

Internal Operational Damages

The IKEA case study

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Abstract

In Portugal, the IKEA brand has five retail stores and its growth strategy is essentially focused on growing the sales volume and the number of stores. Achieving this goal will require the resolution of some of the internal issues that can put it in jeopardy, such as the percentage of lost business due to unsellable products (damaged beyond repair). In 2016, globally, this percentage amounted to 0,3% of the sales, the equivalent to 110 million euros. As an indicator, in 2016, IKEA's profit margin on sales was, in Portugal, 6%. Internal damages directly impact IKEA's margins, reducing its reinvestment power and subsequently its ability to retain their market position as a low-cost differentiated company. Another affected aspect is the quality perception of the client towards the brand which is IKEA's largest concern. Having in mind the mitigation of this growing problem it was necessary to analyse the warehouse processes, define the scope and elaborate an action plan. In this paper, the company will be presented as will the characterization of the case study focusing the identification and processing of internal damages, and its most critical places of occurrence. After this framework a literature review will be developed using concepts related to internal damages, warehousing and retail leading to the usage of root cause analysis methods and the development of an action plan suitable to its results. IKEA has the capacity to rapidly adapt, however it would benefit greatly from an improvement on the follow up on their implemented ideas.

Keywords: *Damages, Logistics, Warehouse operations, Retail, Root Cause Analysis*

1. Introduction

A company's future is defined by its competitive strategy. The most common strategies used in retail are: leading by low-cost and differentiation. It is, however, possible to use a combination of both and

Miller and Dess (1993) conclude that the resulting hybrid strategies are extremely profitable. IKEA is a Swedish multinational company focused on developing, manufacturing and selling home décor

products and is one of the companies successfully sustaining a hybrid strategy. Its success is based on the capacity to provide benefits to the customer while maintaining its low-cost leadership and still achieve enough profit margin to reinvest in research and development. In Portugal, the IKEA brand has five retail stores and its growth strategy is essentially focused on growing the sales volume and the number of stores. Achieving this goal will require the resolution of some of the internal issues that can put it in jeopardy, such as the percentage of lost business due to unsellable products (damaged beyond repair), In 2016, globally, this percentage amounted to 0,3% of the sales, the equivalent to 110 million euros. As an indicator, in 2016, IKEA's profit margin on sales was, in Portugal, 6%.

Internal damages directly impact IKEA's margins, reducing its reinvestment power and subsequently its ability to retain their market position as a low-cost differentiated company. Another affected aspect is the quality perception of the client towards the brand which is IKEA's largest concern. Having in mind the mitigation of this growing problem it was necessary to analyse the warehouse processes, define the scope and elaborate an action plan.

The main goals of this work will be, in a first instance, the presentation of a well substantiated inventory analysis methodology aiming to identify which product references should be prioritized by IKEA. Secondly, to ascertain the causes that can lead to the occurrence of internal damages using root cause analysis methods. The final objective will be the

development of a set of actions that significantly reduce internal damages.

The last four years have shown a continuous growth in the volume sold by IKEA. While trying to keep in line with its growth strategy, IKEA increased the volume of product received in the stores to satisfy customer demand. This increase in volume was not supported by an increase of the warehouse capacity resulting in a space management issue, which originates internal damages in the inventory. On the other hand, there was a considerable increase in co-worker rotation at IKEA stores, meaning that some of the most experienced co-workers did not have the time to convey their knowledge appropriately resulting in a decrease in comprehension regarding the operation. Lastly, products that are considered damaged can also be received, in those conditions, directly from the supplier. Improvements in this case should focus on the increase of effectiveness of quality control upon receiving the product from the supplier. The scope of this work are the warehouse operation related damages.

IKEA considers internal damages as all articles that, by co-worker action, are not in line with their standard. In some cases, the damage is repairable and can be sold to the customer after some intervention. In other cases, the article status is beyond repair, leaving no choice but for IKEA to send it to disposal. After their identification, damaged products are removed from the inventory through a report called Transfer Type (TT). There are several Transfer Types but in this work the TT390 will be focused, as It is the one used for the internal damages. One of

the most important IKEA performance indicator, and the most related to the internal damages, is the Cost of Poor Quality (COPQ). This indicator measures the costs of the company due to the loss of product by quality issues such as damages. There are several ways to perform the calculations of the COPQ, but for retail it is the sum of the transfer type values, co-worker costs and refund costs divided by the sales value.

During the literature review, the concept of the warehouse as a part of the supply chain was studied by Kopczak and Johnson (2003).

Christopher (2011) defined the concept of supply chain management as the management of relations between customers and suppliers in a way that minimizes the costs to the supply chain. The concept of logistics is born later, and is a part of the supply chain management. Rushton et al. (2014) defines logistics as the aggregation of material management and distribution. Fleischmann et al. (2012) considers transport costs and warehouse costs the two most influential aspects of distribution. The typical warehouse activities are described by Gu, et al. (2007). Warehouse activities are prone to cause damages to the product. It is common for co-workers to create storage areas for damaged products which can also make them hard to notice for the manager (Ackerman 2012). Ackerman (2012) found that the best way to measure the performance of the warehouse is to audit its operation periodically and using both the Damaged Load Ratio and the Shrinkage Ratio used to measure losses by incorrect handling and inventory inaccuracy,

respectively.

There are very few scientific reports concerning internal damages but Akshay and Sahay (2016) report that, in the store they studied, 16% of the capacity was used in damaged products. 58% of exposed products presented light damage on the package, 22% presented severe damages in the package, 8% presented damages in the product itself, 7% was damaged while in display and 5% of products were missing.

Of stored products, 80% presented light damages in the package, 14% presented severe damages, 3% of products were damaged inside the package and 3% were missing. Akshay and Sahay (2016) used the Fishbone Diagram to analyse the root causes of instore damages.

2. Methodology

The methodology for this work covers 7 different stages. Warehouse process mapping, ABC analysis, Cause-effect Diagram, 5 Whys Analysis, Improvement proposals, Implementation, Follow-up.

2.1. Process Mapping

Anjard (1998) defines a process as constituted by a series of activities that add value to an input, transforming it into an output. A company's processes are critical to the achievement and preservation of competitive advantage, they are the means to fulfil the company's objectives and exceed customer expectations.

Process Mapping is the most prominent tool used to analyse processes, and its defined by Sharp and McDermott (2009) as a simple

graphic representation of a group of processes related through information flows and interdependencies. Its goal is to identify which are the existing steps in producing an output, bringing to light what problems occur, and where. The most important source of information to create the map is the co-workers. Observations of the processes should be in progress to validate the collected information. In this work, two process maps will be discussed, developed through the information gathered in interviews. Wilson (2014) defines three distinct ways to conduct interviews: the structured interview, the semi-structured interview and the non-structured interview.

In this work, the semi-structured interview was used due to its characteristics such as: collecting information about opinions and attitudes with ease & ease of gathering information in an environment where it is difficult to observe in person due to safety concerns.

Two maps were drawn, since the processes were updated during the timeline of the work developed.

2.2 ABC analysis

Due to a decrease in the customers bargaining power, companies were forced to adopt cost reducing policies. Companies that have a high number of products had to develop a method that could maximize their inventory management efficiency. This method, based in the principle of Vilfredo Pareto, was developed by General Electric and is called ABC Analysis. In this work. Its name is a result of the categorization imposed by the method, that groups

products in A, B or C categories (Flores and Whybark 1987). The first category, A, will account for 5-20% of items representing 55-65% of value. Category, B, will account for 20-30% of items representing 20-40% of value. Category, C, will account for 50-75% of items representing 5-25% of value (Güvenir and Erel 1998). Since IKEA has over ten thousand references, the need arose to define the scope of the study. It was decided that a multicriteria ABC analysis with the parameters, units damaged and units sold, would be in line with the company's needs. This decision was validated by the manager of the logistics department at IKEA. After this analysis, the results were cross referenced with the inventory management tool used by IKEA in order to understand their position throughout the store. It was found that some corridors had more occurrences than others, which led to a new ABC analysis with the objective of understanding which corridors were critical, and focus on those.

2.3 Impact of sales and capacity on internal damages

The decision was made to study the impact of sales and capacity on internal damages. The capacity is a parameter given by IKEA to each product and its calculated by multiplying the expected sales, safety stock and lead time. The capacity is the quantity of product available and accessible by the customer. The reasoning behind this analysis is based by the hypothesis that, the larger the sales relatively to the capacity given, the larger will the internal damages be. A sales peak implicates a higher number of product movements and a higher number

of movements implicates a higher probability of damaging products.

2.4 Root Cause Analysis

In this work, root cause analysis methods were used to understand the underlying causes of the internal damages problem.

Andersen and Fagerhaug (2006) try to define root cause analysis as a structured investigation that aims to identify the true cause of a problem and to understand what should be taken in consideration to eliminate it. A root cause analysis should use a group of strategies and tools rather than just one. It was decided that the fishbone diagram or Ishikawa diagram and the 5 whys analysis would be used. This decision was made supported by the reasoning that these tools would be less depend of a well-organized database, making it easier for the information to be obtained through individual or group interviews. Their relative simplicity is also a benefit in the IKEA context.

2.4.1 Ishikawa Diagram

The Ishikawa diagram or cause-effect diagram, aims to identify the various processes and factors that contribute to a problem (Robitaille 2004). There are studies where Slack et al. (2001) reports the utilization of the Ishikawa diagram in the retail context by the company Hewlett Packard.

Later in another publication, Slack et al. (2013) presents a new example of the use of the cause-effect diagram by the company, KPS, stating that even though there is a standard categorization to be used in the diagrams, any categorization so long as it comprehends all relevant causes, can be

used. In this work the categorization used to address the internal damages problem is: Machinery, Product, Manpower, Processes, Environment, Tools.

2.4.2 The 5 Whys Analysis

The 5 whys analysis was developed by Sakichi Toyoda in the 1930's and is now one of the more prominent tools in Six Sigma's Quality Management System (Alukal 2007). Marquis (2009) states that the idea behind the 5 whys analysis is quite simple, through the successive question "why?" it is possible to separate the symptoms from the causes of a problem. This exercise is critical since generally symptoms can mask the underlying cause. The 5 whys analysis performed in this work uses some of the causes that resulted from the cause-effect diagram analysis previously mentioned. These causes were chosen due to their high estimated contribution to the internal damages issue.

3. Results

Concerning the results obtained from the elaboration of the Self-Service process mapping when considering the differences between the original map and the updated one, we can reach to the conclusion that, the number of distribution areas, is decreased from 7 to 4. This measure reduces the probability of generating internal damages due to the significant decrease of the quantity of movements made by products during the replenishment operation.

Regarding the elaboration of the inventory ABC analysis, shown in Figure 1, it was possible to conclude which products were included in the 20% that suffered the most damages, and sold the most units.

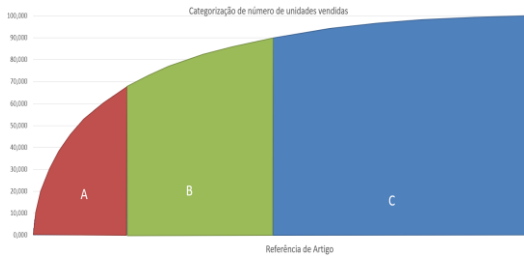


Figure 1 - ABC Categorization

As for the IKEA corridors ABC analysis, which included 195 products resulting from the inventory ABC analysis, it made possible the conclusion of which corridors were critical in terms of damage occurrence. The top corridor, presented in Table 1, shows over 30% more occurrences than the second highest corridor.

Table 1 - Corridors ABC analysis result

Corridor	Occurrences	Occurrence percentage	Cumulative percentage
1	12	0,1519	0,1519
7	9	0,1139	0,2658
10	8	0,1013	0,3671
28	7	0,0886	0,4557
14	6	0,0759	0,5316
21	5	0,0633	0,5949
Total	47		

Regarding the analysis of the impact of sales and capacity on internal damages in the products resulting from the ABC analysis, it was not possible to find a clear definition of cause-effect since there is large variability during the analysis period, which is seen internally as resulting from failure to follow the reporting procedure. On the other hand, in sales peak days, the client's degree of exigency is significantly decreased due to the reduced availability on the shelves resulting in a decrease of TT390 reported, visible in Figure 2.

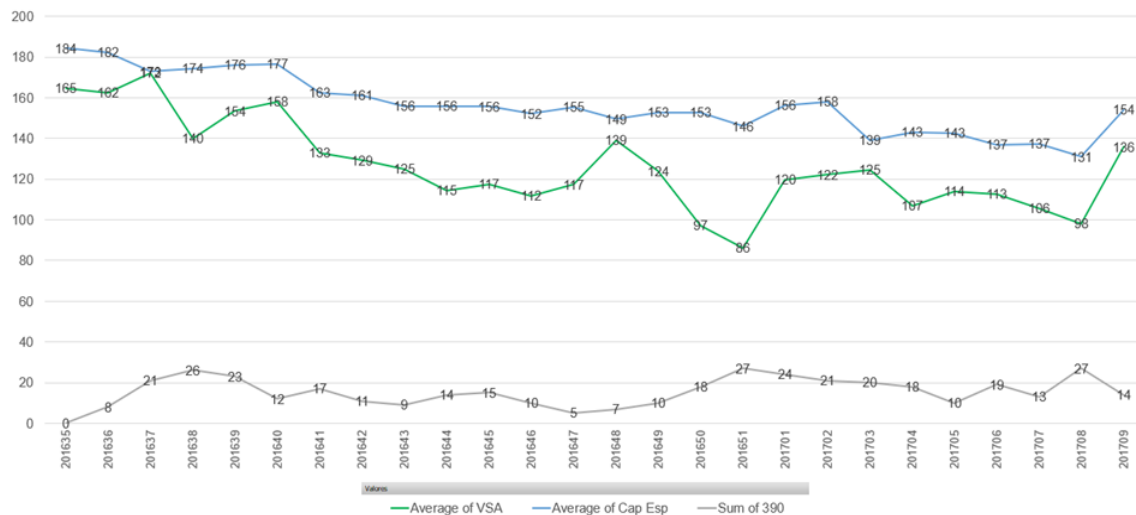


Figure 2 - Analysis of the impact of sales and capacity on internal damages (before Lean Project)

At a certain point, a Lean project was implemented in IKEA, after which there was a noticeable decrease in the TT390, totaling

22%. Even though the influence from the Lean project is undeniable, it is important to know that, this 2% decrease was

accompanied by a decrease in sales and capacity during the same time.

Another visible phenomenon is the regression to the state previous to the Lean program after its terminus.

After this, the visible patterns are: Sale peaks present a decrease of the TT390 and

Sales decreases present a considerable increase on internal damage reports.

Regarding the Cause-Effect analysis (Ishikawa diagram) presented in Figure 3, the diagram presents in an organized fashion the cause-effect chain, which connects the different root-causes to the problem under study.

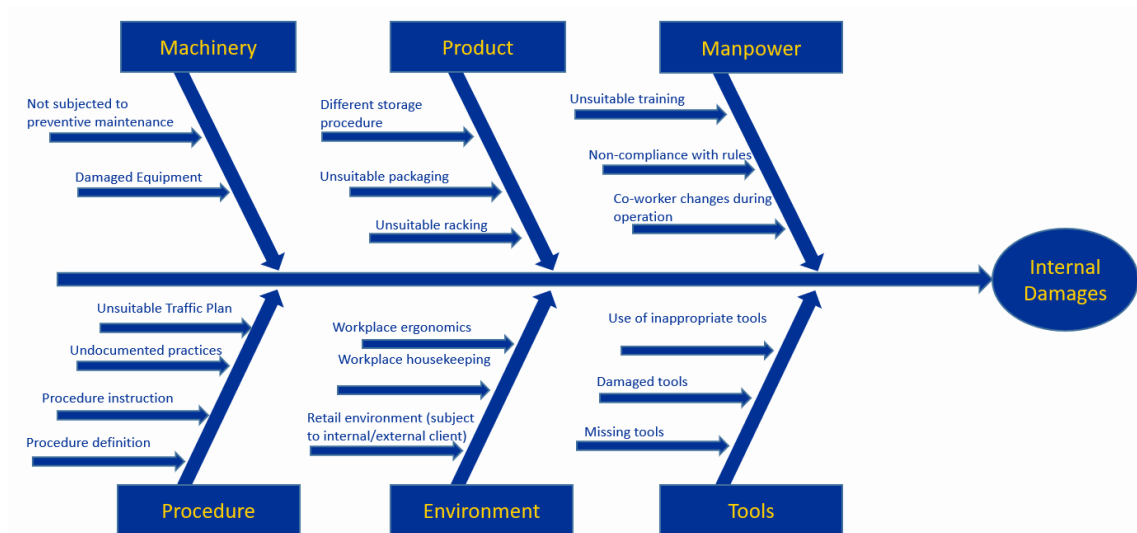


Figure 3 – Ishikawa Diagram for Internal Damages at IKEA Alfragide

Regarding the 5-why analysis, it allowed the definition of a group of actions that, supported by the results obtained from the Ishikawa diagram, will lead to the mitigation of the issues identified in the several analyses performed. As such, its application is of capital importance. Some of the presented measures are: implementation of a metal control guide and elaboration and implementation of an efficient traffic plan are already being implemented with visible and measurable results, such as the decrease of the internal damages impact on lost sales due to unsellable products. The implementation of the metal control guide was the most cost-effective measure. When using the control guides, the impact between

machine and metal is absorbed and diverted along the guide, avoiding repercussions for the product on the other side of the shelf.

4. Conclusions

The process mapping has shown us that the number of distribution zones should be reduced, and the ABC analysis identified the products that have more damages, and sell more units, it has also shown the corridors with the highest incidence of damages the analysis on the impact of sales and capacity on internal damages couldn't return a clear root cause since there was extreme variations during the analysis period. The Lean Project reduced the TT390 but it returned to prior levels after the project terminus. The Cause-Effect Diagram leads

to the most probable causes of the internal damages problem and the 5 whys analysis lead to the development of a set of actions meant to solve the internal damages issue, shown in Table 2. Lastly an action plan was created addressing the necessity of

investment, the need of a pilot test, the duration of said test,

the method by which the results will be measured and the expected result, presented in Table 3.

Table 3

Table 2 – 5 Whys Analysis

Cause	1 st Why	2 nd Why	3 rd Why	4 th Why	Action
Unsuitable racking	Inadequate contact between racking and product	Racking is not approved by IKEA	Acquired in local market	No budget for official IKEA racking	Implementation of metal control guides
Damaged Equipment	There is no preventive maintenance	There is no control on who uses the machines	Fear of possible consequences There is no maintenance plan implemented	---	Development of a training program centred in the importance of reporting
Workplace housekeeping	Hinders machine movements	Obstructed Corridors	Lack of knowledge on the procedures	Lack of training and information	Elaborate a training plan for co-workers focusing the time saved with the decrease of TT390
Non-compliance with rules	Indiscipline	Lack of knowledge of the rules	High rotation of co-workers	Company motivates personal development in other areas	Increase the responsibility level of the more experienced co-workers
Unsuitable Traffic Plan	Inadequate contact between equipment	Constraints	Co-workers don't follow a unique and efficient flow	There is no traffic plan implemented	Elaborate and implement an efficient traffic plan

Table 3 - Action Plan

Action	Need for Investment	Test Pilot proposal	Pilot Duration	Result Measurement	Expected Result
Implementation of a metal control guide	Yes	Yes	2 months	Measurement of the TT390 decrease	Decrease of Forklift related damages
Development of a training program centred in the importance of reporting	Yes	Yes	6 months	Audit the number of reports by co-worker	Increase in number and quality of reports
Elaborate a training plan for co-workers focusing the time saved with the decrease of TT390	No, internal Resources utilized	No	NA	Define objectives in line with the training and follow-up	Productivity increase and damages decrease
Increase the responsibility level of the more experienced co-workers	No, internal Resources utilized	Yes	6 months	Define objectives in line with the co-worker's role and follow-up	Increase in motivation to follow the rules
Elaborate and implement an efficient traffic plan	No, internal Resources utilized	Yes	4 months	Measurement of the TT390 decrease	Productivity increase and damages decrease

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