke (Mistake-proofing)	The purpose of Poka-yoke is to achieve zero defects in products and processes by eliminating, amending or drawing attentiveness to human errors when they occur. It comprises the adoption of safe failure methods that aim to detect and prevent human and technical errors at their roots.
Just-in-time (JIT)	This technique means creating flow by getting the right quantity of products at the right place and the right time. It is based on planned elimination of all wastes and continuous improvement activities. The primary elements include zero inventories, zero defects, zero lead time (min.), and reduced lot sizes.
Value stream mapping (VSM)	A flowchart used in designing, analyzing or mapping out the flow of raw material and information throughout the supply chain. By using VSM, organizations can provide optimum value to the customer through a complete value creation process with minimum lead time and production time. VSM helps in identifying the waste that occurs within the process, smoothing the processes, and improving the quality of a product. It reduces operational cost, increases flexibility and helps organizations to meet the demand of their customers.
Kanban (Pull system)	It is a tool used to control and balance the flow of resources inside the firm and with external partners based on automatic replenishment through signal cards that indicate when more goods are needed. It aims to eliminate waste of handling, storage, expediting, obsolescence, repair, rework, facilities, equipment, and excess inventory. Implementing this tool improves the final delivery of products and services and help companies to develop products that meet customers' requirements.
Kaizen (Continuous improvement)	A method by which employees at all levels of an organization cooperate proactively to accomplish consistently, incremental changes to the production process. As it were, it joins the aggregate talents inside an organization to powerful engine for improvement. As an action plan, Kaizen helps to improve the employees' productivity and behavior for the better. This method encourages all employees to compete and communicate in order to continuously improve the company's level. This type of cycle is frequently referred to as PDCA (Plan, Do, Check, and Act).
The five Ss' (sort, set, shine, standardize and sustain)	They are tools aim to contribute to the management practice to create better workplace by sort (eliminate that which is not needed); set in order (organize remaining items); shine (clean and inspect work area); standardize (write standards for above);

	and sustain (regularly apply the standards). Implementing these tools enable companies to change employees' behavior and contribute to productivity, quality and safety.
Key performance indicators (KPIs)	Measures intended to track and support progress towards fundamental goals of the organization. Firmly advanced KPIs can be extremely powerful drivers of behavior so it is critical to precisely choose KPIs that will drive the desired behaviors.
Standardized work	Documented production procedures that use the best combination of people, inventory, and equipment to identify and eliminate variations in operator work, to sustain the gains achieved from improvement activities, and to provide a baseline for future improvement.
Fishbone diagram (Cause and effect diagram)	This tool helps the organization to determine the intrinsic cause of the problem and thus help in reducing time and cost.
Process mapping	A tool that shows the complete picture of the process flow starting from the input to all the steps that will lead to outputs.

Source: Rauch et al. (2017); Shah et al. (2017)

Lean supply chain management (LSCM)

Optimizing the supply chain is a tricky task due to the involvement of many parties (the firm, suppliers, and buyers at different levels), mainly with divergent goals. Various proposed strategies to optimize supply chain have focused on a set of specific aspects of the supply chain operations such as agility of supply chain to better respond to customer requirements and various techniques such as total quality management and process re-engineering to improve performance and gain competitive advantage (Soni and Kodali, 2011). Among the many optimization theories and strategies, lean is perceived as one of the most widely recognized techniques for operations to remain competitive (Adebanjo et al., 2016). Many manufacturing companies consider lean thinking to be a dominant paradigm in supply chains (Jasti and Kodali, 2015). Lean represents a new system of interconnected and interrelated networks that operate in unison to move the whole 'value stream' towards perfection. Lean methods seek to increase the company's actual value through waste reduction and improved customer satisfaction and profitability (Womack et al., 2007). Therefore, it is not surprising that lean methods also find ample room for application in the field in the field of SCM under the term LSCM.

Over the past years, interest on lean implementation has been limited to specific processes within single organizations and has not been extended to other processes of the supply chain where considerable amounts of merchandises were stored in anticipation of customer demand (Bruce et al., 2004). Large firms found that it was not enough to improve the performance of certain processes. Improvement must be extended across the entire supply chain processes (Behrouzi and Wong, 2011). Studies on the application of the lean concept to the supply chain concluded that most of the theoretical principles of lean are applicable to the supply chain (Bruce et al., 2004). Considering the benefits of lean as a management approach, many researchers have begun to actualize lean principles in the field of SCM to make it more effective. Thus, those organizations seeking to integrate their supply chain members and activities can adopt lean across the entire supply chain (Ugochukwu et al., 2012).

An extensive review of the literature revealed that implementing lean principles have enabled organizations to achieve significant improvement in both organizational and

operational outcomes (Wu, 2002). Various studies have explored the influence of lean and management's practices of the green supply chain on business performance. For example, Manzouri et al. (2014) categorized and adopted lean principles into the SCM context. Researchers argued that there are benefits for the supply chain when lean techniques are adopted; such techniques can yield greater manufacturing efficiency, reduced costs, and improved profitability and flexibility. Due to the scarcity of LSCM literature, only positive suggestions exist showing an association between lean adoption and performance of supply chain without empirically testing it (e.g. Wee and Wu, 2009). The lack of cognizance and inappropriate implementation approach has led many organizations to struggle to implement the practices of LSCM (Anand and Kodali, 2008). In addition, a few studies have mainly focused on the sole features of LSCM, and very few researchers have approached the uphill and downhill precedencies of the organization (Tortorella et al., 2017). Due to lack of stable, unidirectional, and fully developed concepts and theories of LSCM, the majority of the studies have been limited to a specific sector of the LSCM framework (Anand and Kodali, 2008; Petra and Marek, 2015).

In addition, only a few LSCM practices have been spanned by some studies in an isolated manner. However, these studies provided only a cramped perspective of their application and benefits. For instance, inference from studies conducted by Miwa and Ramseyer (2002) and Kim et al. (2004) indicate that the returns of the application of LSCM practice may not equally occur among the supply chain partners. Green et al. (2014) reported that the proper implementation of just-in-time (JIT) technique in SCM increases efficiency and reduces waste by receiving goods only as required in the production process, thereby reducing inventory costs. The same authors also suggested that the adoption of this bundle of practices would have benefits for both. Other evidence of such isolated approach is found in Kohtamaki and Partanen (2016), which examined how the customer-supplier relationships influenced the enhancement of knowledge and learning along the supply chain for product innovation and services development. Generally, these studies provide evidence to support the positive impact of some LSCM practices on organizational and operational performance of the organization, although they are usually taken from a limited perspective. In the same context, several studies have been conducted suggesting a positive relation between improvements in the supply chain performance and LSCM practices implementation (e.g. Wu, 2002; Blanchard, 2010). Essentially, the application of these practices is continually connected with inventory levels improvement measures (Bruce et al., 2004; Chiromo et al., 2015), quality (Wee and Wu, 2009), supply lead time (Agarwal et al., 2006; Naim and Gosling, 2011), level of service delivery (Savino and Mazza, 2015; Petra and Marek, 2015) and cost (Stratton and Warburton, 2003; Theagarajan and Manohar, 2015).

The main idea behind LSCM is to get over several problems that resulted from SCM practices such as delay of information flow in the chain and the absence of strategic alliance between companies and their suppliers. However, according to Anand and Kodali (2008), adjusting lean principles from manufacturing to SCM activities is rather a complex process. This is due to reasons such as manufacturing processes rely primarily on a stream of materials while the focus of SCM is primarily on the flow of information. As indicated by Blanchard (2010), the information and inventory have a cozy relationship with the system and reliant on each other. One of the targets of lean principles is to confine stock in the system. Clearly, the way of evading information waste in SCM is to reduce inventory levels in the organization. It is recognized that information is one of the main causes of waste in the SCM system. Further, it is easy to identify and measure waste volumes in manufacturing and this is not conceivable in SCM activities to gauge information flow

waste. Moreover, manufacturing processes can be controlled by senior management and employees of the firm, while SCM requires consideration throughout the entire supply chain from suppliers to end-customers. Additionally, more flexibility is needed in order to adapt to changes in the needs and requirements of the customers. Under the lean philosophy, the firm must establish a trust-based relationship with its customers and suppliers which will lead to the exchange of knowledge and a high-learning motivation. However, although widely discussed, the integration of lean principles and practices into SCM still has much to evolve in order to better comprehend the adaptation of lean approach (Chiromo et al., 2015).

Generally, it has become clear that the expansion of lean implementation to the supply chain operations was more difficult and often was indiscriminate. Partially, this challenge is consequent to the fact that the application of lean tools requires adaption to different production contexts and it might be necessary to restructure the social and the technical systems of the organization, including leadership and infrastructure systems. Moreover, the lean implementation imposes the appreciation of interconnection with external partners, i.e. the prolonged supply chain (Cudney and Elrod, 2011). An effort in this direction is the development of pull systems with suppliers. Anand and Kodali (2008) argued that traditional systems use resources less effectively than LSCM; demand variation may be reduced by lean methods by making things easier, augmenting, restructuring, and forming capabilities since they are integrated into both upstream and downstream activities. The demand variation is a measurement of how much variability can occur in the demands from customers. It is expected to have a more stable demand since the inventory reduction and lead times are focused by lean production. Moreover, lean production is real customer orders driven, rather than market demand anticipation forecasts. This implies that demand “pulls” a product through production, rather than management forecasts “pushing” it onto the shop-floor. To achieve this, lean thinking tends to shift management’s focus in optimizing the products and services flow across the whole value streams that flow horizontally across technologies, possessions, and divisions to patrons rather than optimizing separate technologies, assets, and vertical departments.

A lean supply chain should allow the presence of a horizontal and uninterrupted flow of goods, services and information from suppliers to the end-customers with minimal waste (Wee and Wu, 2009; Tortorella et al., 2017). The LSCM approach goes beyond the current concept of trading mentality, which operates on short-term profit targets, market prices dependent, and strong negotiation ability with suppliers or customers to a strategy based on a long-term obligation and involvement among supply chain partners. It is also a cooperative approach to a methodical dismissal of leftover along the supply chain (Agarwal et al., 2006). It is enormously challenging to achieve lean implementation in multi-levels of a supply chain (Bruce et al., 2004). Additionally, achieving such an ideal perfection at the level of the entire supply chain may not be feasible. However, from the viewpoint of specific echelon of the supply chain, it would be easier to determine whether or not if practices are lean as well as their level of adoption (Tortorella et al., 2017). Moreover, most studies have focused on identifying practices and benefits, assuming that once organizations have sufficient knowledge about lean practices, lean implementation will begin automatically.

From the literature, it’s clear that the expansion of the supply chains requires the implementation of a pool of practices consistent with lean principles both within the firms and at their external partners (partner, suppliers, and customers). In order to be able to have full implementation in the supply chain, it is important that all supply chain actors are committed, sharing the same knowledge and lean information, and that their operating

systems are synchronized. Accordingly, there are four major key practices for expanding lean programs to supply chains. These practices are: Engage suppliers, transfer lean-knowledge, lean program commitment, and lean program alignment (Bortolotti et al., 2016). To implement lean techniques across the supply chain, communications beyond the company must reach to the outside actors. When companies achieve supply chain transparency (100%), the supply chain has the ability to become more responsive and resilient. Wong (2009) pointed out that the importance of managing employees' behavior and actions because lean applicability depends on their mood in daily work; there is a need to avoid their errors in operations. It should also be noted that in order to succeed in lean implementation, management commitment is required to support the transformational process. In addition, an external support may provide a new way of thinking and transferring knowledge to organizations by recommending areas in which the minimum application is necessary (Mallur et al., 2011). Therefore, organizations must be aware that lean cannot be implemented all of a sudden. There is a persistent need to continuously strive to eliminate waste and increase commitments by considering opportunities and constraints.

Barriers to lean implementation in the hotel industry

Lean practices have been implemented mainly in the manufacturing settings, and there is limited evidence of lean implementations in the service settings, particularly in the hotel sector. A few hotels companies like Starwood Hotels Worldwide have applied lean practices to their operation. The project has resulted in the launch of 3500 lean projects in Starwood Hotels worldwide. The company has reported a \$100 million in profits to its bottom line by adding value through optimizing, simplifying, and streamlining operations (Tan and Chakraborty, 2009). Hilton Hotels have applied lean techniques, such as value-stream mapping, in their operations. The Four Seasons Hotels used lean to improve different supply chain processes, such as inbound trailer cycle times and space utilization at their properties. Lean added superior process and cycle time speed, as well as drops operational costs (Vlachos and Bogdanovic, 2013).

Generally, the successes and failures of lean implementation depend heavily on the context in which they are implemented. The pace of change and the results of this implementation vary widely across sectors and even across companies. Barriers that hinder lean implementation have been discussed in the literature. Some of these barriers are generic, that is, they can also be encountered in any situation where a new idea, new instrument or concepts are created. Public literature has provided many case studies that demonstrate the factors contributing to the failure to launch relatively new ideas such as lean management. Although the barriers to leanness are general, some barriers prevail under certain conditions, while other barriers are a specific case. In this context, one needs to understand that the premise under which the hotel industry operates is much different from other industries. The following section discusses the specific characteristics of the supply chain in the hotel sector that may affect the lean implementation in this sector (Tortorella et al., 2017).

The effectiveness of SCM in the hotel industry is assessed through three key factors: cost, quality, and safety. Moreover, effective waste management and improvement in the supplier-buyer relationship are considered to be the two major indicators of efficiency and effectiveness of hotel supply chain. Therefore, decreasing the cost of inventory, eliminating wastes, increasing supply chain interaction, and creating value in supply chain management in the hotel industry are critical in order to reduce hotel costs in general (Akkarangoon, 2010). Thus, optimization of SCM or a new supply chain system should

lead to improvement in these factors. On the contrary, the aim of applying lean supply chain in hotel sector is to increase added value. In this regard, the characteristics of this sector should be highlighted. The hotel sector is based on a heterogeneous group of products with varying levels of perishability, different production times, as well as various demands from customers in different quantities at different frequencies. Despite the heterogeneous nature of the industry as a whole, the large variations in the quality of raw materials, which are largely unpredictable, as well as the volatile requirements of customers, make the hotel sector very unique. The sensitivity of the hotel activities to political and economic conditions and the impact of seasonality on hotel activities require effective strategies to meet the times of low demand to balance the risk of waste and reduced the quality of the product with the risk of stock-outs and unsatisfied customers (Bortolotti et al., 2016).

Another notable barrier to lean implementation is that hotel industry in Egypt has put a lot of emphasis on various quality certifications and related scientific management systems. As such, it can hamper lean implementation, as lean can be seen as another management tool for continuous improvement. Therefore, for successful lean execution, innovative mechanisms are required to identify lean and lean position as a philosophical approach which can be used to achieve additional benefits beyond other scientific management systems (Salem et al., 2016). In addition to the barriers mentioned above, another prominent barrier to lean implementation in the hotel sector in Egypt might include the resistance against change. Under these circumstances, unique determinants of lean success must be determined in order to remove any form of passive resistance due to lack of confidence and skepticism in the lean adoption. Thus, it is necessary to convince the organization and managers at various levels as well as all staff that the lean implementation after the quality certificates is beneficial. In addition, a sustained effort and commitment to lean change are required in order to achieve lean success and sustain the benefits of lean implementation.

To conclude, the salient challenges to the implementation of lean thinking include: (a) how to spread lean understanding in a complex working environment as mentioned in the preceding paragraph; (b) how to determine the right starting point; (c) how to engage a labor force that has tirelessly implemented a number of other management approaches (employee resistance); (d) How to deploy leanness in quality certified firms that have achieved the targeted outcomes according to shareholders aspirations (changing the culture), and (e) How to overcome the forces of unwillingness to change that may actually disrupt efforts in lean implementations (Salem et al., 2016). Although there are a number of challenges, there is always scope for success in lean implementation within a variety of contexts as illustrated by Pattanaik and Sharma (2009). In theory, it is known that lean principles and concepts provide firms with the ability to confront the global challenge (Womack et al., 2007.) While there are a number of lean theories and concepts, it is important to explore the applicability of these theories in the context of their applications. To this end, exploratory studies can provide more insight into how to reform lean thinking for successful implementation in the hotel industry (Salem et al., 2016).

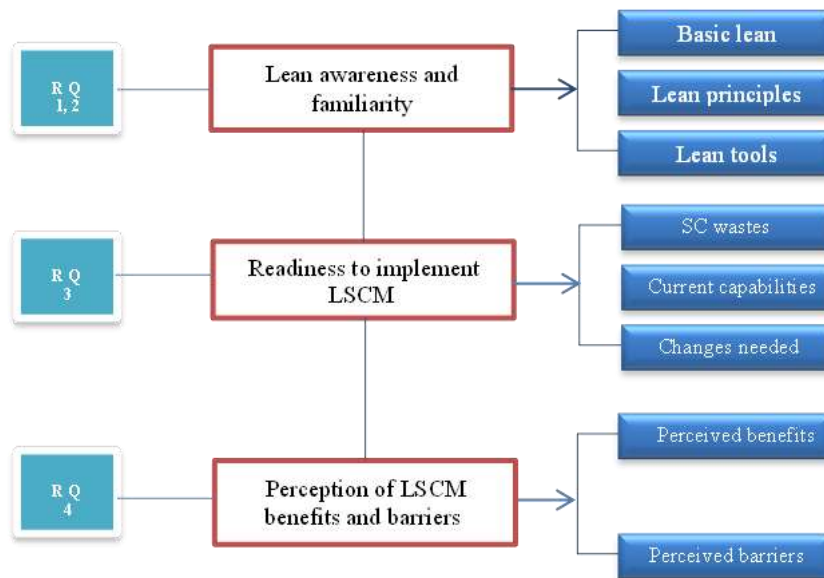
Methodology

Research model

The present study focuses on exploring the presence, extent, and awareness of lean within the hotel sector in Egypt, as a point of reference to assess the readiness of this sector to implement lean in the management of their supply chains. Particularly, three areas of interest were: lean awareness and familiarity, readiness to implement LSCM, and

perception of LSCM benefits and barriers. The initial findings from the study were obtained from a quantitative methodological approach which seemed to be appropriate to boost the investigation concerning the extent of lean awareness and understanding within the Egyptian hotel industry. In order to answer the aforementioned research questions, a framework was proposed as shown in Figure (2).

Figure 2: The proposed framework for the study



A survey was conducted using a structured questionnaire. The questionnaire was developed through a prudent examination of similar studies found in the literature review. Consistent with prior research, (Achanga et al., 2006; Shah and Ward, 2007; Kumar et al. 2009; Salem et al., 2016) various attributes validated in previous research have been adopted. A multiple-item method has been adopted to structure the questionnaire. Most of the items are rated on a five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. The questionnaire was pilot tested to check its reliability before distributing it to the main sample participants. The main purpose for conducting a pilot study was to judge the strength and weaknesses (reliability) of the questionnaire. A total of 12 pilot surveys have been completed with operations managers, consultants and academics to test the questionnaire and the rating system in terms of clarity and understanding. Based on the feedback received, the wording of some items has been slightly altered in an attempt to match the specific context of this study.

Based on the objectives and purpose of this study, the survey instrument was divided into four sections: The first section of the survey involved an introductory opening to explain the purpose of the study. Further, this section was designed to identify some of the characteristics of the investigated hotels. Information gathered included the hotel ownership (specifically if the hotel was part of a chain or locally owned), the duration of operation, the number of employees, the quality-certification, and also the annual gross revenues). This section provided the opportunity to determine who would be more interested in lean and if the size of hotels had an impact on using lean. The second section of the survey intended to investigate the respondent's awareness and understanding of the lean concept, principles, and tools/techniques especially in SCM. For respondents who were familiar with the lean concept, three questions were directed in the third section to assess their readiness to integrate lean thinking in the management of hotel supply chain.

Respondents were asked to identify the current LSCM practices and the changes needed to implement this approach. Finally, respondents were asked about their perception of LSCM implementation benefits and challenges.

Population and sampling procedures

The population frame for the current study incorporated all five-star and four-star hotel chains operated in Egypt throughout 2016/2017. These categories represent a significant share of the hotel capacity in Egypt. According to the estimations of the Ministry of Tourism for 2016, four-star hotels continue to retain the highest share of total hotel capacity (21%). The five-star hotel capacity also shows a significant share (16%) of the total hotel capacity in Egypt (MOT, 2016). These categories were selected because they have the prerogative of accumulated administrative and technical experiences, human and financial resources, and standard operating procedures. By surveying those hotels, the data would present the most accurate trends of lean implementation in the hotel sector in Egypt because these hotels are always taken the lead in applying modern management approaches such as lean management. The researcher used the non-probability (judgmental) sampling technique with the aim of sampling the hotels in Egypt. Accordingly, the hotels of Greater Cairo and Alexandria were selected as the sample for this study. Greater Cairo and Alexandria were chosen as they are the most civilized downtown areas with the largest number of five-star and four-star hotels and have the same socio-economic backgrounds. In essence, these cities occupy a unique position, connecting different parts of the country. In terms of tourism, these cities host several Egyptian tourist attractions. The target respondents of this study were hotel managers holding senior management positions such as CEO, managing director, department manager or the decision-maker of the hotel. Therefore, it can be assumed that their responses would truly reflect the current attitudes and future plans of their hotels with regard to lean thinking implementation. Moreover, lean thinking is a continuous and inevitable process that requires levels of management commitment and the decision to incorporate this thinking into the management of hotel supply chain would be taken at the highest managerial level.

Using a standard sample size calculation ($z = 0.075$; $s = 1.15$, $e = 0.20$), approximately (70) respondents are needed for a valid sample size. Since total of (75) respondents from the hotels operating in Egypt participated in this survey, a valid sample was obtained for this study. Responses were collected from 40 five-star hotels in Greater Cairo and Alexandria (32 hotels in Greater Cairo and only 8 hotels in Alexandria) and 35 four-star hotels in Greater Cairo and Alexandria (28 hotels in Greater Cairo and 7 hotels in Alexandria).

The mailing list assembled and used for this study was comprised of data acquired from the Directory of Tourism Companies produced by the Egyptian Cabinet Information and Decision Support Center (IDSC), and also from the Egyptian Hotel Guide (36th edition, 2016) produced by the Egyptian Federation of Tourist Chamber (EFTC). Because of the size of the population and its discrimination in several governorates, the final questionnaire survey has been managed through an online survey development cloud-based site: www.Zoomerang.com. This proves to be the most suitable and economical technique that can be applied in order to collect data. A package, containing an introductory letter explaining the objectives of the study, a brief description of the lean approach, the survey and how to complete the online survey, was sent by e-mail to the selected hotels in February 2017. The data was collected within a period of three months.

Data analysis

A reliability test has been applied to measure the internal consistency of the attributes of the questionnaire. The Cronbach alpha factor has been applied to measure the internal consistency of the same group of the questionnaire. In general, reliability coefficients of (0.70) or more are viewed as adequate (Aichouni et al., 2014). As shown in Table (2), Cronbach alpha factor was used to measure the internal consistency of three constructs, i.e., lean awareness and familiarity, potential to implement LSCM, and perception on LSCM implementation. Findings demonstrate that the Cronbach's alpha for the entire attributes of the questionnaire, running from (0.728) to (0.855), reflects the internal consistency and reliability of these attributes. Moreover, the loading factor was applied to estimate the reliability of individual attributes of the survey given that (0.7) is the minimum level for item loading (Manzouri et al., 2014). Out of the (58) attributes, only seven items were below this threshold. The detailed results of the reliability and validation of the questionnaire attributes and ratings used in the analysis are shown in Table (2). The Statistic Package of the Social Sciences (SPSS v 22.0) and the Smart PLS software were utilized to analyze the data obtained in this study. Simple frequencies, mean ratings, and standard deviation were used as statistical methods whenever needed. The t-test also was utilized to assess whether the means of the two samples are statistically different from each other. Moreover, the Pearson correlation test was performed to determine the strength and direction of the linear relationship between respondents' characteristics and the levels of awareness and understanding of the lean concept, principles, and tools. Data and information found in this study were analyzed and discussed in accordance with the research objectives

Table 2: Factor loading and Cronbach's α

Factors and attributes	Mean	St. deviation	Loading factor	Squared loading	Cronbach's α
Basic lean awareness	2.68	1.25	0.78	0.613	0.855
A system to manage supplier and customer relations	3.12	1.28	0.79	0.624	
Tools and techniques for waste reduction	4.01	1.42	0.64	0.425	
Continuous improvement philosophy	3.87	1.08	0.86	0.754	
Long-term cost-cutting strategies	1.06	1.51	0.75	0.567	
Fully integrated management system	1.75	1.43	0.81	0.665	
Tools and techniques for operation improvement	2.25	0.78	0.83	0.644	
Awareness of lean principles	2.64	1.23	0.71	0.596	
Elimination of wastes	3.62	1.11	0.76	0.543	
Continuous improvement	2.87	1.54	0.71	0.653	
Establishment of process flow tracking systems	2.62	1.43	0.67	0.651	
Specifying value stream	1.87	1.09	0.83	0.678	
Pull from the customers	2.25	0.99	0.62	0.456	
Awareness of lean tools and techniques	1.47	1.33	0.85	0.605	
Total productive maintenance	1.34	1.57	0.98	0.764	
Just in time (JIT)	3.01	0.94	0.86	0.754	
5Ss	0.75	1.64	0.98	0.543	
Kanban	0.88	1.45	0.96	0.478	

International Journal of Heritage, Tourism and Hospitality Vol. (12), No. (3/2)
Special issue on papers of the 11th ICTH (2018) organized by Faculty of Tourism and Hotels,
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SMED	0.13	1.54	0.60	0.342	
Production smoothing	1.25	1.43	0.87	0.743	
Standardized work	3.12	1.46	0.87	0.689	
Visual control	1.12	1.22	0.76	0.569	
Kaizen	2.03	1.26	0.85	0.631	
Value stream mapping	1.03	0.87	0.75	0.543	
Current LSCM practices	2.14	1.15	0.76	0.594	0.774
Supplier partnerships and strategic alliances	3.25	0.91	0.70	0.456	
Synchronize flow and pull throughout the supply chain	2.25	0.89	0.78	0.457	
Just in time (JIT)	2.03	1.04	0.76	0.434	
Outsourcing	0.50	1.09	0.87	0.865	
Access to customers' forecasts	2.08	1.45	0.87	0.765	
Continuous process flow	2.62	1.43	0.78	0.653	
Inventory management and control	3.00	1.40	0.76	0.564	
Use of inter-organizational systems such as EDI	1.63	1.33	0.60	0.366	
Cycle timecompression	3.04	0.91	0.78	0.632	
Knowledge transfer	1.04	1.12	0.76	0.752	
SC waste analysis	2.99	1.08	0.87	0.622	
Excess purchasing and production	3.13	1.00	0.88	0.567	
Losses due to overprocessing	2.25	1.19	0.77	0.476	
Production of defective items	1.70	0.91	0.87	0.634	
Non-value added activities	4.00	1.32	0.86	0.675	
Excess storing materials	3.87	1.02	0.98	0.758	
Requirements for implementing LSCM (CSF's)	2.87	1.18	0.73	0.545	
Re-engineering material flows	3.92	1.53	0.87	0.653	
Integration of internal and external activities with supply partners	4.04	0.98	0.73	0.671	
Creating a lean culture within the organization	3.34	1.12	0.70	0.562	
Training operational management	1.99	1.38	0.68	0.569	
Eliminate all waste in the supply chain cycle	3.09	0.88	0.70	0.456	
Establish a pull system	1.55	0.91	0.66	0.534	
Customer relationship management	2.25	1.20	0.77	0.476	
Value stream management (mapping)	2.78	1.44	0.73	0.445	
Perception on LSCM implementation benefits	2.92	1.25	0.75	0.614	0.728
Improving quality	2.35	1.33	0.74	0.434	
Improving flexibility	3.63	1.12	0.67	0.765	
Reducing wastes	3.07	1.32	0.76	0.656	
Reducing cycle times	2.89	1.06	0.74	0.567	
Decreasing inventory	3.86	1.33	0.87	0.678	
Increasing profit	2.00	1.65	0.76	0.665	
providing great customer satisfaction	2.65	0.97	0.71	0.536	
Perception on LSCM implementation challenges	3.01	1.21	0.77	0.630	
Lack of support from top management	3.34	1.19	0.70	0.543	
Difficulties in understanding the concept of	1.76	1.23	0.87	0.778	

lean (fear factor)				
Employees resistance to change (people factor)	2.76	1.65	0.73	0.545
Lack of customer and supplier involvement	3.76	1.08	0.88	0.661
Financial benefits not recognized	3.45	1.07	0.64	0.657
Lack of know-how to implement	4.06	0.98	0.87	0.765
Absence of long-term planning	1.99	1.31	0.74	0.467

Results and discussion

A total of (75) responses were collected; (26) incomplete responses have been removed, and (49) responses were found suitable for data analysis (See Table 3). A total of (49) questionnaire forms were valid out of the total forms collected from the investigated hotel chains with a response rate of (65%). This response rate can be regarded as satisfactory for this kind of surveys (Nulty, 2008). The respondents represent a group of general managers, quality managers, purchasing managers, and/or development managers. The majority of the respondents belong to the senior management category. These insights give more certainty about the results of the current study since the investigated population has ended up being firmly related to the decision-making process. All respondents have substantial experience and are considered experts in the field of quality management concepts and practices.

Table 3: Response rate of the investigated sample

Category	Distributed questionnaires	Valid questionnaires	%
Five-star hotels	40	28	70
Four-star hotels	35	21	60
Total	75	49	65

Profile of the surveyed hotels

The following section highlights the demographic details of the participating hotels. Table (4) describes the profile of the respondents from five-star and four-star hotels.

Table 4: Profile of the respondents

Attribute	Five-star hotel chains (n= 28)		Four-star hotel chains (n = 21)	
	Freq.	%	Freq.	%
Hotel ownership				
Part of international chain or group	16	57.1	17	81.0
Locally owned and operated	08	28.6	03	14.3
Foreign owned and operated	04	14.3	01	04.7
Years of operation				
< 10 Years	05	17.8	11	52.4
From 10-20 Years	12	42.9	07	33.3
> 20 Years	11	39.3	03	14.3
Annual gross revenues				
Less than 50 million EGP	00	0.00	02	09.5
From 50 million to less than 100 million	09	32.1	16	76.2
More than 100 million EGP	19	67.9	03	14.3

Size of the firm				
< 100 employees	00	0.00	03	14.2
From 100 to 300 employees	07	25.0	09	42.9
>300 employees	21	75.0	09	42.9
Quality certification				
ISO 9001:2008 quality management systems	10	35.7	7	33.3
ISO 9001:2008 standard certifications	09	32.1	10	47.6
ISO 14001 environment management systems	06	21.4	2	09.5
Six-Sigma	03	10.7	2	09.5

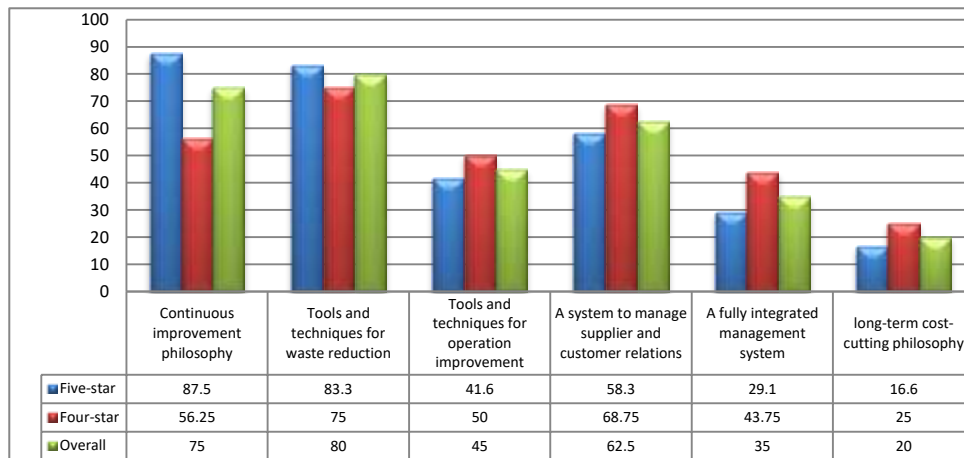
The respondents were asked to self-categorize their properties based on the form of property ownership. It is notable that about (57%) of the respondents from five-star hotels and (81%) of the respondents from four-star hotels recognized themselves to be part of international chains or groups. The managers who participated in the survey were also asked to indicate how long their hotels had been operating. More than half (52.4%) of the four-star hotels have operated for less than ten years. In contrary, only (17.8%) of the five-star hotel chains have operated for less than ten years. Therefore, it may be inferred that the firms participated in this study have experience, and they are also likely to be fairly well-known brands. For this study, the size of the hotel was determined based on its total employee numbers rather than the number of rooms. The labor power of 21 five-star hotels (75% of the sample) is more than 300 employees, while 7 of them (25% of the sample) are within the range of 100 to 300 employees. Hotels that employ less than 100 employees have not been found. This is not surprising when considering that generally five-star hotels in Egypt tend to be a medium to large size. Furthermore, the majority of respondent five-star hotels (67.9%) reap more than 100 million EGP as annual gross revenue. On the other side, the labor power of 9 four-star hotels (42.9% of the sample) is within the range of 100 to 300 employees, while only 9 of them (42.9% of the sample) employ more than 300 employees. Moreover, 16 four-star hotels (76.2%) reap between 50 and less than 100 million EGP as annual gross revenue, while the minority of these hotels (2 companies, 9.5% of the sample) generates less than 50 million EGP as annual gross revenue. Moreover, a question has been postured to specify the types of quality certification gained by the investigated hotels. Results clearly reveal that more than half of the five-star hotel chains (67.8%) have stated that their firms are certified with ISO 9001:2008 quality management systems and ISO 9001:2008 standard certifications. In addition, (21.4%) of the surveyed hotels have got the ISO 14001 environment management systems certificate. Only (10.7%) of the investigated hotels have been actively involved in Six-Sigma certificates. Similarly, ISO 9001:2008 standard certifications and ISO 9001:2008 quality management systems have been respectively implemented the most in the four-star hotels. Only (9.5%) of the investigated four-star hotels have been actively involved in Six-Sigma certificates. The findings also showed that there were hotels which were certified with more than one certification.

Hotel managers' awareness and understanding of lean management (LM)

The second section of the questionnaire addressed whether respondents were familiar with the concept of LM and asked them to explain their understanding of the lean principles and techniques/tools. It was noted that (81.6%) of the respondents have heard about the term whereas the rest never did. The second question in section one of the questionnaire asked the respondents (who positively answered question 1) about their common thoughtfulness

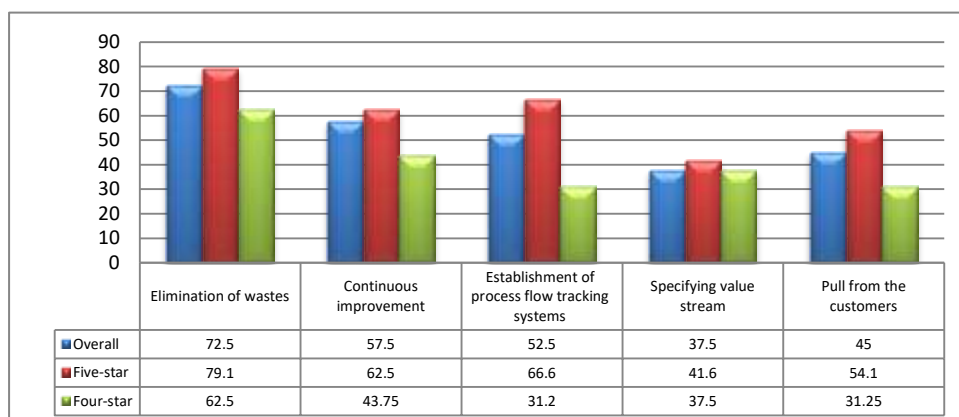
of LM (more than one answer could be selected). Figure (3) summarizes the results of the perceived levels of awareness and understanding of LM

Figure 3: Perceived levels of awareness of lean management (LM)



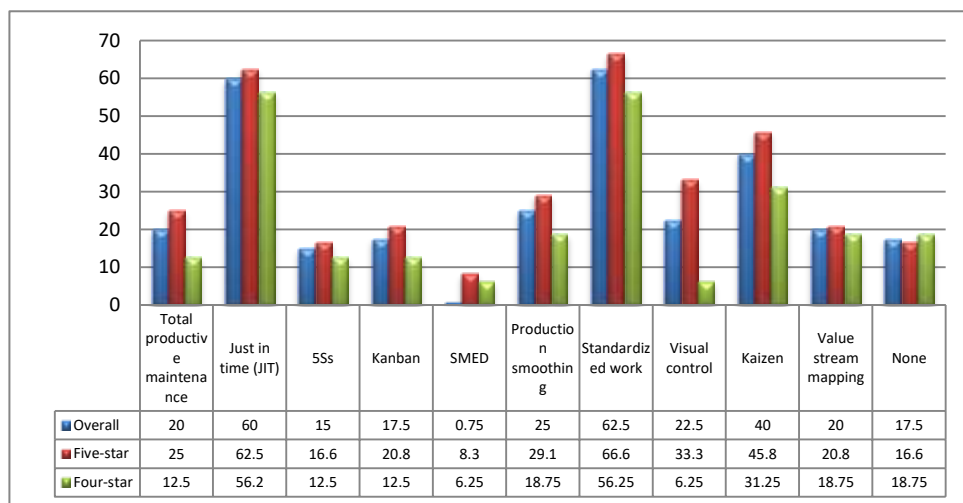
Waste reduction and continuous improvement were the highest ranked choices which overall scored (80%) and (75%) respectively. It is remarkable that the majority of respondents identified lean management as an approach for waste reduction and continuous improvement since it is a concept that emphasizes on these two principles. This result was expected in the hotel context since waste minimization and process improvements are key issues in a variety of management systems implemented in most large hotel companies. The respondents seem to have a sufficient understanding of lean management in which its basic is to use lesser resources for further improvement and growth. (62.5%) of the respondents perceived it as a system to manage product development and supplier and customer relations. Interestingly, only (35%) associated it as a fully integrated management system. The long-term cost-cutting strategies scored the least percentage. Despite the fact that long-term cost-cutting strategies are a significant feature of the success of lean implementations, these are relatively less recognized in the hotel industry in Egypt, yet they may have a large impact on the success of lean implementations. Hence, training on long-term cost-cutting strategies is necessary for preparing hotel sector for lean implementation and lean transformation projects. This is a concrete implication of this observation. The third question in the first section of the questionnaire asked the respondents to identify the type of lean principle that they are familiar with. Respondents' responses to this question are shown in Figure (4). The highest elevated scores got were for the principle of waste elimination, followed by continuous improvement and just-in-time respectively. It can be concluded from the findings that the majority of the respondents showed more than a basic understanding of the lean principles.

Figure 4: Perceived levels of awareness of lean principles



In order to further verify whether the respondents had really embarked on LM, they were asked to indicate which tools they might recognize from a list of 10 tools/techniques. The results are summarized in Figure (5). As can be seen from the results displayed in Figure (5), the most known tools are standardized work, just in time (JIT), and kaizen respectively. This result also shows that respondents have limited awareness of lean management tools and techniques. Generally, the results showed that five-star hotels have a relatively better understanding of the principles of lean management compared to four-star hotels. However, as displayed in Figure (5), the percentages are low for tools such as SMED, visual control, 5Ss, and Kanban. The lack of awareness of these tools may be attributed to the fact that these tools have been the focus of lean management in the manufacturing contexts.

Figure 5: Perceived levels of awareness of lean tools/techniques



It was also perceived that only (17.5%) of all respondents were unfamiliar with any of the lean tools. For the question (do you think that any tool would be applicable and effective to your SCM at any process), (71%) answered yes while (29%) answered no.

In an attempt to answer the second question of the study, the results obtained from calculating the overall awareness scores were used. The output shows a p-value of (0.037) with a confidence level to be $\alpha=0.05$. Since the p-value (0.037) is less than 0.05, it can be inferred that there is a significant difference in lean awareness between the five-star hotels on the one hand and the four-star hotels on the other. These results can be useful for future planning of lean implementations as well as for developing strategies for lean implementation and lean transformations in the hotel industry in Egypt. Furthermore, the initial level of lean implementation should be different for the five- and four-star hotels. Furthermore, in order to measure the strength and direction of the linear relationship between respondents' characteristics and the levels of awareness and understanding of lean concept, principles, and tools, Pearson correlation test has been used. The results are shown in Table (5).

Table 5: Results of Pearson correlation test

Attributes	Type of ownership	Duration of operation	Annual gross revenues	Size of the firm	Quality certification
General awareness of LM	0.053	0.597**	0.44	0.662**	0.630**
Familiarity with lean principles	0.455	0.128	0.43	0.084	0.570**

Familiarity with lean tools	0.029	0.314	0.35	0.617**	0.631**
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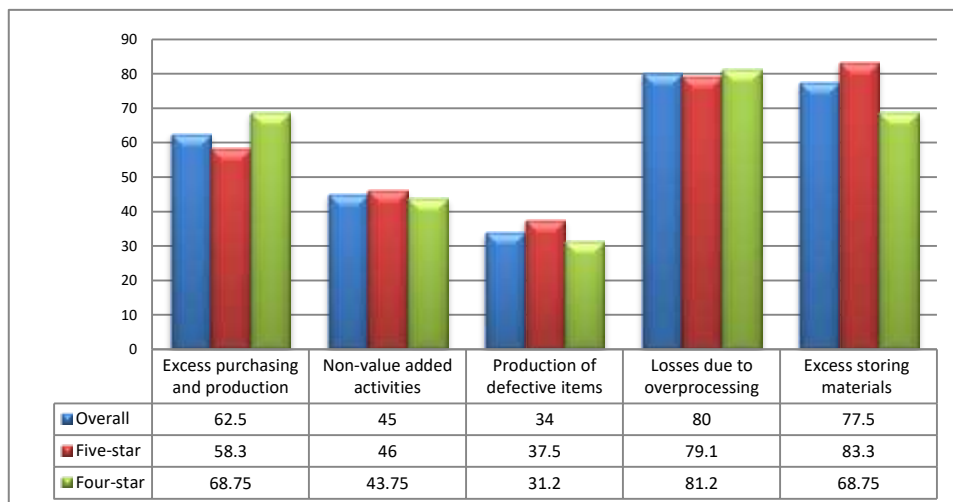
(**)The correlation is significant at the (0.01) level (2-tailed).

It could be deduced from Table (5) that the computed r for the significant relationship between the level of general awareness of LM and the duration of the operation is (0.597) in which it is considered as moderate coefficient because, in Pearson Correlation Coefficient, r of .8 and above is considered a high coefficient, the r around (.5) is moderate and the r of .3 and below is considered as low coefficient (James et al., 2013). Therefore, the level of general awareness of LM and the duration of the operation is significantly related. Similarly, the size of the firm is significantly related with the level of general awareness of LM. It was also observed that quality certification is significantly related to the level of general awareness, lean principles, and lean tools/techniques. Meanwhile, according to Table (5), the computed r for the significant relationship between the quality certification and level of lean principles awareness is (0.570) in which it is considered as a moderate coefficient. Therefore, quality certification and level of lean principles awareness are significantly related. Moreover, the computed r for the significant relationship between the level of familiarity with lean tools/techniques and the size of firm is (0.617) which falls on moderate coefficient. Therefore, the size of the firm and level of familiarity with lean tools/techniques is significantly related. Similarly, the quality certification is significantly related to the level of familiarity with lean tools/techniques. According to Table (5), there is no significant effect of the type of ownership and annual gross revenue on levels of awareness and understanding of the lean concept, principles, and tools.

Readiness to implement LSCM

The third section of the survey questionnaire dealt with three questions to assess the readiness of the hotels that are familiar with the lean concept to incorporate lean thinking in the management of their supply chains. This section does not aim to assess the leanness of hotels, but rather to evaluate their current practices and see whether they have the capabilities to implement LSCM. The first survey question of this section concentrated on whether hotel managers were familiar with the concept of to lean deadly wastes and asked them to explain their understanding of the sources of wastes across the supply chain. The choices given were focused on wastes that created in the inputs used by hotel processes, within the production processes, and their produced outputs. Figure (6) summarizes the obtained results.

Figure 6: Key sources of wastes across the hotel supply chain



From Figure (6), it can be observed that the vast majority of the respondents (80%) consider wastes due to over-processing as the major source of wastes across the hotel supply chain. On the other hand, the low percentages in other sources of waste indicate that there is a dearth of the acquaintance in terms of the total scope of waste in the lean framework. Moreover, one more question was directed to the respondents to collect information related to lean deadly wastes. It was observed that (87.5%) of the respondents are unaware of the term lean deadly wastes while only (12.5%) of them are aware of it. Another key question in this section of the questionnaire addressed the set of practices undertaken by the surveyed hotels to promote effective management of their supply chains. Based on a review of the previous literature, ten LSCM practices were selected. Respondents were asked to make a statement on whether or not they fully utilize these practices (evaluation criteria: application), whether the effort to implement the practice is associated with a low or high effort (evaluation criteria: Effort) and an assessment of the estimated potential or usefulness of implementing these practices (evaluation criteria: potential). Table (6) shows the results of the survey on a scale from 1(low) to 4 (very high). Respondents unable to comment this question answered with 5 (I don't know).

Table 6: Assessment of application, effort and usefulness/benefits of LSCM practices

Current LSCM practices	Evaluation criteria	low	decrease	high	very high	don't know	Sum
Supplier partnerships and strategic alliances	application	3	1	20	16	0	40
	effort	4	8	15	13	0	40
	potential	2	0	20	18	0	40
Synchronize flow and pull throughout the supply chain	application	20	8	2	1	9	40
	effort	1	3	10	0	26	40
	potential	1	2	5	6	26	40
Just in time (JIT)	application	11	15	4	10	0	40
	effort	4	10	12	4	10	40
	potential	3	11	10	8	8	40
Outsourcing	application	21	9	8	2	0	40
	effort	11	10	2	2	15	40
	potential	2	6	14	6	12	40
Access to customers' forecasts	application	18	7	11	4	0	40
	effort	2	5	16	0	17	40
	potential	2	4	8	10	16	40
Continuous process flow	application	6	11	9	14	0	40
	effort	4	11	11	10	4	40
	potential	5	10	12	12	1	40

Inventory management and control	application	4	7	14	15	0	40
	effort	5	11	10	14	0	40
	potential	5	9	16	4	6	40
Use of inter-organizational systems such as EDI	application	27	4	6	2	1	40
	effort	3	2	11	2	22	40
	potential	5	0	8	5	22	40
Cycle time compression	application	14	8	16	2	0	40
	effort	2	8	16	2	12	40
	potential	2	2	14	10	12	40
Knowledge transfer	application	11	14	11	4	0	40
	effort	14	8	3	5	10	40
	potential	2	6	14	8	10	40

Table (6) shows that most of the respondents indicated that supplier partnerships and strategic alliances, inventory management and control, continuous process flow and cycle time compression are the lean supply chain practices that have been applied to a great extent by the surveyed hotels. The practices of supplier partnerships and strategic alliances and inventory management and control can be introduced with very high effort, while the practices of outsourcing and knowledge transfer involve a low introduction effort. The practices of supplier partnerships and strategic alliances, continuous process flow, and cycle time compression promise a high potential according to the respondents. Respondents have shown difficulties in evaluating the following SCM practices: synchronize flow and pull throughout the supply chain and use of inter-organizational systems such as EDI. This is probably due to the fact that some of them are less established, quite complex or complicated and just emerging practices in SCM.

Finally, in order to guide LSCM implementation, the respondents were asked to identify the general changes that need to be made in the surveyed hotels in order to provide an environment that supports the insightful implementation of LSCM. The respondents were given eight principles of LSCM and asked to evaluate the importance of these principles. The respondents were allowed to tick more than one option for some categorical questions. Figure (7) summarizes the obtained results.

Figure 7: General requirements for implementing LSCM

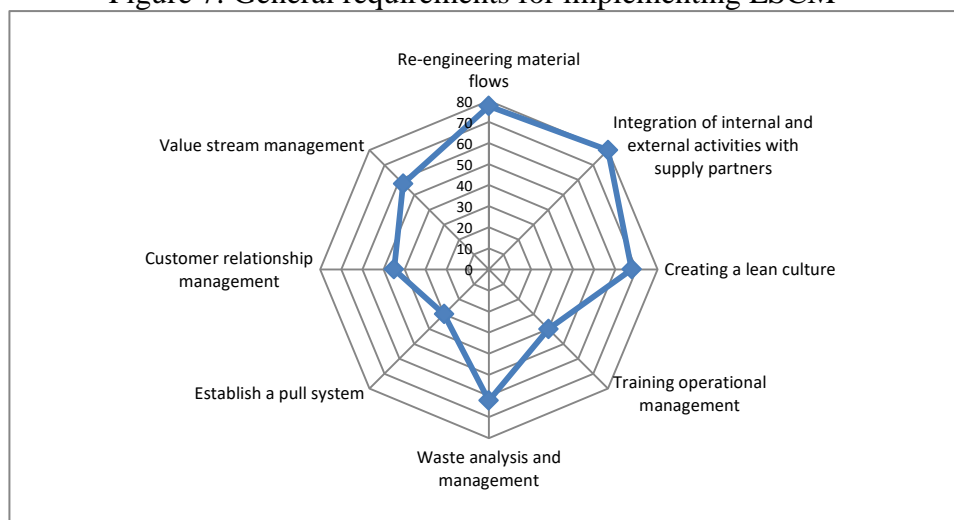
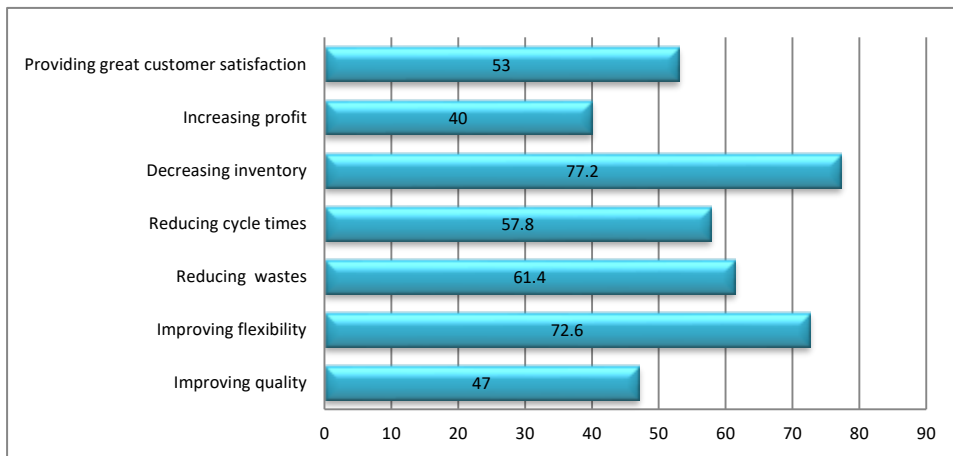


Figure (7) shows that most of the respondents indicated that integration of internal and external activities with supply chain partners, re-engineering material flows, and creating a lean culture are the major requirements that need to be focused on developing and implementing LSCM. Other requirements and their percentages are displayed in Figure (7).

Perception of LSCM benefits and barriers

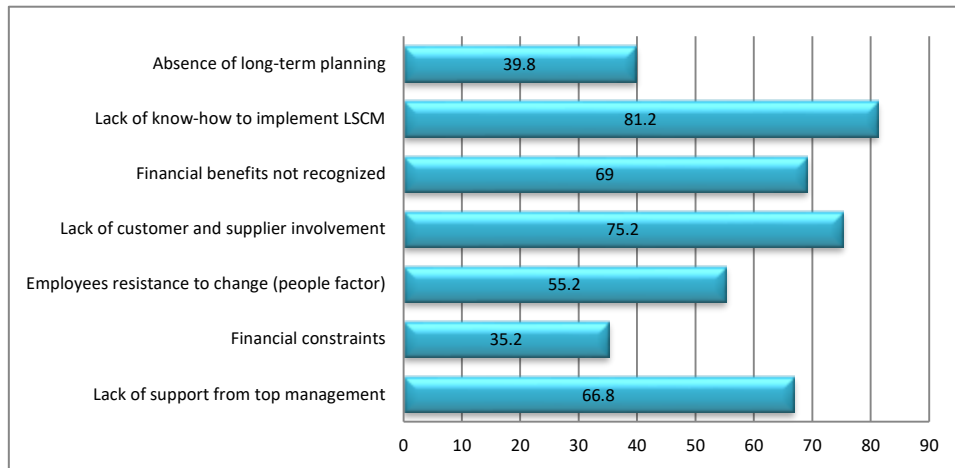
The last section of the survey was intended to determine the perception of respondents towards the potential and applicability of LSCM. Two types of questions were asked. The first one asked the respondent to think about what an LSCM transformation project would bring to the hotel supply chain (i.e., benefits). Knowing the benefits of LSCM can create a more in-depth understanding of the importance of this approach. The survey results are presented in Figure (8). From the results displayed, it can be inferred that the majority of the total respondents (77.2%) perceived that LSCM project would decrease the inventory levels. In addition, (72.6 %) of respondents also indicated that LSCM project would improve the flexibility of the hotel supply chain. Furthermore, (61.4) of the respondents showed that LSCM would reduce the wastes in their corresponding firms. These findings align with the literature (Bortolotti et al., 2016; Tortorella et al., 2017). Other benefits are displayed in Figure (8).

Figure 8: Perception of respondents regarding the benefits of implementing LSCM



The second type of question was about the challenges/obstacles that would arise when LSCM is implemented in the hotel. In the literature review, the main challenges/obstacles that can hinder the implementation of LSCM in hotels have been identified. A number of statements were posed and the respondents were asked to rate the extent to which the listed factors hampered effective implementation of LSCM with (5) indicating the highest extent and (1) the least extent. The respondents were also asked to add other challenges that they perceive are affecting LSCM implementation. However, no significant additions were made by the respondents in this regard. The findings are shown in Figure (9).

Figure 9: Perception of respondents regarding the challenges of implementing LSCM



The respondents indicated that the lack of knowing how to implement LSCM and lack of customer and supplier involvement are the most challenging issues that would resist the successful implementation of LSCM. Moreover, (69%) indicated financial benefits are not recognized as one of the obstacles the hotel would face. On the other hand, respondents indicated that influence of financial constraint and the absence of long-term planning as the least challenging issues when it comes to LSCM implementation. Unlike most of the studies on lean implementation, the financial constraint score was only (35.2%) while the absence of long-term planning scored (39.8%). Therefore, the financial constraint for LSCM implementation was not identified as a big issue in most of the hotels hence LSCM implementations will not be affected by hotels' budget once a commitment to implement lean has been made.

Discussion and implications

This study embarked on reviewing relevant literature and compilation of a set of criteria that should be perused in LSCM design for the hotel sector in Egypt. Specifically, this study presents the findings from questionnaire in order to indicate the level of lean awareness and understanding in the hotel sector in Egypt, as a point of reference to assess the readiness of this sector to implement the lean concept in the management of their supply chains. The outcomes of this study can yield beneficial results which will be beneficial for Egyptian hotels to improve the current SCM systems.

Previous studies have revealed that the fundamental understanding and awareness of managers are critical to the success of LSCM and that many firms have failed to implement LSCM due to lack of lean awareness (Raja Sreedharan et al., 2018). According to Panizzolo et al. (2012), the concern in changing people's mentality, training and lack of awareness about lean concepts leads to more costs and time in the implementation of LSCM. Accordingly, the current study started with evaluating the level of lean awareness and understanding in the hotel sector in Egypt. The survey results indicate that there is an average level of lean awareness within the investigated hotels as can be seen from the average mean score for each of the lean awareness constructs. This proves that hotels in Egypt have the adequate information required to implement LSCM. Hence, it is concluded that the overall level of lean awareness in Egyptian hotel sector is average and they are quite familiar with lean core and principles. They understand that lean management is a philosophy of continuous improvement. They also believe that it is a set of tools/techniques used to eliminate wastes. This finding is similar to that obtained by other

researchers elsewhere (Achanga et al., 2006; Wong and Wong, 2011; Al-Najem et al., 2013; Adebajo et al., 2016). However, more emphasis is needed on how to effectively implement lean tools in the management of hotel supply chains. Lean tools are essential in the implementation process. These tools must be effectively integrated into the SCM practices in order to provide a streamlined and high-quality transformation process. It is suggested by Pavaskar et al. (2003) that lack of understanding of lean tools leads to poor application and inefficiency. In addition, the proper selection of lean tools contributes to improved waste elimination decisions. It is worth mentioning that not all lean tools can solve the same problem and not all problems can be solved by one tool (Mostafa et al., 2013).

Since the true quintessence of lean tools/techniques is unknown and not well understood in most of the surveyed hotels, the average level of awareness observed in this study directly come from core lean concept as a result of the strong presence of ISO certifications that have a number of commonalities with lean management principles. Hence, an inference can be drawn that lean concepts are embedded in other continuous improvement systems, and do not stand up as arduous fundamental concepts and principles upon which continuous improvement is built. According to Bhasin (2012), this situation can be a hindrance to lean implementation since there is a risk of considering lean as simply one more improvement tool. Passive resistance to lean changes could be another barrier related to this. It is also worth noting that there is a significant difference in the level of lean awareness between five-star and four-star hotels. This result can be useful for future planning of lean implementations as well as for developing strategies for lean implementation and lean transformations in the hotel industry in Egypt. Furthermore, the initial level of lean implementation should be different for the five- and four-star hotels. Based on the above-charted evidence, lean awareness campaigns and strategies to improve lean awareness and lean preparedness for the hotel industry in Egypt can now be formulated. Future development of this research can be extrapolated on designing and developing an integrated LSCM implementation model for the hotel industry in Egypt.

Furthermore, the study found that the size of the investigated hotels is significantly related to the level of general awareness of LM. A possible explanation for this finding is that large hotels have more technical and managerial competencies who know more about process improvement methodologies and these firms have the financial and technological resources needed to implement such methodologies. This finding is consistent with the findings of other studies. Given the challenges of financial constraints and limited resources in terms of skilled personnel, especially when it comes to suppliers and customers, small hotels may face significant difficulties in recognizing, understanding, and implementing LSCM, although they can undoubtedly benefit from some lean tools available (Golicic and Medland, 2007). In fact, many authors claimed that LSCM is more suitable for large-scale companies than small ones (Achanga et al., 2006; Shah and Ward, 2007). They argued that LSCM recognition represent a huge challenge for small businesses due to the scarcity of competencies, qualifications, and resources. Temtime and Solomon (2002) found that large-scale companies are able to obtain more top management and leadership commitment; have a better quality culture and philosophy, and are more able to focus on process quality and improvement (factors that are essential for LSCM). Similarly, Kumar et al. (2009) found that, due to their lack of resources, smaller firms pay less attention to quality and business improvement initiatives than large-scale companies do.

On the other hand, this finding appears to be contradictory to the results of some previous studies (e.g., Snee and Horel, 2003), which contended that there are no demographic

characteristics that make LM more suitable for larger firms than smaller ones. Some authors noted that size does not affect the company's ability to implement LSCM and that small-scale companies can implement such systems as effectively and efficiently as large-scale companies. Moreover, small-scale companies are more able to adapt to changes required in the culture of the organization compared to large-scale enterprises, as they are less hierarchical and less bureaucratic than large-scale companies. Thus, information can be exchanged and clarified across the entire departments more efficiently than large-scale companies can.

It was also observed that quality certification is significantly related to the level of general lean awareness, lean principles, and lean tools/techniques. This result is not surprising given that many large hotels in Egypt have been implementing a number of ISO programs. These programs with the various business improvement initiatives have gone a long way in formulating and inspiring the quality culture in hotels in Egypt. In this context, many studies have shown that lean principles are associated with some quality programs, specifically ISO 9000. Thence, the application of quality programs leads to the readiness to implement lean philosophies (Chiarini, 2011; Al-Najem et al., 2013). Quality programs can be the foundations for the LSCM journey, as it helps to upgrade the proficiency of the interior processes utilized inside firms, and also the organizations' quality awareness and documentation procedures. According to Vincent and Reza (2004), there is a commonality between ISO9000 and LM strategies, and ISO9000 can drive organizations towards implementing LSCM practices. Furthermore, Kunnanatt (2007) suggested that firms have been shown to have a superior quality culture after implementing ISO9000, while Gotzamani and Tsiotras (2001) pointed out that ISO9000 can be a powerful initial move towards LSCM, as it empowers critical upgrades regarding most of the supply chain processes. Essentially, Mallur et al. (2011) and Ilkay and Aslan (2012) found that ISO9000-certified firms have better usage of lean practices and perform better than non-ISO firms and that ISO9000 firms are relied upon to have preferable quality practices over non-ISO firms.

Chiarini (2011) found that LSCM is related to ISO9000 as far as influencing quality manuals, work directions, and techniques. Besides, the primary procedure of ISO9000 takes after the lean arrangement plan-do-check-act (PDCA) technique. The same author added that numerous companies have implemented LSCM after reaching ISO9000 certification. ISO9000 enabled firms to better characterize representative parts, and that employees were better prepared and more dedicated to their jobs following ISO9000 certification (AL-Najem et al., 2013). According to Kumar et al. (2009), ISO might be the foundation or building obstruct before grasping lean. They additionally found that ISO9000 firms apparent the significance of CSFs similarly as lean organizations (i.e. ISO9000 firms recognized the significance of management commitment, preparing and training, relationship with customers, correspondence, customer and supplier relations, and vision and planning). Notwithstanding, firms can just benefit from ISO9000 in the case that it is utilized for invigorating internal upgrades (i.e. for expanding profitability, proficiency, management control, the definition of duties and responsibilities, and employee inspiration) (Gotzamani and Tsiotras, 2001). Besides, ISO9000 ought to be viewed as a long haul speculation that requires constant endeavors and employee inclusion. From the findings above, we expect that ISO9000- certified hotels in Egypt will have better quality practices, and hence a higher level of lean readiness.

It is very important for hotels to note that failure to demarcate lean from other quality and improvement systems may result in failure to recognize the benefits of lean. Although it is significant to demarcate lean from other tools/techniques, it is equally important to have a

systemic scope of lean and its true perspective of implementations. This study has shown that hotels in Egypt have a limited knowledge on the systemic scope of lean since some critical elements of lean, such as “long-term cost-cutting strategies” and “fully integrated management system,” received very low scores. Development of long-term cost-cutting strategies is the key to lean implementations and its benefits since it demonstrates the understanding that lean implementation is continuous improvement event. If leaders of lean implementation programs fail to understand and realize that the benefits of lean at an early stage, then it could lead to failure to implement lean. Unlike other studies somewhere else, budget issues for lean implementations will not be an issue for the hotels in Egypt as findings suggest in this study. Furthermore, Egyptian hotels have already demonstrated the commitment to various quality systems certifications. Therefore, the same level of commitment can be replicated to the needs for LSCM implementation.

The current study attempted to assess the readiness of the surveyed hotels and to identify whether they have the capabilities to implement LSCM. Many recent studies have discussed the significance of readiness aspects and have concurred that being prepared for LSCM implementation is a prerequisite to be effective in the rollout of the lean project (Garza-Reyes et al., 2015; Narayanamurthy et al., 2018). Respondents were asked to explain their understanding of the sources of wastes across their supply chains. The vast majority of the respondents consider wastes due to ‘over-processing’ as the major source of wastes across the hotel supply chain. This gives a general idea of the process that generates the most waste at the investigated hotels. Results would provide a good platform for implementing lean practices in the hotel supply chains since the role of lean techniques is to eliminate/reduce these wastes. On the other hand, the low percentages in other sources of waste indicate that there is a dearth of the acquaintance in terms of the total scope of waste in the lean framework. Such lack of knowledge on the total scope of lean could lead to failure of lean implementations. Moreover, it was observed that the majority of the respondents are unaware of the term lean deadly wastes. This result illustrates deficiencies in terms of the lean philosophy, lean thinking, and lean culture in the majority of the surveyed hotels in Egypt. For effective LSCM implementation, all seven wastes types, discussed earlier in the literature review, should be analyzed and identified at different stages of the hotel supply chain according to Anand and Kodali (2008). Hence, the present study recommends it as one of the pillars to achieve excellence in the field of LSCM.

In addition, the study showed that certain LSCM practices such as ‘suppliers’ partnerships and strategic alliances’, ‘cycle time-compression’ and ‘inventory management and control’ had actually been applied to a great extent by the surveyed hotels. Thus, it can be inferred that the respondents portray SCM practices that can ultimately improve the organizational performance. These practices cover upstream (supplier partnerships and strategic alliances) and downstream (inventory management and control and cycle time compression) sides of the supply chain, and continuous process flow (postponement). The role of these practices in a hotel can be considered significant for succeeding in the implementation and sustainment of LSCM. According to Furlan et al. (2011), these practices can both support the implementation of LSCM as well as continue supporting the lean practices after they are initiated. The practices of supplier partnerships and strategic alliances and inventory management and control can be introduced with very high effort, while the practices of outsourcing and knowledge transfer involve a low introduction effort. The practices of supplier partnerships and strategic alliances, continuous process flow, and cycle time compression promise a high potential according to the respondents. Consequently, with this notion, the current study proposes suppliers’ partnerships and strategic alliances to be

one of the important pillars in implementing the LSCM framework in the hotel sector. Respondents have shown difficulties in evaluating the following LSCM practices: synchronize flow and pull throughout the supply chain and use of inter-organizational systems such as EDI. This is probably due to the fact that some of them are less established, quite complex or complicated and just emerging practices in supply chain management.

In order to guide LSCM implementation, the respondents were asked to identify the general changes that need to be made in order to provide an environment that supports the insightful implementation of LSCM. Most of the respondents indicated that integration of internal and external activities with supply chain partners, re-engineering material flows, and creating a lean culture are the major requirements that need to be focused on developing and implementing LSCM. This finding is like that of an early study (Snee, 2010). In fact, these three principles are common in the implementation of the LSCM methodology. Secured, coordinated and maintained formal integration of internal and external activities with supply chain partners is one of the most important steps for LSCM implementation. In order to do this, hotels need first to develop a SCM process map to examine the activities of all members involved in the supply chain to indicate which suppliers hold especially strategic significance (Tummala et al., 2006). Moreover, hotels need to address all concerns of the areas/processes that will be affected. Both internal and external functional areas must work to build awareness of mutual needs and the importance of LSCM to all channel members.

The respondents also ranked the re-engineering of material flows across the supply chain as one of the top requirements that need to be focused on to realize the effective implementation of LSCM. Lean principles impose firms to examine their processes and characterize the value-added and non-value-added activities (wastes). Material flow mapping supports lean transformation by recognizing scopes for waste minimization (Mostafa et al., 2013). Thus, it is important for hotels willing to implement LSCM to efficiently move materials across the supply chain in a timely and cost-effective manner to reduce the logistics-related costs and wastes. This certainly provides the opportunities for hotels reduce the inventory costs by anticipating and responding to a widening array of demand and supply scenarios. Hotels that effectively do this are able to have a great advantage over their competitors. According to the respondents, the third most important prerequisite for effective implementation of LSCM is creating a lean culture and commitment that should be reinforced by all the supply chain players. Without commitment and involvement of all parties in the supply chain, it is difficult to create a change in the management process and establish the necessary relationships between hotels and suppliers. Salonitis and Tsinopoulos (2016) argued that culture is the most important factor accounting for success and failure of LSCM implementation.

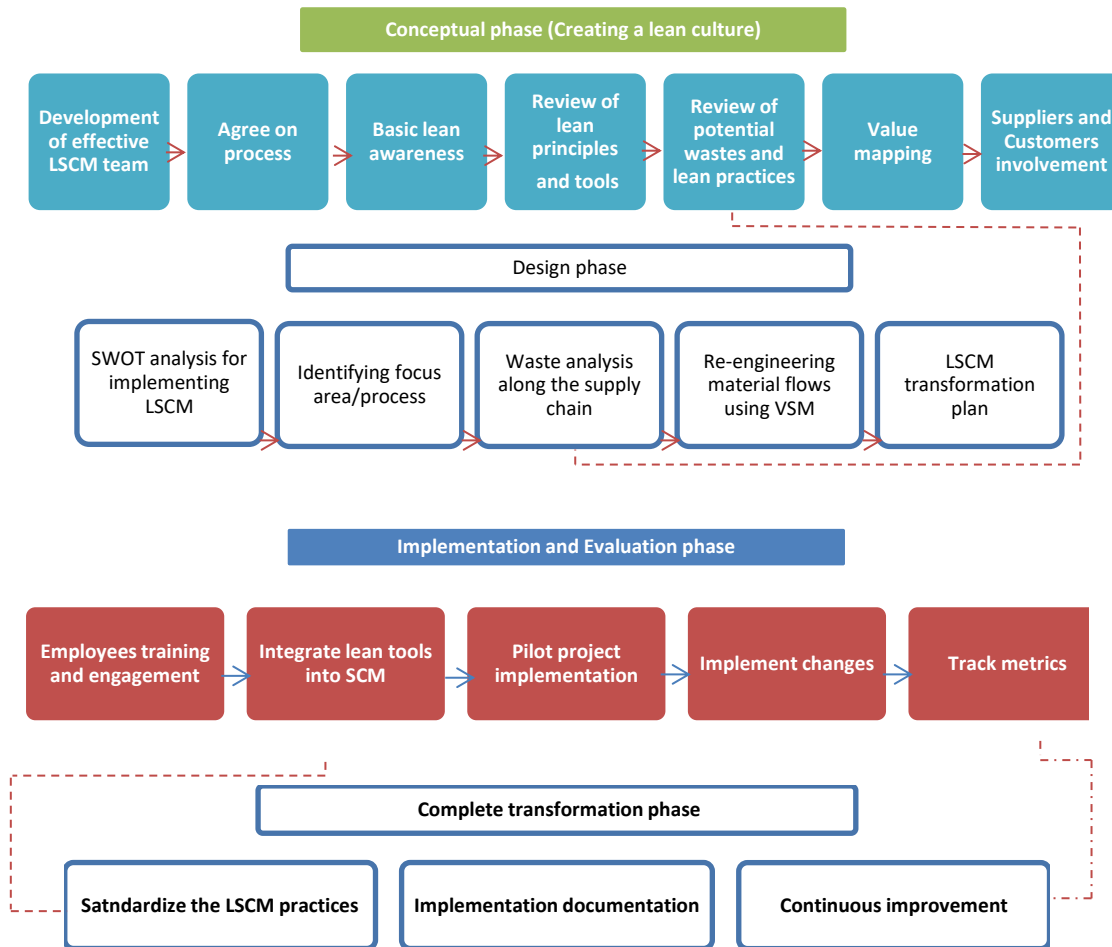
Before committing to the implementation of LSCM, the subsequent benefits and challenges should be projected in advance. The key benefits for a hotel to engage into LSCM project have been highlighted by the respondents. The key benefit revealed to be decreasing the inventory level. Improving the supply chain flexibility, eliminating wastes and reducing the cycle times are added benefits to include and these finding also align with the literature (Bruce et al., 2004; Achanga et al., 2006; Womack et al., 2007; Cudney and Elord, 2011; Borges Lopes et al., 2015). Interestingly, the drivers related to providing great customer satisfaction and increasing the profits were ranked low, in agreement to the understanding of basic lean depicted in previous section. This is quite different to the findings in other studies (Garza-Reyes et al., 2015; Narayanamurthy et al., 2018).

In practice, LSCM implementation is not an easy journey with a guaranteed successful end. Unfortunately, there is no formula that if used can ensure fruitful implementation. Therefore, it was necessary to identify the different challenges that are to be considered in implementing LSCM within hotels. In this case, the key reasons that prohibit the implementation of LSCM in the hotel sector in Egypt in order of importance were identified. The most prominent challenges are related to the lack of know-how to implement the LSCM. This is not surprising given that it is not possible to have a commitment from senior management and employees on something that they do not really understand. Hence, the use of a sensei lean team to give training, guidance, and deal with the implementation procedures is critical to overcoming this challenge. The configuration of this team represents the key node in the process (Dombrowski et al., 2012). The team ideates the requirement for LSCM in their premises and pictures the excursion they will take to reach the hoped for future state. Thus, they should be prepared for what it will take to prevail in this excursion. Enlisting lean specialists encourages and advances the change towards LSCM. Moreover, the team gives the required training and consultancy to the practitioners. The enrollment of lean specialists might be started either from an internal cross-functional team or external consultant team (Mostafa et al., 2013).

Another obstacle identified by hotel managers is that the financial benefits of LSCM application are currently not recognized. In some cases, hotels need to spend money to make (or save) money. LSCM is no different. Mistake proofing processes procedures will cost money. Settling issue areas/processes will for the most part cost money. Redesign of material stream to facilitate new line balancing will cost money. However, over time, these improvements will pay for themselves through expanded quality and diminished deformities (wastes). The third identified obstacle is related to the lack of active involvement of customers and suppliers. In order to effectively implement LSCM, hotels must confer evenhanded weight to the engagement of both customers and suppliers. Identifying customer needs, delivering the products to the customer at right time, at right quantity, at right place, and at right cost are critical to maintain and sustain long-terms relationships with customers. The supplier side is always integrated with all these elements and hence the supplier always has an essential role to play in the organizational success (Vitasek et al., 2005). Consequently, with this notion, hotels should invest resources in maintaining long-term relationships with the customers and suppliers for that matter (Wong and Wong, 2011; Vlachos and Bogdanovic, 2013; Xu and Gursoy, 2015). Hence, the present study includes the effective involvement of suppliers and customers as one of the important pillars in implementing LSCM framework. Of the major constraints identified by hotel managers is the lack of top management support. The involvement of top-level management is unavoidable when it comes to implementing any kind of operational strategy in the organization. The top management's commitment is one of the important influential pillars for LSCM implementation. This factor is considered critical, as the support of top management is essential to initiate any change management activities. They need to demonstrate exemplary commitment apart from having a thorough understanding of both the business as well as the proposed change management initiatives such as LSCM. Thus, according to the results of this study, hotels that are planning to implement LSCM are expected to have a high level of commitment from their managers and leaders.

In terms of the practical implications, the findings of the current study have solid useful implications for the hotel sector in Egypt. In this way, and based on the review of the related literature and the analysis of the study findings, a proposed framework for effective LSCM implementation is being suggested as shown in Figure (10)

Figure 10: A four-phase proposed framework for effective LSCM implementation



Limitations and future directions

The current study has encountered many constraints, including the lack of adequate studies on the application of LSCM in the hotel sector. Moreover, the current study is limited to Greater Cairo Region. Another major limitation of this study is the use of five-point Likert scale, which does not give respondents the opportunity to express their opinion in more detail. Hence, future research involving more cities and interviews can be conducted to capture relevant qualitative information, for example, on the reasons for the responses collected. Further, future research may extend the survey to incorporate different business accomplices in order to explore the plausibility and benefits of implementing LM over the entire supply chain. Exploratory studies on the critical success factors of LSCM implementation can also be directed to further examine the obstacles faced by hotels of different sizes and types.

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