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Reverse Logistics in Morocco: The Case of Hospitals

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Abstract - *The medicine has become an indispensable object for the life of people in any country because of serious, chronic diseases and even pains. It is even a major health, regulatory and economic challenge for health facilities. The methods of management, distribution and control of these drugs differ from one company to another depending on the strategies and means used in the manufacturing process. Knowing that the reorganization of the management of the supply chain is necessary, in order to meet the objectives of securing the drug circuit and rationalizing health expenditure. This makes it possible to control the management of medicines at the level of the normal logistics chain. We have made a state of the art of reverse logistics management and internal hospital traceability, while trying to develop a proper relationship between the hospital sector and health (medicine) and the field of logistics and more precisely the implementation of traceability. Based on an empirical study containing statistics on reverse logistics of drugs in state health institutions (delegation and hospitals).*

Key Words: Traceability, logistics chain, reverse logistics, logistics information system, hospital logistics

1. INTRODUCTION

Over the past decades, our consumer society has been able to observe the strong growth in the production of waste products from industries, the population and hospitals. Faced with the growing abundance of these, their treatment aimed at a cleaner planet becomes a real social problem. Whereas until now, we have been content to treat them summarily, by recovering energy by incineration or by storing them as they are in public landfills, it is now our duty to remedy these dysfunctions and to guarantee the generations that the company we propose to them will be responsible for the waste it produces. This is how the last few years have seen the emergence of an emerging research problem: waste management.

A waste can take various forms. It can be nuclear waste, organic waste, household waste, industrial waste, a manufactured product such as automotive, electronics or household appliances ... In our case, we are particularly interested in medicines. Indeed, the latter represent both an interesting internal complexity to study, and basic components, most of the time heterogeneous in their function, their form and their material, which may have a high potential for revaluation, but some of which may be harmful to the environment. (Landrieu, A. 2001)

Driven by regulatory and safety concerns, companies have embraced the concept of traceability. Indeed, the security of the products, their logistics units, their flows and processes, physical distribution, consumption, and recycling ensure their compliance with the regulations.

As a result, traceability is anchored in the supply chain and several scientific studies have shown it. It is indispensable throughout the supply chain. Reverse logistics is an extremely important lever for managing products that may be out of date or may become unusable for a variety of reasons. In addition, the different quality standards require more and more product traceability. Reverse logistics management and product traceability go hand in hand.

For this our research focuses on the study of the traceability of drugs treated by reverse logistics, in health delegations and public hospitals.

After a presentation of the state of the art of reverse logistics and traceability we will present the results of a study conducted in the greater Casablanca area and finally a conclusion.

2. Reverse logistics

Irjet Template sample paragraph .Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

According to (Pohlen and Farris, 1992), reverse logistics can be defined as "the movement of consumer products towards the producer through a distribution chain". (Eymery, 1997) gives a more precise definition, which corresponds more to a logistic view: "Reverse logistics responds to the need to withdraw the products after use and to treat them by destroying them,

transforming them or recycling, in order to reduce costs by valuing recovered products and, increasingly, to meet the requirements of respect for the environment. Five issues are distinguished: collection and transport, product identification and sorting, processing operations, the switch from the pushed to the drawn flow, and finally the determination of a global allocation. Some are tactical, others operational. Let's first focus on the tactical level of reverse logistics, before going down to the operational area.

The reverse logistic term is the one most commonly encountered in the literature when it comes to the management of returns and the processing of recovered products. This term is evocative because it allows to refer to the traditional chain, but in the opposite direction. Not surprisingly, many authors have proposed a general definition of reverse logistics, hence the abundant terminological emergence of the subject. In fact, according to the author, we will talk about reverse distribution, logistics, reverse logistics, reverse logistics, and so on. Reverse logistics is a topic that dates back several years. It is even difficult to trace the date of its exact emergence. However, literature about terms such as reverse and reverse-flow channels appeared in the 1970s (Guiltinan and Nwokoye 1974, Ginter and Starling 1978). During the 1980s, one of the first descriptions of the concept of reverse logistics is the inverse distribution.

Lambert and Stock (1981) characterize the movement implicit in the inverse distribution as "going in the wrong direction on a one-way street since the vast majority of the flow of shipments is in one direction". These focus on the costs of bringing the customer's products back to the business and address the reverse logistics problem in terms of impact on the distribution system. In the 90s and 2000s, several authors were interested in reverse logistics. The latter sought to broaden the definition of reverse logistics by building on those defining the traditional supply chain. For example, Rogers and Tibben-Lembke (1998) proposed a definition based on the one described by the Council of Logistics Management (now known as the Council of Supply Chain Management Professionals).

In recent years, reverse logistics has become an area of importance for all organizations due to growing environmental concerns, legislation, corporate social responsibility and sustainable competitiveness. RL refers to the sequence of activities required to collect the product used by customers for the purpose of reuse or repair or re-manufacture or recycle or dispose of it. A careful reading of the literature shows that research in the area of RL is in evolving phase and issues relating to adoption and implementation, forecasting product performance, outsourcing, RL networks of secondary market perspective, and disposition decisions have not been thoroughly examined. (Agrawal, et al., 2015)

Reverse logistics arose from the need for organizations to structure and better control the return of their products. Despite this need, the traditional logistics network of a majority of companies is not made to deal with reverse logistics (Lambert and Riopel, 2003).

Thierry et al. (1995) provide a strategic analysis of product valuation management. To facilitate the analysis, the authors propose a list of valuation options. Options are characterized according to the level of disassembly of the product, the level of quality required and the type of output resulting from the valuation. Each of the possible alternatives for the treatment of unused or unusable products, be it reuse or direct resale, recovery or disposal, must be examined in order to target those that are best suited to the situation of the organization. . More specifically, these categories are ranked in increasing order of effort for rehabilitation or as a function of expected value gains.

- Reuse (sometimes including product repair)
- Valuation
- The repair;
- Repackaging
- Reassembly
- Cannibalization;
- Recycling unused products or their components

3. Hospital logistics

In the face of the challenges facing the health network, many Western countries, the authors argue that an improvement in hospital logistics activities could be an avenue of solution that would reduce costs while freeing up time at home. Nursing staff.

Improving the performance of the health sector is a priority objective pursued in all the industrialized countries, which must contend with cost growth in this sector. To constrain this progression without compromising the quality or accessibility of care, more and more health facilities view hospital logistics activities as a reservoir of potential savings.

As a result of the many changes currently taking place in the healthcare sector, hospitals must optimize their management to reduce expenses while ensuring the safety and quality of patient care. Pharmaceutical logistics is an important part of the hospital budget and cost savings can be made.

Medical waste management is of great importance because of the potential environmental risks and risks to public health. Manufacturers must collect medical waste and control its recovery or disposal. Medical waste recovery, which includes the reuse, refurbishment and recycling of materials, requires a specially structured reverse logistics network to efficiently collect medical waste. This paper presents a mixed integer linear programming model with minimal costs for reverse logistics networks for medical waste. Total reverse logistics costs include transportation costs, fixed costs of opening collection centers and processing centers, and operating costs for these facilities over finite planning horizons. An improved genetic algorithm method with a hybrid encoding rule is used to solve the proposed model. The effectiveness and practicability of the proposed model is validated by an application to an illustrative example dealing with medical waste returned from some hospitals to a given manufacturing.

Nowadays, some studies have focused on the possibility of applying the concept of reverse logistics to medical waste management, which can significantly improve the efficiency of medical waste management and reduce the negative influence it can exercise on the environment. Here, reverse logistics is called the logistics management process involved in planning, managing and controlling the flow of medical waste for reuse or final disposal of waste. Traditional measures, such as: waste treatment technologies, used for the treatment of hazardous waste, do not integrate the management, collection, storage, distribution and transport of medical waste into global strategies reverse logistics. Therefore, the effective design of a medical waste recovery network is one of the major challenges in the field of reverse logistics recently emerging (Shi, et al., 2009).

4. Traceability

Currently traceability in the supply chain is an essential element to ensure the reliability and legality of products. Since the 1990s traceability has been a great success. As defined in 1994 by the NF EN ISO 8402 standard, which was later replaced in 2000 by ISO 9000 and enriched in 2008 by ISO 22000 (Sep 2012), traceability refers to the ability to recover the history, use and location of an entity by means of recorded identifications. Traceability systems can be considered as an operational tool for supply chain management (SCM) (Romeyer 2000; 2005; Colin, SaracAbsi, and Dauzere-Peres 2015), as a cross-cutting concept (Pellaton and Viruega, 2007), or as a strategic management process (KarâaMorana, 2008 and 2011). Traceability with the ability to track and correctly locate a product's position throughout the supply chain is key to managing operations and improving performance (Wang, Wang and Liu, 2008). Saikouk, Zouaghi and Spalanzani, 2011). Information has economic value in supply chain management (Lee, therefore, and Tang, 2000). According to Cheng and Simmons (1994), we can not manage what is not under control, we cannot control what cannot be measured, and we cannot measure what cannot be detected. The identification of products along the supply chain is a pillar of traceability and provides businesses with an important source of operational information, management and strategic levels (Ngai et al., 2007). For Crozier and Friedberg (1977), the actor who holds the information resource and the opportunity to effectively disseminate this resource benefits from decisive leadership in its supply chain network. Traceability management is a strategic approach available to businesses to better manage products and information processes that lead to greater productivity and profitability. According to Brooke and Williams (2005), relevant information is the basis of any improvement in the supply chain; nevertheless, logistics chains have become so complex and decentralized that dissipation is difficult to avoid (Chen, 1999, Yu, Yan, Edwin and Cheng, 2001, Saikouk, Badraoui, and Spalanzani 2014). According to Alfaro and David Marsden (2009), the use of traceability information can improve supply chain management. However, a study by Harwood and Humby (2008) pointed out that organizations rarely share information with their supply chain partners, which can negatively impact chain activities such as inventory management (Yu, Yan, Edwin and Cheng, 2001), exchange of resources and collaboration (Yim and Leem 2013).

In this article, we will try to find out what are the characteristics of traceability technologies used in the management of reverse logistics of drugs? To answer this question, we present in the next section our methodological approach and the results of our study.

5. Methodology

This empirical analysis is based on a database that includes observations on the pharmacies of 22 institutions in Greater Casablanca, 11 delegations and 11 hospitals. The difference between the pharmacy of a delegation and that of a hospital must be explained

These institutions in a common point which is the flow management of the reverse logistics of drugs, this is what we have tried to dissect in this study.

6. Results and discussion

Pharmaceutical products have always occupied a major place in the Moroccan health system. In fact, the percentage of 31.7% represents medications and medical products absorbed from total health expenditure.

However, despite the efforts made so far in the context of FP supply in terms of savings (standardization of purchases) and quality assurance (European standards), the availability of these products in health facilities remains a matter of concern. Patients do not fully benefit from these efforts.

The questionnaire that we put in place could give us the following results:

Fig -1: Control of expiry dates by SIs by hospitals and delegations

In Morocco, there is an extension of health coverage, so the number of basic health care facilities and hospitals has evolved considerably. The number of doctors has increased from 1 doctor per 1775 inhabitants in 2009 to 1.5 doctors per 1000 inhabitants in 2014. Currently, the development of pharmaceutical industries can cover 70% of the national need for drugs. While the control of expiry dates by SI by hospitals and delegations has shown that 91% of establishments do not control.

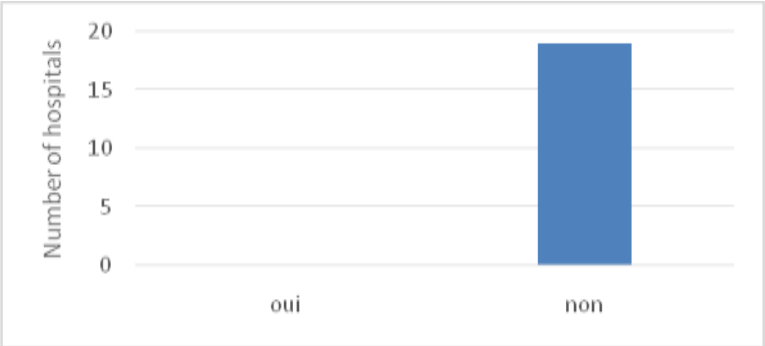

Fig -2: Drug recycling by hospitals

The provincial hospital, prefecture or regional hospital (CHP or CHR). It may be one or more general or specialized hospitals. It constitutes, within the territorial limit of the province or prefecture of its implantation, the second level of reference in the hospital care sector. It must provide, in addition to the medical services mentioned above, specialized care and

trauma-orthopedics, ophthalmology, otolaryngology, maxillofacial surgery, stomatology, gastroenterology, cardiology, nephrology, psychiatry and pneumophtisiology.

The CHP can have a regional vocation when its attractiveness exceeds the regional area. In this case he must develop disciplines such as urology, neurosurgery, burns department, nephrology, rheumatology, neurology and hematology.

Figure 2 shows that not all hospitals in Morocco recycle drugs.

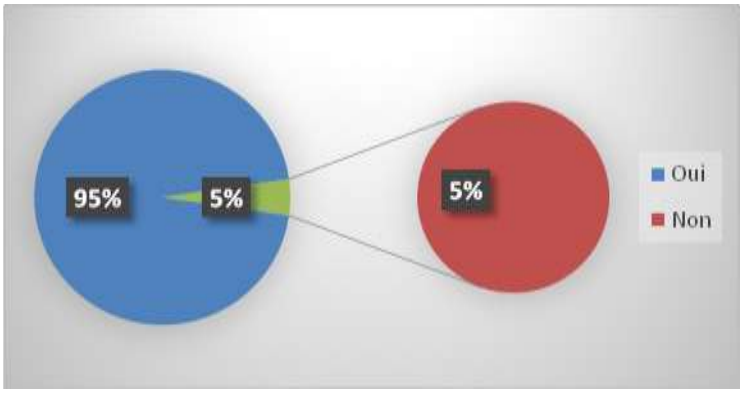

Fig -3: The waste is collected treated by the beneficiaries

However, there are many constraints to achieving these goals.

The public hospital is currently under pressure from guardians seeking to rationalize spending on health while maintaining or even improving the quality of care. On the other hand, the hospital is an organization that represents certain peculiarities compared to other organizations, especially industrial or service, among these peculiarities:

- ✓ Absence of the notion of profit maximization
- ✓ Coexistence of multiple stakeholders with conflicting interests
- ✓ Massive public intervention.

While the 3rd figure shows that 95% of the collected waste of the pharmaceutical products are treated by providers.

7. Performance issues at the public hospital

The stakes of performance for public hospitals are four according to [COSTIN & CHITOU, 2012]:

- ✓ Legitimacy issue: which responds to the objective of improving the image of the public service seen as archaic and rigid by the population with regard to the service of the private sector.
- ✓ Political stakes: this issue is important insofar as a public organization loses all credibility if it does not satisfy citizens.
- ✓ Economic challenge: it focuses on the efficiency of public services in terms of cost reduction.
- ✓ The issue of social integration: by making the service more efficient, the public authorities reinforce citizens' sense of belonging to their community.

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