

Collaboration Program with Packaging Vendors in a Consumer Packaged Goods Company

Universidad de la Sabana

Logistics Management Specialization

Capstone Project

2011

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April, 2011

General Objective

To define and implement a plan to provide manufacturing flexibility in a Consumer Packaged Goods Company engaging vendors to find out how to reduce complexity, optimize inventory levels and meet customer demand.

Specific Objectives:

- To identify opportunities in the KC packaging procurement process understanding the different purposes and motivations in related areas.
- To tailor the functionality of the collaboration framework so that it is suitable for cultural exploration with the people involved in the packaging procurement process inside and outside KC.
- To explore the postponement concept and its application in flexible packaging manufacturing process.
- To build a collaborative model that can be applied in similar procurement process for providing flexibility to the supply chain.

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1. Introduction and Background

Nowadays customer demand is forcing companies to provide a high product variety and keep at the same time a low cost performance, on the other hand, increased competition is putting pressure on supply chains to achieve higher levels of customer service and improve response times and meet customer demand, always.

One way to deal with this is investing higher levels of inventory not only in finished goods but also in raw materials in order to react quickly to market demand but it means increased exposure to the risk inherent in changing conditions and becomes more susceptible to large inventory write-offs or sales at a loss.

In mass consumption companies the accumulated sales at the end of the month and the low forecast accuracy represent a short visibility that planning people have to face to react to the demand and avoid backorders while at the same time having to deal with long lead times for both raw materials and final products. Indeed one of the most critical points identified with some companies in the process of launching new products, introducing changes to current ones or just adapting to unexpected changes in the production plans is the question, *is there packaging material availability?*

With challenges like these, collaboration plans become an opening to explore; this project is about finding the opportunity to implement a postponement strategy in packaging vendor productions and some keys to be properly executed.

This project examines the manufacturing and planning processes of packaging including: engaging vendors to identify potential collaborative plans and improving communication processes finding out how to reduce complexity and optimize inventory levels to better meet customer demand, minimize the capital investment and risk and lower market reaction time.

1.1.Description of Organization

The company where this project will be developed is Kimberly Clark, doing business in Colombia for 40 years, the company belongs to a worldwide company which has operation in 35 countries around the world and has a wide portfolio of solutions essential to the health and hygiene with different well-known brands which are sold in local and international markets.

In Colombia there are four manufacturing facilities in different locations across the country and two main distribution centers that stored finished product to be delivered to the consumers throughout Colombia.

Kimberly Clark is also committed to social responsibility and investing in the communities where it works and lives. Some programs that KCC has developed are environmental outreach programs such as: recycling old and used paper and wasted fiber, pollution reduction programs and environmental education programs. As a company, KCC is actively focused on and supportive of doing the right thing for his neighbors, employees, suppliers, customers, strategic partners and shareholders.

1.2.Opportunity

For the company, global and local market demand is difficult to forecast in times of economic uncertainty and strong competition in Colombia, furthermore and despite big efforts with saving plans, products innovation, marketing and commercial strategies and the support given from all departments to the commercial area in order to avoid backorders, enhance good service level to the customers and more, the brands are not leaders in Colombian market yet.

There are different plans and projects inside each area to support the big idea of getting the leadership in the market conducted by interdisciplinary teams, and this project is focused on analyze one of the reasons for losing sales which is short product availability as

consequence of low forecast accuracy by Stock Keeping Unit and the challenge of keeping low inventories and costs.

In KC Colombia, packaging procurement is found as bottle neck for the production and this is the opportunity to look for a high degree of collaboration and visibility across the supply chain as company leaders have to invest heavily to improve business-critical Supply Chain Management processes.

2. General Methodology:

The methodology is based on analyzing a real case inside KC Colombia which is a Consumer Packaged Goods Company that is facing the need to offer a good packaging procurement response in a “dynamic” environment.

Steps:

Describe and analyze the company

- Identify areas and people involved in the process of buying flexible packaging inside and outside the company.
- Set meetings and interviews in order to review the current process
- Gather historical data about suppliers, lead times and volumes.
- Identify the issues, describe the problem and define objectives to reach.

Identifying opportunities

- Meetings and interviews with main suppliers for sharing information and check the ongoing process.
- Analyze current packaging manufacturing process
- Engage suppliers to identify improvements for the process and collaboration opportunities together.

Developing the Action Plan

- Build a team work for developing the plan to apply inside the company
- Describe the suggested new process.
- Define roles and responsibilities inside the group.
- Asses potential implementation problems

Describe Findings, Conclusions and Recommendations

- Identify key factors for the implementation
- Define how to measure the plans performance to ensure that objectives are met.
- Generate final recommendations.

3. Basic Literature:

3.1.Theoretical Collaboration Framework

Technically, collaboration is a process of participation through which people, groups and different organizations work together to achieve a desired result. It involves getting the right information to the right people at the right time to make the right decisions.

Organizations need to make use of new collaboration possibilities or face a significant competitive disadvantage, it's well known that companies which successfully adopt new collaborative processes will be able to move faster, make better decisions based on high quality information and more effectively operate across barriers as uncertainty in this case.

There are several collaborations plans and frameworks related to develop new collaboration technologies which are very useful to help organizations to share information and expertise in ways that simply have not been possible, databases revolutionized sales and marketing efforts and IT advances promise to radically improve the way that people interact and share information.

However, collaboration is much more than communication, it's the way that people in the company function together. Better collaboration means better business operation and new technologies on their own can do little to improve processes.

This framework has target to make collaboration more effective while realizing specific outcomes; in the process, it's valuable to recognize increased skills in communication, decision making and applying research, at the same time encourage people and each area involved to invest their capacity to develop new solutions while maximizing a range of resources to their fullest potential and solve a complex problem with a "simple solution".

Important factors to have in mind are following:

Aiming to Vision drivers solutions: Once the problem it's identified, it can be the initial point to forming a collaboration, but defining the vision and desired outcomes can give a better shape to the process, in other words, moving from problem driven solutions to vision drivers solutions offers greater potential for maximizing resources and developing sustainable outcomes and avoid the tendency to solve practical problems with ready-made solutions that neither address the fundamental causes of the problem, nor challenge thinking in new directions.

Building relationship: "Win-win" relationships are the kind of relationships where expectations are clear and understood by all members involved. It includes assists in identifying skills, abilities, tasks, roles, responsibilities, work plans and finally reaching desired outcomes.

Define Collaboration: The group needs to clearly define what it means by collaboration in the specific case to work on and what activities in collaboration are supposed to do. It is important to do not assume that a common definition exists.

Components of collaboration:

To efficiently move through this work it's identified to review carefully three main components which are:

- a. Strategic Partners and People:** It can be described as the cultural aspect of the collaboration; it's focuses in ways to influence people attitudes and collaborative behaviors not only for people in the company but also the suppliers, understand what people believe, how they feel about something and what they think can be a good way to interact with others in a specific situation.

It is also sharing the diversity of motivations to collaborate. It opens the door to gaining an understanding of how all the element and ideas fit together and how each is important to the whole.

So, new behavioral expectations need to be clearly defined, developed and incorporated into the process to implement.

- b. Processes:** Processes changes are changes in the way people get the work done. It's those aspects which affect the everyday activities of the collaboration and it includes decision making and a strong emphasis on review and improve cycles. The individual performance must shift to group performance in order to work effectively and this is because individual systems produce competition and team systems produce collaboration, this can apply for people and partners organizations.

- c. Technology:** The range of collaborative possibilities will be limited by the technological infrastructure of the companies; organizations need to look ways to integrate packages of tools into a single collaborative environment such as a single

internet portal between many others to support the needs for managing information.

It is important in this case to realize that people and processes concepts blend fluidly. They both combine to create behavioral changes that lead operational improvements in the organization and this is the focus of this job, create solutions through strength the current process with vendors, in next phases of this first initiative Technology must be a critical aspect to enhance the process but it is not in the capstone project scope.

Phases for Collaboration:

To capture the full value of this initiative it's suggested following three phases:

- a. Investigative Phase:** Involves learning and preparing to identify the real opportunities working with suppliers, in this phase must be defined the findings, work team to follow the process and the plan to implement. The investigative phase generates best practices and examples of success that the company can use to teach and inspire.
- b. Performance Phase:** Work team and vendors move from the current behavior to and organized adoption of collaboration tasks. It's important to identify the key factors for the implementation and define clearly how to measure the effectiveness of the plan.
- c. Transformation Phase:** So far we are only at the beginning of the evolution of collaboration. This phase is mentioned as the next step suggested to optimize the initiative and it includes adding new elements as technology which enhances the process after it's reached the culture and motivation to make changes in the packaging procurement process. This phase is not in the scope of the capstone project.

Postponement is the “next big thing” that will provide an answer to the identified problem and in order to understand the application of the concept it is necessary to make an easy review to the manufacturing flexible packaging process as well.

3.2.Packaging Manufacturing Process Review

Plastic film can be converted or fabricated into bags or pouches. Today, advanced technologies have helped introduce manufacturing machinery capable of automatically combining the complex series of processes needed to produce the widest variety of shapes and sizes. Such processes often use computerized methodologies to precisely control everything from raw material input to extruding, cutting, punching, finishing and packaging for dispatch. The bags can be packed either loose in boxes, wound on rolls or wicketted in stacks.

The flexible packaging manufacturing process is based on the combination of several film layers, where one or more layers are fabricated using special resin blends and particular extrusion conditions in order to obtain a package.

The more often utilized resins are LLDPE (Linear Low Density Polyethylene) and LDPE (Low Density Polyethylene). LLDPE is stronger; using this resin the bag will be more puncture resistant and hold heavier weight.

The mains steps are:

Pre press: It’s the first step to generate the printing press according to the customer packaging design. The supplier takes virtually any art file and preps it into “press-ready”. They also work closely with customer’s marketing people to ensure the design is optimized for printing.

Extrusion: It’s the process to extrude the resins by the rotating platform process getting transparent forms and also by using master batch colors in the dimensions defined by customers. *Figure 1*

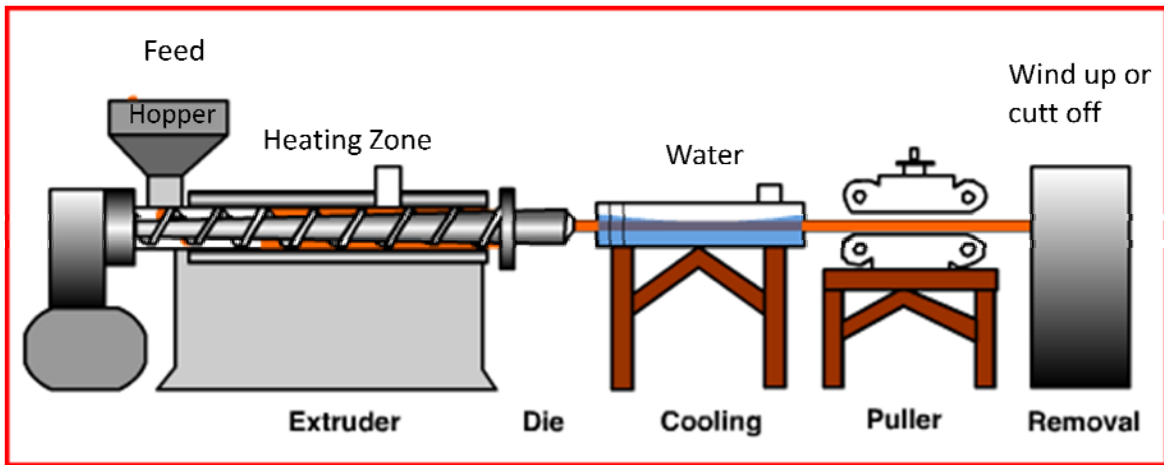


Figure 1: Extruder manufacturing line

First, raw material, in the form of small plastic pellets, is placed in the hopper. The hopper rests on top of the barrel. The barrel is a heated hollow steel cylinder, sort of like a really thick pipe. An auger-type screw rotates inside of the barrel. The screw's rotation takes the plastic pellets and pushes them forward, into the barrel. As the pellets move towards the front of the barrel, frictional and electrical heat from the barrel melt the plastic. After the plastic is melted, the rotating screw continues to act as a pump and forces the molten plastic through a die. The die is usually a piece of steel with the shape of the desired part machined into it. Once the melted plastic exits the die, it is shaped like the finished product. Next, it is pulled through some sort of cooling apparatus, which usually cools with air or water. Once cool, the product can be rolled up, cut into sections, packaged, or can go on to secondary operations. At this part it's already defined if the need is rolls or bags to continuo to next steps.

Corona Treating: It's an important step to increases the surface energy of plastic films to improve wettability and adhesion of inks, coatings and adhesives. This treating works best when is at the time of extrusion and in-line prior to converting. Film can be easily printed and coated immediately after production. To ensure consistent quality to the converter and to the end customer, the substrate must be corona treated twice: At the time of production and Prior to converting.

Laminating: This step is used just when it's needed in the specification. In this part, lamination utilizes polyethylene to bond 2 or more films together. There are many variations on the methods for bonding the materials but the most common is with the use of PSA (pressure sensitive adhesive) as a bonding agent. The adhesive can be applied as 'transfer tape' which is adhesive pre-coated onto a release liner (with or without a carrier) or coated directly onto one of the surfaces.

The laminating process prevents contamination due to printing by introducing a layer of film in between printed material and the product. It decreases O₂ transfer, prevents the light exposure and increases the products shelf life. *Figure 2*

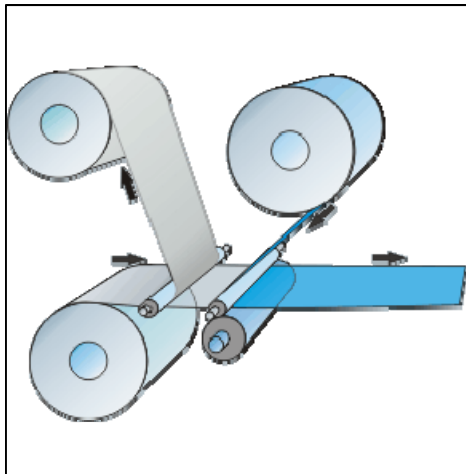
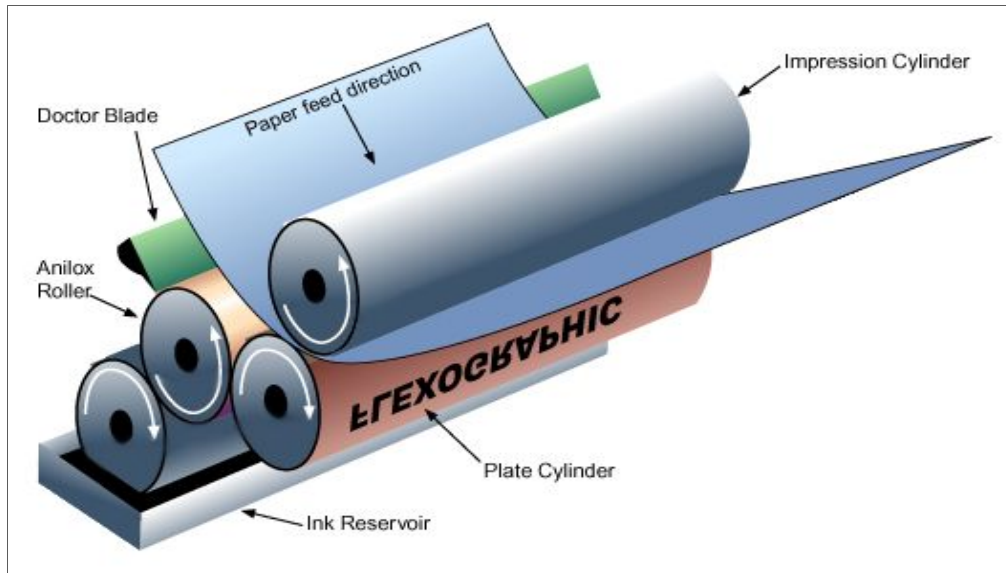


Figure 2: Laminating process

Printing: The relief plate used for flexography is made of molded rubber or photopolymer materials with the image areas raised above the non-image areas of the plate. Flexographic plates can be created with analog and digital plate making processes. Flexography is a direct printing method in that the inked plate applies the image directly to the substrate. An inked roller applies ink to the raised portions of the plate which is then transferred to the substrate. The inked roller has cells that carry a specific amount of ink to the plate. The number of cells per linear inch can vary according to the type of print job and the quality required. *Figure 3*

Figure 3: Printing process



Slitting: Several methods are available for soft materials like plastic films and paper. Razor blades, straight, or circular blades are being used. Some blades cut through the material while others crush the material against a hard roll. Those are similar to knives and cut the material into narrow strips, which are called coils when being rewound. The cutting blades can be set to a desired width. Some machines have many blades to increase the options of cutting widths; others have just a single blade and can be set to a desired location. The slit material is being rewound on paper or plastic cores on the exit side of the machine.

The process is used because of its low cost and high precision for mass production. Some machines have a program that monitors the blades and sharpens the blades often to maintain the quality and precision of the cut. Depending on the industry and the product that is being slit these machine can run between 10m/min (special metal webs) and 5000 m/min (paper making process)

Sealing: It's the final process to seal the bags and let them ready to package manually.

Quality Control: Every produced order is subjected to different test and measurements. This exacting evaluation is conducted on raw materials, work in progress and finished rolls and bags.

4. Findings

4.1. Current Packaging Procurement Model

The Supply Chain Organization in the company is formed by five main dimensions of activities of supply chain led by different people: Distribution, Customer Service, Warehouse, Planning and Purchasing.

The current general process and information flow of planning and buying raw materials has involved two main areas inside the supply chain in the company (Planning and Purchasing) and are described as follows:

Planning:

Each BU has specialized planners and there are 1-2 people for planning the production in each mill.

The Sale Forecast comes from the commercial area and is the starting information point, this forecast is completed 4 months in advanced and is based on estimated customer demand but not on orders already placed.

- **Raw Material Buying Plan:** The sales forecast is converted into raw material needs using the Bill of Material (BOM) information. Raw material and packaging orders are generated according to procurement lead times, inventory levels at the end of the month and safety stock target defined for each material. The Buying Raw Material Plan is generated and revised every single month.
- **Production Schedule Month 1:** Is generated at the beginning of the month based on the optimum production sequence defined for each machine and given the production priority to the items with low or no stock at the end of the previous month.

- **Packaging Schedule Month 1.** Based on the General Production Schedule, it's possible to make visible the daily packaging consumption at the beginning of each month.



Figure 4: Planning process

Purchasing:

Purchasing has a packaging buyer responsible for negotiation and maintaining supplier relations. On the other hand there is a logistics analyst responsible for all logistics issues including flexible packaging and other key raw materials.

Since Raw Material Buying forecast is available, Planners create purchasing requisitions in the SAP system showing quantities and requiring delivery dates according to lead times and optimum order sizes previously submitted by buyers in the system for all the items.

Purchasing requisitions are the starting point where purchasing and logistics begin the process of buying and tracking the deliveries with suppliers in order to guarantee the availability of materials for production.

So far, the demand and forecast information is available and revised by planning people, the general forecast is just shared with some suppliers who ask for some kind of visibility to guarantee production capacity, mainly with imported products due to long lead times.

Suppliers:

Flexible packaging procurement is supported by 9 local suppliers which deliver to the three mills located across Colombia. There is no any specific criteria to define the packaging vendors for each mill, through the time each business or product category is being assigned to the supplier based mainly on prices and sometimes on quality preferences in the mill, as a result each mill receives material from several suppliers located in different cities.

The average lead time of packaging procurement is 30 days and the stock level target is 30 days at the end of the month¹.

Flexible Packaging Procurement Summary

Nr of suppliers	9
Nr of SKU's	370
Lead Time	30 Days
Stock level Target	30 Days
Stock level Average	46 Days
Supplier - Origin Cities	Bogotá
	Cali
	Medellín
	Barranquilla
	Pereira
Mills - Destination Cities	Medellín
	Cali
	Bogotá

¹ Stock Level Calculation: Final Inventory * 30 / Forecast for the next month

Recognizing Packaging Procurement Opportunities

An important point to consider is that procurement packaging is identified as **bottle neck** in the production process as a consequence of:

- **Low forecast accuracy by Finished Good SKU's:** At the end of the month, it is normal to run out of some stock references and have excess stock levels in others. The variability per SKU is very high and the results are very different each month. *Figure 2 shows the number of SKU's meeting the forecast.*
- **Changes in monthly production schedule:** The monthly schedule of packaging consumption defined at the beginning of the month has differences because of productivity variations, unexpected sales, lack of different materials that implies change the production sequence among other reasons.
- **Lead time for product launch:** When it's needed to launch a new product or make a change in the current products it's necessary to modify packaging information. Marketing people are supposed to wait at least 30 days to get the new packaging production due to lead times or 60 days to reduce the inventory level in order to avoid large write-offs. In a rapidly changing market where the competitors are aggressive on promotions and product differentiation, 30 days is quite a long time to wait and represents lost sales and market share.

Forecast Accuracy (Sales vs forecast)

Figure 5

FORECAST ACCURACY (Sales vs Forecast)

		Total SKU	More than 110%	Between 110% and 90%	Less than 90%	No forecast	
Month 1	B2B	Nr.SKU	135	32	35	65	3
		%	100%	24%	26%	48%	2%
Month 2	B2B	Nr.SKU	124	31	21	72	0
		%	100%	25%	17%	58%	0%
Month 1	Massive consumption	Nr.SKU	168	51	26	88	3
		%	100%	30%	15%	52%	2%
Month 2	Massive consumption	Nr.SKU	160	32	28	100	0
		%	100%	20%	18%	63%	0%

The forecast variability by SKU comes from final customers and their buying trends and behaviors as studied by the marketing department. This is not the focus of the project as we are developing an inbound logistics solution for the whole variability issue including domestic and regional sales.

As a consequence of this dynamic environment we have found the next:

- Permanent urgencies to deliver products at the right time.
- Low Inventory Quality (high and low inventory levels by SKU of packaging and finished goods).
- Lost productivity for people involved in reorganized deliveries.
- People “putting out fires”
- Delays in design changes.
- Obsolete materials
- Relationships with packaging suppliers are often adversarial as they perceive the process as a mess representing extra costs and a stressful environment for both sides.

- The packaging vendors don't really understand who is making the decisions and what information is available to be prepared for the demand.
- There is a lack of trust and some suppliers feel that there is a great deal of confusion in the planning and execution of logistics
- Packaging vendors are trying to understand what drives the flexible packaging buying behavior to avoid this stressful relationship with the company.
- The lack of information sharing makes these relationships more costly than they need to be ("unpredictable" requested deliveries and changes, excessive inventories, service failures...).

The current model was working well when there was not a strong competition in Colombia and the company was the leader in the market, while environment was changing and the need to be flexible become more important to reach customer demand, the findings described above were appearing as a result of the pressure on the supply chain, so this "invisible" situation become a critical situation for the company.

With this information, it was identified the potential opportunity to examine the packaging manufacturing and planning processes engaging vendors to find out how to handle complexity in the process to increase product availability to the final customer while reducing inventory levels.

5. Action Plan

5.1. Team Work:

The company has established the following team to work on the plan:

- a. Inside team Leadership:
 - Production Planners (3 people)
 - Packaging Buyer
 - Packaging Logistic Analyst

b. Inside team Supply:

- Sales Person
- Production Planner
- Customer Service Analyst

All team members have to participate in the study of the baseline situation including information about input availability and desirable outcomes, so in the spirit of collaboration and information sharing, the company team and the selected flexible packaging vendor have a meeting to review the process, harmonize views and ensure that strategic areas (planning, purchasing, logistics, and vendor) are aligned with the collaboration framework.

The first step focuses on defining the existing or potential relationship between members. A range of relationships have been defined in the “Group Linkage – Motivations and Support” matrix. Recognizing and strengthening the interrelatedness contributes to the “infrastructure” of the collaboration. This matrix defines six levels of relationships (members) and the purpose, current process and the potential support to build the new process for each level.

Relationship in Procurement Packaging Process
 Figure 6: Groups linkages - Motivations and Support

Levels	Some Motivations	Current Process	Inputs / Potential Support
Company	Optimize working capital and guarantee product availability		
Planners	Get flexibility to have available products when changes in production plan.	Informal communication, Facing changes and willing to obtain help to program machines	Information and visibility with the group to address common issues
Packaging Buyer	Develop long term relation with suppliers that offer high performance standard service which meet the mill needs with low costs.	Focus on low prices, looking for short lead times in the market of flexible packaging.	Support from the commercial side to develop the process and commitments
Packaging Logistics Analyst	Match production needs and provide coordination with suppliers. Stop putting off fires!	Putting out fires. Asking planners to avoid changes or increasing safety stock! , asking suppliers to be more flexible.	Ensure tasks and commitments are done
Vendor	Offer a good quality product with a high service level as a competitive advantage vs competitors.		
Sales Person	Guarantee an non complex process to achieve a good service level and keep the business for his company. It's a good account to care!	Open to dialog and common understanding	Support from the commercial side to develop the process and commitments.
Production Planner	Stop unpredictable and presistent changes in production plans in vendor schedule to attend customer requests.	Affording changes which represents high costs and high inventory levels in their warehouses.	Share ideas and be willing to pull resources from existing systems or identify pre-analyzed changes in the process.
Customer Service Analyst	Define a good methodology to communicate the needs in advance and coordinate requisitions with enough time.	Stresfull days receiving continuous changes in their schedule and attending orders placed out of lead time. Investing more time than expected to follow the deliveries and persisten calls from customer.	Ensure tasks and commitments are done

After this analysis two main supplier were selected as part of a pilot program to develop and help to implement the proposal plan (Supplier Z and Supplier L), the reason to select them was the fact they have been working with KC for long time and the business represents an important volume of their production; they are considered strategic partners for the packaging procurement strategy.

In the suppliers approach it's important to try to get a sense of how they might help to fix the identified problem, in the research process everything must work together as one, the more transparently that happens the more productive the process will be.

One of the main topics to research is how suppliers can get the data and marry it with their production planning process to anticipate packaging demand or reduce response time.

5.2. Postponement and Proposal Plan ²

To manage inventory effectively, companies not only must anticipate demand, but also when it will taper off. Not having sufficient inventory early in the product cycle can cost market share. Products at the end of life cycle lose value quickly and risk obsolescence, which can lead to large inventory write-offs. Moreover, with customer demand increasing for product specification, companies must produce several versions of each model.

Many manufacturers today are turning to postponement or delayed differentiation strategy to strike the right balance. By holding inventory in a less finished state- that is, postponing final product assembly until actual customer demand is known –companies can more quickly respond to market opportunities and offer greater customization options. However, postponement can require the fundamental redesign of a company’s decade-old manufacturing processes and it also calls for collaboration and visibility.

Studies of emerging trends in postponement found that postponement is an underutilized, but increasingly viable and effective strategy within the supply chain. The survey found overall reductions in inventory costs by as much as 30 percent to 40 percent in successful postponement implementations.³

Postponement is a systematic approach to designing and developing standard, configurable products that can be differentiated, quickly and inexpensively, once actual customer demand is known. This model allows organizations to transition from a “push”-oriented supply chain to a “pull” or a demand-driven supply chain.

² Source: AMEinfo.com (The Ultimate Middle East business Resource)

³ 2003, Survey sponsored by Oracle Corporation and Cap Gemini Ernst & Young U.S. LLC in conjunction with APICS – The Educational Society for Resource Management.

Postponement is not a new concept, for more than a decade, a small but influential group of sector leaders in the consumer electronics and semiconductor industries, such as Dell, HP and Xilinx, and major retailers like Wal-Mart and Home Depot, have implemented delayed differentiation strategies to reduce manufacturing, shipping and inventory costs, while improving order fill rates.

A postponement strategy is mainly related to the product lifecycle: not having right inventory early in the lifecycle will mean missing customer service level targets and the opportunity to gain market share. Products at the end of life cycle lose value quickly and risk obsolescence, resulting in costly write-offs. Moreover, if old products are held in a generic state, their components and parts can be “recycled” for next-generation products.

One of the most important factors for selecting a postponement strategy is the needs of the final customers. When demand is unpredictable, the risk of speculation is high. Postponement is the opposite of speculation. It is the philosophy of not doing today the things that you can put off until tomorrow--because who knows what will happen tomorrow?

As the Oracle/Cap Gemini Ernst & Young survey found, a postponement implementation involves a fundamental changes to a company’s manufacturing processes and internal operation. Product design and production must be restructured to support product standardization and design modularity. The company must convince its supplier and partner network to go along with pushing the point of product differentiation closer to the customer.

With postponement, teamwork is critical. When the order specifications are known, the supply chain partners must respond by pulling in the right people and gearing production accordingly.

The postponement strategy can achieve two primary strategic objectives: to lower inventory costs and improve customer service levels.

The first step in considering a postponement strategy is to *have management support*. For postponement to work, management must be willing to take risks, implement sweeping changes and commit resources to reform manufacturing practices and build a collaborative infrastructure.

The next step is to determine how best to implement the strategy. Successful companies implementing postponement create cross-functional teams and invest in information technology in order to redesign their business process.

It's recommended to determine how changes in one supply chain area will affect others and map enabling information flows.

The most important benefits of a successful postponement implementation are improving customer satisfaction while minimizing inventory costs, increase flexibility that increases a company's ability to offer a wide range of good, improve fill rates and decrease lead times.

Companies and its suppliers enjoy reductions in inventory costs through better resource planning and allocation. This is attributed both to shorter forecast cycles and shifting inventory upstream to a less expensive generic state.

Overall postponement's primary benefits are to reduce the effects of market uncertainty and to meet customer needs, while effectively managing supply chain costs.

The postponement concept can be applied in the packaging manufacturing process through collaboration activities with vendors and engaging them to create and generate ideas to modify the current model doing in advanced the extrusion process and postponing the printing decision as much as possible.

After checking the manufacturing process it was suggested to make some changes in the process using the available information (forecast) in order to get flexibility.

Baseline:

- In month 1 KC Planners share packaging consumption forecast for month 2 by SKU: With this information the supplier can extrude the volume per reference in Month 1 but is not allowed to print until the need arises in the two month cycle.
- Vendor set a **weekly** capacity for printing, slitting and sealing in order to guarantee production space in their plan to attend the company requirements. (According to weekly capacity communicated by the vendor it's important to verify if there is constraint with volume or with the number of items or references to print, slit and seal).
- At the beginning of each month the daily production schedule must be shared with vendors for month 1 (current month) and suppliers are allowed to print the complete volume if they decide to do it because of their minimum quantity size. *See Figure 7*
- In a short weekly meeting with planning and the logistics analyst the references to be printed for consumption since the next week are determined, the deal is to finish the manufacturing process (print, slit and seal) and deliver the references in the next 7 days according to the production plan and using the previously capacity reserved for the company. It's important to mention that at this specific point the material is already extruded with the forecast information in the previous month and this is the key to reducing delivery time and be flexible on design changes requests.
- The company planners must define the items which are identified with consistent monthly production to keep a certain stock (30 days is suggested) as a contingency plan in case any unexpected issues occur. In this case the specific production, in which the packaging delivery is having problems, will be postponed until the packaging arrives and instead of this the contingency references can be produced avoiding stop machines and lost production time.

Main Initial Actions Summary

Action	Responsible
Set a weekly capacity for printing, slitting and sealing	Vendor Production Planner
Share Forecast per SKU with 1 month in advanced	Customer Planner
Share Daily Production Schedule for Month 1	Customer Planner
Share Weekly Delivery Schedule	Customer Planner
Verify limit of volume and # SKU's in the weekly capacity	Planners
Define SKU's Pareto used in the contingency plan	Customer Planner

Figure 7: Forecast example to be share at the beginning of the month.

Supplier 1					Daily Delivery Schedule Month 1																	
					To Print	To Extrude																
					MONTH 1	MONTH 2																
					TOTAL ORDERS	FORECAST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
							Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
42044869	BSP PAÑ BRAND PEQ X 30 45U CHEEKY2	Un	55.000	65.000						44.000	11.000											
42044305	BSP PAÑ BRAND CHEEKY GDEX24 50U	Un	142.000	110.000								60.000						37.000				
42044306	BSP PAÑ BRAND CHEEKY GDEX48 50U	Un	80.000	110.000								22.000	58.000									
42044307	BSP PAÑ BRAND CHEEKY GDEX72 50U	Un	96.000															16.000				
42044875	BSP PAÑ BRAND GDE X 30 45U CHEEKY2	Un	450.400	350.000							120.400	30.000										
42044877	BSP PAÑ BRAND GDE X 30 B.I 45U CHEEKY2	Un	57.600	95.000							57.600											
42044298	BSP PAÑ BRAND CHEEKY PEQX60 50U	Un	30.000	40.000										30.000								
42044303	BSP PAÑ BRAND CHEEKY MEDX72 50U	Un	80.000	45.000										40.000								
42044309	BSP PAÑ BRAND CHEEKY XGDEX44 50U	Un	155.000	100.000													30.000	30.000				
42044310	BSP PAÑ BRAND CHEEKY XGDEX72 50U	Un	80.000	55.000																30.000		
42044301	BSP PAÑ BRAND CHEEKY MEDX28 50U	Un	130.000	100.000													40.000	40.000				
42044302	BSP PAÑ BRAND CHEEKY MEDX56 50U	Un	52.000	35.000												22.000						
42044308	BSP PAÑ BRAND CHEEKY XGDEX22 50U	Un	130.000	140.000																		80.000
42044883	BSP PAÑ BRAND XXDE X 20 45U CHEEKY2	Un	6.900	140.000													6.900					
42044879	BSP PAÑ BRAND XDE X 30 45U CHEEKY2	Un	200.000	100.000													75.000	75.000				
42044881	BSP PAÑ BRAND XGDE X 30 B.I 45U CHEEKY2	Un	30.000	30.000																		
42044872	BSP PAÑ BRAND MED X 30 45U CHEEKY2	Un	85.000	160.000																		
42044311	BSP PAÑ BRAND CHEEKY XXGDEX32 50U	Un	23.000	83.000																		
42044878	BSP PAÑ BRAND GDE X 50 45U CHEEKY2	Un	45.000	40.000																		
42044882	BSP PAÑ BRAND XGDE X 50 45U CHEEKY2	Un	26.000	26.000																		
42044873	BSP PAÑ BRAND MED X 30 B.I 45U CHEEKY2	Un	0																			
42043009	BSP PAÑ BRAND ULTRATRIM GDEX33 09	Un	0																			
42044886	BSP PAÑ BRAND MED X 33 09	Un	0																			
42043013	BSP PAÑ BRAND ULTRATRIM XGDEX33 09	Un	0																			
42046299	BSP PAÑ BRANDGIES ULTRATRIM PEQX50 CH II	Un	0	33.000																		
TOTAL					1.953.900	1.857.000	0	0	0	44.000	189.000	112.000	153.000	0	0	0	22.000	204.900	145.000	30.000	80.000	

The idea is that plastic films are produced to the customers' specifications providing them with scheduling flexibility. In addition, the supplier does not carry final product inventory because the customer's specification can be susceptible to changes, the packaging film for each item is printed to the customer's specification at the time is needed, it means that extruded material is standard in dimensions and if any change in the designs are needed it can be possible to do in the weekly teleconference.

Previously, suppliers had to check their internal procedures to balance costs, inventory levels and operating expenses in order to analyze the new way to work applying the concept of postponement.

In order to implement the plan the main activities to do and the frequency are:

Action	Responsible	Frequency
Share Forecast per SKU with 1 month in advanced	Customer Planner	Monthly
Share Daily Production Schedule for Month 1	Customer Planner	Monthly
Share Weekly Delivery Schedule	Customer Planner	Weekly
Teleconfererece to confirm deliveries	Logistics team	Weekly
Place orders in the system according the commitments	Logistic analyst	Weekly
Follow the deliveries and OTIF measurement	Logistic analyst	Weekly

To make the process blend fluently, it's supposed that before the weekly Teleconference suppliers have checked the orders to be printed and finished in the week in order to review and confirm with the team at the commitments and in an easy way check the next points to insure everything is working accordingly:

- OTIF for the last week (Logistic Analyst)
- Identify delay causes to take corrective actions if any delay happened.
- Supplier confirmation for the next week delivery schedule.
- If there are modifications for the deliveries it's the opportunity to be informed and approved by the company planner.

For ensuring the proper monitoring and evaluating the set of activities, it's defined the next table to fill weekly.

Responsible	Activity	Week 1	Week 2	Week 3	Week 4
Company Planner	Share Forecast per SKU with 1 month in advanced	✓	✓	✓	✓
Company Planner	Share Daily Production Schedule for Month 1	✓			
Company Planner	Share Weekly Delivery Schedule before teleconference	✗			
Company Planner	Weekly needs according the weekly capacity defined	✓			
Logistics Analyst	Place weekly orders in the system according the commitments	✓			
Supplier	Weekly Deliveries compliance	◆			

Additional points:

The day of the teleconference, the orders are placed for the week according to the commitments and the planners must have inventory to meet the needs of the next 7 days.

Each business unit has available stock in the plant for the items identified as consistent consumption as a contingency plan in case there is any inconvenience in the vendor production process, quality issues or any delay in the delivery in order to avoid stop machines.

The next is a Summary Diagram for the proposal plan:

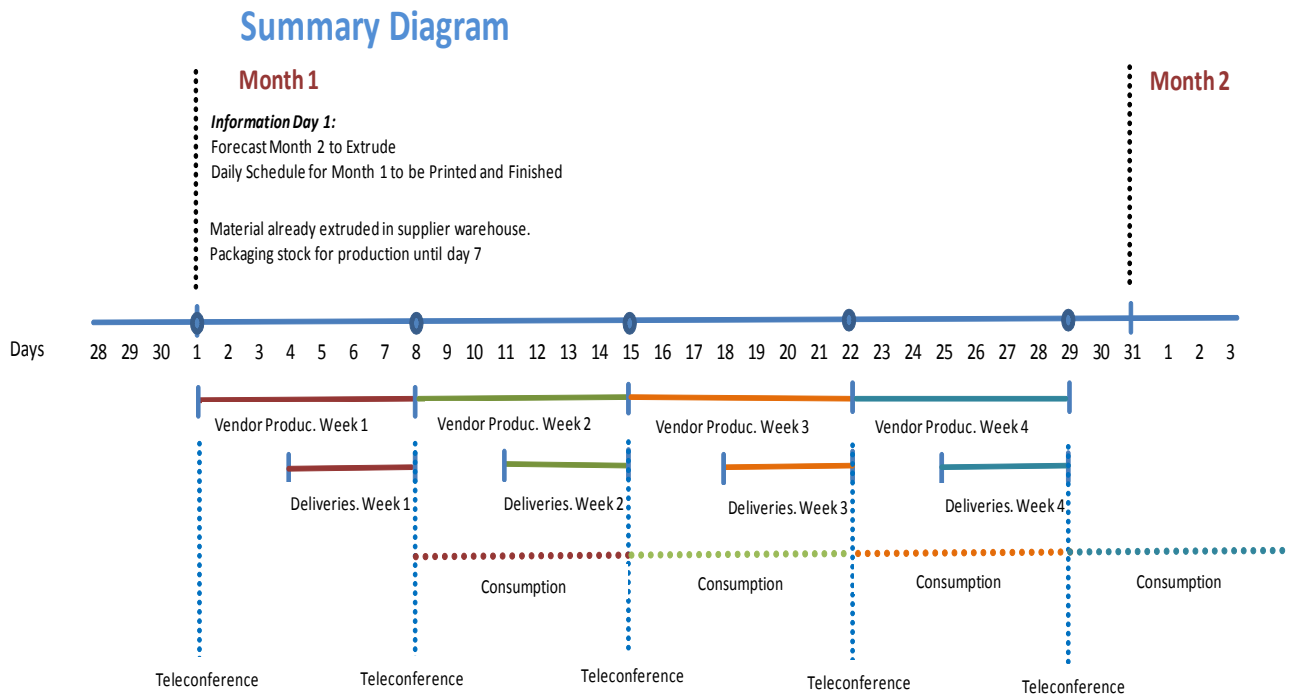
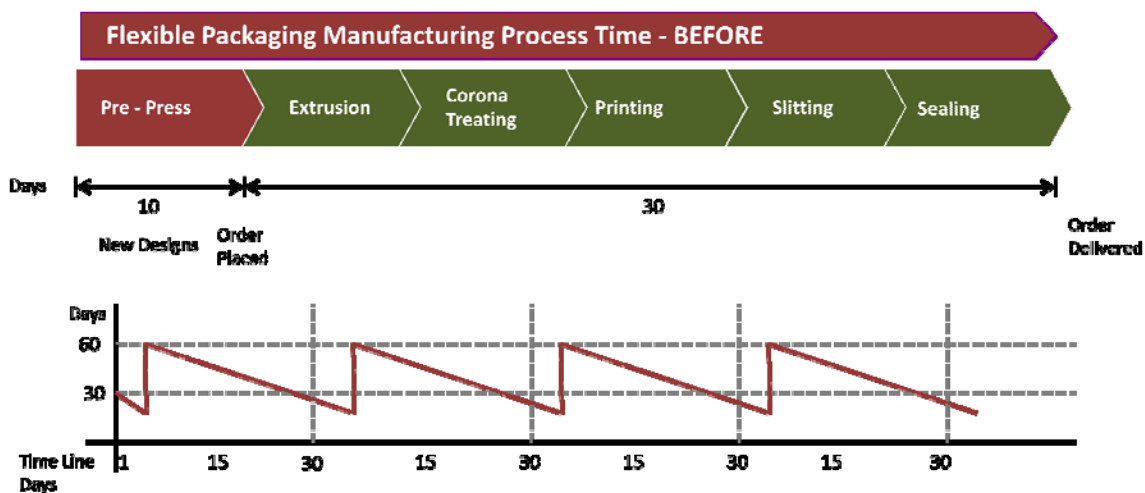


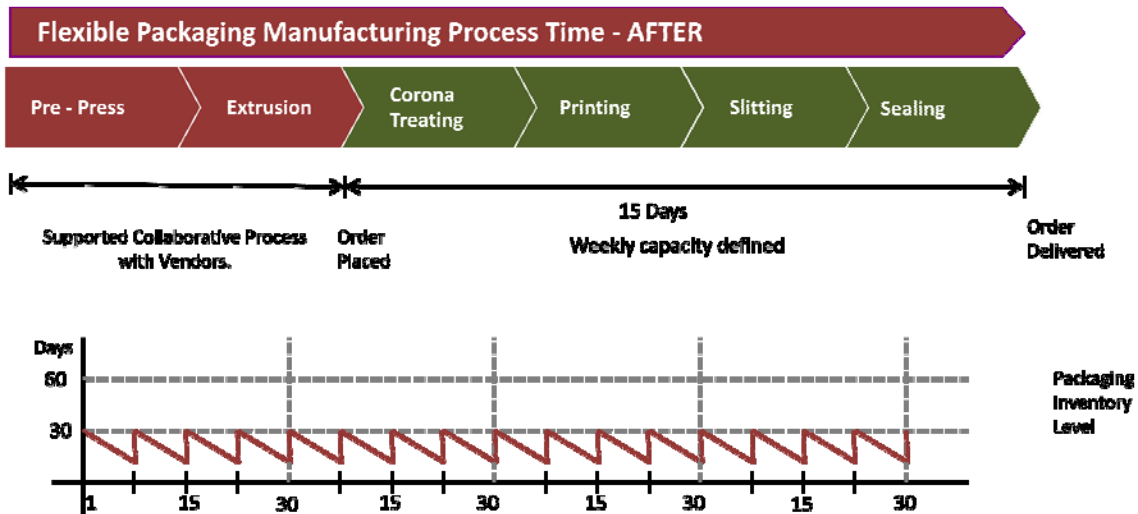
Figure 8: Summary Diagram Process

Team member	Rol	Activities / Responsibilities
Company Planners	Provide update information about the needs	Share Forecast to extrude for Month 2
		Share Monthly schedule for Month 1
		Weekly information for printing.
Packaging Logistics Analyst	Chair the teleconferences and follow the commitments to guarantee the right information flow in the team.	Set up Weekly Teleconferences
		OTIF Indicator Measurement
		Link between Supplier and the Company for logistics topics
Vendor Production Planner	Coordinate the planning process inside the supplier to meet the requirements.	Analyze the weekly capacity
		Coordinate activities to meet the customer production plan
Customer Service Analyst	Link between Supplier and the Company for logistics topics	Get PO, coordinate deliveries.
		Provide logistics information and delivery status report.

The Packaging Logistics Analyst has to be the leader in the process and the link between vendor and the company as it's important to have a person in charge of following the process, setting the meetings, measuring indicators of achievement to ensure proper monitoring and evaluating the process to guarantee the process meets the expectations.

The following is the process time before and after the implementation

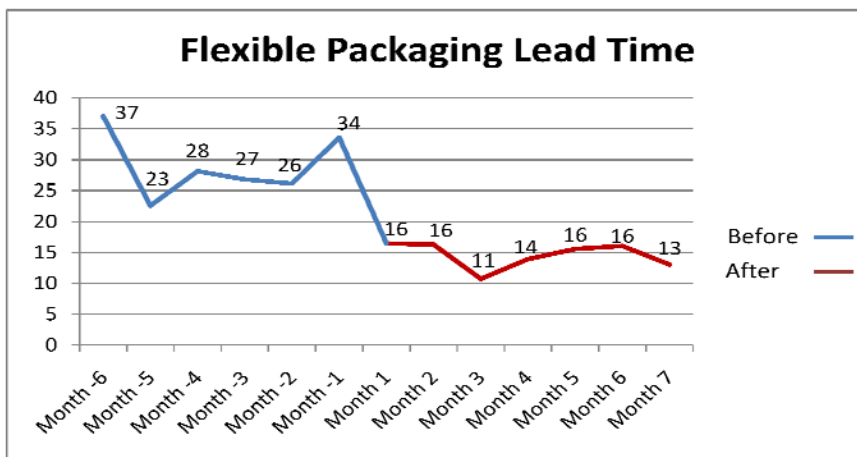




5.3.Measurement after implementation

The process described was started with suppliers L and Z and the results are showed with next indicators:

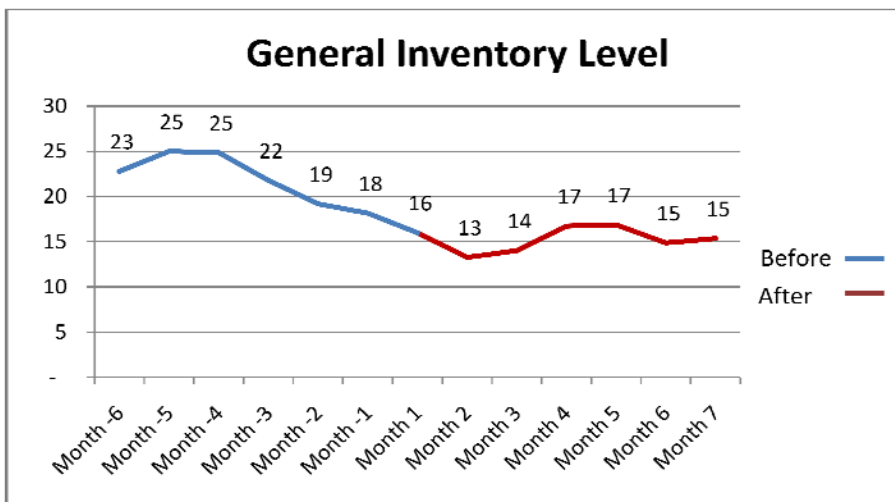
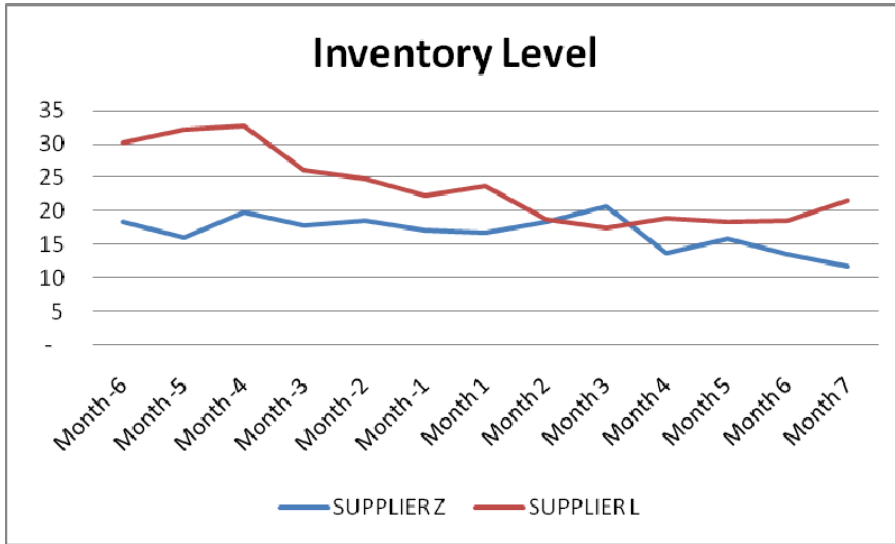
Lead Time:



Providing forecast visibility to the vendor for extrusion and defining weekly capacity for printing and finishing have reduced packaging lead time from 30 to 15 days

The lead time is calculated and based on Purchasing Order Date vs Delivery Date.

- **Flexible Packaging Inventory Level:**



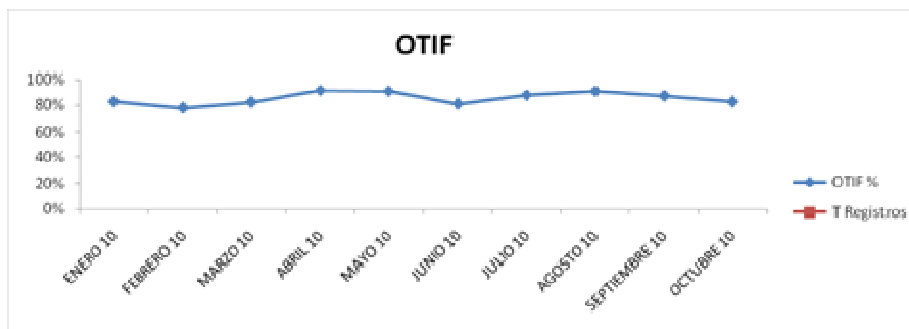
Packaging Inventory Level has been reduced from 25 days to 15 days reducing working capital around 100 MUSD

Inventory level is calculated using stock value at the end of the month vs the consumption value of the month.

- OTIF Supplier 1:

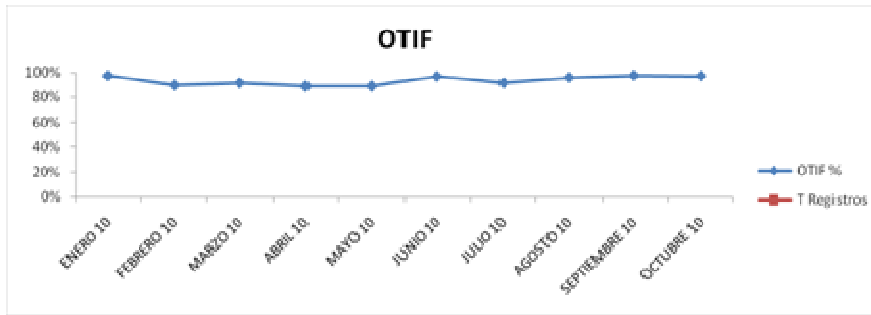
Supplier L

MES	<input checked="" type="checkbox"/> OTIF %	T Registros
ENERO 10	82%	12
FEBRERO 10	78%	10
MARZO 10	80%	12
ABRIL 10	90%	10
MAYO 10	90%	11
JUNIO 10	80%	12
JULIO 10	85%	17
AGOSTO 10	90%	11
SEPTIEMBRE 10	85%	11
OCTUBRE 10	80%	11



Supplier Z

MES	<input checked="" type="checkbox"/> OTIF %	T Registros
ENERO 10	99%	134
FEBRERO 10	99%	135
MARZO 10	99%	153
ABRIL 10	99%	187
MAYO 10	99%	117
JUNIO 10	99%	122
JULIO 10	99%	94
AGOSTO 10	99%	146
SEPTIEMBRE 10	99%	125
OCTUBRE 10	99%	189



After 6 months the proposal plan was implemented the comments from the team were:

Supplier Z:

- The process has improved the communication and information flow and it's more organized than before.
- At the beginning of the implementation production became less productive as they were having more changes during the month which did represented wasted time, it was necessary to adjust the process printing in some cases the minimum lot sizes supported by the monthly forecast.
- Delivery time during the next 7 days has become very difficult because the production process is not always consistent and sometimes the ways for transportation presents some delays so they are arriving in some cases after day 7.
- Internally are doing adjustment to the production process and involving other customers in order to showcase the way of working which can help to achieve the objectives of the plan.

Supplier L:

- The supplier is having a better way to program the production with a real capacity defined for KC, the accumulated delivery dates required before showed a capacity constrain and now it has been demonstrated that it can be optimized with agreed production schedules according the real company needs.

- It's become essential to guarantee having the forecast at the right time, when there is a delay with this they face internal issues to meet the commitments.
- It's suggested in the weekly teleconferences to follow the new references which have received the approval of the design process to stop to avoid generating production expectations to the planners when the process is stuck for marketing people.
- Still internal opportunities to improve the OTIF level.
- Reconsider the delivery time between 7 to 9 days as the space between production schedule and delivery time is being very tight and unexpected situations occurs with logistics.
- Internally they have found many opportunities to open doors to new ways of working in logistics and planning matters and feel it's a winning plan if it is built with a solid basis and mutual engagement.

KC planners:

- When the production is low and the vendor capacity is higher than the need, they decided to select the consistent references to be produced and achieve the capacity commitment with the vendor.
- The minimum order size has become a restriction to the plan when the need is less, so it's showed in the inventory level results which are not they have expected, however it's been reduced and the most important is that service for marketing people has been improved because of the lead time reduction.
- Quality Control in suppliers is becoming an aspect to be revised more carefully as much lower inventory levels become critical and it becomes difficult to handle quality issues.

6. Conclusion:

This plan can positively impact the way procurement packaging works to meet customer demand and improve customer satisfaction.

The concept of “quality” is not only to meet customer expectations but to do so at a competitive cost, and it’s important to find out how to optimize processes through multi-functional teams that can adopt collaborative behaviors and enable information flow; the pilot program results show a real lead time reduction which implies better response time and a general decrease in the packaging inventory level which helps to reduce working capital for the company.

The program also shows the benefits of investigating and going deeper into the process as suppliers discover potential opportunities to generate benefits adopting new models not only to their internal process but also to the customer service.

Some studies show that in the nearly future packaged goods are becoming very similar in terms of product quality and the buyer decision process will be driven by the packaging as a differentiation factor at the stores.

The model is viable to copy in other raw material categories but is very important to define a leader for following the process in order to guarantee the real commitment to achieve the desirable results.

7. Recommendations:

As information travels faster reaction capacity increases, so it’s important to include marketing and sales people to share the changes they will encounter as soon as they are identified; it’s recommended to involve them in the program as a part of the communication flow in the S&OP meetings.

Focus at the beginning of the process could mitigate the effects of the low forecast accuracy, it means engaging the commercial area to invest efforts in reducing the failures

on meeting the forecast by SKU implementing plans to encourage sales people not only to reach the quote but also to hit the sales by SKU.

Regarding vendors, this can be a good opportunity to review the SMED theory for reducing waste in the manufacturing process providing a rapid and efficient way of making reference changes in the process generating more flexibility, time reduction and cost with short production orders.

With low material inventory levels the quality becomes a critical issue so it's important to assure quality control during the total manufacturing process to avoid realized problems at the customer facilities.

No.	VARIABLES
1	NOMBRE DEL POSTGRADO
2	TÍTULO DEL PROYECTO
3	AUTOR(es)
4	AÑO Y MES
5	NOMBRE DEL ASESOR(a)
6	DESCRIPCIÓN O ABSTRACT
7	PALABRAS CLAVES
8	SECTOR ECONÓMICO AL QUE PERTENECE EL PROYECTO
9	TIPO DE ESTUDIO
10	OBJETIVO GENERAL
11	OBJETIVOS ESPECÍFICOS

12	RESUMEN GENERAL
13	CONCLUSIONES
14	FUENTES BIBLIOGRÁFICAS

Vo Bo Asesor y Coordinador de Investigac

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DESCRIPCIÓN DE LA VARIABLE
Especialización en Gerencia Logística
Programa de Colaboración con Proveedores de Empaques Flexibles en Compañía de Consumo Masivo
Camacho Gomez Andrea
Febrero de 2011
Pasquale Carlos
<p>Cada día los consumidores son más exigentes y buscan variedad de productos con bajos costos y altos estándares de servicio, así mismo las compañías productoras se enfrentan a diferentes barreras como baja asertividad en pronósticos de demanda y largos tiempos de abastecimiento en la cadena.</p> <p>Colaboración entre socios estratégicos y el concepto de postponement en el proceso productivo de empaques, identificado como cuello de botella en la compañía de estudio, se presentan como una propuesta logística con un plan que impacta positivamente el abastecimiento reduciendo tiempos de entrega y optimizando niveles de inventarios para minimizar capital de trabajo y permitiendo a la compañía obtener la flexibilidad requerida para atender la variable demanda reduciendo riesgos de obsolescencia y sus costos asociados.</p> <p>Customer demand is forcing companies to provide high product variety at low cost and high customer service, at the same time companies are dealing with some barriers such as low Forecast Accuracy and Long Lead Time for Raw materials.</p> <p>Strategic Partners Collaboration and postponement concept in packaging manufacturing process, identified as bottle neck in the company involved for this project, are presented as a logistics solution with a plan that can positively impact the way procurement packaging works to meet customer demand and improve customer satisfaction.</p> <p>Reducing lead times and optimizing inventory levels not only minimize the capital investment but enable the company to move faster to meet the variable demand while reducing the risk of obsolescence and write offs.</p>
Colaboración, Comunicación, Socios estatégicos, Flexibilidad, Procesos
Manufactura
Trabajo aplicado
<p>To define and implement a plan to provide manufacturing flexibility in a Consumer Packaged Goods Company engaging vendors to find out how to reduce complexity, optimize inventory levels and meet customer demand.</p> <ul style="list-style-type: none"> • To identify opportunities in the KC packaging procurement process understanding the different purposes and motivations in related areas. • To tailor the functionality of the collaboration framework so that it is suitable for cultural exploration with the people involved in the packaging procurement process inside and outside KC. • To explore the postponement concept and its application in flexible packaging manufacturing process.

Motivation and Background:

The Consumer Packaged Goods Company located in Colombia provides health and hygiene products in local, regional and international markets.

Nowadays customer demand is forcing companies to provide high product variety at low cost and high customer service, for the company, global and local market demand is difficult to forecast in times of economic uncertainty and strong competition in Colombia so in the Company there are some barriers such as:

- Low Forecast Accuracy by SKU (20%)
- Long Lead Times for Raw Materials (30-45 Days)
- Inventory Quality Ratio for Raw Material (IQR)
- Risk inherent in changing conditions – Obsolescence – Packaging Write offs (15.000 USD/Month)
- Packaging Procurement as bottle neck for production

Packaging procurement is found as bottle neck for production and there is an opportunity to look for a high degree of collaboration and visibility across the supply chain as company leaders have to invest heavily to improve business-critical Supply Chain Management processes.

Collaboration Framework and Methodology:

To efficiently move through this work it's identified to review carefully three main collaboration components which are:

- a. Strategic Partners and People
- b. Processes
- c. Technology

People and processes concepts blend fluidly, they both combine to create behavioral changes that lead operational improvements in the organization and this is the focus of this project, create solutions through strength the current process with vendors, in next phases of this first initiative Technology must be a critical aspect to enhance the process but it is not in the capstone project scope.

Postponement and Proposal Plan:

The postponement concept can be applied in the packaging manufacturing process through collaboration activities with vendors and engaging them to create and generate ideas to modify the current model doing in advanced the extrusion process and postponing the printing decision as much as possible.

The idea is that plastic films are produced to the customers' specifications providing them with scheduling flexibility. In addition, the supplier does not carry final product inventory because the customer's specification can be susceptible to changes, the packaging film for each item is printed to the customer's specification at the time is needed, it means that extruded material is standard in dimensions and if any change

This plan can positively impact the way procurement packaging works to meet customer demand and improve customer satisfaction.

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The model is viable to copy in other raw material categories but is very important to define a leader for following the process in order to ~~guarantee the real commitment to achieve the desirable results~~

Cisco Collaboration Framework

ción: