

The Impact of a Better Logistics on POP Marketing Material

Filipe Manuel de Pinho Brandão

Dissertação de Mestrado

Orientador na FEUP: Prof. Jorge Rui Guimarães Freire de Sousa



Mestrado Integrado em Engenharia e Gestão Industrial

2019-07-01

Abstract

The brewing industry is characterized by a heavily competitive environment, having to fight harder for each pint of beer sold. In fact, the search for increased economies of scale and larger markets, having to cope with an accelerated globalisation and characterized by a fairly static demand and an intensive segmentation and premiumization, forced brewers to focus on innovative strategies and distribution channel developments to maintain their returns and margins. To overcome such challenges, companies started to recognize the importance of advertisement and improved logistics as the strategic use of firm capabilities and distinctive competencies is imperative for competitive advantage.

Therefore, this thesis focuses on studying and exploring the impact of a better logistics on POP marketing material in the beer industry, trying to understand how a beer production company should organize their logistic process in order to optimize this return and to measure the impact it can generate. For that reason, it includes a case study on a Spanish brewing company to evaluate results.

The existing literature on the impact of POP marketing presents two main conclusions: The increasing competition of the beer industry has made the leading brewing companies strongly invest in advertising, which despite not being irrefutable that increases the beer market, is believed to impact sales across different brands. Besides, POP marketing is stated to be an important decision factor for customers when deciding which product to buy. As a result, the belief that POP marketing can indeed strongly affect the beer sales can be extrapolated.

This thesis also presents the kaizen breakthrough project selection process that culminated into the choice of this theme and the methodology followed for, starting from the analysis of the initial situation, being able to identify improvement opportunities and plan the deployment of the necessary workshops in order to lead to an optimized process. This structured methodology proved to have good results as it was aligned with the company's goals and allowed all the involved people to understand the project selection and be on board with all the proposed initiatives.

The results obtained are limited as some initiatives were not fully implemented and there were certain setbacks that prevent the deployed initiatives to generate all the expected and potential results. Therefore, proper conclusions could not be made regarding the exact impact of the improved logistical solutions implemented. However, all the estimations and first results pointed to the same conclusion. In fact, the results obtained in the studied brewing company, anticipated and supported the thesis that an improved logistic can positively impact the return of POP marketing material in the beer industry.

Resumo

A indústria cervejeira é caracterizada por um ambiente de enorme competitividade, obrigando a um grande esforço para potenciar o seu volume de vendas. De facto, a procura pelo aumento das economias de escala e pelo alargamento dos mercados, juntamente com a necessidade de lidar com uma globalização cada vez mais acelerada e marcada por uma procura estagnada, bem como uma intensa segmentação e crescimento do consumo de produtos premium, forçou as empresas cervejeiras a focalizar-se em estratégias de inovação, marketing e no desenvolvimento dos canais de distribuição de forma a manter as suas margens e retorno financeiro. Para conseguir ultrapassar estes desafios, as empresas começaram a reconhecer a importância da publicidade e o impacto da melhoria do processo logístico, já que a utilização estratégica de maiores capacidades e competências são absolutamente fulcrais para desenvolver vantagens competitivas.

Neste contexto, esta tese procura estudar e explorar o impacto de uma melhor logística e de material de marketing em pontos de venda na indústria cervejeira, com o intuito de compreender de que modo uma empresa produtora de cerveja deveria organizar o seu processo logístico para otimizar o aumento na quantidade total produzida sem um aumento proporcional no custo de produção, ou seja medindo o impacto que isso pode gerar. Por essa razão, esta dissertação apresenta um caso de estudo de uma empresa cervejeira espanhola para estudo e validação dos resultados.

A literatura existente que explora o impacto do marketing em pontos de venda apresenta duas principais conclusões: a crescente competitividade da indústria cervejeira levou a que as maiores empresas investissem fortemente em publicidade já que, apesar de não ser capaz de aumentar o mercado de bebidas alcoólicas, pode ter um forte impacto nas vendas das diferentes bebidas e marcas. Por outro lado, considera-se que o marketing efetuado diretamente nos pontos de venda é considerado um importante fator de decisão para os clientes no momento de escolher que produto comprar. Consequentemente, é possível extrapolar que o marketing em pontos de venda tem efetivamente um impacto significativo nas vendas de cerveja destas empresas.

Esta dissertação descreve também o processo de seleção do projeto de melhoria contínua a implementar numa empresa e que culminou na escolha do tema desta tese. A metodologia utilizada no projeto de melhoria consiste numa análise inicial do seu fluxo de material e de informação, identificar as oportunidades de melhoria no processo e planear a implementação dos workshops daí decorrentes com o objetivo de otimizar o processo. Esta metodologia estruturada provou ter bons resultados, uma vez que permitiu alinhar o projeto escolhido com os objetivos estratégicos da empresa, mobilizando todas as pessoas envolvidas a participar ativamente no desenvolvimento e implementação dos projetos e iniciativas planeados.

Os resultados obtidos são, no entanto, limitados já que algumas iniciativas ainda não foram totalmente implementadas devido a alguns contratempos que impediram que os resultados inicialmente esperados fossem totalmente atingidos. Consequentemente, não é possível fornecer dados completamente definitivos relativamente ao impacto exato das

iniciativas implementadas com vista a desenvolver uma logística otimizada. Contudo, todas as estimativas e os resultados obtidos na empresa cervejeira estudada fazem antever e suportam a tese de que uma logística otimizada pode impactar positivamente o retorno do investimento em material de marketing em pontos de venda das empresas da indústria cervejeira.

Acknowledgements

The grounding of this master's thesis is the culmination of a process, from which I must highlight the contribution and friendship of some people, to whom I want to publicly show my profound appreciation.

To Dr. Jorge Freire de Sousa, the scientific advisor of this dissertation, for having accepted the responsibility to guide this project, with whom I receive invaluable teachings, suggestions, as well as the availability with which he always attended my doubts, clarified my uncertainties and the way he has motivated me to finish this thesis despite some setbacks that occurred along the way.

I also thank all the professors who contributed to my training at the Faculty of Engineering of the University of Porto, for the important knowledge I acquired from them during the course.

To Kaizen Institute, a special thanks to engineer Tiago Pérez Sanchez, who was not only my advisor in the company but also an important support on my integration to the company and to a new country.

I also would like to show my gratitude to the whole Kaizen Institute Spain team for transmitting me a set of methodologies, processes and teachings enabling me to achieve my goals during this stage, with a special mention to engineer Carlos Lloret and engineer Aitor Ramírez.

To my parents, brother and friends for the support throughout this course and for having constantly motivated me, my sincere thanks.

Contents

1	Introduction	1
1.1	Motivation	1
1.2	Scope	2
1.3	Case Study description	2
1.4	Dissertation Structure	3
2	Literature Review	5
2.1	Kaizen methodology	5
2.1.1	Kaizen Business System	5
2.1.2	Kaizen Change Model	6
2.1.3	Roadmap Kaizen Transformation	6
2.1.4	Breakthrough Kaizen Project Planning – Value Stream Mapping	7
2.2	POP marketing	7
2.3	Pull Planning (TFM)	8
2.3.1	The Total Flow Management Kaizen Model	9
2.3.2	The External Logistics Pillar of the TFM Kaizen Model	10
2.3.3	Stock reorder point and supermarket size	12
2.3.4	Orders levelling	13
2.3.5	Purchasing orders	14
2.4	MRP software and pull planning algorithms	14
3	Problem Description	17
3.1	Project Selection Process	17
3.2	Internal and External Actors	20
3.2.1	Internal Departments	21
3.2.2	External Partners	22
3.3	Process as-is	22
3.4	Muda and Improvement Opportunities	25
3.5	Workshops Identification	27
3.6	Process to-be	29
3.7	Limitations and Workshops Prioritization	30
4	Methodology	33
4.1	Purchasing Process Workshop	33
4.1.1	Annual Purchasing Needs	33
4.1.2	Implementation of a Purchase Reorder Point	35
4.2	Pull Planning System	35

4.3	Implementation of an MRP	38
5	Implementation and Results	41
5.1	Purchasing Process	41
5.1.1	Annual Purchasing Needs.....	41
5.1.2	Purchase Reorder Point	42
5.2	Pull Planning System.....	42
5.2.1	Implementing a Pull Planning System in the Logistic Operator's Warehouse	42
5.2.2	Level Wholesalers Delivery Orders by Implementing a Pull Planning System	43
5.3	MRP.....	43
5.4	Project Results	44
6	Conclusions	47

Acronyms and Symbols

AS400: A corporate IT application for POP marketing material order management and tracking reports.

DILO: Satisfaction Survey

EBITA: Earnings Before Interest, Tax, Depreciation, Amortization

ERP: Enterprise Resource Planning

JDE: Jdedwards. A transactional system where the company's operations are recorded.

KBS: Kaizen Business Model

KPI: Key Performance Indicator

MRP: Material Requirements Planning.

OA: MRP Oracle message that stands for provisioning order.

OB: MRP Oracle message that stands for purchasing order.

POP: Point-of-Purchase. Synonym of Point-of-Sale (POS).

POS: Point-of-Sale. Synonym of Point-of-Purchase (POP).

QCD: Quality, Cost, Delivery

QCDM: Quality, Cost, Delivery Motivation

ROI: Return on investment

SIPOC: "Supplier-Input-Process-Output-Client". A framework to analyse the processes performed by a department or a company.

TFM: Total Flow Management

TPM: Total Productive Maintenance

TQM: Total Quality Management

List of Figures

Figure 1 - Kaizen Business Model (Bastos 2019).....	5
Figure 2 - Roadmap KAIZEN Transformation™ (Bastos 2019).....	7
Figure 3 - Value Stream Mapping Implementation Steps (Bastos 2019)	7
Figure 4 - SIPOC analysis.....	17
Figure 5 - Project Priority Graph	20
Figure 6 - Flow Chart Process to-be	29
Figure 7 - Implementation Plan	31
Figure 8 - Replenishment Level Formula (Bastos 2014).....	36
Figure 9 - Order Replenishment Level and Average Stock on a Pull Planning System (Bastos 2014).....	37
Figure 10 - Supermaket Size Calculation Method (Bastos 2014).....	38
Figure 11 - MRP Decision Process Flow Chart.....	44

List of Tables

Table 1 - Project Impact KPIs	18
Table 2 - Projects Impact	18
Table 3 - Difficulty / Investment Criteria	19
Table 4 - Difficulty/Investment Results	19
Table 5 - Project Priority Results	19

1 Introduction

The present chapter serves a starting point for this dissertation and is divided into four sections: Section 1.1 sets up the motivation for this work; Section 1.2 defines the scope of the problem under analysis; Section 1.3 presents the company which serves as case study for the developed work; Finally, Section 1.4 provides a thesis outline and a brief description of each chapter.

1.1 Motivation

As one of the oldest and most widely consumed beverages, beer remains in the thick of a challenging era. Over the last several years, the global beer industry has experienced a roughly stagnant if not decelerated market with various factors impacting consumption. Having to face structural challenges, tighter regulation, higher competition, and a change in consumer habits, brewers are focusing on innovative strategies and distribution channel developments to maintain their returns and margins (“What’s on Tap for the Global Beer Market? The Beer Industry: Pouring Both Pints and Profits Away from the Sector” 2018).

Profit maximization requires both production and marketing/advertising efficiency. In fact, a firm's performance in many consumer goods industries hinges on marketing and advertising as well as production success (Färe et al. 2004). According to Scherer et al. (1975), brewing industry experts claim that advertising is inclusively ‘much more important’ for a firm's success than production.

In the opinion of Hector Gorosabel, Asahi Europe’s CEO, premiumization is far from a new trend but has played significant importance in shaping the global beverage industry. Consumers are willing to pay more for better quality products, exclusivity and a more enjoyable consuming experience (Arthur 2017). In an age of premiumization and shift in customer preferences, brewers and brands must recognize that traditional plans for growth might not align with their target audience or cultural trends.

To overcome such challenges, companies are focusing on new strategies including increasing portfolio and channel complexity, reducing the lead times of product innovation and understanding consumer needs and aspirations. In fact, in a heavily competitive environment, a major concern of business management in general, and logistics management in particular, is the strategic use of firm capabilities and distinctive competencies for competitive advantage. This logistic capabilities can make major contributions to overall corporate strategy and performance, and even sometimes provide the core competitive competence by creating differentiated customer value (Morash, Droge, and Vickery 1996). Indeed, Boston Consulting Group's Vice President Harold Sirkin has noted that within an increasingly global economy, supply chain management is critical to long-term success: "As the economy changes, as competition becomes more global, it's no longer company vs. company but supply chain vs. supply chain” (Fawcett and Clinton 1996).

As the beer market continues to become more saturated, focusing on value over volume and understanding the fast-changing consumer are more important than ever. In addition to testing different strategies and releasing diverse products, several leading brands have begun experimenting with new forms of technology, such as using artificial intelligence to help brewers efficiently test different taste combinations. Beer may be one of the oldest and most popular drinks in the world yet, even tradition needs innovation.

In an ever-increasing competition world, more and more businesses and individuals see the pursuit and achievement of a Kaizen Management System as a potential solution. The word *kaizen* means “change for the better” and it can, in fact, embody a way of life for modern corporations, so that change for the better becomes a daily habit of continuous improvement (Coimbra 2009). It is this constant willingness to innovate and do better that creates organizations capable of thriving.

1.2 Scope

In an increasingly concentrated European beer industry market driven by the search for increased economies of scale and larger markets, having to cope with an accelerated globalisation and characterized by a fairly static demand and an intensive segmentation and premiumization, companies have to fight harder for each pint of beer sold. In fact, nowadays, beer production companies are continuously offering and negotiating better terms with their clients, therefore leading to the decrease of their profit margin. As a result, their investment on marketing is becoming more and more important as a differentiation factor in their disputation of market share.

The present dissertation will focus on point-of-purchase marketing material, aiming to increase its return on investment through an improved logistics. The goal is to understand how a beer production company should organize their logistic process in order to optimize this return and to measure the impact it can generate.

1.3 Case Study description

This thesis serves as a case study for a Spanish beer production company which will be referred to as “Company A” due to the existence of a confidentiality agreement.

The more than 100-years-old company concentrate its sales in Spain despite having recently started to focus on the internationalization of its brands. In fact, Company A has been in the front line of the beer industry tendency of diversification and premiumization having several brands with products of different quality and subsequently different price. Furthermore, this company is also being focused on vertical and horizontal integration. Although in its first years Company A has been focusing on developing a sustainable and organic growth, they have shifted their expansion strategy and have bought dozens of companies in the last years.

The beer market increasing competition and the difficulty of homogenising the culture and management system across all the acquired organizations were the main reasons why Company A has hired Kaizen Institute for embracing a cultural change and helping the organization to build a Continuous Improvement management system. The current dissertation project covers part of the work developed in Company A.

1.4 Dissertation Structure

This dissertation is divided into six chapters, the first of which being the present chapter. The remainder can be outlined as follows:

In chapter 2, the existing literature related to the scope of this thesis will be presented. It will firstly explain the basis of the kaizen methodology, which will be used in this dissertation. Afterwards, the POP marketing impact and importance are initially analysed in all the consumer goods industry but later reduced to the beer industry scope. Besides, pull planning systems and Kaizen's total flow management model are studied and, finally, MRP softwares are concluded to help and support pull planning algorithms.

Chapter 3 - Problem Description – uses the kaizen methodology described in chapter 2 to firstly explain the project selection process and, later, to analyse its current information and material flow, identifying the problems and improvement opportunities and planning the resultant needed workshops to implement and lead to an optimized process.

In chapter 4, the methodology to be used in the implementation of the identified workshops will be explained thoroughly as it serves as the basis for the success of the results of the entire process. It is divided in three different topics that cover the workshops to be implemented in the initial cycle of the project which is being deployed in the company that serves as case study for this thesis: purchasing process, pull planning system and implementation of an MRP.

In chapter 5, the implementation steps of each initiative being deployed is described, using the methodology presented in chapter 4 as a starting point. Here, all the encountered setbacks and specific characteristics of the process are considered and the methodology is adapted accordingly in order to successfully deploy the initiatives. Afterwards, the obtained results are presented and analysed.

Finally, chapter 6 is the conclusion of this thesis, summarizing the important outcomes that resulted from the work developed and reaching to a final conclusion regarding the questions this present dissertation is trying to answer to. At last, some future works are recommended in order to further explore the question under analysis.

2 Literature Review

2.1 Kaizen methodology

The meaning of Kaizen is 'Change for the Better' or 'Continuous Improvement', and more and more companies are adopting Continuous Improvement management systems. In fact, continuous improvement is becoming a company strategy dedicated to the continuous improvement of operations, a truly operational strategy based on Kaizen principles and tools.

The underlying vision is that organisations which implement Kaizen and install a Continuous Improvement dynamic, based on the pursuit of excellence in terms of the people and continuous improvement, create a strong competitive advantage. (Coimbra 2009)

2.1.1 Kaizen Business System

Kaizen Institute, a consulting company founded by Masaaki Imai, has been implementing its Kaizen Business System Model and changing the culture of several organizations throughout the world since 1985.

The KBS Model consists of a set of principles and tools whose main strategic goals are to increase growth and profitability leading to higher shareholder returns and company values, focusing on creating a culture of continuous improvement and guaranteeing great business results year after year (Imai 2012).

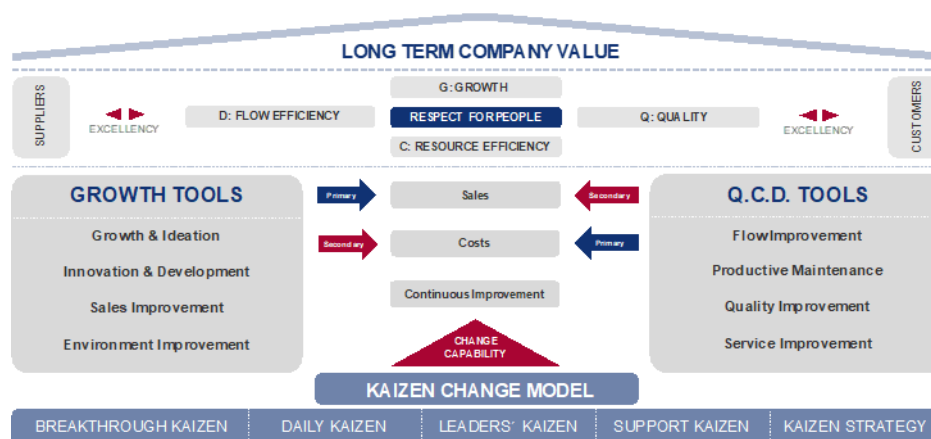


Figure 1 - Kaizen Business Model (Bastos 2019)

The KBS Model is divided in three different parts:

- **GROWTH:** focusing on increasing customer voice-based sales which consists of a toolbox to improve strategy, innovation, development, marketing and sales. Starting with disruptive ideation through a system for generating new ideas that really bring value to the customer, it aims to develop products and services efficiently and prepare a marketing and sales strategy in order to optimize the company's payback.

- QCD: improvement model to reduce costs based on flow efficiency. This set of tools aims to improve the quality of products or services offered so that they can meet customer expectations while increasing productivity and resources efficiency through the elimination of waste in the value chain.
- MOTIVATION: Related to the implementation of a continuous improvement culture, through motivated/devoted people, who attain results. In fact, what kaizen really does is improve these processes, up to a point in which the continuous improvement philosophy becomes part of the entire organization. This is the only way to attain Business Excellence (Bastos 2019).

2.1.2 Kaizen Change Model

The kaizen change model enables a company to create a culture of continuous improvement with zero defects. It is an integrated four pillar system consisting of: Breakthrough Kaizen, Daily Kaizen, Leaders kaizen and Support Kaizen.

The Breakthrough Kaizen program is into improving processes, productivity equipment effectiveness, safety and the quality of products and services using the new paradigms of flow, synchronization and levelling. These improvements lead to increased sales, reduced costs and inventory, saved time and decreased waste. By customizing Breakthrough kaizen, it is possible to achieve better results in sales growth, innovation, time-to-market, operational efficiency and reduced capital investment.

The Daily Kaizen program is training and motivating line managers including group and team leaders to identify and solve problems that lead to tangible improvements, benefiting their own workplace and team. It encourages small, frequent improvements that lead to the establishment of the kaizen culture and a team focused environment. People become inspired to take more ownership of their work and contribute to the organization and achieve operational effectiveness at levels never reached before.

The Leaders Kaizen program focuses on management helping managers to understand kaizen principles like *gemba* commitment, visual management, strategy deployment and strategy improvement. By helping managers with role model kaizen behaviours, this mix of techniques and principles makes significant transforming impacts possible in an organization.

The Support Kaizen program accelerates the effectiveness of kaizen activities across an organization and is the key to their long-term success. They help monitoring towards achieving their strategic goals. By making progress visible, both roadblocks and deviations can be eliminated in a timely effective way (Kaizen Institute 2019).

2.1.3 Roadmap Kaizen Transformation

A continuous improvement project is divided in three parts: a diagnostic phase, followed by a planning and an implementation ones. In the first phase, an initial situation diagnosis is to be delivered. This includes analysing the current situation of all the areas of the company, understanding and evaluating their current management model and sensitizing the board of directors about the tasks that are being undertaken as well as the importance of their commitment and responsibility towards the project. In the planning phase, the continuous

improvement management model is redefined, being the proposed solutions and initiatives presented and scheduled throughout time. As a matter of fact, the company strategy is aligned and its deployment across the different areas is planned, quantifying the improvement potential and adapting to the needs and resources availability of the departments. In the third and final phase, the continuous improvement model and the deployed initiatives are implemented (Bastos 2019).



Figure 2 - Roadmap KAIZEN Transformation™ (Bastos 2019)

2.1.4 Breakthrough Kaizen Project Planning - Value Stream Mapping

As stated before, in the planning phase of a kaizen continuous improvement project, the selected breakthrough kaizen projects are presented and scheduled throughout time. In order to achieve this, a value stream mapping is undertaken.



Figure 3 - Value Stream Mapping Implementation Steps (Bastos 2019)

This consists in the first workshop of a breakthrough kaizen project and aims to define the future vision of the process under analysis. It provides a clear vision over the improvement initiatives and a detailed implementation plan which takes into account the prioritization and economic return of the proposed solutions (Bastos 2019).

2.2 POP marketing

Since 1977 that the beer industry has faced a sales plateau and that market share battles have become the major objective of the leading brewing companies with advertising being

central to this competition. In fact, the total media advertising expenditures for beer have been rising since then (Wilcox 2001).

Färe et al. (2004) evaluated the performance of six US beer firms in terms of their ability to translate advertising messages into sales. According to them, advertising induces sales for at least one of the two reasons: advertising may be informative and/or advertising may be persuasive. In the former case, advertising informs consumers that a good exists; it may describe characteristics of the beer and may also inform the consumers where the good can be bought and at what price. In the latter case, advertising encourages consumers to try the brand for real or imagined benefits.

There are several studies about the impact of advertising in the consumer goods industry. For instance, Lesser, Zimmerman, and Cohen (2013) proved the existence of a positive relationship between the percentage of outdoor food advertising and overweight/obesity. The same conclusion was drawn by Wilcox et al. (2013) who stated that alcohol advertising in the aggregate makes us drink more than we would otherwise as does food advertising make us eat more. Galbraith, Galbraith, and Kenneth (1973) were a little bit further by supporting that advertising has strong effects on consumer budget allocations even across product classes which are not close substitutes. Contrarily, several other authors such as Grabowski (1976) agree that advertising results in brand switching but does not increase the overall size of the market. This conclusion was reached by Gius (2015), Wilcox and Gangadharbatla (2006) and Duffy and Martyn (1991) regarding brand-level distilled spirits, beer and alcoholic drinks and tobacco, respectively. Nguyen (1987) even concluded advertisements influenced the sales of different brands produced by a single company. Finally, Nelson and Moran (1995) assume an intermediate position when studying the advertising effect on total ethanol consumption. They concluded that although the total consumption of alcoholic beverages remained constant, advertising does have some impact in each beverage and each brand markets.

According to McKinsey&Co's study of 2015, the falling consumer demand, the increasingly competitive products, the heightened requirements by retailers and consumers, and the tougher market access make the breweries work with retailers increasingly important. Availability is more than just being everywhere – standing out is a key driver of sales. Therefore, breweries need to develop “shelves of the future,” compelling beer and food combinations, and effective point of purchase displays (Rutishauser, Rickert, and Sängler 2015).

In fact, Ramírez Beltrán and Alférez Sandoval (2014) concluded that 28 % of the customers always make decisions by responding to the visual advertising or the visual merchandising, getting even to the 61 %, considering those who change their decision occasionally. The “POPAI Executive Summary Report - Mass Merchant Study Results” (2014) goes further and states that 70% of the purchase decisions are taken in the point of sale, reflecting the big importance of POP marketing.

2.3 Pull Planning (TFM)

In an ever-increasing competition world, Bowersox and Morash (1989) highlighted the need to integrate marketing and logistic flows for achieving customer satisfaction, leveraging the channel performance for competitive advantage. Some years later, Fawcett and Clinton

(1996) alerted for the importance of supply chains optimization. In fact, Presson (1991) noticed that companies are increasingly coming to recognise that the way in which 'time' is managed throughout the logistics system - from procurement of materials to the receipt of payment for goods sold - is a determinant key of competitive advantage. Not only are work-in-progress and inventory reduced through a shortening of total logistics lead-time, but also responsiveness and flexibility to marketplace requirements are dramatically enhanced.

Coimbra (2009) defends that embracing Lean as a total system is the key for companies to improve their operations and that by creating and increasing a total flow of materials and information they can improve quality, reduce cost and inventory, and meet diversified customer requirements in terms of volume and delivery. He concludes by stating "Lean means to employ minimum resources for maximum output. Lean is what you gain as a result of building TFM."

A Total Flow Management can be defined as an integrated system for increasing the process flow and pull effectiveness across the entire supply chain, both downstream (what we call the delivery side of the supply chain) and upstream (the source side of the supply chain). The main target is the reduction of the total lead time in the supply chain, eliminating all *muda* and non-value-adding operations, leading to the creation of flow and ensuring: reduced cost, reduced working capital, increased productivity, improved quality and higher levels of customer service and satisfaction.

This is achieved by creating a flow across the entire supply chain, starting with customer consumption. Production or distribution orders are pulled on the basis of continuous real demand requirements while forecasts will be used only for capacity management (Coimbra 2009).

2.3.1 The Total Flow Management Kaizen Model

The Total Flow Management Kaizen Model focus on changing a company culture based on the Kaizen spirit of improvement every day, everywhere, and by everybody (Imai 2012). It follows 7 Kaizen principles:

1. Create Customer Value:

Today the strategy of any company should be centred in this principle: discover what the client wants/needs and offer him that in the best way possible

2. Create Flow and Eliminate Waste - through the elimination of the 7 Muda:

People waiting, material and information on hold, movement of people, movement of material and information, excessive production, excessive processing and errors causing rejections and rework.

The goal is to eliminate activities which don't add any value to the value chain, from suppliers to customers. Through the continuous removal of *muda*, it is possible to reduce lead times, thus improving flow efficiency and boosting large productivity increases and cost reductions.

3. *Gemba* Effectiveness:

Go to the *gemba* (the shop floor, the place to make improvement) and change the working habits of people for the better, increasing the density of transfer of value between resources and flow units.

4. People Engagement - motivation through improvement:

This principle places a great deal of emphasis on the involvement of people in the improvement activities. The most important aspect is that working in teams and developing people ultimately results in the development and adoption of new working habits that improve quality, reduce costs and improve customer service.

5. Visual standards

The visual standards principle embodies the concept that a picture is worth a thousand words and that a standard is the most efficient known way of performing a task. A standard that is based on pictures, drawings and creative word pictures is quickly and easily understood.

6. Process and results

Looking and analysing a process in detail is the only way to improve it. However, the result is also important as it allows you to check if the process improvement is having the right effect.

7. Pull Flow thinking

Pull flow means organising all your supply chain in terms of an optimal material flow and an optimal information flow. The term pull means that the material flow should be pulled and initiated by customer consumption or customer orders (Coimbra 2009).

The Total Flow Management Kaizen Model has three main areas of improvement: production flow, internal logistics flow, external logistics flow. For each of these, it uses several flow tools to develop the best solution for improving a company's supply chain.

2.3.2 The External Logistics Pillar of the TFM Kaizen Model

Regarding the flow of POP marketing material, the brewing companies mainly focus on their relationship with external partners.

The two parts of the external logistics flow are source and delivery. Source means all the logistics processes that take place before the delivery of the materials and the arrangement of the incoming goods, including any reserve stock and all the warehouse inbound work. It also includes the transportation and outbound operations at the suppliers. On the contrary, delivery covers all logistic operations that take place from the point of the outbound goods supermarket, including the distribution inventory, the outbound work, transportation to the customers and the inbound supplies to the customer's storage points (Coimbra 2009).

The elements of external logistics flow consist of the following domains: storage and warehouse design, milk run, source flows, delivery flows and logistics pull planning.

1. Storage and warehouse design deals with the layout of the warehouse and the type of storage for the pallets, cases or items to be stored.
2. Milk Run for transport between stations in the supply chain, either for source or delivery, these features of the old milk run are a key element in the creation of flow. It also allows work to be levelled, which in turn helps to prevent the Whiplash Effect and stabilizes manpower in warehouse facilities and all across supply chains. Another advantage of the milk-run type of transport is that it improves the productivity of the unloading and loading tasks performed by the driver and other people in drop points, because consolidated deliveries will always take place at the same times and will be done by the same people.
3. Source flows deal with the physical operations in the source logistic loops, especially within the inbound process at a customer storage facility. The goal is to create a flow in all the operations and increase productivity at the same time. It is the old paradox of how to reduce inventory, improve customer service and reduce logistic costs all at the same time.
4. Delivery flows deal with all the physical operations in the delivery logistic loops, especially the inbound and outbound operations of the product distribution facilities. The elements of these logistic loops are quite similar to those in the source flows domain as they share the same goal: to create a flow in all these operations and increase productivity at the same time.
5. Logistics pull planning deals with how to decide the planning strategy of each product reference. It uses forecasts to plan capacity in the logistic loop and to plan the real orders, either the final customer orders or the replenishment ones (Coimbra 2009).

When starting a TFM strategy in a stand-alone distribution warehouse that is not part of a network, one has to look at both ends of the supply chain and define both a source and a delivery strategy that fit the corresponding pull logistic loops.

One should start by creating a flow in the following areas:

1. Logistics pull planning – sending orders to suppliers with daily deliveries, which will reduce the size of the inventory on hand.
2. External transportation – redesigning the shipment routes according to the milk run principle and increasing the frequency of shipment while encouraging the customer to order on a daily basis, which can also help the customers reduce their own inventories.
3. Outbound improvement – organizing picking waves managed with a levelling box as well as checking and sorting stations.

The logistics pull planning processes will be used to define the optimum inventory level (OIL) for each SKU and to decide when and how much of each product reference to order. This process starts with the final customer needs. This ordering process, also called inventory

management, inventory control or stock replenishment, is frequently plagued by the Whiplash Effect. This is a feature of traditional systems – small changes in the final customer demand will generate demand increases in every loop of the chain. This is also called the Demand Amplification Effect.

Artificial variation in demand can be reduced by focusing on better management of the information flow and reducing its lead time. This can be approached by:

- harmonizing plans and forecasts internally into one set of numbers, so that all forecasts are prepared to fulfil the same plan
- creating visibility and collaboration across the supply chain. An important goal is for each node to be aware of what is the real end customer demand and what is the demand created by the supply chain
- standardizing the replenishment process according to proven rules that counter the Whiplash Effect, so that every planner follows the same proven standard procedure
- reorganizing responsibilities in the replenishment process and applying (when appropriate) pull vendor-managed inventory (VMI) systems, in which: the customer provides the supplier with real-time data on inventory and demand and the supplier takes responsibility for stock replenishment at the customer's site, with agreed rules (Coimbra 2009).

The subprojects dealing with external logistics, according to Coimbra (2009) will probably start with the source side. Here it is the company that will probably have the greater power, because it is the buyer or customer. From this position it is easy to change logistics pull planning.

2.3.3 Stock reorder point and supermarket size

According to Graves and Willems (2003), there is a significant opportunity to improve the total supply chain cost by jointly optimizing sourcing and inventory decisions during the configuration of the supply chain. The earlier that these supply chain considerations can be incorporated into product and sourcing decisions, the more leverage they can generate.

Logistics pull planning steps consist in, firstly, defining the planning strategy for the product references, secondly, in planning the capacity on a medium to long-term basis and finally in order planning – deciding when and how much to order.

Order planning involves the process of deciding real orders to suppliers. The traditional replenishment models that work on the basis of the stock reorder point can be used on a daily or continuous basis. Future stock is calculated by checking the available stock against the customer orders on hand and supplier orders in process. As the levels of this stock reach the point where it is necessary to reorder, an order is issued covering the lead time for replenishment. The reorder level is calculated on the basis of how much consumption is expected during this lead time.

This daily stock review algorithm works well when the lead time for supply is short and is close to the stock review period. However, this situation should be avoided if the supply lead time is really long. The forecasting errors involved in ordering and receiving thereby will result in an increase in inventory and a drop in the service level.

Regarding the supermarket size, it depends mainly on the characteristics of the lead time of this logistic loop as, by definition, a supermarket will always be the waiting point at the end of it.

The supermarket will have to be designed to accommodate the maximum number of items to be stored. This in turn depends on two main parameters: the transport batch size and the replenishment lead time.

The replenishment lead time is used to define the trigger point for ordering a replenishment of parts to the supermarket. Therefore, the quantity of items stored needs to be large enough to serve the customer while the information that replenishment is needed and the material needed move through the logistic loop.

There is, however, a third parameter used in calculating the size of supermarkets. It is related to the frequency of delivering. If the frequency is low, then the supermarket will have to be bigger. If the delivery frequency is high, the maximum storage point will not be reached so often. If we can keep the delivery frequency at a constant high level, then the size of the supermarket can be reduced (Coimbra 2009).

Two conclusions can be drawn from the work of Coimbra (2009): Best results are achieved when batch sizes match transport frequencies and both are minimized and when transport frequencies are low, moves to reduce batch sizes have no effect at all.

2.3.4 Orders levelling

Regarding inbound delivery flows, a company receives the orders from the customers and has to quickly pick and ship the goods. If customers are not implementing a TFM strategy, they will probably place orders based on forecasts and higher than necessary daily call-off orders.

A company can propose a more frequent delivery service, perhaps conducting a pilot project to show the customer the advantages to be reaped by reducing material waiting inventories. This naturally leads to discussion of shipment frequencies and transport lead times but allows the company to levelling its operations (Coimbra 2009).

Liker (2004) defines levelling production as smoothing out the volume and mix of items produced, which means a little variation in production from day to day. So, levelling out the schedule is a foundation for flow and pull systems and for minimizing inventory in the supply chain. In fact, it eliminates spikes in consumption and gives the suppliers a smoothed takt time, possible to use a fixed manning crew in the lines independently of the work content of the various products being assembled. Levelling deals with the sequencing of small or unit batches to create a better flow.

The same conclusions are stated by Bastos (2014) regarding levelling in inbound delivery flows. However, apart from reducing costs and waiting inventory and simplifying the

management of the company resources, it is concluded that levelling orders also enables companies to improve their service level.

2.3.5 Purchasing orders

New concepts in the field of purchasing, such as outsourcing, supply-base management and value-chain management, have become increasingly common practice. Because of the cross-functional character of these concepts, the call for a strategic reorientation of the purchasing function becomes louder (van Weele and Rozemeijer 1996).

Because of supply chain management and other factors, purchasing performance is considered an important element of corporate performance. According to Easton, Murphy, and Pearson (2002), purchasing started to gain increased recognition due to its direct impact on the final cost of the end product. Purchased components constituted over 55% of the sales dollar in many manufacturing industries, which left purchasing with the significant potential to reduce costs for the company. Advanced technologies reduced labour and operating cost, which increased the percentage of purchased cost in every sales dollar.

In more recent years, the concentration on core competencies coupled with business practices that focus on the supply chain, have afforded purchasing the opportunity to play a larger strategic role in the firm (Carr and Smeltzer 1999; Narasimhan, Aram, and Carter 2009).

This focus on core competencies and supply chain management significantly increases the number and importance of external relationships. Firms that have recognized the strategic importance of purchasing, now expect this function to develop and maintain effective and efficient relationships with suppliers. Purchasing is now looked upon to lead the way towards analysing the external market, developing the appropriate relationships, and negotiating contracts that will increase the profitability of the firm and the supply chain (Cox 1996). The purchasing role in supply chain management includes communicating with suppliers to decrease redundancies and increase efficiencies along parts of the supply chain (Wisner and Tan 2000).

2.4 MRP software and pull planning algorithms

Coimbra (2009) commented on the difficulty of implementing a pull planning system in companies with well-established information system already in place and which focus and give a big influence to the work of planning teams. In these cases, an effortful work with the planners in small teams to try out and test the pull planning algorithms is needed. Luckily, many ERP packages already offer the possibility of testing new models and most of them have pull algorithms.

According to G. Plenert (1999) when studying the successes and disappointments of Material Requirements Planning, MRP is the planning and control system which allows greater flexibility. In fact, several authors have already argued that MRP's basic philosophy is only focused on what and when materials are needed (G. J. Plenert 1990; Ritzman, L.P., King, B.E., Krajewski 1984; Chase, R.B., Aquilano 1995; Lee, S.M., Schniederjans 1994; Nahmias 1997; Schroeder et al. 1981), allowing it to be easily adaptable.

In order to implement a pull planning and levelling system, Coimbra (2019) described the steps that need to be taken in a monthly material requirements planning (MRP) based on forecasts. The first change is to use the forecasts only to do the monthly capacity planning exercise. The second is to apply a pull planning algorithm on a daily basis to compare a certain replenishment level with the stock of goods, so that when the stock falls below the replenishment level, a replenishment order is generated. With this system the source of the planning data will no longer be forecasts, but real pull orders.

ORACLE's Material requirements planning (MRP), for example, calculates net requirements from gross requirements by evaluating the master schedule, bills of material, on-hand inventory balances, lead times and order modifiers. It then plans replenishments by creating a set of recommendations to release or reschedule orders for material based on net material requirements. These planned recommendations are stated in discrete quantities with due dates and in repetitive build rates with first and last unit start dates.

Oracle's MRP assumes that an infinite capacity is available to meet the material requirements plan. However, capacity planning can be used to verify that sufficient capacity exists to support the material plan. Supply Chain Planning users can employ additional functionality to generate and manage their material and distribution requirements across multiple, interdependent organizations.

Oracle's MRP provides many different items and plan level attributes that give the user the flexibility for generating material and distribution requirements plans that satisfy the business needs. The purpose of the planning process is to derive an MRP that meets schedule dates while maintaining inventory levels within your "material" policies (Oracle® 2018).

3 Problem Description

This chapter will start presenting the kaizen breakthrough project selection process, covering the initiatives taken under the first and second phases of the entire continuous improvement project presented in chapter 2. Afterwards, the internal and external actors are described and an analysis of the current tasks occurring throughout the integral management of POP marketing material is performed, identifying *muda* and improvement opportunities. The goal is to find how the process should be done in the future and what workshops need to occur for it to be achieved. Finally, the deployment of the workshops is planned.

3.1 Project Selection Process

The project started by interviewing all the directors, identifying the macro-processes taking place in each area of the company. A macro-process refers to a process that cuts across several departments of different areas and in which numerous people are involved resulting in long execution periods. From this list of processes, a SIPOC analysis was done, recording the suppliers, inputs, outputs, main tasks/processes and the internal clients of each area and, consequently, summarizing the connections between the different departments of the organization.



Figure 4 - SIPOC analysis

This analysis is characterized not only by describing and quantifying the duration, deadlines and frequency of the referred processes but also for extending it to all the tasks performed by each one of the addressed departments. In order to do so, all these processes should be inspected in the *gemba*, focusing on scanning the non-value-added activities (*muda*) and estimating the improvement potential of tasks effectiveness, information flow and people's productivity.

Furthermore, from the gathered information and with the help of the directors, 31 possible kaizen breakthrough projects were identified making use of their expertise.

However, as so many possible projects were enumerated, there was the need to reduce this list and to prioritize the ones who should firstly be analysed. This was done by assessing the resource consumption and the improving potential of each one of the projects.

In order to do so, the strategic drivers of the company were taken into consideration and the impact of each one of the projects was estimated. This was done, initially, by defining the KPIs that would serve as criteria to evaluate the impact on each of the company drivers and, secondly, by attributing a weight to each one of them. This considered the expectations that the board of directors had about the project that was being undertaken. The following table shows the strategic drivers, KPIs and the assigned weights that served as criteria for the measure of the projects' impact.

<i>Drivers</i>	<i>Indicators</i>	<i>Weight %</i>	<i>KPI</i>
LONG-TERM DEVELOPMENT	Excellence and Continuous Improvement	20	% Total Costs / VN
		7.5	AECOC rating
	Transversal Projects	7.5	Sustainability
		7.5	Carbon footprint (kg CO ₂ /hl)
		10	Digitization
Transversality, TALENT AND DIVERSITY	People	20	% Internal Covered Positions
		5	Conciliation measures achieved
		10	DILO
ORGANIC AND INORGANIC GROWTH			
Internalization			
PROFITABLE LEADERSHIP IN SPAIN	Leading the Category	12.5	% VN Innovation and Premium / VN

Table 1 - Project Impact KPIs

Once having defined these criteria, the impact of each project was evaluated by attributing a grade between 0 and 10 to each of the KPIs. The accordant impact estimations were obtained:

DESCRIPTION PROJECT	% TOTAL COSTS / VN	AECOC RATING	SUSTAINABILITY	CARBON FOOTPRINT	DIGITALIZATION AMOUNT	% INTERNAL COVERED POSITIONS	CONCILIATION MEASURES ACHIEVED	DILO	% VN INNOVATION AND PREMIUM / VN
Project 1	10	0	0	0	5	10	0	10	2
Project 2	10	0	0	0	5	10	0	10	2
Project 3	10	0	0	0	5	10	5	5	0
Integral Management of POP Marketing Material	10	0	5	5	5	2	0	5	0
Project 4	5	0	0	0	10	5	5	5	0
Project 5	5	2	0	0	0	2	0	5	10
Project 6	5	0	0	0	2	5	0	5	0
Project 7	5	0	5	5	2	0	0	0	5
Project 8	5	0	10	10	0	0	0	0	0
Project 9	2	2	0	0	2	0	0	5	10

Table 2 - Projects Impact

As it is expected that a continuous improvement project starts producing significant returns as soon as possible, which will then be used to continuing financing the improving initiatives throughout the time, only the 10 highest impact potential projects were considered relevant.

Afterwards it was time to add the difficulty/investment requirements variable to the equation. This was determined based on the following four criteria:

DIFFICULTY / HIGH INVESTMENT	YES	NO
INVOLVES MANY PEOPLE	Involves more than 100 employees	Involves fewer than 100 employees
INVOLVES THIRD PARTIES	Changes the way other companies work	Only changes the way internal people work
HIGH INVESTMENT	It's possible that the solution requires the acquisition of new computer equipment or applications.	The acquisition of new equipment or applications is not foreseen, although it may be needed to modify current ones.
TIME TO RETURN	The visibility of the impact on the actions taken will be more than 6 months.	The visibility of the impact on the actions carried out will be less than 6 months.

Table 3 - Difficulty / Investment Criteria

The difficulty/investment requirement evaluation for the 10 highest impact potential projects is quantified by summing up the number of yeses and the results are presented in the next table:

DESCRIPTION PROJECT	INVOLVES MANY PEOPLE	INVOLVES THIRD PARTIES	HIGH INVESTMENT	TIME TO RETURN
Project 1	YES	YES	NO	NO
Project 2	YES	NO	YES	YES
Project 3	NO	NO	NO	NO
Integral management of pop marketing material	YES	YES	NO	YES
Project 4	YES	NO	NO	YES
Project 5	YES	NO	NO	YES
Project 6	NO	NO	NO	NO
Project 7	NO	YES	NO	YES
Project 8	YES	NO	NO	YES
Project 9	YES	NO	NO	YES

Table 4 - Difficulty/Investment Results

Finally, in order to establish a priority measure, the potential impact is divided by the difficulty/investment requirement factor. As easily perceived, the higher the priority value the more recommended and viable the project is.

DESCRIPTION	STRATEGIC IMPACT	DIFFICULTY / INVESTMENT	KAIZEN PRIORITY
Project 1	5.75	3	1.92
Project 2	5.75	4	1.44
Project 3	5.25	1	5.25
Integral Management of POP Marketing Material	4.15	4	1.04
Project 4	3.75	3	1.25
Project 5	3.30	3	1.10
Project 6	2.70	1	2.70
Project 7	2.58	3	0.86
Project 8	2.50	3	0.83
Project 9	2.50	3	0.83

Table 5 - Project Priority Results

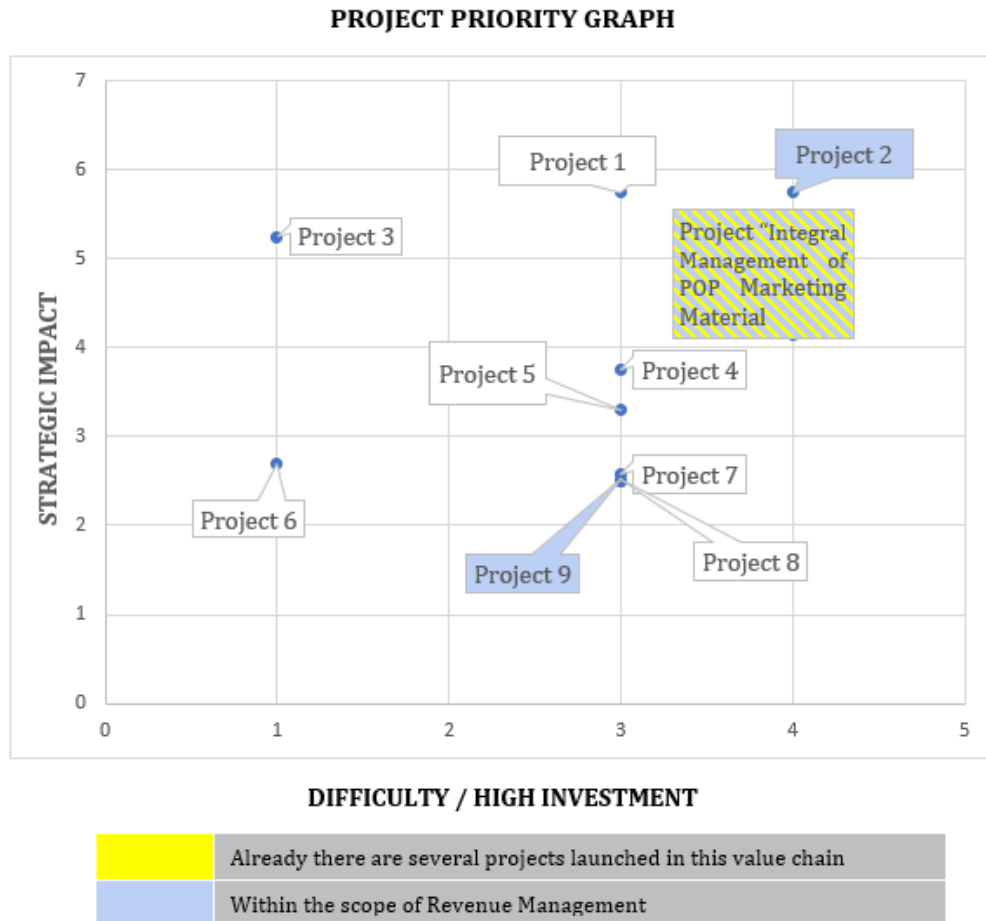


Figure 5 - Project Priority Graph

Although the results indicated other projects were more recommended, the integral management of POP marketing material was selected as one of the projects which should start being undertaken firstly. This was due to the fact that a lot of resources were already being used on that purpose as some initiatives had been recently launched. This meant some of the required effort had already been made and motivated a decisive factor as the current initiatives should be aligned with the entire project that sooner or later would be deployed. In fact, with this decision the company seized the opportunity to avoid bad resource usage and not to undermine the project full potential by possibly creating some limits in the meanwhile. In other words, this decision was supported by the kaizen principle of pursuing resource efficiency and reducing *muda* as deciding not to turn the project into a priority could work exactly against it.

3.2 Internal and External Actors

The integral management of POP marketing material is a macro-process that involves many internal departments and other external partners. It is also important to highlight that this process includes two different flows of both materials and information: POP marketing material for grocery-store chains and for the hospitality industry, which mainly focuses mainly on restaurants and bars. Therefore, they must be analysed separately although they have a similar structure.

3.2.1 Internal Departments

There are 6 internal departments involved in this process: Marketing, Commercial, Information Systems, Accounts Payable, Purchasing, Business Development and Customer Marketing and Logistics.

The main goal of Marketing is to increase the customer's awareness regarding the company's brands. Their responsibilities go from deciding which events should be sponsored and what tv ads should be made, giving directives on the marketing strategy of the company's stores, defining the innovation and digital strategy of the company to the POP marketing materials and the packaging of the products. Therefore, this department will only act on the beginning of the process.

The mission of the commercial department consists in defining and boosting the commercialization of the company's portfolio of products according to the positioning and growth and profit plans of each brand. This department is subdivided in 2 different teams: a team responsible for the hospitality industry market and another for the grocery-store chains one. Their main responsibilities are to negotiate, manage and control the commercial agreements and to enhance shared initiatives and promotions with distributors of the hospitality industry market and the grocery-store chains, respectively.

The Information Systems department develops program features and transactions aiming to support and improve the company's processes, maintains all the company's information systems working properly and supports all departments when needing to upload or run a large amount of data.

Accounts Payable's specific mission is to process incoming invoices and pay the business's suppliers and partners. They also have the task to identify and report invoices that do not match the existing terms.

The Purchasing department focuses on procuring all the necessary materials needed for the daily operation of the company at the best possible price. It generates and tracks purchase orders and handles all the involved paperwork ensuring that it is complying with all company's policies.

The Business Development and Customer Marketing department mission is to inform and give support to the commercial department. They analyse the objectives and needs of the company's brands and identify where and when to launch initiatives and promotions, approve requests and define the yearly requirements and budget for POP marketing material and develop and maintain the tools and programs used by the commercials.

Finally, the logistics department is responsible for managing the existing requests for products and POP marketing materials, which includes controlling stock, analysing lead times, launching and tracking supply and buy orders and managing returns.

3.2.2 External Partners

The relationships with external partners are fundamental for the company's core business as well as for this process. It includes 3 external actors: suppliers, a logistic operator and wholesalers or grocery-store chains, depending on the process flow.

The company buys the POP marketing products to several suppliers according to the clauses of a negotiated contract. Therefore, after signing the contract their only part is to produce and deliver the agreed quantity and type of products at the right time. They may either choose to produce all the products at a time and stock them or to produce them right before they are to be delivered. Their only responsibility is to guarantee they meet the arranged lead times. Nowadays, there is a tendency to concentrate the production of each type of products on an only supplier in order to improve the existing relationships, increase the contract's value and, therefore, have a greater bargaining power and be able to negotiate better terms.

The logistic operator is responsible for storing, preparing and delivering the supply orders launched by the company. They charge the company for each day of storage, travelled distance and weight of the prepared and delivered products. There is a single logistic operator responsible for all the POP marketing materials for the whole company. Once again, this allows building a stronger relationship with the organization and signing better deals.

Lastly, the wholesalers or grocery-store chains represent the clients of the process. However, they occupy a different position in the entire supply chain. In the case of the wholesalers, they are the ones responsible for managing the delivery of POP marketing material to the final link of the chain – restaurants and bars. Despite this difference, the return of the company's investment in these materials may be still highly affected by the distribution criteria of the external partners whether it is across their own or third parties' locations. It is important to point out some wholesalers are owned by the same owners of company A.

3.3 Process as-is

The integral management of POP marketing material process analysis started by creating its value stream mapping, identifying the required steps sequence and the department responsible for each step. Once again, there was a distinct analysis for each process flow: grocery-store chains and hospitality industry.

However, in spite of having some distinct steps and actors involved, both flows are similar and present the same macro-structure.

In order to fulfil the annual needs of POP marketing material of the wholesalers and grocery-store chains, two periods were established for receiving demand requests and purchasing these materials. The first period aims to meet the demand of the first four months of the year and requires this demand to be predicted and the purchasing materials agreements closed before the next year's budget is approved. After the approval of the budget, a second window is available to cover for the rest of the year.

Portfolio of Products

The process starts at the beginning of June by elaborating the products' portfolio for the next year.

Firstly, the items which need to be redesigned or created are selected. This decision is determined by the marketing department considering modifications of brands' images, next year's important events, type of product and current product design life length, among others. The resulting obsolete items are discontinued.

Secondly, the new items are redesigned and a new product code is requested to the logistics department through JDE. Afterwards, the logistic department asks the supplier for the technical & logistic sheet, uploads it to the product master record and adds it as an appendix to the platform. The technical & logistic sheet includes, for example, the weight, volume, minimum lot size, palletization data and photograph of the product.

Lastly, the information regarding the new items is sent to the purchasing department which will try to estimate the costs of the products for the next year. They perform distinctly according to the process flow. In the case of the hospitality industry process flow, a price estimation for the first period will be obtained based on the market trend and past orders' quantities and prices. Regarding grocery-store chains, there is no price estimation until an agreement with the supplier is reached. Until this happens, the purchasing department is buying these items to different suppliers according to the best possible prices on the market.

POP Marketing Material Budget

The second macro-step of the process is to define the budget for POP marketing material for each process flow. In fact, every July, the Business Development and Customer Marketing department starts elaborating a budget for POP marketing material for the following year. This macro-step presents two different procedures according to the market it refers to.

Regarding the process flow of the hospitality industry market, they define a budget allocation criterion for each POP marketing material family. This is done by means of indexes that consist in the amount of money to invest in POP marketing material for each hectolitre of beer to be sold. Afterwards, these indexes are uploaded by the Information Systems department to AS400 and then translated into the available budget for each active commercial based on the expected sales volume.

In the process flow of grocery-store chains, the budget (around 7% to 8% of the total POP marketing material budget) is estimated for the whole market and only then split by area and client. This process is done manually through a Microsoft Excel file using not well-defined criteria.

At the end of the year, after the approval of next year's budget, the Business Development and Customer Marketing department calculates the remaining amount of money available to meet the demand of POP marketing material from July to December for both markets.

Annual Requirements

After the first window estimated budget is complete and approved, the Information Systems department is responsible for uploading it as well as the information of the portfolio of the products (available items and costs) to Sherpa application. Afterwards, commercials enter

the monthly requests for each item per wholesaler or grocery-store chain considering the existing restrictions. It is important to point out that 35% to 40% of the requests proceed from contracted demands and, therefore, have definitive quantities and delivery dates while the rest of them are the result of an estimation exercise based on the business sense of the commercial department. The same happens at the end of the year after the budget is approved.

During the year, the existing requests can be modified by the commercials in Sherpa in order to face eventual needs of the clients. When this happens, however, the Business Development and Customer Marketing department has to approve the changes before they can be real. In fact, aspects such as product availability, request criticality, extra cost and lead time of urgent orders, among others, must be considered.

Purchasing Orders

In late September/early October, the purchasing department receives the requirements information for the first window and launches the purchase orders for materials accordingly. Besides the obvious cost and quantity of the requests, they also negotiate the dates from which the articles need to be available as well as the minimum antelation period to modify orders. Like previous macro-steps, this procedure is repeated at the end of the year after next year's budget is approved.

Throughout the year, however, there may be the need to launch other purchasing orders when some articles are running out of stock and there are no more items to be provisioned. In these situations, the purchasing department usually has to launch urgent and small orders which tends to result in very high unit costs. Furthermore, even urgent lead times cannot always prevent the company from facing stock outs. In any case, every time an extra purchasing order is requested it has to be previously approved by the Business Development and Customer Marketing department which is already taking this into account.

Provisioning and Delivering POP Marketing Material

During the year, depending on the requirements, provisioning and delivery times and existing stocks, the logistics department will then release material supply orders and the materials will be stored in the Logistic Operator warehouse. In fact, the existing stocks and the future demands are revised weekly and, considering the deadlines, this department will send provisioning orders to suppliers indicating them the date and place of delivery and will inform the logistic operator when to receive and deliver material. From there and in collaboration with the logistic operator, logistics should monitor the status of the delivery processes.

In case there is no stock available to fulfil all the existing requests, the situation is translated to the Business Development and Customer Marketing department to firstly define which of the requests should be prioritized and, secondly, to decide whether an extra purchasing order should be released or not. If the product lacking is considered critical, all the existing delivery orders to the respective client could inclusively be put temporarily on hold.

POP Marketing Material Accountability and Follow-Up

Once the order has been delivered, the delivery note and the invoice of the transportation and warehousing costs are sent to the company by the Logistic Operator. However, this may

not be the only expense the company has as the economic valuation of its inventory of POP marketing material decreases when one of these products reach a grocery-store chain.

On the contrary, regarding the hospitality industry market, the company's inventory is only reduced when the material reaches its final destination. In fact, while the products remain in the wholesaler's warehouse, it continues to belong to the company despite not being under its control.

In some cases, the Accounts Payable department finds out mismatches between the order requests and the respective invoices. When this happens, the invoice payment gets on hold and the information is translated to the Logistics Department which is responsible for analysing the situation.

The process ends at this point as no information regarding the impact generated by delivering POP marketing material is returned to the company.

3.4 Muda and Improvement Opportunities

The map of the initial situation of the process was diagnosed and the non-value-added activities, difficulties and main errors and problems were identified. Furthermore, some improvement opportunities and solutions were proposed.

Portfolio of Products

Regarding the macro-step 1, defining the portfolio of POP marketing products for the next year, two main problems were identified: firstly, the short period of time between the start of the portfolio preparation and the start of the negotiation of the purchasing department with the suppliers might prevent some products from being available in the first months of the year; secondly, the existing stock would not be considered when taking this decision, which could result in unnecessary losses in discontinued items.

POP Marketing Material Budget

The process of creating the POP marketing material budget could also experience some improvements. Although there are two different markets, a single data entry channel should be created. In fact, this would allow having a better control of the process and avoiding errors.

Other substantial improvement could come from simply defining clear criteria for the budget of both markets. An area allocation criterion should also be considered in the hospitality industry market and the budget calculation based on past sales does not consider the existing trends and future forecasts. Besides, the adjustments made to the budget to reflect the growth goals of the company happen out of the information system and might create errors.

Finally, it is important to guarantee that wholesalers no longer working with the company are marked as obsolete otherwise the budget will be parted with them.

Annual Requirements

The definition of the annual requirements has three main identified problems: it is a subject process with no clear criteria, determined before the strategy of the company is completely defined and, therefore, not adjusted to it and, lastly, does not avoid the duplicity of

requests by the commercials. This can lead to bad resource usage and difficulties managing orders and stocks across clients along the year.

Purchasing Orders

These difficulties in controlling the stock may originate errors when planning purchasing quantities at the beginning of the year which will cause extra costs and will fail to meet some deadlines. However, the extra purchase orders that occur throughout the year are the ones which can be better improved. With the current software procedure, if a purchase order is launched it puts on hold all the other purchase orders for the same supplier until it is approved or refused by the Business Development and Customer Marketing department. Moreover, these extra purchase orders don't consider forecasts of next year's demand which tends to result in very small quantities and very high unit costs.

Provisioning and Delivering POP Marketing Material

Provisioning and Delivering POP Marketing Material is the main macro-step of the process as it requires more resources and occurs longer and more frequently during all year. As expected, it is where more improvement opportunities were identified. They can be split into 3 different categories:

1. Possibility of exploring JDE to allow including more information regarding the demand of the items so that a more effective management of delivery orders and materials can be achieved;
2. Improvement of the procedure for requiring extra purchase orders and the management of substitutive products;
3. Development of a better communication system with the Logistic Operator.

Nowadays, the full potential of the information system is not being exploited and prevents supply and delivery orders from being optimally managed. In fact, some information fields should be added to the system allowing commercials to provide further details on the characteristics of the request which would lead to an improved order prioritization and consequent agility on short stock situations without the need of the Business Development and Customer Marketing department's intervention. Besides, it would allow the Logistics department to gather delivery orders by strategically adjusting the dates of the more flexible requests and, as a result, decrease the overall logistics costs. Finally, a more detailed information on the packaging units of the products can cut repacking costs.

Regarding the management of extra purchasing orders, by being provided with better information, the Logistics department should be able to decide which orders should be prioritized and which orders must be put on hold until a critical product is available. Besides, a more frequent checking of the correct link of products with their replacing item could prevent some of these situations from happening as it currently only occurs once a year. This would not only liberate the work of the Business Development and Customer Marketing department but also enable the company to perform better on meeting deadlines and keeping client satisfaction high.

Finally, the communication with the logistic operator could be improved. In fact, currently only 3 status of the order are shared with the company: received order, in transit and delivered. This inflicts some limitations to the management of delivery orders as there is no visibility on whether the order is already being prepared or if it can still be modified. Therefore, it disables sent orders to suffer any change without requiring great effort and sometimes creating duplicity of orders. Moreover, there should be a better control of the stock on the logistics provider warehouse, preventing several requests for stocked out products from being launched.

POP Marketing Material Accountability and Follow-Up

The last macro-step of the process is characterized by one main problem: an insufficient communication with the final client which causes assets accounting problems and no idea over the impact and final destinations of the POP marketing material. In fact, there are products already delivered to the final client and that keep being accounted as an asset of the company. Besides, surpassing this problem would also allow a better management and distribution of stock across all the wholesalers.

As stated before, the wholesalers are responsible for delivering the POP marketing material to the final clients in the hospitality market. This problem consists therefore in a big strategic consequence as the company has little information on the final client of POP material in this market and has no idea if the plans of Business Development and Customer Marketing and the commercial departments are being followed. Finally, as there is not currently any feedback from the wholesalers and grocery-store chains on the impact of POP marketing material in sales, its return on investment cannot be measured neither its strategy can be well evaluated.

3.5 Workshops Identification

After enumerating all the improvement opportunities that were identified in the process, several workshops were planned in order to optimize it. Once again, the workshops are also divided per macro-step to enable a better perception of the tasks they aim to improve:

Portfolio of Products

1. Optimize the Innovation Process: Standardize processes for designing and creating new POP marketing material references based on real market data and aiming to increase their impact.
2. Optimize the Product Registration Process: Design and standardize a new product registration process and the creation of the logistics sheet, changing the article master to include all the necessary fields including the assignation of the substitute product and its discharge or expiration date.

POP Marketing Material Budget

3. Improve the POP Marketing Material Budget Allocation Process: Establish a methodology for POP marketing material budget allocation in the most cost-effective way considering the profitability of the markets, zones and customers segmentation.

Annual Requirements

4. Create an Efficient Information System for the POP Marketing Material Annual Requirements: Develop an order recording tool and train commercials to upload all the information regarding requirements. This will result in avoiding rework and preventing errors by preventing orders duplicity and notifying the applicant when there is a problem with the requirement which is being created. In fact, even for the requests created throughout the year, this could liberate the Business Development and Customer Marketing department from the task of approving new requests. Besides, this may allow orders to start being prioritized in terms of their importance and a better management of substitute references.

Purchasing Orders

5. Create a methodology for calculating annual purchasing needs: Standardize and expedite the calculation of annual purchasing needs based on past delivery orders data, forecast demand and existing stock. At the end of the first window for receiving demand requests and purchasing, the Purchasing Department should be able to launch purchase orders that entirely covers next year's POP marketing material needs. This would allow the Purchasing department to negotiate more convenient rates and to avoid the generation of a logistical overrun by making urgent orders and buying small quantities.
6. Implement a Purchase Reorder Point: Calculate and implement a purchase reorder point to alert the Purchasing and the Business Development and Customer Marketing departments to decide on whether to launch a new purchasing order or not. This should result in a better adjustment of the necessary stock volume and in a reduction of stock outs. Besides, the decision should be made considering next year's demands in order to obtain better deals with suppliers.

Provisioning and Delivering POP Marketing Material

7. Implement a Pull Planning System: Definition of a replenishment order point and a safety stock procedures in the logistic operator warehouse. This workshop aims to avoid generating stock breaks due to errors in demand forecasting, ensure timely delivery in grocery-store chains and in wholesalers and still reduce the warehouse average stock.
8. Implement an MRP and Improve the Communication and Information Management: Utilize ORACLE's MRP and implement an Order Management common tool that will reduce time spent validating orders and logistical cost savings by having much clearer information and communication with the Logistic Provider and being able to group orders. As a result, this tool will also improve the control and management of POP marketing material stock in the Logistic Operator warehouse. This communication improvement aims to include a procedure for the flow of reports between the logistics operator and company A about the status of orders, allowing the current status of the orders to be known by the Logistics, the Business Development and Customer Marketing and the Commercial departments, ensuring an easy management of incidents. Therefore,

the stock differences between Logistics Operators and company A will be significantly lower.

9. Level Wholesalers Delivery Orders by Implementing a Pull Planning System: Delivery orders levelling, sending orders using a Pull Planning System. Goods will only be shipped to dealers in the event of actual consumption or request of a POS. This measure will create a more frequent delivery and result in a significant stock reduction either in the Logistic Operator warehouse as well as in wholesalers' facilities. In fact, the average stock of wholesalers will be adjusted to the needs of real demand. To start, this workshop should be implemented in pilot wholesalers owned by the same owners of company A.

POP Marketing Material Accountability and Follow-Up

10. Improve the Communication with Wholesalers/Grocery Store Chains: Generate a system that ensures a better communication between Company A and the wholesalers/grocery store chains. The implementation of this system aims to control and measure the suitability between POP marketing material final destination and the developed segmentation strategy regarding zone, customer or type of Point of Sale. Besides, increased information received from wholesalers allows the company to study and further understand the return on investment on POP marketing material. To start, this workshop to be held on 20 wholesalers.
11. Optimize the analysis and calculation of the ROI of POP Marketing Material: Develop a methodology for calculating the ROI of POP marketing material. The objective is to start preparing periodically reports on the impacts of each POP marketing product, both in the hospitality industry and in grocery-store chains, and across customer segments and types of POS. This analysis is expected to bring company A a great benefit by maximizing the effectiveness of its investments.
12. Promote and Enhance the Impact of POP Marketing Material: This last workshop aims to sensitize all the company employees and its external partners towards the impact and effort of the company to provide them with POP marketing material. This is expected to contribute the partnerships of company A with the beer market stakeholders and contribute for the growth and stronger positioning of the organization in this market.

3.6 Process to-be

After the implementation of all the workshops, it is expected the process of managing POP marketing material to have the structure represented in the following flow chart:

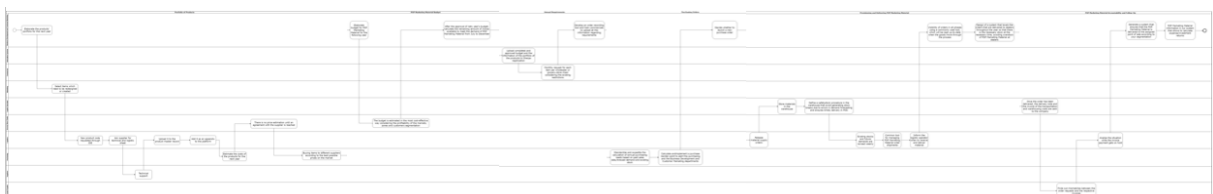


Figure 6 - Flow Chart Process to-be

3.7 Limitations and Workshops Prioritization

Finally, before the start of the implementation phase it is time to plan how the several workshops will be deployed throughout the time. This decision considers the company's resources availability, the difficulty of developing and implementing process changes and the precedence of the workshops as some can only be launched after others are completed.

For the first stage of the implementation plan, the workshops which do not depend on the result or implementation of any other and are expected to produce quicker and higher returns are selected. As a result, workshops 5, 6, 7, 8 and 9 were planned to be deployed at the beginning of April. Besides, as the initiative of creating an efficient information system for the POP marketing material annual requirements (workshop 4) was already being developed by another consulting company, there was the need to do a follow-up of this project so that it could meet the requirements and purpose of the other initiatives. However, as the development of this information system was of an external part responsibility, it was not considered further on this dissertation.

Regarding workshop 9, it was divided in two stages of implementation. In fact, initially it was planned to only implement the proposed changes in a few pilots which share the same owners of Company A. The remaining wholesalers will need to be convinced by the obtained result. Therefore, the second part of this initiative is planned to occur a few months later.

The implementation of these workshops was expected to result in an optimized purchasing process and in a pull planning system throughout the supply chain, part of which would be managed with the help of an MRP. Consequently, the more frequent replenishment orders and deliveries were expected to lead to a better communication between Company A and the wholesalers.

This improved communication would serve as a trigger for the deployment of workshop 10 and, with this, a lot of other dependent workshops could also be launched. In fact, the analysis and calculation of the ROI of POP Marketing Material (workshop 11) required good data from the wholesalers, which would then be used in the workshops 1 and 3. As a result, these initiatives were planned to start right after the end of the first cycle of implementation. Furthermore, as workshop 2 was strongly related to the innovation process of new POP marketing products, it was also planned to start at the same time.

Finally, only workshop 12 was left. However, as it could only be implemented after the results of all the initiatives were perceived, it was planned for last and it is only expected to start in November.

	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Diagnostic and Planning											
Workshop 1											
Workshop 2											
Workshop 3											
Workshop 4											
Workshop 5											
Workshop 6											
Workshop 7											
Workshop 8											
Workshop 9											
Workshop 10											
Workshop 11											
Workshop 12											

Figure 7 - Implementation Plan

4 Methodology

This chapter focuses on adapting the existing literature and explaining the methodology that give support to the workshops and actions that would be deployed in company A. It is divided in three sub-chapters:

Sub-chapter 4.1 - Purchasing Process - will cover the calculation of annual purchasing needs (Workshop 5) and the implementation of a purchase reorder point (Workshop 6).

Sub-Chapter 4.2 - Pull Planning System - will address the initiatives of Workshop 7 and Workshop 9.

Sub-Chapter 4.3 focuses on the process of implementing an MRP (Workshop 8).

4.1 Purchasing Process Workshop

As stated in chapter 2, the purchasing process is considered an important element of corporate performance as it started to gain increased recognition due to its growing potential to reduce costs for the company. Indeed, in terms of POP marketing material it has a big importance on brewing companies costs as the material is not manipulated in any of the processes under their scope of action.

Therefore, being able to reduce the unit cost of each POP marketing product could significantly decrease the necessary investment and, consequently, increase its ROI.

In order to be able to negotiate better terms, a company needs to have a considerable importance on the sales of the supplier. The way to achieve this is ordering big amounts of products and being able to schedule the materials picking effectively so that it does not occur into extra warehousing costs. Furthermore, it is also important for the company to be sure about the order quantities. It is very often that the market demands vary along the time and so, companies may have some problems when trying to calculate it. Mainly if this is done based on guesses of their employees and not by considering or estimating any data.

The capacity of estimating the annual purchasing needs properly can prevent companies from generating logistical overruns as they will need to place urgent and small quantity orders. Contrarily to provisioning orders, the suppliers lead time when needing to produce an item is significantly bigger and can, in certain cases, take up to several months. Therefore, a good forecast becomes considerably important.

4.1.1 Annual Purchasing Needs

The achievement of an improved purchasing process depends on the capacity of properly analysing past delivery orders data, organizing a good system for gathering sales managers perspective on the future trends of the market and ability to control and manage the existing stock. Besides, the company has to be capable of estimate demands considering the effects of substitutive, obsolete and complementary POP marketing products. Finally, the demand originated by the occurrence of special events must also be considered: the past non-recurring

events have affected the historical data by increasing the usual expected demand of that day; the future events are also important in order to adapt the purchase needs to the effects which will be originated in the future. In fact, it is essential to properly manage the effects caused by these exceptional events.

According to the past date evolution throughout time, trend and seasonality can be identified and enable the estimation of a better forecast. However, the more recent the data, the best it can give information about the demand of tomorrow. Therefore, the obtained forecast should be adjusted according to the information that the commercial agents of the market have collected. Some contract and negotiations start several months in advance and, as a result, these agents start having a good idea of how the market will behave in the future. Finally, the annual requirements should also be adjusted according to the actual stock and the existing demand of the product. As the purchasing order has to be placed several months in advance, a good estimation of the existing stock at the end of the year is also essential. In order to be able not to occur in a big error and result in extra costs, the existing requests should be known as soon as possible and there cannot be significant mismatches of stock across the information systems of the supply chain partners. This reinforces the importance of a good communication between these partners.

The calculation of the annual purchasing needs can then be divided in 6 phases:

1. Prepare past data by cleaning it and removing the effects of past special events.
2. With the data previously prepared, forecast next year's demand
 - a. In order to calculate this forecast, several different methods are available. The method that best delivers a quality/effort ratio should be used.
 - b. It is necessary to consider the obsolete and substitute products effects on calculating some products demand as they can significantly affect it.
3. When this first forecast based on historical data is obtained, it is important to check it against the already existent request for next year and evaluate if the expected trends of the market are in line with the forecast. If not, some adjustments should be done.
4. After a revised forecast is available, it must be verified by the departments more connected to the clients of the firm and also the ones responsible for the delivery strategy of these materials. Here, the actual forecast should be adjusted to both the strategy of the organisation and to the expected market trends. Moreover, also the products which are planned to be discontinued next year should be signed and their needs reduced so that the probability of having obsolete products is minimized.
5. In order to calculate the annual purchasing needs, it is also important to estimate the expected stock at the end of the year. The margin of error of this calculation should not be significant as the great part of the requests should either be closed or up to it. Therefore, important differences are not expected if only a good communication with the commercial departments exist.
6. At last, when the purchasing department is negotiating terms with the suppliers, they should warn the company about good business opportunities because

sometimes the unit price of a product can be substantially reduced by slightly increasing the quantity ordered.

Finally, it is important to point out that this methodology should result in a good preview of requirements throughout next year and, therefore, should enable the purchasing department to place orders accordingly to the material requirements. This would not only decrease extra costs of warehousing as it would ensure the suppliers will not fail on having the right amount of needed products at any time.

4.1.2 Implementation of a Purchase Reorder Point

Despite all the work that can be done in order to be able to calculate effective estimations, a company should not be left with no solution when a product is getting out of stock.

As a result, there is a need to calculate an indicator that warns the company when there may be a need to place an extra purchase order. To calculate that one should consider the trend of the demand along the year, the percentage of available stock consumed and the amount of time remaining until the end of the year or until the moment of a new yearly purchasing order. When this indicator, according to the criteria defined by the company, starts giving signs that an extra purchase order might be needed, it is time for the responsible departments to analyse if the company should or not place the order. Moreover, in order to avoid placing small quantity orders, they can even considerate increasing the purchasing order to be already covering the demand of the following year.

Therefore, the calculation of the purchase reorder point should have the following factors into account:

- Leadtime – obviously an important variable as the time to deliver a product significantly affects the antelation period of the request and, consequently, the needed amount of remaining products to be able to deal with the existing demand.
- Demand – this factor should be analysed in two different ways:
 - Compare the current with the planned demand as that it can reveal that the existing quantity of products ordered may not be adjusted with the reality. If this happens it should be analysed and some countermeasures can be taken on time.
 - Check if the current and expected future requests are in line with the existing stock, otherwise there may be the need to place an extra order.
- Time of the year – depending on the amount of time until the end of the year, it might not be worthy to launch new orders as new annual requests may be launched in a short time. At most, the annual request could be slightly anticipated.

4.2 Pull Planning System

As stated in chapter 2, the implementation of a pull planning system leads to several benefits on the supply chain like the elimination of the whip effect and, consequently, the reduction of stocks, the improvement of the service level and a simple management and order planning through the creation of a material flow, resulting in a reduced lead time.

The implementation of a pull planning system is based on placing replenishment orders triggered by the actual consumption of customers. As a result, it consists in a tool to run frequent and cyclical orders with greater simplicity.

In order to implement such a system, it is important to calculate the Replenishment Order Level of each product.

$$\begin{array}{c}
 \boxed{\text{REPLENISHMENT LEVEL}} \\
 = \\
 \text{Average Consumption} \\
 \times \\
 \text{LT Replenishment} \\
 + \\
 \text{Safety Stock}
 \end{array}$$

Figure 8 - Replenishment Level Formula (Bastos 2014)

The replenishment order point aims to cover for the existing demand meanwhile the ordered products are being delivered. For example, if a supplier takes two days for delivering a product and a new order is only launched when there is no stock, all the interested customers will not be able to have their needs fulfilled until the supplier delivers the products. However, if the order is launched when the stock is just the necessary to cover for the demand of these days, there will be no stock outs.

Despite this concept looks so well on paper, the fact is that usually the demand varies along the days and the supplier may not always have the same lead time. For this reason, it is important to include a safety stock to deal with this variability.

In fact, as it is not possible to guarantee that the demand during the lead time is always equal or inferior to the average demand, it is necessary to create a normalized safety stock to cope with these variations.

Besides, the lead time of the supplier may also be affected by several reasons and, for that reason, the safety stock also needs to consider the variability of the lead time of the replenishment process. It depends of 4 factors:

1. When a product is consumed and the replenishment order point is reached, the supplier may not immediately receive the new order. Firstly, there may be some time between the consumption of a product and its notification. Secondly, a company can also take some time to be aware that a new purchase order must be released. Finally, the supplier may take some time to notice the new request.
2. Time between the supplier receiving an order and having the material read to be delivered.
3. Time to transport the material from the supplier to the company.
4. Finally, the time between receiving the product from the supplier to having it available to be picked.

The formula to calculate the safety stock is presented in the next figure:

$$SS = z * \sqrt{\bar{P}\sigma_d^2 + \bar{D}_d^2\sigma_1^2}$$

Equation 1 – Security Stock

- z = Security Factor (Service Level)
- P = Average Lead Time (number of days)
- σ_1^2 = Lead Time Variance
- D_d = Average Daily Demand
- σ_d^2 = Daily Demand Variance

The z variable is the security factor of the safety stock and assumes a very important part as it represents the service level that the company wishes to have regarding a certain product. In fact, it represents the probability the company has to be able to deliver this product on time. This factor results from the company decision on what is the optimum point between having zero stock and being able to provide for 100% of the requests.

After reviewing the formulas for the replenishment order level and the safety stock, we can conclude they directly depend on the lead time of the orders. Consequently, the shorter the lead time the shorter the average stock of the company.

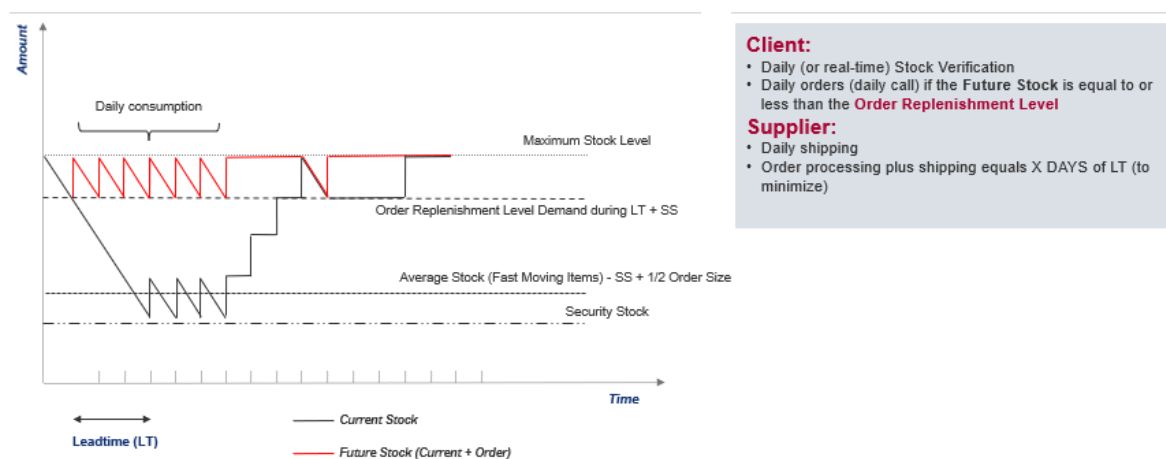


Figure 9 - Order Replenishment Level and Average Stock on a Pull Planning System (Bastos 2014)

As the picture shows, the average stock depends not only on the lead time but also on the frequency of the demand. In the initial part of the period represented on the graphic, the daily consumption allowed the average stock to be kept low. However, at the second part of the graph when the demand was not so frequent, the average stock increased to its maximum level. In fact, the more frequent the demand, the smaller the average stock.

However, only having a more frequent demand does not change the maximum stock level, also known as the supermarket size. As a matter of fact, it depends on the relationship between

the frequency of demand and the lead time of the replenishment orders as there is the need to cover for the longest of them.

The important factors for the calculation of the supermarket size are explained in the next figure:

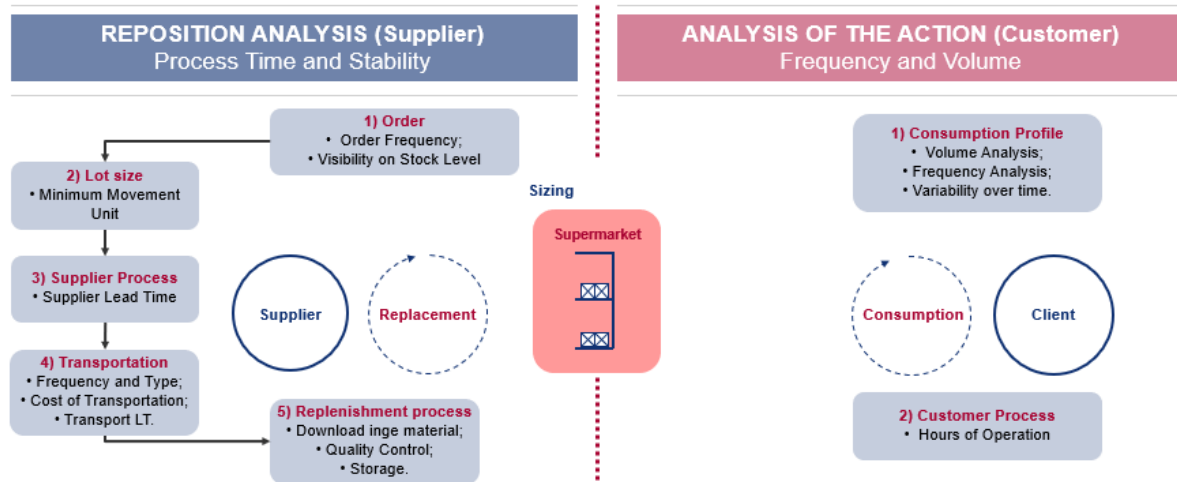


Figure 10 - Supermarket Size Calculation Method (Bastos 2014)

Besides all the factors priorly mentioned, also the lot size as to be considered in order to calculate the supermarket size.

The lot size affects the flexibility and speed of the replenishment process. Indeed, the bigger the lot size the slower the longest the replenishment process and, consequently, the higher the stock.

The supermarket size is given by adding the lot size to the replenishment order level.

4.3 Implementation of an MRP

The implementation of an MRP allows a company to unite all the initiatives' methodologies presented above. In fact, this planning system, as stated by Coimbra (2009), can be used to effectively deploy a pull planning system in a company.

In fact, having the existing stock, the demand requests and the safety stock been uploaded into the system, the MRP creates a set of recommendations to release or reschedule delivery and replenishment orders for the existing products. Besides, this system can also consider a purchase reorder point and release warning messages when it is achieved. However, before it is capable to function accordingly to the planned, it has to be previously programmed. Therefore, there is the need to develop a decision process that will be carried out by the MRP.

Moreover, the implementation of an MRP can also lead to a better communication with supply chain partners, allowing the reduction of stocks mismatches and a better visibility over the status of the orders. Besides, this system may enable a more efficient management of delivery requests which might not be fulfilled by the company. In fact, having all the information together will result in an anticipated perception of unfulfilled requests and, consequently, allow an effective prioritization of the most important delivery orders. Finally,

an MRP could reduce the necessary employee dedicated time to managing POP marketing material and decrease errors occurrence.

5 Implementation and Results

In this chapter, the implementation of the concepts discussed in the previous chapter is described. The measurements and results are presented, however they may not be definitive as some processes are still not fully implemented.

5.1 Purchasing Process

5.1.1 Annual Purchasing Needs

The calculation of the annual purchasing needs followed the methodology described in Chapter 4.

Firstly, the past delivery orders data was adjusted by removing the effects caused by special events. However, two setbacks have surged: there was only available data regarding total POP Marketing Material deliveries from 2018 and the calculation of the impact of the special events on the products deliveries was not completely available as some events could not be considered due to lack of information.

Secondly, the demand of 2019 should have been estimated based on past data. However, as only data from 2018 was available, it had to be considered 100% equally and only reflect the demand of the obsolete products on their own substitutes expected requests.

Thirdly, this demand was adjusted by checking it against the already existent request in the beginning of September of 2018. However, as there was no available data about the percentage of demand covered by the anticipated requests of the past years, only cases where the known demand was already higher than the expected were adjusted. In these cases, the forecasted demand was increased to the required quantity.

Fourthly, the forecast should be verified by the Commercial and the Business Development and Customer Marketing departments but, as they could be influenced by their idea of the existing trends of the current year, this step was not considered. In fact, only the products which are planned to be discontinued in the current year had their purchasing needs decreased.

Fifthly, the final stock of 2018 should be expected. However, as it is expected that both underestimations and overestimations occur every single year, the final stock should not be significantly different. Therefore, the actual final stock of this year was used.

Finally, the estimated ordered quantities of products were increased whenever the purchasing deals could be beneficial.

As the new process will only be put into practice on next year's purchasing period, the results could not be measured properly. However, if we consider the estimation of 2018 and compare the new purchasing process with the previous one, the unit cost of POP marketing products could be reduced by 20.7% without even considering costs of occurred extra purchasing orders.

5.1.2 Purchase Reorder Point

Regarding the second improving initiative of the purchasing process, it could not be implemented. In fact, as the company is currently focused on reducing the number of different suppliers and creating closer relationships with the supply chain partners, this initiative was postponed and should only be deployed at the start of 2020.

5.2 Pull Planning System

Both workshops 7 and 9 were based on implementing pull planning systems in two different parts of the supply chain. However, depending on the available data and existing resources they might present some differences.

5.2.1 Implementing a Pull Planning System in the Logistic Operator's Warehouse

In order to implement a pull planning system in the logistic operator's warehouse, there was a need to calculate the replenishment order levels, the supermarket sizes and the security stocks according to the methodology explained in the previous chapter.

But first, the products' daily demand and lead time need to be characterized statistically so that their mean and variance could be obtained.

The Central Limit Theorem states that the distribution of sample means approximates a normal distribution as the sample size gets larger, regardless of population distribution shape. Therefore, these variables can be approximated to a normal distribution as the sample size is more than enough.

Secondly, it is also important to define the service level required for each type of product. Three different categories were created: indispensable, very important and important. For each of these categories a different service level was determined by the Business Development and Customer Marketing department: 99%, 95% and 80%, respectively.

However, as stated in chapter 3, 35% to 40% of the delivery orders were already based in actual requests and were not estimated. Therefore, if considering the same service levels, the actual security factor would be much higher. A 30% reduced variability would then be implemented despite the amount of known orders is a little higher.

The new service levels were calculated using Microsoft Excel Functions. They were given by:

$$\% \text{ Adjusted Service level} = \text{NORM.DIST}(\text{NORM.INV}(\% \text{ Service Level}, \text{Average}(X), 0.7 * \text{Std}(X)), \text{Average}(X), \text{Std}(X), \text{TRUE})$$

Equation 2 – Calculation of adjusted service levels

As a result, the calculation of the safety stocks will use the following values of service level: 94.83%, 87.52% and 72.21%.

After having determined these values, the replenishment order levels, the supermarket sizes and the security stocks were calculated.

Regarding the results of implementing this initiative, so far only a few measurements could be calculated as this implementation is quite recent. However, it is expected that 0.88 FTEs are reduced from managing POP marketing material stocks and that the service level increases from 74% (data from 2018) to 89%.

5.2.2 Level Wholesalers Delivery Orders by Implementing a Pull Planning System

While the data regarding the past delivering orders released from the logistic operator's warehouse was available, the same did not happen in the wholesaler's case. In fact, this forced the implementation of a pull planning system to face some unexpected difficulties and to be only able to implement in part of the products.

The products from which no data was known (40% to 50% of the products depending on the respective wholesaler), had to continue being managed by requesting all the products which were estimated to be delivered and, therefore, did not followed a pull planning system.

Regarding the rest of the products, their demands and lead times were considered to follow normal distributions, with the average lead time to be of 5 days and the variance of 1. In fact and once again, according to the Central Limit Theorem, the daily demand can be approximated to a normal distribution as its sample size is sufficiently high. Finally, the required service levels were 95%. The replenishment order levels, the supermarket sizes and the security stocks were calculated according to the formulas of chapter 4.

In the last two months, the obtained results are pretty positive: the average stock of POP marketing material in the 5 pilots' warehouses decreased by 41%, only 52% of the delivery orders required were necessary and the higher demand frequency also allowed the reduction of the average stock on the logistic operator warehouse, saving warehousing costs.

5.3 MRP

The implementation of the MRP system is still under develop by the Information System Department of Company A. In fact, they are trying to adapt the current ORACLE's MRP that is being used in the organization to cope with the needed functionalities for managing the POP marketing material. However, the current workload of the employees of this department is too heavy for a faster implementation.

So far, only a better communication between Company A and the logistic operator was achieved. In fact, a new status of orders being prepared was added to the system. This enables Company A and the MRP to send requests alterations up to the moment when the order starts being prepared. In the past, once the delivery order was released it could not be changed unless a lot of effort and time spent directly communicating with the logistic operator was employed. Besides, it is also important to point out that the refresh rate of the orders' status is significantly higher, allowing Company A to work with information up to the minute.

Furthermore, the next figure presents the decision process flow chart that was developed and that is being currently implemented. It is important to notice that this version is still provisional as, for example, it does not include the possibility of considering a purchase reorder point.

MRP Decision Process Flow Chart

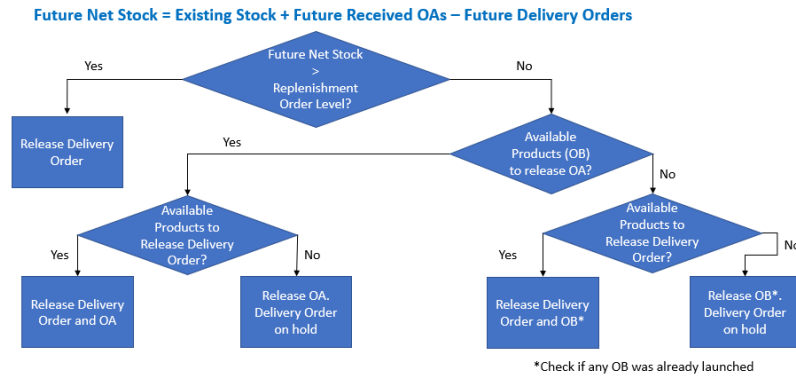


Figure 11 - MRP Decision Process Flow Chart

When the MRP is implemented, it is expected to be able to reduce 80% of the employees dedicated time to POP marketing material management. Besides, this system should also be programmed to gather all the requests planned for same week and with close destinations and, consequently, save up to 20% of transportation costs. However, this numbers are only based on estimations and, therefore, are still pending to be confirmed.

5.4 Project Results

The deployment of the workshops described above altered the entire logistic management system of POP marketing material of Company A and the dynamics and processes throughout its supply chain. However, as some initiatives are not fully implemented neither are their results definitive, a detailed analysis of the generated impact will still not be able to generalize proper conclusions.

Regardless, the following assertions can be made:

- Forecast annual purchasing requirements and launching big purchasing orders by gathering the expected needs can decrease the unit cost of POP marketing products by 20.7% without even considering costs of occurred extra purchasing orders.
- The implementation of a pull planning system in the logistic operator's warehouse is expected to reduce 0.88 FTEs from managing POP marketing material stocks and to increase the service level from 74% to 89% in less than a year.
- Simultaneously, the implementation of a planning system of the same type but this time on the wholesalers' warehouses resulted in different improvements: in two months, the average stock of POP marketing material has decreased by 41%, only 52% of the expected delivery orders required were, in fact, necessary and the higher demand frequency also allowed the reduction of the average stock on the logistic operator warehouse, saving warehousing costs.
- The implementation of an MRP is expected to be able to reduce 80% of the employees dedicated time to POP marketing material management and to save up to 20% of transportation costs.

Regarding these results, although the specific amounts cannot be disclosed due to a confidence agreement, the percentual value can give an idea of the impact generated by the deployed initiatives. Indeed, either being estimated or based in real data, the benefits of the project may anticipate a substantial positive impact of these initiatives on POP marketing material return, which supports Coimbra's (2009) thesis as the implemented logistical improvements enables stock, costs and lead times reduction and still makes it possible to increase service levels.

However, some setbacks also occurred leading to difficulties in implementing the methodology in the best possible way. In fact, Company A's actual policy of reducing the number of different suppliers and creating closer relationships with the supply chain partners prevent the initiative of creating a reorder purchasing point from being deployed. Besides, the reduced or even inexistent data limited the calculation of a better forecast for annual purchasing requirements and prevented the pull planning system implemented in the 5 pilot wholesalers' warehouses from demonstrating its full potential.

Moreover, the first cycle of workshops suffered some delays mostly related to the heavy workload of some departments, but also to employees' holidays that have not been considered when planning the implementation of the initiatives. As a matter of fact, from the 5 initially planned workshops, only 3 could be implemented. This delay consists in a big liability, as it might force all the other workshops to be deployed later than planned.

Finally, it is important to point out the current results can only anticipate a positive impact on the ROI of POP marketing material. However, as the initiatives that are closely related to measuring and effectively analysing the impact of the POP marketing products are still to be deployed, the quantification of the exactly impact that the investment in these advertising materials has in the profit-and-loss statement of a brewing company is yet to be determined and, consequently, it was not possible to properly evaluate the impact the implemented logistical improvements had on the ROI of the POP marketing material so far.

6 Conclusions

Remaining in the thick of a challenging era, brewers are focusing on innovative strategies and distribution channel developments to maintain their returns and margins. In a heavily competitive environment, a brewing industry firm's performance hinges on marketing and advertising and depends on their logistics management capabilities and distinctive competencies for competitive advantage and for creating differentiated customer value. In fact, having to fight harder for each pint of beer sold, beer production companies' investment on marketing is becoming more and more important as a differentiation factor in their disputation of market share.

Despite the existing literature does not fully explore the impact of POP marketing on the sales of beer, two main conclusions can be withdrawn: firstly, that the increasing competition of the beer industry has made the leading brewing companies strongly invest in advertising. Although it is not irrefutable that advertising can increase the beer market, it is commonly accepted that it does impact sales across different brands. Secondly, that POP marketing can be a really important decision factor for customers when deciding which product to buy. As a result, we can extrapolate that POP marketing can indeed strongly affect the beer sales.

Chapter 3 was divided in two parts: the kaizen breakthrough project selection process and the methodology followed for, starting from the analysis of the initial situation, being able to identify the improvement opportunities and plan the deployment of the necessary workshops in order to lead to an optimized process. This structured methodology proved to have good results as it was aligned with the company's goals and allowed all the involved people to understand the project selection and be on board with all the proposed initiatives.

However, the workshops planning throughout the year end up by being a failure point of the project. In fact, the implementation of the several initiatives could not follow the plan and some delays were generated. Besides, this might lead to a late completion of the all project and, consequently, in a longer time to return. In this case, a more conservative distribution would have been beneficial as the progress of the project would be in line with the initial expectations. At last, it is important not to forget to consider the employees holidays when preparing the implementation plan.

The results obtained are limited as some initiatives were not fully implemented and there were certain setbacks that prevent the deployed initiatives to generate all the expected and potential results. Therefore, proper conclusions cannot be made so far regarding the exact impact of the improved logistical solutions implemented. However, all the estimations and first results point to the same conclusion. In fact, the results obtained in Company A, anticipate and support the thesis of Coimbra (2009) regarding the positive impact that implementing a pull planning system could create.

To conclude, these obtained results, together with the general conclusions withdrawn from the existing literature on the impact of POP marketing material on beer sales, allow this

dissertation to support the initial hypothesis that an improved logistics should increase the return on investment of point-of-purchase marketing materials.

However, the implementation of the missing workshops, mainly focused on the proper analysis of Company's A ROI in POP marketing material, needs to be completed so that an approximate quantification of the exact impact that an improved logistics throughout the supply chain can have on the return on investment of point-of-purchase marketing products can be reached.

Bibliography

- Arthur, Rachel. 2017. "The Future of the Beer Market: 'You Can't Talk about Growth without Talking about Premiumization,'" no. 1: 1.
- Bastos, Alberto. 2014. "Total Flow Management - Kaizen Institute Introduction File."
- . 2019. "Kaizen Business System - Kaizen Institute Introduction File."
- Bowersox, Donald J., and Edward Morash. 1989. "The Integration of Marketing Flows in Channels of Distribution." *European Journal of Marketing*. <https://doi.org/10.1108/EUM00000000000546>.
- Carr, Amelia S., and Larry R. Smeltzer. 1999. "The Relationship of Strategic Purchasing to Supply Chain Management." *European Journal of Purchasing and Supply Management*. [https://doi.org/10.1016/S0969-7012\(98\)00022-7](https://doi.org/10.1016/S0969-7012(98)00022-7).
- Chase, R.B., Aquilano, N.J. 1995. *Production and Operations Management*. Irwin, Chicago.
- Coimbra, Euclides A. 2009. *Total Flow Management Achieving Excellence with Kaizen and Lean Supply Chains*. Kaizen Institute.
- Cox, A. 1996. "Relational Competence and Strategic Procurement Management towards an Entrepreneurial and Contractual Theory of the Firm." *European Journal of Purchasing and Supply Management* 2 (1): 57–70. [https://doi.org/10.1016/0969-7012\(95\)00019-4](https://doi.org/10.1016/0969-7012(95)00019-4).
- Duffy, and Martyn. 1991. "Advertising and the Consumption of Tobacco and Alcoholic Drink: A System-Wide Analysis." *Scottish Journal of Political Economy* 38 (4): 369–85.
- Easton, Liane, David J. Murphy, and John N. Pearson. 2002. "Purchasing Performance Evaluation: With Data Envelopment Analysis." *European Journal of Purchasing and Supply Management*. [https://doi.org/10.1016/S0969-7012\(02\)00002-3](https://doi.org/10.1016/S0969-7012(02)00002-3).
- Färe, Rolf, Shawna Grosskopf, Barry J. Seldon, and Victor J. Tremblay. 2004. "Advertising Efficiency and the Choice of Media Mix: A Case of Beer." *International Journal of Industrial Organization*. <https://doi.org/10.1016/j.ijindorg.2003.10.002>.
- Fawcett, SE, and S.R. Clinton. 1996. "Enhancing Logistics Performance to Improve the Competitiveness of Manufacturing Organizations." *Production and Inventory Management Journal* 37 (1): 40–46. <http://search.proquest.com/openview/53b5e279e7f116ffa26d0b3bb33e75f1/1?pq-origsite=gscholar&cbl=36911>.
- Galbraith, John Kenneth, Galbraith, and John Kenneth. 1973. "Power and the Useful Economist." *American Economic Review* 63 (1): 1–11.
- Gius, M P. 2015. "Using Panel Data to Determine the Effect of Advertising on Brand-Level Distilled Spirits Sales." *Journal of Studies on Alcohol*. <https://doi.org/10.15288/jsa.1996.57.73>.
- Grabowski, Henry G. 1976. "Chapter Title: The Effects of Advertising on the Interindustry Distribution of Demand." *Economic Research*. Vol. 3.
- Graves, Stephen C., and Sean P. Willems. 2003. "Supply Chain Design: Safety Stock Placement and Supply Chain Configuration." *Handbooks in Operations Research and Management Science*. [https://doi.org/10.1016/S0927-0507\(03\)11003-1](https://doi.org/10.1016/S0927-0507(03)11003-1).
- Imai, Masaaki. 2012. *Gemba Kaizen: A Commonsense Approach to a Continuous Improvement*

Strategy. MCGRAW-HILL EDUCATION - EUROPE.

- Kaizen Institute. 2019. *The KAIZENTM Change Model*. Kaizen Institute Consulting Group.
- Lee, S.M., Schniederjans, M.J. 1994. *Operations Management*. Boston: Houghton Mifflin Company.
- Lesser, Lenard I., Frederick J. Zimmerman, and Deborah A. Cohen. 2013. "Outdoor Advertising, Obesity, and Soda Consumption: A Cross-Sectional Study." *BMC Public Health*. <https://doi.org/10.1186/1471-2458-13-20>.
- Liker, Jeffrey K. 2004. "The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer."
- Morash, Edward A, Cornelia LM Droge, and Shawnee K Vickery. 1996. "Strategic Logistics Capabilities for Competitive Advantage and Firm Success." *Journal of Business Logistics* 17 (1): 1–22. <http://search.proquest.com/openview/89692fb8160eee33c0193ca25edba6cf/1?pq-origsite=gscholar&cbl=36584>.
- Nahmias, S. 1997. *Production and Operations Analysis*. Irwin, Chicago.
- Narasimhan, Ram, Jayanth Jay Aram, and Joseph R. Carter. 2009. "An Empirical Examination of the Underlying Dimensions of Purchasing Competence." *Production and Operations Management* 10 (1): 1–15. <https://doi.org/10.1111/j.1937-5956.2001.tb00064.x>.
- Nelson, Jon P., and John R. Moran. 1995. "Advertising and US Alcoholic Beverage Demand: System-Wide Estimates." *Applied Economics*. <https://doi.org/10.1080/00036849500000105>.
- Nguyen, Dung. 1987. "Advertising, Random Sales Response, and Brand Competition: Some Theoretical and Econometric Implications." *The Journal of Business* 60 (2): 259–79.
- Oracle®. 2018. *Oracle® MRP User Guide*. 12.1. ORACLE®. https://docs.oracle.com/cd/E18727_01/doc.121/e15188/T478564T478850.htm.
- Plenert, G.J. 1990. *International Management and Production Methods*. Blue Ridge Summit, PA: Survival Techniques for Corporate America, Tab Professional and Reference Books.
- Plenert, Gerhard. 1999. "Focusing Material Requirements Planning (MRP) towards Performance." *European Journal of Operational Research*. [https://doi.org/10.1016/S0377-2217\(98\)00339-7](https://doi.org/10.1016/S0377-2217(98)00339-7).
- "POPAI Executive Summary Report - Mass Merchant Study Results." 2014.
- Presson, Göran. 1991. "Achieving Competitiveness Through Logistics." *The International Journal of Logistics Management*. <https://doi.org/10.1108/09574099110804625>.
- Ramírez Beltrán, Claudia Janeth, and Luis Gerardo Alférez Sandoval. 2014. "Conceptual Model to Determine the Impact of Visual Merchandising in Making Purchasing Decisions at the Point of Sale." *Revista Científica Pensamiento y Gestión* 36: 1–27. <https://doi.org/10.14482/pege.36.5564>.
- Ritzman, L.P., King, B.E., Krajewski, L.J. 1984. "Manufacturing Performance – Pulling the Right Levers." *Harvard Business Review*, 143–152.
- Rutishauser, German Estevez, Stefan Rickert, and Frank Sängler. 2015. "A Perfect Storm Brewing in the Global Beer Business." <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/a-perfect-storm-brewing-in-the-global-beer-business>.
- Scherer, FM, I Scherer, A Beckenstein, and E Kaufer. 1975. "The Economics of Multi-Plant

Operation: An International Comparisons Study.” https://books.google.com/books?hl=pt-PT&lr=&id=R_DiQKjNgPwC&oi=fnd&pg=PA1&ots=B1usrSrHMQ&sig=je5kZM4LkdJ9ufNWhvnDR3P3Fh8.

- Schroeder, Roger G., John C. Anderson, Sharon E. Tupy, and Edna M. White. 1981. “A Study of MRP Benefits and Costs.” *Journal of Operations Management*. [https://doi.org/10.1016/0272-6963\(81\)90031-0](https://doi.org/10.1016/0272-6963(81)90031-0).
- Weele, Arjan J. van, and Frank A. Rozemeijer. 1996. “Revolution in Purchasing: Building Competitive Power through Proactive.” *European Journal of Purchasing & Supply Management* 2 (4): 153–60. [https://doi.org/10.1016/S0969-7012\(96\)00010-X](https://doi.org/10.1016/S0969-7012(96)00010-X).
- “What’s on Tap for the Global Beer Market? The Beer Industry: Pouring Both Pints and Profits Away from the Sector.” 2018. <https://www.jpmorgan.com/global/research/beer-market>.
- Wilcox, Gary B. 2001. “Beer Brand Advertising and Market Share in the United States: 1977 to 1998.” *International Journal of Advertising*. <https://doi.org/10.1080/02650487.2001.11104884>.
- Wilcox, Gary B., and Harsha Gangadharbatla. 2006. “What’s Changed? Does Beer Advertising Affect Consumption in the United States?” *International Journal of Advertising*. <https://doi.org/10.1080/02650487.2006.11072950>.
- Wilcox, Gary B., Jerome D. Williams, Sara Kamal, and Kyung Ok Kacy Kim. 2013. “The Role of Advertising on Attitudes and Consumption of Food and Beverage Products.” In *Advances in Communication Research to Reduce Childhood Obesity*, 197–219. New York, NY: Springer New York. https://doi.org/10.1007/978-1-4614-5511-0_9.
- Wisner, Joel D., and Keah Choon Tan. 2000. “Supply Chain Management and Its Impact on Purchasing.” *Journal of Supply Chain Management*. <https://doi.org/10.1111/j.1745-493X.2000.tb00084.x>.