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Dysfunctions in procurement process according to the lean approach: case study of a university hospital centre

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Dysfunctions in procurement process according to the lean approach: case study of a university hospital centre

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Abstract: Purchasing within all organisations is a major issue for their overall performance. This study aims to identify the three families of waste: Muda; Muri; and Mura, through the purchasing process of the University Hospital. Indeed, the results of this study show that the bottlenecks of the purchasing process are non-performing information and communication system; excessive bureaucracy and control; and non-standardised functional organisation. These results confirm that the waste concept of lean management is applicable to the public sector, where administrative bureaucracy is the main dysfunction, which has been corroborated by the literature.

Keywords: lean process; hospital purchasing; public procurement; 3Ms method; waste management; public management; process analysis.

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1 Introduction

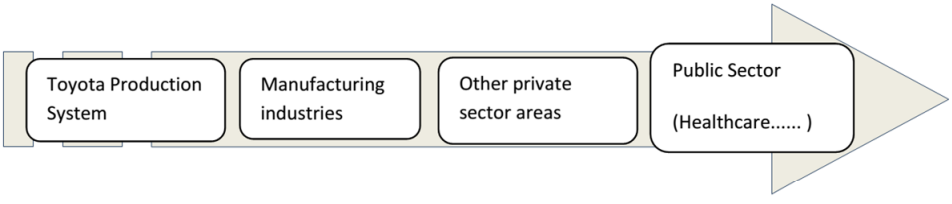
Procurement Performance is critical to the achievement of any organisation's strategic and operational objectives, but procurement-as a support function-is characterised by a highly regulated environment with detailed procedures. As well, there is an increased demand for openness to the media and accountability (Baily et al., 1994). According to Kolchin (1990), public sector purchasing in the USA is like 'buying from a fishbowl'. In

this sense, public procurement managers are concerned with compliance with regulations without sometimes focusing on quality and efficiency.

In general, suppliers complain about the late payment of their receivables. In addition, the users/prescribers of the purchased products and services complain about the cumbersome purchasing cycle and even the defects in the purchased products. All this has a negative impact on the overall performance of the purchasing organisation. In short, a poorly managed purchasing process contributes to the non-delivery of value in public services (Guarneri and Gomes, 2019; Dayson and al., 2020). These problems are mainly related to the lack of time control and also to the realisation of actions that do not add value, making the flow of activities heavy and generating a waste of time and resources. The latter are concepts from Lean Management.

According to Hohmann (2014), lean can be defined as "a system aimed at generating maximum value at the lowest cost and in the shortest time, using the right resources to provide customers with what they value". The principles of lean management find their foundations (see Figure 1) in the automotive industry through the history of Toyota. The term 'lean' means slim, lean, or even agile, aiming to maximise value and minimise waste in the industry. This approach considers that the efficient process will produce the right results, aiming especially at reducing the time between raw materials and finished products and optimising deadlines and resources in a team spirit and project mode.

Figure 1 Historical evolution of lean management

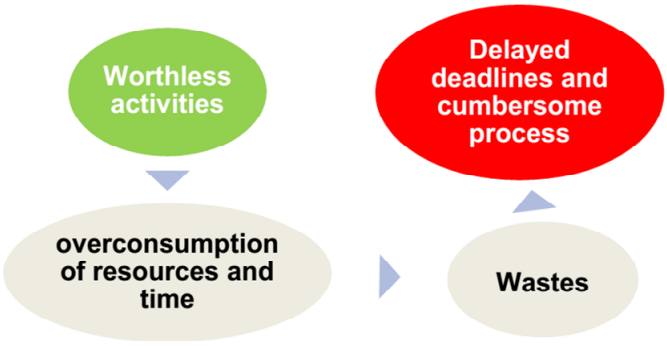


From now on, the concept of waste does not only concern industrial production but also extends to other sectors of activity. The lean Process, as a managerial and production approach, focuses on operational issues related to time and autonomy (Vlachos and al., 2021; Rosin et al., 2020). Its principles are not conceived as a set of rules to be applied at a certain stage, but rather the objective is the continuous improvement of existing processes (Radnor and al., 2012) through the use of just-in-time management. To achieve the lean process, we must identify and eliminate non-value actions or 'waste' (Ohno, 1988), which can be classified into three categories called the 3 Ms: Muda, Mura, and Muri (Yamamoto and al., 2019; Marques and al., 2022).

The lean process allows us to answer the deficiencies at the operational level of the process by permanently looking for its bottlenecks rather than attacking only the effects. From this perspective, addressing the question of the purchasing process in its correlation with lean management seems very relevant and feasible. The interest of research on hospital purchasing is that it is considered a key to the evaluation and optimisation of the management of the flows of an institution, in particular, with regard to its contribution to the core business of hospitals (hospital care) (Hassan, 2006), whose purpose is to satisfy the needs of users and patients and also reduce the payment times of suppliers.

To address this issue, this study will focus on the following problem (see Figure 2): lean management identifies the dysfunctions in the purchasing process of a university hospital via lean management.

Figure 2 Study problem (see online version for colours)



Three assumptions or premises, with some empirical support, will guide our research approach:

- the purchasing process suffers from several shortcomings and failures
- bottlenecks in the procurement process are mainly due to information and communication problems, as well as administrative bureaucracy and the commitment and motivation of the procurement actors
- lean management can provide innovative solutions to the cumbersome purchasing process.

Rahul et al. (2020) found the important goal of this have a look at is to lessen the time delay among discharge orders and a affected person bodily leaving the ED via the implementation of LSS, that is define, measure, analyse, improve and control. Data series for a length of 1 month found out that the common time among discharge orders and affected person bodily leaving the ED as 76 mins with inside the cutting-edge method. The root reasons of put off with inside the method had been recognised and development thoughts had been figured out. In case study by Tissir et al. (2020) came up with the implementation of the necessities with inside the business global are continuously growing and evolving. This obliges groups to look for constantly enhance their methods a good way to assume those traits and absolutely meet the wishes of clients with inside the shortest time, the specified pleasant with the least feasible cost. Since the early 1990s, lean production has been strongly encouraged and followed via way of means of groups due to its simplicity and effectiveness.

2 Literature review

Alkhaldi and Abdallah (2019) studied the impact of lean management on operational performance and examined the effects of operational performance aspects on the business performance of hospitals. The study data was gathered from 260 managers and 25 supervisors from Jordanian private hospitals. The result shows that the HRM bundle had

a positive influence on all operational performance aspects; the TQM bundle had a positive impact on quality performance; the JIT bundle had a positive effect on accessibility and efficiency performance, and the TPM bundle had a positive effect on quality and accessibility performances. The findings also showed that operational performance aspects (quality and accessibility) had a positive influence on the business performance of hospitals.

Mor et al. (2018) examined the non-value-adding activities (NVAs) of the core-making process and removed them using standardisation-of-work (SW) methods. Discussions with shop-floor executives helped identify a variety of NVAs, which were then recorded after a continuous process study that included the technique study, motion analysis, and standard operating procedures. The study's findings indicate that SW was used to get rid of NVAs and that doing so increased the productivity of the specific core-making process by up to 6.5%. SW created transparency in workflows, improved security, and eliminated 3Ms.

Cherian et al. (2020) Stu investigated the elements affecting the e-procurement of goods and measured the impact of e-procurement practices on the procurement of goods along the value chain. Data was collected from selected managers through a Delphi interview method and from 126 employees through questionnaires. The findings show that important factors contributing to e-procurement practices in India have been identified. The study also found that employees are comfortable using e-procurement but need adequate training and better e-infrastructure.

Grandia and Voncken (2019) examined how the six types of sustainable public procurement relate to ability, motivation, and opportunity. Data was collected from procurers working in Dutch public agencies. The study demonstrates that ability, motivation, and opportunity all have an impact on green public procurement. The outcome also demonstrates that opportunity had an impact on green public procurement, innovation-driven public procurement, and the circular economy.

Alkadry et al. (2019) determined that the impact of organisational, demographic, socio-economic, and political attitudes affected local governments' use of sustainable procurement methods in the USA. Data were collected from 207 US local and regional governments. The study found that people's political preferences are more likely to have an impact on ethical public spending than a local government's ability to establish and implement sustainable practices.

Adeniyi et al. (2020) evaluated the procurement law compliance in a developing country's local government system, compliance challenges, and workable solutions. Data were collected from 87 individuals involved in contract management for local governments. The results of the study show that in local governments there is some compliance accompanied by procurement rules. The research revealed that there is an important correlation between knowledge of procurement law, compliance with the law, and possession of a copy of the law.

Endo and Kamei (2022) clarified the Japanese manufacturing companies' procurement risk management actual status and incentives. A total of 362 listed firms have data collected from the Tokyo Stock Exchange. The study shows an outline of procurement risk management in these 362 listed firms and identifies the current issues and the three main incentives.

Po et al. (2019) provided the first in-depth analysis of Lean in US public hospitals. A total of 288 US general hospitals responded to the study. The results of the study provide

enhanced data for heads and policymakers of public hospitals to benchmark lean implementation and explore opportunities for improvement.

3 Study site

The University Hospital Center was chosen as the working universe (Labovitz, 1969) in order to constitute an empirical corpus for the following reasons:

- as an employee of this organisation, access to data and control of research locations is confirmed
- it is the largest and oldest university hospital in Morocco
- it is a public organisation in the middle of a reform process.

The study site is a public establishment with legal personality and financial autonomy under the supervision of the Ministry of Health. It is ranked first in the amount of subsidy from the Ministry of Health and, therefore, is the most expensive public hospital in Morocco. Therefore, the study site meets the criterion of theoretical relevance to the research objectives.

According to the law on the status of the study site, it is responsible for the following missions

- the care
- the training
- scientific research, expertise, and innovation
- public health

Table 1 Key figures of study site (the Year 2018)

Indicator	*Key figures*
Number of establishments	10 + Branch
Capacity Functional	2,297
Total number of staff	6,461
Operating budget	160,069,810$
Capital budget	23,007,942$
Number of visits	532,000
Number of hospitalisations	212,000

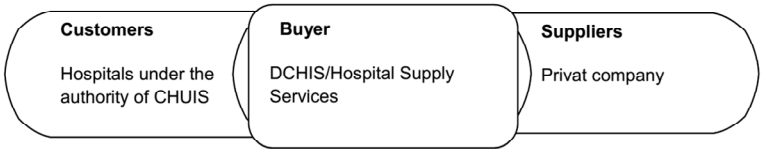
It is administered by a board of directors assisted by a management committee and managed by a director. It is composed of a general directorate, nine hospital establishments, and one non-hospital establishment, in this case, the Centre for Dental Consultations and Treatments (see Table 1).

Except for the National Institute of Oncology, the establishment procurement is attached to the Procurement and Logistics Division (DAL), itself attached to the study site General Management. This division is divided into five departments: logistics department; pharmacy department; contract services; procurement services; and inventory management department.

The procurement process at study site involves several actors and stakeholders (see Figure 3), namely:

- user/prescriber: These are the various medical and administrative departments of the study site with purchasing needs. They are also external customers
- buyer/provider: This is the division of purchasing and logistics and the supply services of the study site
- receptionist: This is mainly for the stock and pharmacy departments
- paymaster: This is the financial affairs and treasury department
- authorising/sub-authorising officer: the director general of study site and the directors of its establishments
- supplier: the contract holder
- external clients: patients.

Figure 3 Key procurement players



Notes: DCHIS: the general management of the University Hospital Center.
CHUIS: University Hospital Center.

4 Materials and methods

To understand how the purchasing process works, we opted for a pragmatic spirit (positivism and interpretivism) (Mackenzie and Knipe, 2006) and a qualitative approach. This choice was motivated by the following arguments:

- good understanding of the subject matter (Welman et al., 2005)
- interviewees have a direct relationship with the purchasing process
- studying a phenomenon in the current context (Yin, 2011)
- the qualitative method facilitates the identification of process waste in an office environment.

In addition, we chose the case study (Stake et al., 2000), which seems to be the preferred strategy to analyse the purchasing process by answering our research questions based on how and why (Yin, 2003).

Taïchi Ohno, founding father of the Toyota Production System (TPS), defined 3 families of waste, or the 3Ms:

- Muda (non-value-added task, but accepted): 'Muda' signifies uselessness or waste and is an NVA from the customer's point of view

- Muri (excessive task, too difficult, impossible): 'Muri' means 'overload or overburdening of people, facilities, and equipment, which directly negatively affects employee morale. Poor working conditions and pushing a machine or a person beyond their normal limits lead to work stress
- Mura (irregularities, fluctuations): 'Mura' refers to unevenness and variation in terms of quality and quantity. This is not caused by the rise and fall of demand or changing production problems.

Indeed, we opted for the 3Ms method (Ohno, 1988; Womack and Jones, 1996), which allows us to see hidden waste and blockages. To achieve this, we went through three steps to analyse the purchasing process at study site:

1 define the value from the user's and customer's point of view

2 make an inventory of all the activities in the purchasing process according to the role of each actor

3 identify the waste.

The target population of our study is represented by a non-probabilistic sampling of all the establishments under the authority of the study site, whose purchases are attached to the General Management. To construct this sample, we adopted internal diversification (between departments of the same hospital) and external diversification (between hospitals). It is not therefore a question of aiming for numerical representativeness in the sample, but rather of achieving an intensive and complete accumulation while stopping at the point where it is judged that the additional information did not add much (Michelat, 1975), or what is called 'knowledge saturation' (Glaser and Strauss, 1967). The subset of individuals in our target population consists of 18 people who are the heads of departments and resource persons in the following administrative departments of the General Directorate and its hospital facilities: procurement departments; financial affairs departments; inventory management departments; financial affairs division; and treasury.

The interviews conducted (see Table 2) are individual semi-directive 'in-depth' interviews (Grawitz, 2001). Based on the conceptual framework of our study and following the informal interviews we conducted with five key people with extensive experience in the purchasing profession, we developed an interview guide that consists of a preamble acknowledging the necessary information on the study and on ethical considerations; then a section of questions on the interviewee's factual data; followed by a third section composed of four themes broken down into open-ended questions; and finally an optional question.

Table 2 Characteristics of the interviews

Duration of administration	Average: 31 minutes
	Minimum: 13 minutes
	Maximum: 56 minutes
Administration period	From June15, 2019 to August 9, 2019
Type of maintenance	In-depth semi-structured interview

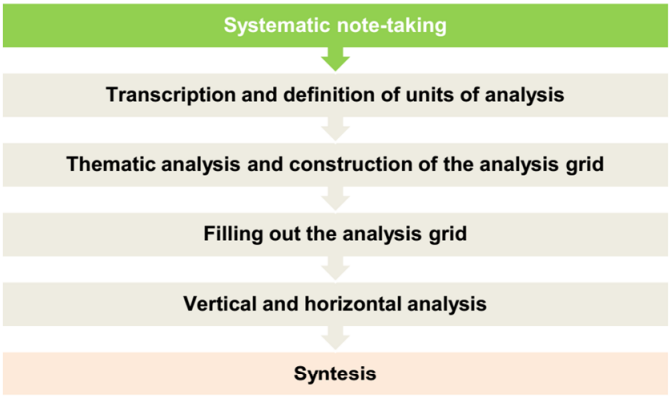
However, due to the refusal of the participants, we were not able to make an audio recording of the interviews, so we proceeded to systematically take notes in order to

collect the data. Moreover, this note-taking is perfectly suitable for our study since we will not be studying 'a critical case' (Yin, 2015).

Following the collection of data according to a pre-established grid, we proceeded to the content analysis (see Figure 4). The first step in the content analysis was the transcription of the field notes, which was done immediately after each interview, which were also coded (E1 …….En). In order to make the raw survey data accessible for analysis, we organised the survey material in a directly usable format. Specifically, we defined units of analysis. Then, we did a thematic analysis that allowed us to identify themes and sub-themes that were otherwise coded (T1.....Tn). Then, with the help of an analysis grid, we moved on to the second stage, in this case, the vertical analysis for each interview and the transversal analysis for all the interviews. These two analyses allowed us to calculate and compare the frequencies of certain elements, as well as to formulate judgments from the point of view of frequency and direction, and finally group them into significant categories.

The third step consists in describing the purchasing process and categorising the sources of waste (C1…. Cn)

Figure 4 Steps in the content analysis (see online version for colours)



5 Results and discussion

5.1 Results

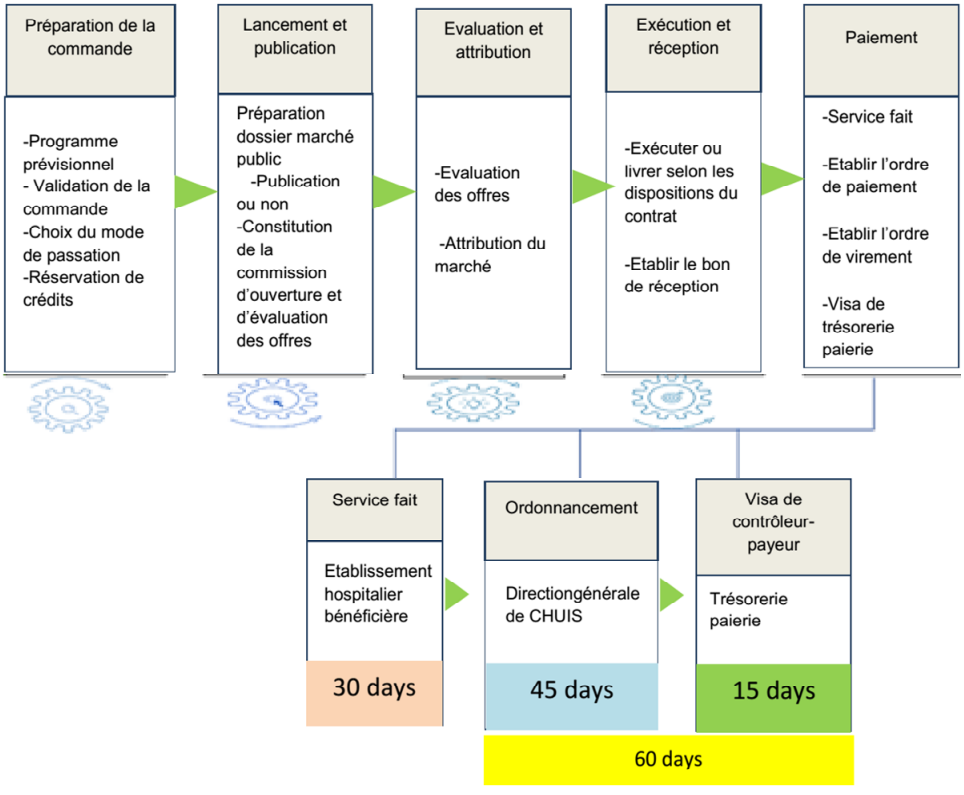
Considering that almost all of the interviewees have an experience of more than 10 years in the purchasing business, their comments allowed us to understand and describe the purchasing circuit within study site.

Every purchase begins with the expression of needs. In this first step, the study site sends a letter to all its establishments asking them to express their needs within four months. Almost all of the interviewees (14/18) consider that this time frame is sufficient. Some of them link the respect for this deadline with the size of the hospital and even with the architectural characteristics of its administration.

In addition, 2/3 of the interviewees raised the problem of non-alignment between the budget cycle and the purchasing cycle. More specifically, the delay in establishing the budget accentuates the difficulty of expressing real and relevant needs. Also, the

expression of needs must be done according to the nomenclature contained in the integrated expenditure management (IEM) information system. However, the nomenclature has not been updated. Almost all of the interviewees pointed out this problem, which, according to them, generates a considerable amount of back and forth between the General Management and its establishments and is a waste of time.

Figure 5 Hospital purchasing process (see online version for colours)



After this stage of expression of needs, the procurement and logistics division of the study site prepares the tender documents. Once the special requirements booklet is established, it is sent to the establishments concerned by the purchase for validation within eight days. In this respect, almost half of the interviewees (10/18) stated that this time frame was insufficient and that sometimes the management did not send it to all the establishments concerned.

The next stage concerns the opening and awarding of the contract: At this stage, the majority of interviewees (13/18) said that the work of the bid opening committee was cumbersome and time-consuming.

Then, the execution stage of the contract will take place within a time limit set in the CPS. In this stage, the supplier carries out the execution and the purchaser establish the reception, which is materialised by a receipt and a statement of account. The latter is the responsibility of the compliance committee jointly with the stock management service. Here again, the problem of cumbersomeness was raised by the majority of the interviewees (11/18).

Once the statement is drawn up by the purchasing institution's procurement department, it is sent to its financial affairs department to proceed with the establishment of the payment order after certification of the invoice. The latter is the trigger point for payment deadlines. All the interviewees said that the payment stage is characterised by a Ping Pong effect between the departments concerned in order to rectify errors and satisfy the reasons for rejection.

Following the thematic analysis of the interviews, the Table 3 summarises the main themes announced by the interviewees, as well as their frequency:

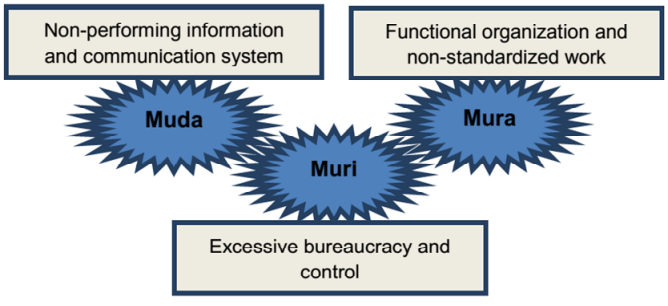
Table 3 Topics analysis of interviews

Topic frequency	
The deadlines for the expression of the needs and the validation of the special	14/18
Requirements specifications	
Non-alignment between the budget cycle and the purchasing cycle	12/18
The information system	18/18
The deposit of invoices by the supplier	15/18
The conformity of the received products	11/18
The work of the opening committee	13/18
Bottlenecks in the payment sub-process	3/18

As a summary, the diagram below shows the purchasing process (see Figure 5)

The triangulation of data resulting from the content analysis of the interviews and the literature search allowed us to identify the 3Ms of the hospital purchasing process (see Figure 6), which are considered bottlenecks. These are non-performing information and communication system; excessive bureaucracy and control; and a non-standardised functional organisation.

Figure 6 3Ms of hospital public purchasing (see online version for colours)



5.2 Discussion

First, our study asserted that the waste concept of lean management is also applicable to the public sector (Radnor and Walley, 2008; Bagley and Lewis (2008), aiming to identify waste and streamline the procurement process.

The hospital public purchasing process suffers from administrative bureaucracy (Waterman and McCue, 2012). In addition, due diligence checks to maintain compliance

with laws and administrative guidelines have resulted in an overly complicated set of purchases. Rather than providing quality services (Radnor and Walley, 2008; Scorsone, 2008; Thai, 2007), this finding was corroborated by Teichgräber and de Bucourt, (2012), who stated in a study that control and inspection is a waste of time.

Considering that the functional organisation of the University Hospital (study site) is flexible and linked with the management and even the architecture, the physical and informational flows may differ from one establishment to another under the general management of study site , which induces non-standardised work, and therefore, generates waste. In this light, Roeser and Kern (2015) identified in a study the non-standardisation of work in the purchasing profession as one of the hindrances to process performance, which increases time and cost. In contrast, he found that standardisation of work has a definite impact on process performance and even an improvement in the overall performance of the organisation.

On the other hand, although the Hospital Information System is already implemented in study site, it still suffers from deficiencies, increasing the flow of paper information and generating non-value added activities. This observation was corroborated by Schiele and McCue (2006). Moreover, some authors are very convinced of the importance of information systems in the improvement of the purchasing process. They even recommend the digitalisation of the process (Nicoletti, 2013) by combining the tools of lean management with digital information systems.

In addition, unclear communication between the purchasing actors generates errors and irregularities and increases delays, which negatively impacts the performance of the process. Our study showed the existence of this waste at study site. This finding has been defended by Radnor et al. (2006), who consider that poor communication is one of the eight wastes in the service sector.

6 Conclusions

In conclusion, our study has shed light on the waste or failures that make the public hospital purchasing process cumbersome, mainly the administrative bureaucracy and the information system. Based on the conceptual framework of our study and following the informal interviews we conducted with five key people with extensive experience in the purchasing profession. The triangulation of data resulting from the content analysis of the interviews and the literature search allowed us to identify the 3Ms of the hospital purchasing process, which are considered bottlenecks. These are non-performing information and communication system; excessive bureaucracy and control; and a non-standardised functional organisation.

The hospital's public purchasing process suffers from administrative bureaucracy. The study found that the non-standardisation of work in the purchasing profession is one of the hindrances to process performance, which increases time and cost. The result also shows that the unclear communication between the purchasing actors generates errors and irregularities and increases delays, which negatively impacts the performance of the process. These results confirm that the waste concept of Lean Management applies to the public sector, where administrative bureaucracy is the main dysfunction, which has been corroborated by the literature. Certainly, as a public institution, the University Hospital Center can seize several opportunities to implement a purchasing strategy aimed at satisfying the needs of its external and internal customers. From this perspective, we

recommend the implementation of lean management tools such as KAIZEN EVENT and the 5S or visual management. I understand that it is not a magical solution to all of the purchasing business's problems. The major shortcoming of this study is that the sample size of the study is small because the interview was conducted with only five key people, and due to the refusal of the participants, we were not able to make an audio recording of the interviews. Future research should include larger sample size and an evaluation of the improvement actions is necessary in order to adapt the tools and make them more efficient.

7 Statements

It is increasingly recognised that purchasing performance is critical to the achievement of the strategic and operational objectives of the hospital and that the failures in the current model of purchasing management, as asserted by observers and stakeholders, are partly the consequence of a lack of it, and also the non-appropriation of new management tools, focusing only on the legal and administrative.

At the global level, very few studies are focused on lean public purchasing, so the majority of studies conducted a deal with the problem of purchasing in the company, or deal with the problem of purchasing, sometimes neglecting the notion of time in the purchasing flow, or even the lean management approach.

By appropriating lean management tools, this study aims to evaluate the purchasing process and identify appropriate remedies to improve the workflow and eliminate sources of time wastage in the context of the public university hospital. In addition, the objective is to provide new evidence on the problem of deadline delays in relation to public purchasing.

In short, our subject is realistic and feasible, it is topical and has a noble purpose, as well as, it perfectly meets the criteria of creativity and innovation, as long as, we are going to see the problem of the performance of hospital purchases from a different angle compared to the majority of the studies led in this direction.

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