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# **ERP IMPLEMENTATION IN FINCARTA GROUP**

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## SOMMARIO

Due anni fa il gruppo Fincarta decise di rivedere i processi e procedure per raggiungere la massima efficienza e efficacia nel proprio business.

L'implementazione di un sistema ERP fu la soluzione che il gruppo decise di prendere e seguire.

L'implementazione di sistemi ERP ha aiutato numerose PMI a migliorare il proprio business attraverso l'ottimizzazione dei processi, il miglioramento dell'intera supply chain, un maggiore integrazione tra le funzioni aziendali e una maggiore trasparenza nell'organizzazione. L'introduzione di sistemi ERP ha anche contribuito ad aumentare la loro stessa credibilità sul mercato e la fiducia dei suoi stakeholders.

La maggior parte delle PMI era abituata ad usare applicazioni create e sviluppate in casa, assolutamente non integrate e su architetture informatiche diverse.

Questo ha portato ad avere tecnologie ridondanti, perdita di supporto e una non disponibilità di informazioni necessarie al momento opportuno, portando quindi ad una complessiva perdita nel proprio business.

I driver principali che portano all'introduzione di un sistema ERP in una PMI sono sicuramente l'introduzione di processi standardizzati già incorporati nell'applicazione, la maggiore integrazione tra le varie funzioni aziendali, maggiore trasparenza, accesso in tempo reale alle informazioni, report analitici per le decisioni aziendali. Un altro motivo che ha portato il gruppo Fincarta all'implementazione di Microsoft AX è il fatto di essere composto da 5 aziende di cui una negli Stati Uniti.

Un ERP permette di avere maggior trasparenza e disponibilità dei dati, i top manager dispongono di una visione globale sulle performance e risultati delle altre aziende del gruppo, la gestione finanziaria diventa quindi più facile. Tutti i report sono standardizzati, viene quindi raggiunta una maggiore efficienza a livello organizzativo.

Tuttavia un progetto del genere non è da considerare immediato e facile, tutti i processi e attività devono essere infatti riviste e in alcuni casi anche ridisegnate.

Per fare ciò è possibile usare un metodo chiamato BPR.

## ABSTRACT

Two years ago Fincarta S.p.a decided to re-look at its processes and procedures to make its business more efficient and effective.

One of the key solutions to address this requirement is the implementation of enterprise resource planning (ERP) systems.

The implementation of ERP systems has helped midsized corporations, significantly improve their business metrics by process optimization, improving the entire supply chain process, integration across functionalities and increasing transparency across the organization.

The introduction of ERP in any organization has also helped it move up the value chain in terms of market credibility and building the confidence of its stakeholders.

Most of the mid sized organizations were living with homegrown applications which are non-integrated and on disparate technology architectures.

This has resulted in living with redundant technology, loss of support, non availability of critical information at the right time resulting in overall business loss. The key drivers of introducing an ERP solution in a midsized company are introduction of industry standard processes which are already embedded in the application, adopting integration across business functions leading to transparency, access to real time information, analytical reporting for business decisions and adopting state of the art technology. Another key reason for the choice of an ERP is that Fincarta is a group of 5 middle sized company and one of these in USA.

An ERP allows to have more transparency and availability of the data, top managers can have a overall view of the performances of the other companies and also financial management becomes much easier. All the reports are standardized, then a more efficiency in organizational reporting is achieved.

Introduce a ERP in a Company and in our case in a group is not easy, all the processes has to be reviewed and in some specific case redesigned. To do that we can use a method called BPR.

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# 1. BUSINESS PROCESS RE-ENGINEERING

## 1.1. DEFINITION

The globalization of the economy and the liberalization of the trade markets have formulated new condition in the business environment. Competition is continuously increasing with respect to price, quality and selection, service and promptness of delivery. Removal of barriers, international cooperation, technological innovations cause competition to intensify. All these changes impose the need for organizational transformation, where the entire processes, organization climate and organization structure are changed.

Business Process Re-engineering might be the perfect method to do that.

It is the analysis and design of workflows and processes within an organization. It stands for business process re-engineering and it is a method for improving the effectiveness and efficiency of business processes. BPR is based upon the notion that, if full use is made of information technology, business processes could be entirely different at present.

According to Hammer and Champy we have the following definitions:

- Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service and speed.
- Process is a structured, measured set of activities designed to produce a specified output for a particular customer or market. It implies a strong emphasis on how work is done within an organization. " (Davenport 1993).

Each process is composed by related steps or activities that use people, information and other resources to create value for customers.

Business processes are characterized by three elements: the inputs, (data such customer inquiries or materials), the processing of the data or materials (which usually go through several stages and may necessary stops that turns out to be time and money consuming),

and the outcome (the delivery of the expected result). The problematic part of the process is processing. Business process reengineering mainly intervenes in the processing part, which is reengineered in order to become less time and money consuming.

Business Process Re-engineering involves changes in structures and in processes within the business environment. The entire technological, human and organizational dimension may be changed in BPR.

IT plays a major role in the Business Processes Reengineering as it provides office automation, it allows the business to be conducted in different locations, provides flexibility in manufacturing, permits quicker delivery to customers and supports rapid and paperless transactions. In general it allows an efficient and effective change in the manner in which work is performed. Technology has a relevant role inside the company, most of the times the re-design of the company is possible because its potentiality.

These potentialities increase a lot during the 90's because the huge growth of the innovations related to the information digitalization, multimedia development, network and network services diffusion. This growth in terms of technology allows to increase the process range that company can support and to integrate them not only internally but also in network composed by different organizations.

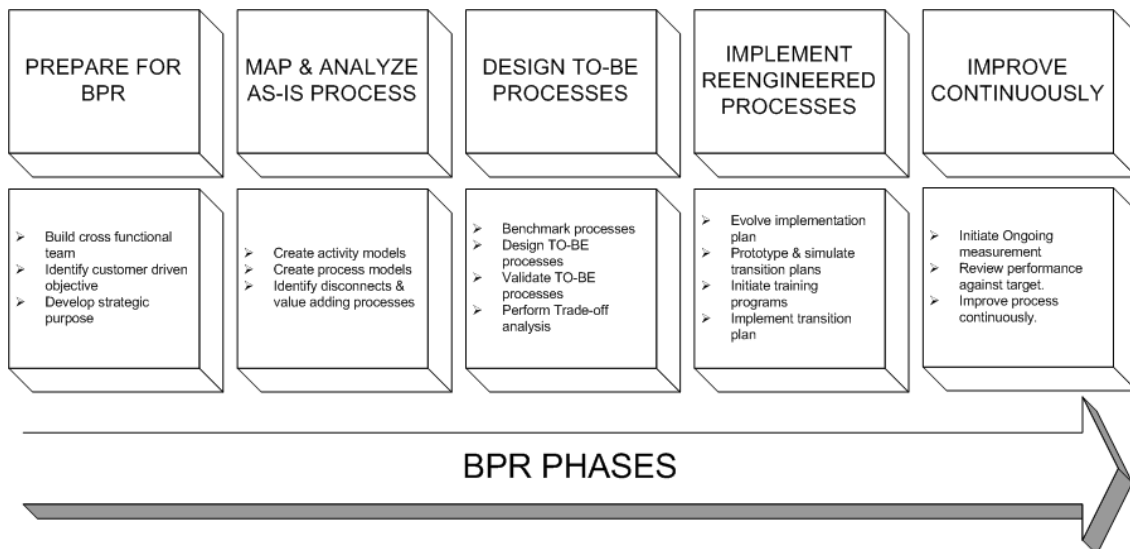
In the other hand these technologies are useful as we said to better finalize the project. Nowadays the business processes are crucial and it has received considerable attention by both business administration and computer science communities. For this, a good frame of reference is required so that processes can be defined and analyzed clearly. To do that it is necessary that enterprises go back to the basics and reexamine their very roots.

It's not a small improvement, it is closer to reinvention of the processes. That's why BPR is not the way for companies who want a 10% improvement.

## 1.2. PHASES

The methodology includes the following activities:

- Prepare for re-engineering;
- Map and analyze AS-IS process;
- Design TO-BE process;
- Implement re-engineered process;
- Improve continuously.



**Figure 1 Business Process Reengineering Phases**

### 1.2.1. PREPARE FOR BPR

Develop the business vision and process objectives: Business Process Reengineering is driving by a business vision which implies specific business objectives such as cost reduction, time reduction, output quality improvement, quality of work life.

This activity begins with the development of executive consensus on the importance of reengineering and the link between breakthrough business goals and reengineering projects.

A cross-functional team is established with a game plan for the process of reengineering. While forming the cross functional team, steps should be taken to ensure that the organization continues to function in the absence of several key players.

### 1.2.2. MAP & ANALYZE AS-IS PROCESSES

Most firms use high- impacts approach which focuses and most important processes or those that conflict most with the business vision. Few number of firms use the exhaustive approach that attempts to identify all the processes within an organization and the prioritize them in order to redesigned urgency.

First of all the team has to understand the existing process and then it can proceed to redesign the process. Although some Business Process Re-engineering exponents, like Hammer and Champy are not agree in analyze the current company situation because in their opinion you will just adjust or reviewing just some inefficiencies on the existing processes. It' not always true, it varies from case to case.

Most organizations need to map the existing processes first, analyze and improve on it to design new processes. This is for sure better then spend a lot of time on designing the TO-BE model directly.

### 1.2.3. DESIGN TO BE PROCESSES

The objective of this phase is to produce one or more alternatives to the current situation, which satisfy the strategic goals of the enterprise. The first step in this phase is benchmarking. "Benchmarking is the comparing of both the performance of the organization's processes and the way those processes are conducted with those relevant peer organizations to obtain ideas for improvement. The peer organizations need not be competitors or even from the same industry. Innovative practices can be adopted from anywhere, no matter what their source.

Having identified the potential improvements to the existing processes, the development of the To-Be models is done using the various modeling methods available, bearing in mind the principles of process design. By performing Trade off Analysis the best possible To-Be scenarios are selected for implementation.

For avoiding the repeating of old mistake and for providing a baseline for future improvements.

### 1.2.4. IMPLEMENT REENGINEERED PROCESSES

The implementation stage is where reengineering efforts meet the most resistance and hence it is by far the most difficult one. Every environment is not conducive to the reengineering effort. When so much time and effort is spent on analyzing the current processes, redesigning them and planning the migration, it would indeed be prudent to run a culture change program simultaneously with all the planning and preparation. This would enable the organization to undergo a much more facile transition.

The next step is to develop a transition plan from the As-Is to the redesigned process. This plan must align the organizational structure, information systems, and the business policies and procedures with the redesigned processes.

### 1.2.5. IMPROVE CONTINUOUSLY

A process cannot be reengineered overnight. A very vital part in the success of every reengineering effort lies in improving the reengineered process continuously. The first step in this activity is monitoring. Two things have to be monitored – the progress of action and the result.

The actual design should not be viewed as the end of the BPR process. Rather, it should be viewed as a prototype, aligns the BPR approach with quick delivery of results and the involvement and satisfaction of customers.

Theoretically a company that want to introduce a new technology into his business environment has to follow some criteria in order to make it easier and it is necessary to have a good result in all the phases. The company has to focus and pay attention on those critical factor.

- Organization Wide Commitment.

Since BPR can involve multiple areas within the organization, it is extremely important to get support from all affected departments. During the project both staff and external experts need to be involved in developing new ideas and ways of working with the technology.

- BPR Team Composition.



Once organization wide commitment has been secured from all departments involved in the reengineering effort and at different levels, the critical step of selecting a BPR team must be taken. The BPR team should be mixed in depth and knowledge. Also is very important to provide everyone that is impacted by the new technology with the necessary background information to understand new solutions and work-flows.

- Business Needs Analysis.

Another important factor in the success of any BPR effort is performing a thorough business needs analysis. Too often, BPR teams jump directly into the technology without first assessing the current processes of the organization and determining what exactly needs reengineering. We have to identify essential goals for BPR within each department and then define objectives for how the project will impact each work group or department on individual basis and the business organization as a whole.

- Effective Change Management.

Change management is the discipline of managing change as a process, with due consideration that employees are people, not programmable machines (Covert).

Ongoing Continuous Improvement. That's why the changes has to be introduce, whenever possible, in an incremental way. New components must be introduced one at a time, with enough time for feedback and adjustments.

- Continuous improvement is defined as the propensity of the organization to pursue incremental and innovative improvements in its processes, products, and services . The company can improve if everyone gives back feedback and suggestions during the processes.

Business Process Reengineering has spread and popularity among companies and public administration, consultants and academics. It reached the pick of interest in the period between '93 and '95, after that it received a lot of critics because its several failures but it never died and today it has a important role in all the innovation based on ICT.

MIT researchers during the 80's found out that progressive companies didn't use just ICT to increase the single activities efficiency or to increase internal integration

between activities and processes, but the acted to re-design processes to use as much as possible the advantages of the technology.

BPR became the main way to think by process management. There others innovative approaches as Total Quality Management and Continuous Improvement that are focused on processes improvement but BPR has a more spread and inter-functional view on that. Another aspect that characterize BPR is that it 's focus on a radical rethinking. Through that radical redesigning of business processes we can obtain a really good improvement of our critical performances, as costs, quality, services and speed. This is much easier and possible with the support of ICT

This radical rethinking is based on redesign the company flows starting from a blank sheet so there are not constraints from the previous situation (AS –IS). A big change like that is possible just if is driven by a good top management commitment. Sometimes can happen that this kind of projects start like radical changing but then are implemented in incremental way.

After several studies Davenport outlined the possible future evolutions of the reengineering:

1. A decline during his life cycle because management fad.
2. Consolidated changing approach
3. Integration with others changing approaches to create a method based on radical and incremental approaches

Most of the times BPR can bring you to downsize processes. This could be good in the short term because you' re cutting costs reducing personnel but of course it doesn't address the company in new directions of development and competitive success in the long term.

It can also bring the Introduction of Enterprise Resource Planning (ERP) systems. This allows to integrate information flows in all the company and everything become much more immediate and easier, all the systems "speak the same language". In the last years companies are trying to integrate and to manage also the relations with the customers and with the suppliers. This is possible with the diffusion of the CRM software and R-Fid for instance.

R-fid system is possible to be integrated inside Microsoft Ax Erp. That is really good possibility and chance for the future to increase the supply chain performances in term of time, cost and traceability. An example that can sustain what I said is the R-Fid implementation between LAVAZZA and COFIBOX.

Born at the beginning of the 1990's, and part of the Goglio Group since 2001, the Cadorago plant specializes in the production of coffee packages, for which Goglio stands out as market reference. The addition of this plant widens the range of offerings to the coffee market but also provides an array of high-barrier materials for packaging foodstuffs. Specific products of Goglio Cofibox are bottle sleeves and wrap around labels. Goglio Cofibox is certified according to the ISO 9001:2000 and BRC-IoP regulations.

### 1.3. LAVAZZA- GOGLIO COFIBOX EXAMPLE.

Goglio Cofibox, born at the beginning of the 1990's, and part of the Goglio Group since 200, is specializes in the production of coffee packages, for which Goglio stands out as market reference. The addition of this plant widens the range of offerings to the coffee market but also provides an array of high- barrier materials for packaging foodstuffs. Specific products of Goglio Cofibox are bottle sleeves and wrap around labels. Goglio Cofibox is certified according to the ISO 9001:2000 and BRC-IoP regulation.

It has a turnover of 44 million euro with 110 employees with more than 100 million meters printed per year. Its core business is flexible packaging in food & beverage and pet food and because the history it remains one of the main Lavazza's suppliers.

After a 6 months sperimental period, from September 2009 R-Fid technology became operational between Goglio Cofibox and Lavazza. Through R-Fid system is possible to control and monitor the packaging flow throughout the supply chain.



Figure 2 Goglio Cofibox and Lavazza RFID integration

Once the pallet is created in Cofibox, a tag is applied to it ( is composed by a chip and an antenna) that will allow traceability through all the supply chain. In this way we obtain visibility of the transit goods and the goods stored in the manufacturer and end user warehouse. The benefits of adopting this technology are countless and range from a

stock reduction, to a safety reduction and a stock-out reduction. All these factors increase the customer satisfaction and save costs.

The aim of the project was to develop an RFID system to support traceability and visibility of the flow of primary flexible packaging products and Goglio used by Lavazza coffee production during the vacuum. The project also reinforces the mechanisms for collaboration and integration between producer and supplier within the supply chain through the adoption of advanced models of partnerships, such as Vendor Management Inventory. In this sense the project has helped in the category chain projects.

The following are the results carried out from RFID LAB of the University of Parma

Results:

- LAVAZZA

Average Stock before R-Fid introduction (30 days): 393.726 €/month

Stock after (15 days): 196.863 €/month = -50%

- GOGLIO COFIBOX

Average Stock 2008 : 182.969 €/month

Average Stock 2009 : 107.312 €/month = -41%

## 1.4. RADICAL AND INCREMENTAL CHANGES

To drive big changes in organization that are working in turbulent environment, the business orientation can be not sufficient. In this contexts, resource training and competencies become critical and relevant. Business Processes approach has to be integrated with the indication of the resource based view, that interprets the company as a group of resources that explain the main characteristics and the potentiality of development. It's really important to focus on the development of the competencies , on the empowerment and on the leadership models.

One of the main elements BPR is based on is change management.

As we had seen before BPR uses a radical approach, in contrast with the past and with the concept of continuous improvement. Things changed and came out the necessity of an integration between the different approaches in relation to different needs and situations. As is possible to see in the Figure 3<sup>1</sup> sometimes a radical approach is not necessary. Indeed to improve continuously after a radical change we need several incremental changes.

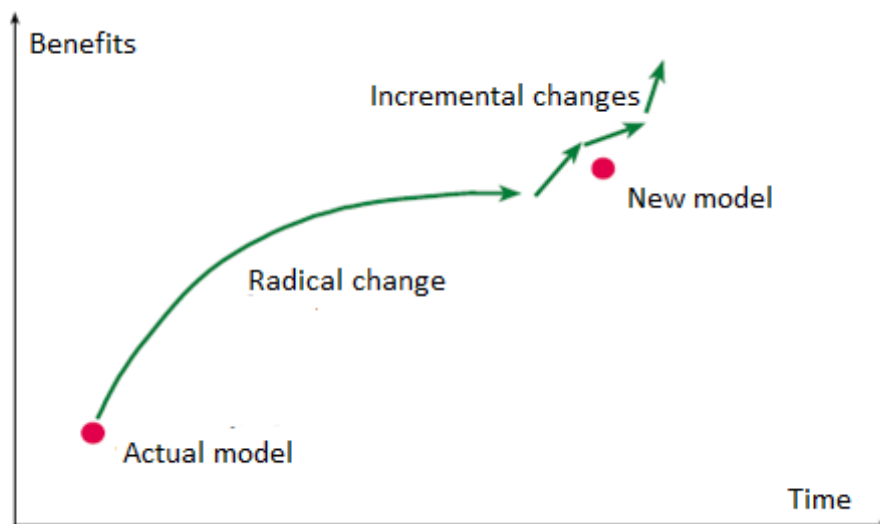


Figure 3 Benefits during the time implementing a Radical Change and a Incremental Change

<sup>1</sup> Source: Emilio Bartesaghi, Dove va il BPR? L'innovazione organizzativa basata sulle ICT, Mondo Digitale, n.2, June 2002

Why? Because sometime is necessary to develop a project step by step in a incremental manner. For example small and medium enterprise are not able to sustain this kind of project in term of money and resources, so it's better to work in an incremental way. Same for companies that already have done an internal deep change, they don't need new innovative changes but they can just base their strategy on continuous improvement. As we can see from the graph there is a strict relation between radical change and incremental. The first allows you to move next to the new model you want to reach. After a several changes are necessary to maintain the leadership and to increase performances in terms of costs, quality, services and time. That's why nowadays company are obliged to use an approach that is really spread and integrated to the innovation and to organizational change.

They have to face simultaneously to:

1. Manage the current activities increasing their performances in terms of efficiency and effectiveness.
2. Looking for continuous improvement of the products/services, activities and processes.
3. To be able to realize innovative changes in terms of products, processes, technologies, organizational structures, new market, partnerships and so on.

Another aspect to take in consideration is how transfer the innovation, that means how integrate it in the existing activities and in the daily routine.

Management of the processes and competences development. Nowadays all the organizations are structured by processes, no more by functions. This is main principle that is the base of a several approaches as Just in Time, Concurrent Engineering, Total Quality Management, Total Productive Management, Business Process Reengineering and Lean Production.

Among them BPR has a wider view of the processes.

It's necessary: to institutionalize management processes, expand the range of processes and integrate management processes.

## 1.5. HOW TO SUCCESS WITH BPR

Here the main factors that allow a company to success with BPR.

### 1.5.1. EMPOWERING PEOPLE

Empowerment means giving people the ability to do their work: the right information, the right tools, the right training, the right environment, and the authority they need. Information systems help empower people by providing information, tools and training.

### 1.5.2. PROVIDING INFORMATION

Providing information to help people perform their work is a primary purpose of most information systems although they provide information in many different ways. Some systems provide information that is essential in informing a business process, such as the prices used to create a customer's bill at a restaurant. Other systems provide information that is potentially useful but can be used in a discretionary manner, such as medical history information that different doctors might use in different ways.

### 1.5.3. PROVIDING TOOLS

In addition to providing the right information, empowering people means giving them the right tools. Consider the way planning analysts produce consolidated corporate plans based on plans of individual divisions and departments. If the plans are submitted on paper, it is a major task to add up the numbers to determine the projected corporate bottom line. When the plan is changed during a negotiation process, the planning analyst has to recalculate the projected results. With the right tools, the numerical parts of the plans arrive in a consistent, electronic format permitting consolidation by a computer.

This leaves the analyst free to do the more productive work analyzing the quality of the plan.

### 1.5.4. PROVIDING TRAINING

Since information systems are designed to provide the information needed to support desired work practices, they are often used for training and learning. As shown by an



expert system and a decision simulator, they sometimes provide new and unique training methods.

IBM developed an expert system for fixing computer disk drives. The expert system was an organized collection of the best knowledge about fixing these disk drives, and it fostered rapid and efficient training. Before the system was developed, technicians typically took between 1 and 16 months to become certified, but with the expert system, training time dropped 3 to 5 months.

### 1.5.5. ELIMINATING UNPRODUCTIVE USES OF TIME

Information systems can reduce the amount of time people waste doing unproductive work. A study of how professionals and managers at 15 leading U.S. corporations spent their time concluded that many professionals spent less than half of their work time on activities directly related to their functions. Although the primary function of salespeople is selling, the time breakdown for salespeople averaged 36 percent spent on prospecting and selling, 39 percent spent on prospection an selling, 3 percent on servicing accounts, 19 percent on doing administrative chores, and 6 percent on training. Better use of information systems could save much of their unproductive time performing chores such as collecting product or pricing information, determining order status for a customer, resolving invoice discrepancies, and reporting of time and expenses.

### 1.5.6. ELIMINATING UNNECESSARY PAPER

One common way to improve data processing is to eliminate unnecessary paper. Although paper is familiar and convenient for many purposes, it has major disadvantages. It is bulky, difficult to move from place to place, and extremely difficult to use for the analysis of a large amounts of data. Storing data in computerized form takes much less physical space and destroys fewer forests, but that is only the beginning. It makes data easier to analyze, easier to copy or transmit, and easier to display in a flexible format. Compare paper telephone bills with computerized bills for a large company. The paper bills identify calls but are virtually impossible to analyze for patterns of inefficient or excessive usage.

### 1.5.7. ELIMINATING UNNECESSARY VARIATIONS IN THE PROCEDURES AND SYSTEMS

In many companies, separate departments use different systems and procedures to perform essentially similar repetitive processes, such as paying employees, purchasing supplies, and keeping track of inventories. Although these procedures may seem adequate from a totally local viewpoint, doing the same work in different ways is often inefficient in a global sense. Whenever the systems must change with new technology, new regulations, or new business issues, each separate system must be analysed separately, often by someone starting from scratch.

### 1.5.8. MINIMIZING THE BURDEN OF RECORD KEEPING DATA HANDLING AND GENERAL OFFICE WORK

Since processing data is included in most jobs, improving the way people process data is an obvious place to look for information system applications. Focus on basic data processing tasks: Reducing the burden of record keeping means being more efficient and effective with the six components of data processing. Those components are capturing, transmitting, storing, retrieving, manipulating, and displaying data. Capture data automatically when generated: Capturing data automatically at the time of data generation is especially important in minimizing the burden of record keeping.

## 1.6. OBJECTIVE OF BPR

When applying the BPR management technique to a business organization the implementation team effort is focused on the following objectives:

- ✓ *Customer focus.* Customer service oriented processes aiming to eliminate customer complaints.
- ✓ *Speed.* Dramatic compression of the time it takes to complete a task for key business processes. For instance, if process before BPR had an average cycle time 5 hours, after BPR the average cycle time should be cut down to half an hour.
- ✓ *Compression.* Cutting major tasks of cost and capital, throughout the value chain. Organizing the processes a company develops transparency throughout the operational level reducing cost. For instance the decision to buy a large amount of raw material at 50% discount is connected to eleven cross checkings in the organizational structure from cash flow, inventory, to production planning and marketing. These checkings become easily implemented within the cross-functional teams, optimizing the decision making and cutting operational cost.
- ✓ *Flexibility.* Adaptive processes and structures to changing conditions and competition. Being closer to the customer the company can develop the awareness mechanisms to rapidly spot the weak points and adapt to new requirements of the market.
- ✓ *Quality.* Obsession with the superior service and value to the customers. The level of quality is always the same controlled and monitored by the processes, and does not depend mainly on the person, who servicing the customer.
- ✓ *Innovation.* Leadership through imaginative change providing to organization
- ✓ competitive advantage.
- ✓ *Productivity.* Improve drastically effectiveness and efficiency.
- ✓ In order to achieve the above mentioned adjectives the following BPR project
- ✓ methodology is proposed.

Summarizing the essential elements or principle of Business Process Reengineering are:

- Rethinking the theory of the business.
- Challenging old assumptions and discharging old rules that are no longer applicable.
- Breaking away from conventional wisdom and the constraints of organizational boundaries.
- Using information technology not to automatic outdated process but to redesign new ones.
- Externally focus on customers and the generation of greater value for customers.
- Internally focus on harnessing more of the potentials of people and applying it to those activities that identify and deliver values to customers.
- Encourages training and development by building creative work environment.
- Think and execute as much activity as possible horizontally, concentrating on flows and processes through the organization.

## 1.7. RELATIONSHIP BETWEEN BPR AND INFORMATION TECHNOLOGY.

Hammer considers Information Technology as the key factor in BPR for organization that wants to witness a “radical change” in its operation. He prescribes the use of IT to challenge the assumption inherent in the work processes that have existed since long before the advent of modern computer and communications technology. He argues that at the heart of reengineering is the notion of discontinuous thinking or recognizing and breaking away from the outdated rules and fundamental assumptions underlying operations. These rules of work design are based on assumptions about technology, people and organizational goals that no longer hold.

Information technology is also considered as a strategic resource that facilitates major changes in competitive behavior, marketing and customer service. In essence, IT enables a firm to achieve competitive advantages.

IT should be viewed as more than an automating or mechanizing force.

Information technology and Business Process Reengineering have recursive relationship. IT capabilities should support business processes and business should be in terms of the capabilities IT can provide.

## 1.8. ISSUES IMPLMENTING AN ERP

In essence, there are critical issues that must be carefully considered to ensure successful implementation of an ERP system project. Based on the vast literature review conducted on ERP system implementation, this research has derived a framework of ERP system implementation depicted

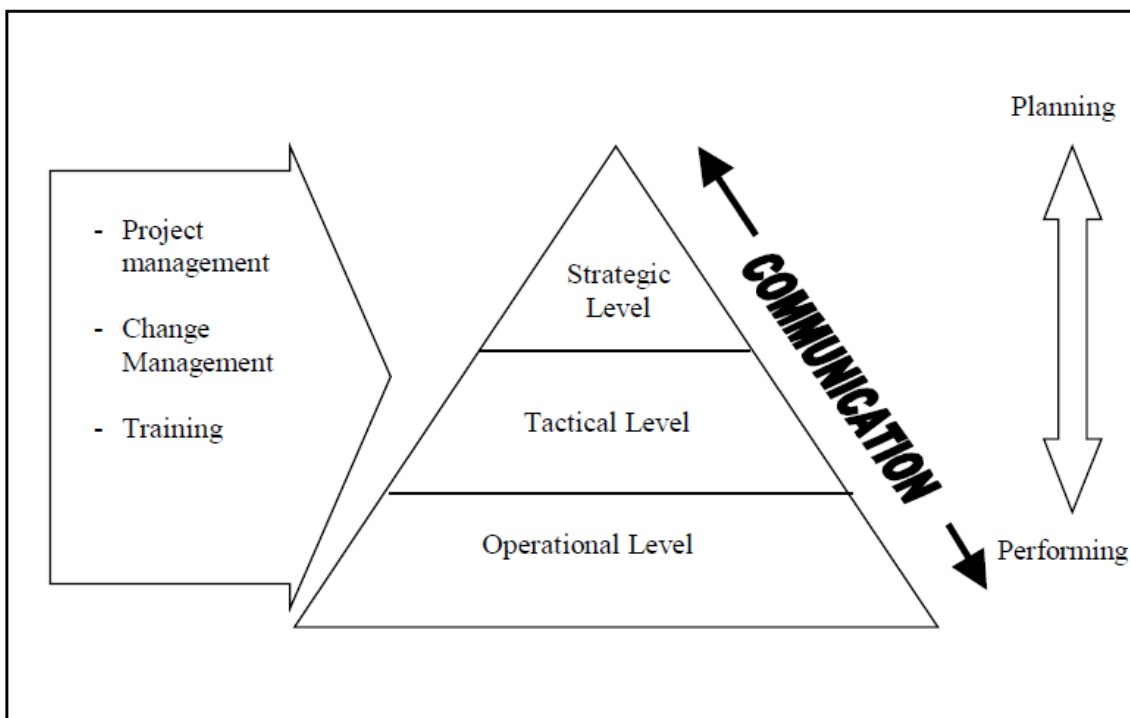


Figure 4 Framework that shows how critical factors impact on the different organizational levels

As the Figure 4<sup>2</sup> shows, there are critical factors that are going to play a more overriding role in the project of ERP implementation. On the other hand, they should be ongoing throughout all implementation's levels. These factors are change management, monitoring and feedback, risk management, communication, and training.

The figure also shows that the implementation ERP system has been subdivided into three levels: strategic, tactical, and operational. Each level contains a number of critical factors.

<sup>2</sup> Source: Abdullah Al-Mudimigh, ERP Implementation: an integrative methodology, 2010

These levels of implementation, however, are not independent of each other and each level should be used to drive to the next level, for example, strategic level should be used to drive to the tactical level, and each level has to be well managed. Moreover, there is a direct relationship between the implementation's levels at which a decision is taken and characteristics of the information required to support decision making.

### 1.8.1. CRITICAL FACTORS

As I already said there are four critical factors that impact on the implementation's levels. Analyzing deeply each of them we have:

#### 1.8.1.1. Project Management

ERP implementation is challenging, costly, and risky. Consequently, to achieve the desired benefits, the ERP system implementation must be carefully managed and monitored. It is in this respect that project management becomes important, if not crucial for success.

Project management deals with various aspects of the project, such as planning, organization, information system acquisition, personnel selection, and management and monitoring of software implementation. Project management is a practiced system necessary to govern a project and to deliver quality products.

Initially, the project manager, in conjunction with the steering committee, will select the project team. Due to the wide ranging impact of ERP software, The members of the project team should ideally be from management or supervisory positions and have the authority to make decision regarding how a process will be completed.

The project manager must have skills to govern the project successfully including being a coach, cheerleader, flexible, confidante, mentor, stress resistance, communicative, and visionary.

#### 1.8.1.2. Change Management

Cooke and Peterson (1998) identified change management, in terms of adopting an ERP system, as activities, processes, and methodologies that support employee understanding and organizational shifts during the implementation of ERP systems and reengineering initiatives.

Many ERP implementation failures have been caused by the lack of focus on ‘the soft issues’, for example the business process and change management. Pawlowski and Boudreau pointed out that almost half of ERP projects fail to achieve expected benefits because managers underestimate the efforts involved in change management. That’s why lot of experts suggested that the management of change has become an increasingly urgent issue in all organizations due to the impact of new technology.

Generally, one of the main obstacles facing ERP implementation is resistance to change. Martin and Ching (1999) suggested that to decrease resistance to change, people must be engaged in the change process and helped to see how the change profits them.

An ERP systems has a major impact on organizations, especially on their staff. Thus, change management is essential for preparing a company to the introduction of an ERP system, and its successful implementation.

Overall, top management commitment, education and training, communication are critical success factors of any change management

### 1.8.1.3. Training

ERP systems are extremely complex systems and demand rigorous training. Installing an ERP software package without adequate end-user preparation could yield to drastic consequences. Inadequate or lack of training has been one of the most significant reasons of many ERP systems failure.

ERP training should address all aspects of the system, be continuous and based on knowledge transfer principles wherever consultants are involved. Every level in the organization class and the various users require different training.

A proper training is one of the main critical success factors.

### 1.8.1.4. Communication

Communication is one of the most challenging and difficult tasks in any ERP implementation project (Welti, 1999). Slevin and Pinto (1987) defined communication as the provision of an appropriate network and necessary data to all key factors in the project implementation. Communication has to cover the scope, objectives, and tasks of an ERP implementation project.



These four factors impact on the three implementations levels.

### 1.8.2. IMPLEMENTATION LEVELS

#### 1.8.2.1. Strategic level

The decisions made at this level significantly change the manner in which business is being done and these decisions are the responsibility of top management.

Enterprises are generally advised to start planning ERP system implementations at the strategic level before proceeding to the technical, software and hardware, levels.

Project mission, top management support, and project schedule, benchmarking, business case determination, and implementation strategy are factors of strategic level. These factors are specific to ERP system implementation requirements.

In general, all these factors mentioned should be considered at the early and long-term planning phase of an ERP project implementation. The following sections will discuss these factors based on some literature.

The ERP implementation strategy will be reviewed to determine the impact of ERP system implementation on the enterprise, while the strategy of ERP system implementation will be overviewed, with details, within the tactical level.

The company has to have a clear understanding of the business implications to avoid a potential peril of failures.

Top management support was consistently identified as the most important and crucial success factor in ERP system implementation projects and also as the willingness of top management to provide the necessary resources and authority or power for project success.

An active top management is important to provide enough resources, fast decisions, and support the acceptance of the project throughout the company. Top management support and commitment does not end with initiation and facilitation, but must extend to the full implementation of an ERP system. They should continually monitor the progress of the project and provide direction to the implementation teams

### 1.8.2.2. Tactical Level

At the tactical level the medium-term planning of ERP specific organizational issues are largely concerned, where the decisions are made by middle managers. Tactical level is responsible of project management infrastructure and change management factors.

Here a list of tactical level factors which include: client consultation, personnel, client acceptance, monitoring and feedback, communication, and trouble shooting (risk management). Then they added two factors: Business Process Change (BPC) and software configuration. They argued that these two additional factors identify the critical role of aligning business processes to ERP software application during implementation.

The following sections will discuss a comprehensive list of factors at this level:

- *Client Consultation.*

Client consultation is defined as the communication and consultation with, and active listening to, all affected parties, mainly the client. They argued that the consultation with clients should occur early in the process, otherwise the chance of subsequent client acceptance will be lowered. It is essential for an organization to keep their clients aware for their future project to avoid miss-convince.

- *Hiring Consultants.*

Due to the complexities of implementing an ERP system, most companies choose to hire consultants to help them select, configure, and implement the system. Most of the time the success of a project depends on the capabilities of the consultants because they have in-depth knowledge of the software.

Actually during the implementation of an ERP system, there are three parties involved: organization, vendor, and consultant. However, with new technology, it is often critical to acquire external expertise, including vendor support, to facilitate successful implementation.

IT research firm Gartner Group (Computer Technology Research Corporation, 1999) argued that the ratio of consulting costs to software costs could reach up to 3:1. Clearly, it is a critical success factor, and has to be managed and monitored very carefully.

- *Business Process Reengineering (BPR).*

As mentioned before, there are two main options to implement ERP systems: modify an ERP system package to suit the organization's requirements or the implementation of an ERP system package with minimum deviation from the standard settings. However, ERP systems are built on best practices that are followed in the industry, and to successfully install ERP, all the processes in a company should conform to the ERP model, that's why as I said before most of the time Business Process Re-engineering method is necessary.

Research has shown that even a best application package can meet only 70% of the organizational needs. Therefore, to take a full advantage of an ERP software, business process redesign is seen as a prerequisite (Holland and Light 1999).

Enterprise consensus is required to reengineer a company's core business processes to align them with the model implicit within the ERP package to take advantage of the ERP system. Companies that do not follow this philosophy are likely to face major difficulties.

The persisting question at this point is when should a company do business process reengineering?

Before, during, or after ERP package implementation. In fact, some companies have implemented ERP system package prior to BPR project to avoid the trouble of a BPR project. If the corporate structure and processes fit well with ERP system package, this approach is possible. While, some companies started with BPR prior to ERP package. Thus answering this question will depend highly on the company's specific situation and as status quo.

In general, the decision as to when BPR should take place in ERP system package implementation, remains dependent on the business situation (Bancroft, et al., 1998).

- *ERP Software Package Selection.*

Selecting new ERP system software is a difficult task and one of the most risky decisions that most companies face. Moreover, ERP package is not like other off-the-shelf package such as word-processing, spreadsheet, or database software, but rather sophisticated and complex software for the areas of enterprise processes.

An enterprise should choose an expert and a clear method to help select the software system. The complexity of selecting an ERP package software can add a lot of time to the ERP system project.

In a sense, several methodologies and approaches of software selection have been proposed by a number of researchers and practitioners.

- *Implementation Approach.*

The company has to take a fundamental decision regarding the implementation approach and clearly select a focused path. There are aspects, such as organizational structure, resources, attitude toward change, or distance between the various production facilities, that influence the company's decision to select ERP system implementation approach. Three main implementation approaches: Big bang, Phased rollout, Parallel adoption.. I will mention and explain later on these three implementation approaches.

However, small and medium size enterprise (SME) cannot afford to spend years on a software project like large enterprise. Therefore, vendors and consultants of ERP system have responded with methods and tactics specifically designed to keep ERP system projects moving. Most enterprises now use a rapid implementation approach.

### 1.8.2.3. Organizational Level

Although installing an ERP software package is not as difficult as getting the enterprise soft elements in line with all the change imperatives, its critical role in yielding optimum outcomes from implementation cannot be over-emphasised. In essence, there is no development requirement, rather, it is business processes.

For this phase, there are numerous tools used during an ERP package system implementation supported by several ERP package vendors.

The following sections will discuss the steps at this level based on the literature review conducted.

- *Business Process Modeling*

In this step, the project team determines how the system will work, not in the technical sense but in terms of the processes the company uses to accomplish

different tasks, and how the business will operate after the ERP system package is in use.

The business process modelling is the complete description of how an enterprise will implement the ERP system package to support its business activities.

- *Configuring System.*

Configuring an ERP system package is largely a matter of making compromises and of balancing the way the enterprise wants to work with the way the ERP package system lets it work (Davenport, 1998a).

Configuration means setting parameters and tables within the boundaries of the provided functionality to match the software package's execution of functions and processes to the organization's business process. However, customization does not mean the modification of the ERP package, but rather the set-up and configuration of all usage options that are possible in an ERP software package.

- *Final Preparation.*

Before going live on an ERP system, all necessary adjustments, in order to prepare the system and business for production start-up, have to be made.

The system must be tested to make sure that it works technically and the business process configurations are practical.

It is important in this step to assess the end-user well training). In general, all testing must be completely prepared and seriously carried out whether for integration or for migration.

Testing helps companies avoid potential problems that might negatively impact customers. The project teams should test the user-acceptance to gather the more intangible feedback about ERP system package materials

## 1.9. THE CHOICE AND IMPLEMENTATION STRATEGIES OF AN ERP

Choosing an ERP and how to implement it is a really critical decision for a company.

In choosing new ERP, implementation is every bit as important as finding the right program. You should be thinking about it proactively when evaluating systems, you should raise the topic with prospective vendors and even ask for examples of their customers' strategies.

There are hundreds of articles on "best practices" for implementing ERP software, but understanding each strategy and choosing the best option is difficult.

The three most widely discussed ERP implementation strategies:

- *Big bang* - Implementation happens in a single instance. All users move to the new system on a given date.
- *Phased rollout* - Changeover occurs in phases over an extended period of time. Users move onto new system in a series of steps.
- *Parallel adoption* - Both the legacy and new ERP system run at the same time. Users learn the new system while working on the old.

From of a recent survey of 45 organizations that have been involved in an implementation of an Erp this is the result.

The survey was brief and informal, made through Twitter and some blog, with just four simple questions:

- Which implementation strategy did your organization choose? Big bang, phased rollout, parallel adoption, combo of big bang and phased rollout, or other.
- If you selected other, please describe the strategy you chose.
- Was the implementation a success?
- If you selected no, please explain why.

Collecting all the answer it's easy to understand that there's not a really successful strategy.

While one strategy may work for a majority of companies, it may not be the best strategy for your organization. The circumstances dictate the appropriateness of the implementation strategy. In some cases, a phased deployment might be more appropriate than a parallel deployment. In other cases, it might be the opposite.

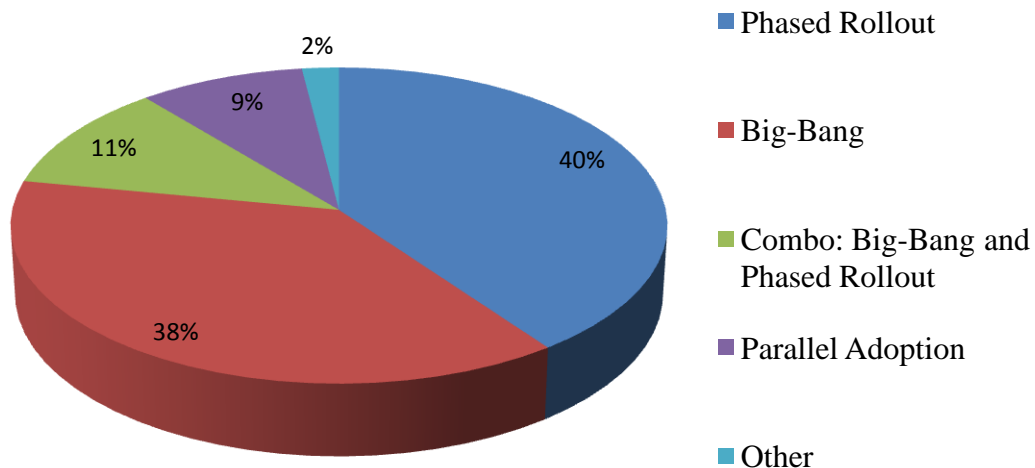
Here are the results:

- 40% followed “Phased Rollout”
- 38 % followed “Big Bang”
- 11 % followed at the same time “Big Bang and Phased Rollout”
- 9 % followed “Parallel adoption”
- 2 % followed other approaches like Pilot Project in a single unit. If successful in it, expand it universally until all units have adopted

Eighty-nine percent of respondents followed "big bang," "phased rollout" or a combination of the two strategies.

The number of phased rollout users compared to big bang was split nearly evenly; parallel adoption trailed far behind; "other" came in last

## Use of the different kind of strategies



**Figure 5** Graphic that shows the percentages of the different kind of strategies used by the companies

Now let's explain one by one all the three main approaches:

### 1.9.1. BIG-BANG

Just as the name implies, a big bang ERP implementation happens in a single, major event. All modules are installed across the entire organization all at once, more or less.

Of course the changeover from the legacy system doesn't happen without proper planning. There are many pre-implementation activities that need to be carried out prior to the big bang. After the planning activities have been successfully executed, the old system will be turned off, and the new system will be launched. At this point there is no turning back. However, there should be fall-back scenarios prepared just in case the initial changeover is a failure.



The big bang implementation strategy has supporters on both sides of the fence. The most common criticism is the risk factor; there are a number of things that could go wrong in an instant changeover. However, the implementation is quick and less costly than a long, drawn-out phased approach. Here in the Table 1 there's a list of other benefits and drawbacks of big bang implementation:

<i>Advantages</i>	<i>Disadvantages</i>
Implementation time is shorter	Difficulties are more pronounced
Implementation difficulties and "pains" are condensed	Details may be overlooked in the rush to change
Costs are much lower than a long, drawn-out implementation	Employees have less time to learn the new system
Employees only need to be trained on the new system, not for the changeover period	Full end-to-end system testing is tough to carry out prior to implementation
Implementation happens on a single date and everyone knows the date	Fall-back scenarios are more difficult than originally perceived
	A failure in one part of the system could affect others
	There is a catch-up period (see Illustration below)

**Table 1 Main advantages and disadvantages of the BIG-BANG strategy**

### 1.9.2. PHASED-ROLLOUT

In keeping with the theme of cosmological evolution, phased rollout would be analogous to the Steady State theory: instead of an implementation happening in a single instance, small changes occur over time. An organization moves off the legacy system and onto the new ERP system in a series of predetermined steps. This can be achieved in several different ways. Here are three well-known techniques:

#### 1.9.2.1. Phased Rollout by module

This is the most common phased rollout strategy. ERP modules are implemented one at a time. Typically you begin with core business functions – those necessary for daily

operations – then add in more modules and functionality with each phase. However, some experts suggest starting with easy modules like general ledger, or beginning with the less mission-critical modules.

1.9.2.2. Phased Rollout by business unit

Under this approach implementation is carried out in one or more business units or departments at a time. For example, you begin with implementing the new ERP system in human resources, then move to accounting. Some organizations may put together an implementation project team that travels between each department during implementation phases. As the team gains more experience with each implementation, subsequent phases become more efficient.

1.9.2.3. Phased Rollout by geography

For organizations with multiple locations, a phased rollout by geography is a frequent approach. The new ERP system is introduced at one or more company locations at a time. This is also referred to as the "pilot adoption method." It's common for large organizations that have multiple locations or independent departments.

Of course there are hundreds of options, including many variations and combinations of these three. Just like big bang, a phased rollout strategy has advantages and disadvantages. The following table includes several common view points:

Advantages	Disadvantages
Companies gain knowledge and experience during the initial implementation phase that can be applied to subsequent phases	Not as focused and urgent as big bang
Possible to introduce modules while programming future modules	Involves continuous change over an extended period of time
With conversion occurring in parts, time is available for adjustments	Each modules relies on information from other modules, so there could be critical information missing

There is no catch-up period, employees learn as they go	Several adjustments are needed
More time for users to adapt to the new system	Duration of the project is much longer than big bang
Technical staff can focus on one part of the system or a select group of users at one time	A fall-back to the old system becomes more difficult with each phase
Project members may develop unique implementation skills that they can be positioned for in later rollouts	Temporary bridges must be created between legacy system and new system

**Table 2 Main advantages and disadvantages of the PHASED ROLLOUT strategy**

### 1.9.3. PARALLEL ADOPTION

The third generic – though less talked about – ERP implementation plan is the "parallel adoption" approach. This has also been referred to as "parallel conversion," "parallel running," or "parallel cutover."

Parallel adoption is thought to be the least risky implementation process. It includes running both the old and new ERP system at the same time. This way users can learn the new system while performing regular work activities on the old system. After requirements for the new system are met, then the legacy system is decommissioned. Parallel adoption can be considered the middle road between big bang and phased adoption. For example, the pace of the changeover is slower than big bang, but faster than phased adoption. Similarly, user adaptation is easier than big bang, but more difficult than phased adoption. The major trade-off is cost. Parallel adoption is the most expensive implementation method. Additionally, having employees enter data in both systems is not efficient. However, if the extra costs are less than costs incurred after a backfired big bang adoption, then it's a reasonable plan. Still, organizations cannot predict cost overruns of big bang, so parallel adoption has become.

There certainly is no one-size-fits-all when it comes to implementing an ERP system. Every company has unique goals, and an implementation requires careful planning and analysis. Some companies may choose a combination of strategies, like a mini big bang mixed with phased rollouts (i.e. "big bang" the important modules, then add in the

peripheral modules later). Others may choose to implement a mid-market ERP system (e.g. Microsoft Dynamics) at the plant-level, while keeping a major ERP system (e.g. SAP, Oracle running at headquarters).

## 1.10. QUALITY MANAGEMENT WITH ERP

A comprehensive approach to quality management – one that integrates information and processes across departments and corporate boundaries – empowers your employees and supply chain partners to maintain and improve quality levels.

The ERP application provides a single, powerful solution that lets you take a comprehensive, broad-based approach to total quality management. It delivers a wide range of integrated quality management functionality and supports collaborative business processes for cost-effectively ensuring the quality of your products and processes and transforming quality management into a competitive advantage.

In today's economy, companies must invest in business software in order to invest in their company's future. It is important to lay a trusted foundation for business excellence and innovation and to provide you organization with the Erp functionality that is needed to gain strategic insight, competitive differentiation, increased productivity and business agility.

Quality is a vital core competency for manufactures industry-wide and nowadays it cannot be treated as simply an afterthought. Companies have to engineer quality into the design of products and processes; they have to track quality through procurement, production, and delivery; and they have to constantly improve quality to keep pace with ever-growing customer expectations and competitive pressures. In short, they need to take a comprehensive approach to quality management- one that integrates information and processes across departments and corporate boundaries and empowers both your employees and supply chain partners to maintain and improve quality levels.

ERP enables the comprehensive and efficient approach they need to transform quality management into a competitive advantage.

Quality management with ERP tightens control and contains costs.

Under current market conditions, many organizations follow a twofold strategy: strive for continued growth and innovation through competitive differentiation and increase efficiency to meet the enormous pressure to cut costs. In the end, companies must be excellent in both to meet stakeholder expectations and achieve financial success. They must reduce costs wherever possible, but avoid risks that might lead to unexpected and unbudgeted expenditures.

Quality management with ERP enables enterprises to manage quality in a highly efficient way, differentiate their business, and establish a reputation of excellence

There is more to quality management than performing quality inspections every now and then. Companies want to focus on prevention of deficiencies, continuous process improvement through collaboration, and sustainable quality control. They need to react immediately to unplanned quality-related events, involve all affected parties, and start follow up actions to solve or control an issue.

ERP supports and ensures consistently high quality throughout the supply chain. Companies can comply continuously with legal requirements and industry standards. Customer satisfaction goes up, as does overall product quality customer service management.

It supports also key business activities with a focus on prevention of deficiencies, continuous process improvement through collaboration, and sustained quality control such as:

- Quality engineering
- Quality assurance and control
- Quality improvement
- Audit management

It brings several benefits to the company such as:

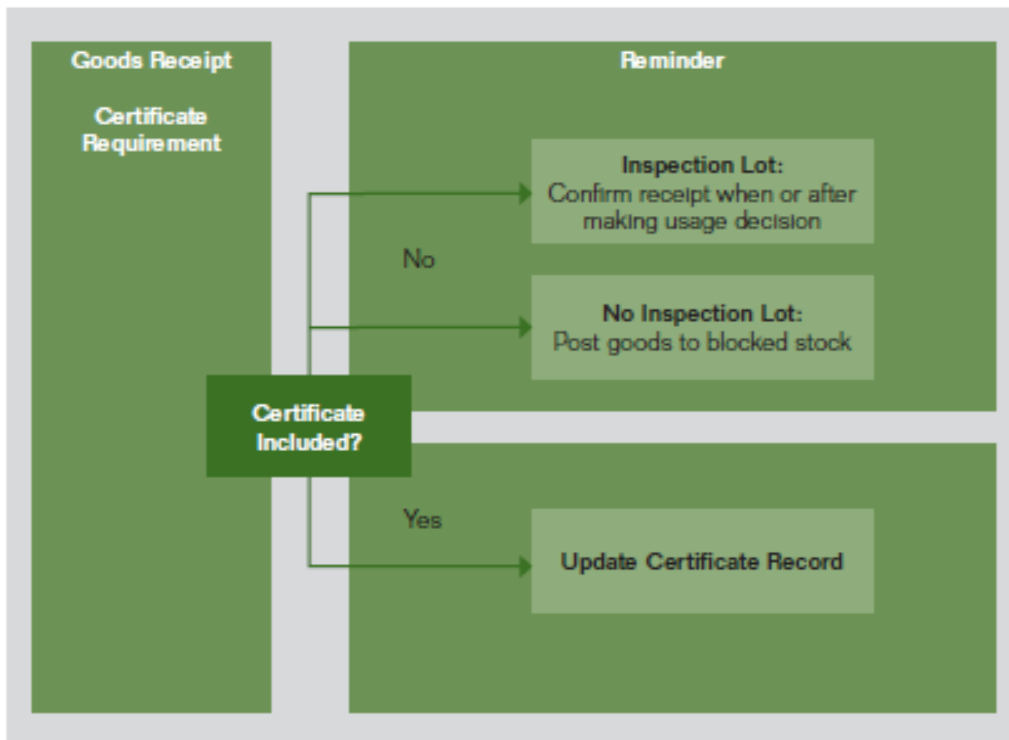
- Increased customer satisfaction through better product quality enhanced complaint management and tracking (corrective and prevention action)
- Increased revenues by retaining customers and strengthening customers loyalty
- Increased efficiency through improved asset utilization

The implementation of an ERP ensures quality across the entire supply chain and beyond company boundaries. It supports your quality management department in the following activities:

- *Procurement.* Quality management with ERP manages vendor-related master data, controls the purchasing process according to certain quality criteria, and handles inspection certificates and good receipt inspections
- *Production.* Quality management with ERP integrates inspection specifications in routings and recipes, allows inspections during production and good receipts

inspections for the manufacturing order to take place, monitors the production process using control charts, and confirms quality, quantity and costs.

- *Sales and distribution.* It can control them according to quality criteria and handles inspection certificates and inspections at goods issue.



**Figure 6 Certificate processing at good receipt**

It is possible also to monitor the shelf life of batches and deadlines for recurring inspections. In addition, you can change the batch status and perform stock perform stock postings automatically. For example you can post to blocked stock when the expiry date is exceeded.

With the help of an ERP we can also determine which raw-material batches or semi-finished products make up the batch of a finished product (top down analysis) or, conversely, which batches of semi-finished or finished products are made up of a particular batch of a raw material (bottom up analysis)

Another aspect very interesting that links together quality management and Erp system is FMEA.

FMEA is an analytical method for early detection and elimination of possible failures and issues in products and processes. In the context of quality management, this method is used for preventive failure avoidance.

ERP offers tools for monitoring as well as a cockpit for building an FMEA product or process structure. It can be used for root-cause analysis in Six Sigma projects, risk assessment during product development, and operational quality control and planning.

Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects and minimizing variability in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization (for example the well known "Black Belts" and "Green Belts") who are experts in these methods. Each Six Sigma project carried out within an organization follows a defined sequence of steps and has quantified financial targets in terms of cost reduction and profit increase.

On the right in the in the Figure 7 we can see the closed-loop inspection planning process. It comprises the following steps: the first step is to work in a team of experts from different departments to create and FMEA. In doing so, the product and process characteristic with high safety risk are pointed out. In a second step , these characteristics are transferred into a control plan.

The control plan gives an overview about all inspections for a final product, including all components, and is the basis for the third step, maintaining the operational inspection plan and routings. A control plan is the description of the entire technical or functional system that is being monitored or checked for possible risks and defects. Fundamentally, the control plan describes all the actions that need to be performed in each phase of the process. This includes the

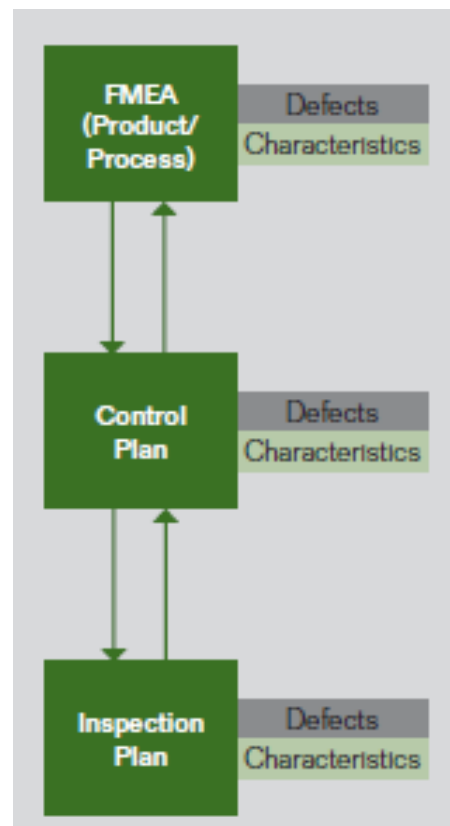


Figure 7 Closed-loop inspection planning process



inspection of the goods receipt, the goods shipment, and the scheduled inspections and quality control activities that make sure all process results are controlled and documented.

The FMEA cockpit and monitor offer the possibility of a hierarchical display of the object, machine, or system being inspected for possible failures. With the help of a hierarchical or a linked structure, the entire chain of failure mode, causes, and consequences can be viewed and investigated. With risk-priority numbers you can evaluate and estimate the defect cause of failure. The necessary actions to diminish or avoid a failure can be managed with the FMEA tool as well.

With the integration of the FMEA tool into ERP, it is possible to connect the FMEA with related functions and objects, for example, with catalogs of failure characteristic or inspections characteristics. Furthermore you can directly connect the FMEA with a control plan.

We have several benefits in term of quality from using an ERP:

- Real time data, transparent for employees, compliant with legal requirement
- Easy creation of certificates
- Automatic warnings if certificate is missing
- Time and money savings through using fully automatic certificate and because the optimal control of subsequent processes.
- Electronic transfer of quality data to your business partners.
- Easy communication and work processing by using internet or intranet

An ERP introduction allows also the workload reduction for the administration department, better processes with standardization, an increasing of efficiency through the reduction of defects, reworks and wastes. Also the accuracy, quality and visibility of the data increase because they are consistent, transparent and available throughout the company. Everyone that have a permission can access to them and have a look on the performance of the company.

## 2.FINCARTA GROUP INTRODUCTION

Fincarta is a multinational group specializing in paper and carton board for the packaging industry (5 sites -1 of them in Boston, US. ).The Figure 8<sup>3</sup> shows their logo.

- Plv S.r.l.
- Con-Pak S.p.a.
- Tifernate S.p.a.
- Cartotecnica Chierese S.p.a.
- Twocpack



Figure 8 Logos of Fincarta Group companies

In difficult times like we are living in financial and market is important to study and prepare all the necessary tools to address and overcome the crisis. The competitiveness of the companies is measured on the potential of the plants and on the innovation of the products, but especially on the quality and on the professionalism of the human resources. A really good way to do and facilitate that is having a good ERP System in the company. The level of specialization and innovation required nowadays from the market are very high and so exasperate that just with a perfect and careful train planning companies are able to create a competitive advantage and a gap with emerging countries that have low personal cost.

The rapid growth, with major acquisitions, and the rise of international transactions between Fincarta Group companies led to a mismatch between the level of IT service resulting from different application architectures and the need to operate in real-time business data.

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<sup>3</sup> Source: [www.fincarta.dex.it](http://www.fincarta.dex.it)

The management systems of the various sites were not integrated with one another applications, databases and processes: the management of Fincarta has seen this scenario as a factor that could affect the overall performance of an industrial group which now has more than one thousand employees. That's why to support the group expansion they need a process optimization and a real time analysis tools.

The Executive Board sees the ERP, and more generally, IT infrastructure, as the main enabler of the current phase of organizational development and process, which must be based on a single platform distributed on a global scale due to the presence of TwoCpack in the U.S. and extended vertically from the automation of factory management control. The analysis have also highlighted the need for a development model having a single flexible application framework able to respond simultaneously to the needs of all 5 locations.

These design requirements have greatly restricted the number of technologies to properly support the new generation of ERP services.

That's one of the main reason that moves Fincarta Group, at the end of 2010, to introduce at group level a new ERP in order to manage and coordinate all the resources, information, and functions from shared database. From an Erp we have also benefits in terms saving time, data more safe and protected then before.

After along selection phase Fincarta chose the Microsoft ERP.

Now they can control over all phases of the business cycle, with a shared platform that integrates disparate reality of commercial and manufacturing.

With the adoption of microsoft Dynamics AX, the group Fincarta has integrated design, manufacturing and selling into a unique business process accelerated, made possible by the consistency of the data, more control on the overall performance and the ability of people to act real time with respect to the information. The ERP solutions built on Microsoft Dynamics AX introduce a major innovation with the ability to share consistent tools within a complex organization, thus defining a process more collaborative and efficient.

The complete data availability guarantees to the different decision levels high capacity planning and performance analysis and market scenarios.

The decision support solutions developed on Microsoft Dynamics are able to break down the traditional barriers to the understanding of reporting tools, thanks to

integration with well-known applications such as Microsoft Excel in order to offer ways to use simplified and customized for each function business process.

They decide to start in Daverio with a pilot project and then one by one implement it also in the other companies. They didn't decide to introduce and implement the ERP at the same time in all the factories because in terms of money and resources would be very high. There should have at least two consultants per company and 1 or 2 internal IT expert for each company at the same time. Right now they don't have a real IT function for each company or just one that can manage 5 companies but only one IT responsible that is helped by external consultants.

Those factors move them to start company by company, that is for sure cheaper but takes longer time to finish the project. At group level an implementation of an ERP and so a Business Process Redesign for each company means also a decreasing of the overall productivity because all the company or part of it is not focus on core business.

Sometimes that brings a decreasing of the customer satisfaction cause by delay or lower quality of the job that nowadays is essential because the high competition inside the market. The customers are asking products that have really good quality but with a lower price.

other strategic decision was to align the training period and the implementation of the software in those period where the production load is lower. Indeed most of these carton board company depending on the customer they have, have really seasonal production. For instance PLV has most of its production load from July to end of October for Panettone Campaign and from December to March for Colomba campaign. In USA there is only one period where the load is



Figure 10 Example of winter seasonal products (On the left Panettone and on the right Pandoro)

Figure 9 Example of Easter seasonal product (Colomba Bauli)

very high that is from end of July to December with the San Valentine Hearts (Figure 11<sup>4</sup>)



**Figure 11 Usa S.Valentine seasonal products**

After PLV that is located in Daverio, the ERP was introduced in Twocpack in July 2011, then in Tifernate ( the one located in Città di Castello close to Perugia) in October 2011 and finally in Cartotecnica Chierese (TO) at the beginning of 2012. The fifth company is Con-Pak that is located in Roletto (TO) and it is the only one where the ERP is not introduced yet.

It might merge with Cartotecnica Chierese that just 2 months ago started to move to a new and bigger plant ( 30000 sqm equipped with a photovoltaic system of 28000 sqm with a capacity of a 1 MWp. It will be one of the most productive company in Piemonte.

TwoCpack was the second company. The ERP and the training to the employees were introduced in June 2011. Columbus consultants made 1 months training to most of the employees but because they were very busy with a big campaign they start to work with the new ERP system since October.

That's why they worked using the old system and in parallel the new one until December.

Before analyzing the work done in the companies let's analyze first the production process.

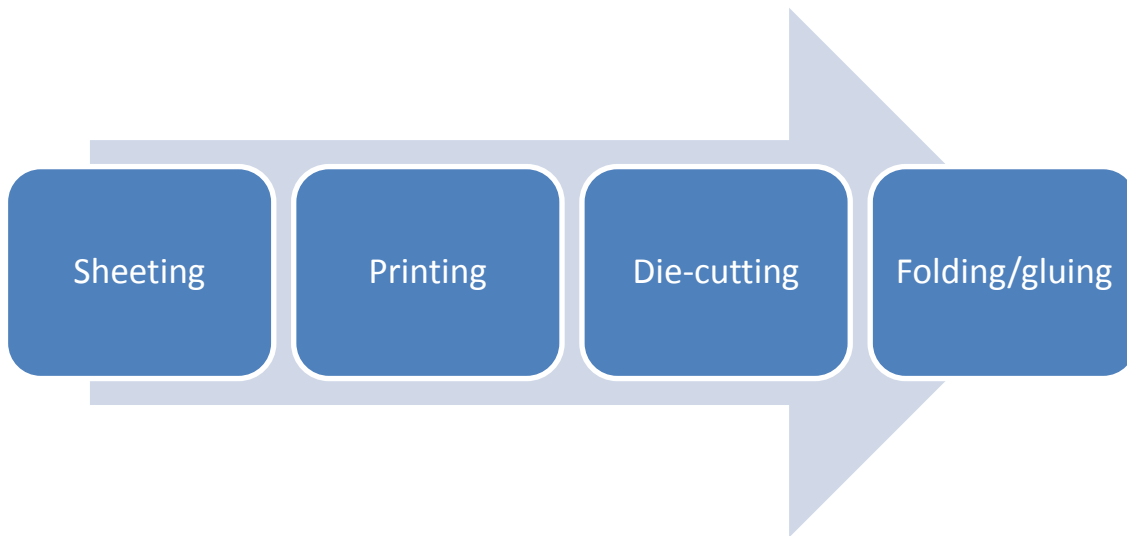
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<sup>4</sup> Source: [www.twocpack.com](http://www.twocpack.com)

## 2.1. PRODUCTION PROCESS

The production process is composed by these following operations:

- Sheeting
- Printing
- Die-cutting
- Folding/gluing



**Figure 12 Production process**

### 2.1.1. SHEETING

Sheeting is the first production process. The rolls arrive from the Raw Material stock and they are load on the sheeting machine. The sheeting machine will cut the rolls creating sheets with a format that the next machine needs relating with the customer requirements.

In Fincarta Group we have this phase just in TwoCpack, that because the suppliers; in United States they use to supply rolls and not sheets. The sheeting phase is necessary then. Two employees per shift work on that machine. Only one shift a day because is enough to create a buffer that can satisfy also the next 8 hours. The picture on the right shows the special forklift dedicated to load and unload the rolls, a rolls warehouse and a roll loaded on a sheeting machine.

### 2.1.2. PRINTING

Printing phase is the second phase of the production. Here the inputs are blank sheets and the outputs are sheets printed that can have on a number of item that usually ranges from 2 to 8 depending on the dimension on the item. It's possible having also a combo, different item on the same sheets.



Figure 13 Printing machine on the left and a quality check on the right side

To print sheets we need plates and inks.

Normally on a printing machine work 3 employees per shift per two shift a day. In the Figure 13<sup>5</sup> is possible to see on the left side how does it look a Printing Machine in particular a KBA 105. On the right side there is an employee that is checking printed sheets quality. Quality checks are done by sample on all the production machines. Usually they check 1 sheet every hundred.

There is a more specific quality check on the final products before they are stocked.

### 2.1.3. DIE CUTTING

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<sup>5</sup> Source: [www.google.com](http://www.google.com)

The third manufacturing process is the die-cutting phase. A die cutter is smaller than a printing machine and it needs maximum two employees per shift per two shift a day. In this phase the printed sheet enter in the machine and it is cut according to its shape. This process produces a lot of scraps of paper that through a suction system are collected in a special room where they will be pressed and sell to the recycling company. This besides being a sustainable system is also a way to increase the quality in the workplace. That decrease the powder caused by the cutting of the papers. The tools used to cut the sheets are the dies.

Each dies is specific for a determinate job and after the use they are stocked in a warehouse. They can be re-used in the future if the customer will ask the same job.



Figure 14 Die Cutting machine on the top and a Die on the bottom



Figure 15 Example of a job just die-cutted

In the Figure 14<sup>6</sup> there is a die-cutting machine on the top and a die on the bottom of the picture. The red parts on the dies are the blades and the lines visible on the picture have the role to create the fold. When a sheet pass through the machine the die goes down and pressing on it will determine the shape of the box open as you can easily see in the Figure 15<sup>7</sup>. It represents a job die cutted, in particular a Moët & Chandon box.

<sup>6</sup> Source: [www.google.com](http://www.google.com)

<sup>7</sup>Source: [www.google.com](http://www.google.com)



#### 2.1.4. FOLDING AND GLUING

Fourth and last phase of the production is the folding and gluing. Here the items arrive like in the picture you can see above and they are folded and glued by the machine. On this machine usually there are 2 employees: one the load the machine and the other one that put the final product in the boxes and send them to Finished Goods Warehouse.

The plant layout follow the flow of the production, so the exit door of the RW warehouse is close to the sheeting machine and then all the machine are in line to make the flow more lean and fast.

Between each department we have a small buffer of WIP that permits to have the maximum possible saturation and avoid the possibility that employees wait to run a job.



**Figure 16 Folding/ gluing machine running**

## 3. TWOCPACK



Figure 17 TwoCpack Logo

TwoCpack System is a provider of high quality and innovative packaging for many market segments including confections, wine and spirits, pharmaceutical, medical, food and beverage, and consumer goods. Founded in 1982, in Boston (USA) as a sales branch, the company was immediately recognized as a supplier of premium and innovative cartons for the confectionery and spirits industry with logistics, contract packaging and packaging systems services.

In April of 2007, TwoCpack System acquired a local folding carton manufacturer in Nashua, NH and began manufacturing stateside thus eliminating the need for importing the finished product from Italy.

In October of 2008, TwoCpack inaugurated a brand new, state of the art production facility in Nashua, NH and was able to incorporate the specialized technique and production expertise of the individual Fincarta Companies.

It quickly earned its place in the US as the industry leader in sustainable business practices and is widely considered the most eco-friendly carton company in the USA.

### 3.1. PROJECT SCHEDULING

My internship in TwoCpack began at the end of September till the finish of December and during this period we worked to achieve the complete implementation of the software trying to abandon the old one. To do that we scheduled the project over 2/3 months. We subdivided the 3 months in this way:

#### 3.1.1. CUSTOMER SERVICE ( 3 weeks)

In this period we focused our analysis on estimations. In the old system they used to do estimations with a simple Excel sheet as most of the companies, that have not an integrated ERP do.

First of all we started comparing the old estimation method to the new one to find out the differences between them. We did that to find out the differences and collaborate

with Columbus Consulting in order to add some fields to the new estimation form or delete in case they were not necessary. The objective of this phase was adapt as much as possible the new form in order to facilitate their work and make them feel more comfortable with it.

Most of the time when you abandon completely a way of work and switch to another one is not easy to reach the maximum results.

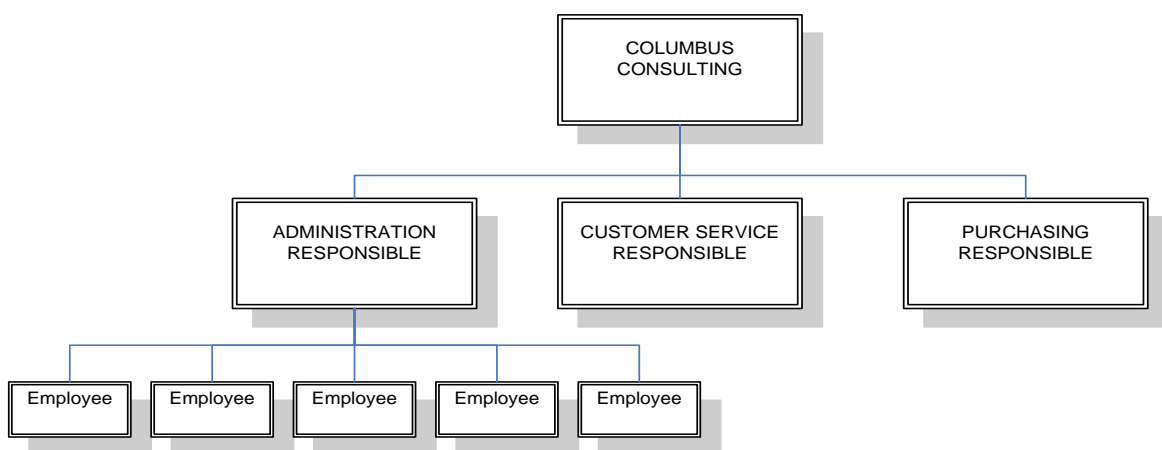
To reach the goal lot of training is needed.

In July, Columbus Consulting started training just the responsible of each area in order to have one person that later on could teach to the other employees of the department. In case of problems or issues with the system the responsible will interface and ask directly to the consultant. In this way the training phase is more lean and smooth.

After this comparing phase we start to work directly with people of that department. The aim of this phase was collaborate with them in order to find out their difficulties and problems that they faced out using the new ERP system and trying to solve them by our-self.

In case we couldn't do it we used to ask for helping to Columbus Consulting.

Third and last point that required more time was to understand the job flow and redesign



**Figure 18 Training Organization chart**

it. We did it that to adapt it to AX requirements and constraints. During this phase my colleague and me did the AS-IS analysis of the job flow and then the TO-BE.

This analysis had to be done at the beginning of the project because from the TO-BE job flow we had an idea of the sequence of the departments we have analyze.

To analyze the AS-IS situation we just followed the Job Bag flow. It's a bag where on the front we have all the information that the production plant required to run the job. Before getting into production this bag used to go around the offices, from Sales to Customer Service, from Customer Service to technical office and finally to Purchasing dept. In this way the flow wasn't that lean and fast and a lot of time the bags were stuck in the offices for days. The picture shows how was the old Job Bag.

AX 12W000190

PRODUCTION TICKET				Graphics Log #:	
Date Issued: 4/12/12	Job #: 28003	Plan Review#: 27587			
Customer: Beaver-Visitec	Customer P.O. #: P204472	Other P.O. #: -			
Ship Date: 4/23/12	Ship Date 2: 4/24/12	Ship Date 3: -	Ship Date 4: -		
4/21/12 100 Pcs 4000 Pcs Combo Information					
CUSTOMER SPEC ENCLOSED					
Quantity: 1,000	Item: 621	Rev: 01	Size: 5 x 3 x 2 1/2		
Description: Box Shelf Gen 5 X 3 X 2 1/2 MO					
Style: T.T.A.B.			Other: -		
Window Material: -			Window Size: -		
Tape Required: -			Tape Size: -		
# of Colors: 2	( ) <del>4-Color Process</del>	Ink 1: 294 Blue	Ink 2: 347 Green		
Ink 3: -	Ink 4: -	Ink 5: -	Ink 6: -		
Special Printing Instructions: ( ) <del>Wire Edge Ink</del>					
Coating: Aqueous Matt / Varnish / U.V. <del>SPOT</del>		Board: SBS	Caliper: .020		
Corrugated: 13 1/4 x 12 1/2 x 8 (2) <del>sp on house</del>		Amount In: 300			
Die Size: 15 7/32 x 16 1/32		Die Location BAY: 10	SHELF: 6	# On: 2	
Sheet Size: 16 1/2 x 22		# On: 2			
STOCK INFORMATION: .020 SBS 23 1/2" dia in box ( ) GUILLO:					

4/21/12

( )  
NEW

( )  
EXISTING

(X)  
EXISTING

( )  
EXISTING  
W/  
CHANGE

Die Room	( ) New Die (X) Existing Die ( ) Need Vinyl	APPROVED TO RUN: _____
Graphics	(X) Existing Plate ( ) New Plate	REKNIFE: _____ DATE: _____
Printing	Run 500 620 Sheets Form 1: _____ Form 2: _____	
COMMENTS		PRODUCTION COUNT: 800
Die Cutting	Run 3-13-12 PF	Form 2: Die # 27587
COMMENTS		PRODUCTION COUNT: 800 (7)
Finishing	Mark Cartons (X) P.O. P204472 (X) QTY (X) Item & Revision	
COMMENTS	Use double poly bags	PRODUCTION COUNT: 1100
Shipping	Ship to: Beaver-Visitec, 411 Waverly Oaks Rd, Bldg 1, Suite 190, Waltham, MA 02452	Receiving Hours: _____
Ship Via:	(X) Prepaid ( ) Collect ( ) Other:	

9#2 14  
MID

Printing  
Pass # \_\_\_\_\_  
Make Ready 1 hrs/pass  
Run 5 hrs/pass  
Dry Time \_\_\_\_\_ hrs/pass

Diecutting  
Make Ready 15 hrs  
Run 5 hrs  
Emboss MFI 15 hrs  
Emboss 15 hrs  
Foilstamping 15 hrs  
Make Ready 2 hrs  
Run Speed 1 hr  
Cable MFI 15 hrs  
Cable RS 15 hrs

Figure 19 JOB BAG

### 3.1.2. PURCHASING DEPARTMENT (2 weeks)

In this phase mostly of our job was to train the purchasing responsible in order to show and teach him how to see with the new system all the actual information about the raw materials and report about the past. The main information he needed were about the Quantity on hand of the carton board, quantity already allocated to a determined job, inks and corrugateds It was supposed to be just one week training because we thought it was a quite easy job but it took one week more. The purchasing responsible wasn't that familiar with computer and technologies, he was a kind of resistance we faced. This is a very common issues that can occur during a project like that. That's why during the implementation of a project it's necessary manage the Risk and the Change.

### 3.1.3. PLANNING/SCHEDULING (1 week)

In this week we focused our attention and try to satisfy the requirements of the planning manager in order to make his work easier with the new system. The misalignment between the old and the new system was about the reports filled out by the purchasing manager regarding delivery date of RW and the reports filled out by the production manager about the quantity produced and to produce the next days. With the help of Columbus programmer we created reports with the same information. Satisfy their needs was necessary because this is a crucial job. A good scheduling means most of the time a good quality, less pressure and more customer satisfaction.

### 3.1.4. PRODUCTION (2 weeks)

Each machine in the plant has a Thin Client, that is a kind of computer used mainly by the operators. On these computers there is another kind of software called OPERA and it collects all the production data and transfer them to AX. Opera is very simple software and the operator has to give it all the input like the code of the job that they are running, if they are doing a make ready or production, the member of the team on the machine, when a breakdown occur and when it finished. In this software there is also the option to print the label for the finished good that will exit from the machine and going to the next production phase. All these data will be elaborated by the software and then transfer to AX erp. The communication between the two system is in both

directions. For instance when an order is approved and scheduled AX passes to Opera the Production Job approved. The operator then can see it on his machine PC and run the job. In this week we train first of all the manager (printing manager, die cutter manager, finishing manager) teaching them the role of AX in their work. They can see now the scheduled jobs on video and they have a very easy view of all the jobs worked in the past. No more paper that goes around the plant and also stored in a dedicated warehouse. The other part of the training we did was on the machine teaching to the operators how to use opera and the importance of it for the traceability.

Traceability refers to the completeness of the information about every step in a process chain. Throughout a good traceability if we take a finished product we have all the information about the previous phase and all the raw materials that compose it.

### 3.1.5. SHIPPING/RECEIVING (1 week)

We dedicated to this department the second last week focusing on the finished good warehouse and on the inbound warehouse. We focused on the importance on reading the barcode of the paper rolls once they enter in the RW warehouse and once they received the finished good from the last production department. This is really important because in that way all the level of the inventory we have on the system is perfectly updated. Before we started to work with them the situation was very bad, on the system there were registered many more RW items than actually there were, and less FG. That's because the operators on the first production machine used not to scan the paper roll and the warehouse operator used not to scan the finished good entering to the finished goods warehouse.

It was just a long operation to update the warehouse on the system uploading one by one the FG and deleting all the RW that physically were not in the warehouse. We did that with them so they could see how long was the work and how many times we lost just because they forgot to shoot the items. After this week they started working correctly without any problems.

### 3.1.6. ACCOUNTING ( 1 week)

In this week we spend most of the time working on the reports trying to standardized. Our work was just to understand the kind of report was needed and then working with Columbus Programmer creating the right report. This request was made by the Fincarta Financial Manager in order to maximize the efficiency and the effectiveness.

As I said above, before starting with Customer Service we re-designed the processes in order to make it as lean as possible and also because Microsoft AX needs the flow going in a certain way.

After that we started, department by department, with training and trying to solve their problem. Where we couldn't solve we interfaced with the Italian IT responsible and with the consultant company.

Let's analyze now the actual situation AS-IS and the future one TO-BE focusing on the job flow.



## 3.2. AS-IS SITUATION

This flowchart represents the job flow before the introduction of Microsoft AX. As we can see all the first part before the estimation is approved or not by the customer is completely different.

First there is a request from the customer that speaks directly with the sales department about the order. After that the sales department receives all the information ( quantity, paper, # on a single sheet ext ext..) and do the first estimation that will be sent back to the sales department. This estimation is made on excel sheet while the information given from the sales to the customer service are on paper module. Sometimes they got lost and they need to ask again to the client all the requirements and specifics.

Once customer service sent the estimation to the sales, it starts between sales department and customer a negotiation phase based on the estimation. If there is the approval by the customer a job bag that contain the information about the job start to goes around the plant.

First it goes to technical office that will define the CAD sample, the sheet composition, the kind of paper and so on.

After the Technical office fill all the fields, this bag goes to the printing office that will determine all the inks for the printing phase. Third step is to determine the layout of the die.

After all these info are filled the purchasing responsible can order all the right quantity of raw material and in relation on the delivery date the scheduling office will plan the production.

Now the production phases can start.

One of the problem that came out first during the redesigning phase was about the detail of the estimation. In the AS-IS situation the customer service does an estimation that actually we can say that is really poor because its few information. Doing in this way might happen that price is estimated but then, once the Tech Office defines all the tech specs they find out that the cost is higher than the one expected.

The Figure 20 represents the flow of the job in the AS-IS situation.

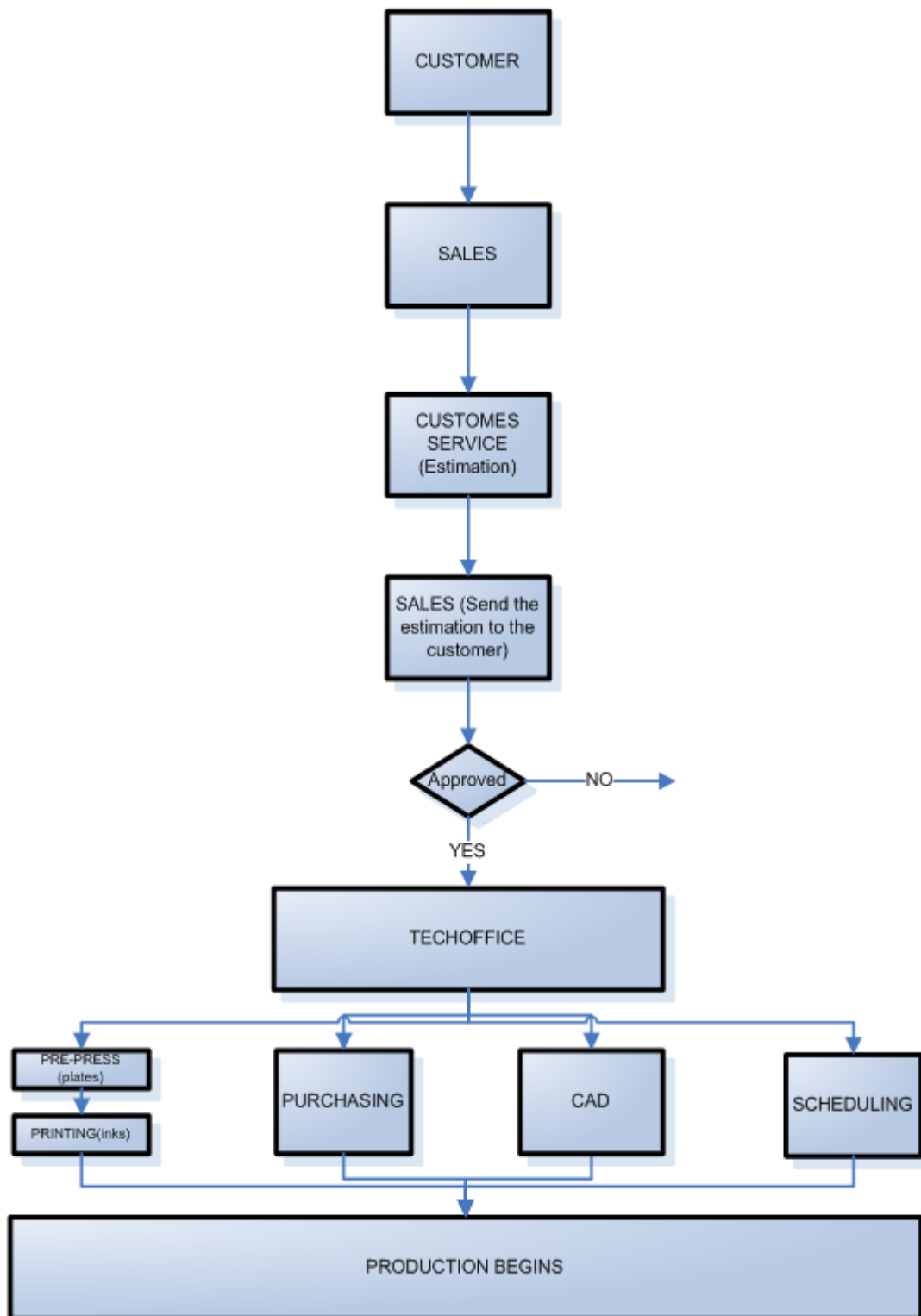


Figure 20 Microsoft Visio flow chart that shows the AS-IS Work Flow

### 3.3. TO-BE SITUATION

Is possible to see from the following graphs that the first show the flow of a new job and the second one the flow of an existing job. Both of them are the situation TO-BE done to support AX. The AS-IS situation was more complicate and also less efficient. There wasn't a Technical Office where all the information go and are elaborated before to pass to the next department that is the Customer Service.

Customers Service people used to walk around and ask information before do the estimation or they let the Job Ticket go around and wait it back with all the information required written on that. Job Ticket it's like a bag where inside we have all the production information and on the back of the bag we have the information that customer service need to do estimations. This Bag once AX will be introduced and implemented 100% in all the department in will be eliminated. This bag to be completed used to go around a lot through the department., this was for sure a waste of time and sometime also a problem because they might lost the bag.

Doing like this it often happens that job ticket arrive on someone's desk and remains there for days or even worst it goes lost.

Once the estimation is ready in the old system there were not electronic notification that tell at the same time to the purchasing dept the kind of paper to buy, to the prepress responsible the kind of plate or to the scheduling dept the quantities and the machine where it can be scheduled. There was just a job bag that goes around from one dept to the other. This causes a big wasting of time, scheduling problems which in turn cause big delays before going to the production.

For this reason, as is possible to see from the graphs we thought to put in parallel all the activities before the job goes into production. In this way we can save time and be more productive and efficient.

This is the situation TO-BE for a new job and as we can see the order request is received by the customer service or sales dept from the client. Once they received the order, the request passes to the technical office that will fill a module with all the specifics of the job and then they will send back to the customer service.

At this point the estimation has to be approved. If it is approved it become a production order and then the parallel process that has as actors Prepress, Purchasing , CAD and

scheduling can start. When all these activities are done, a notification is sent to the production manager. The production can finally start.

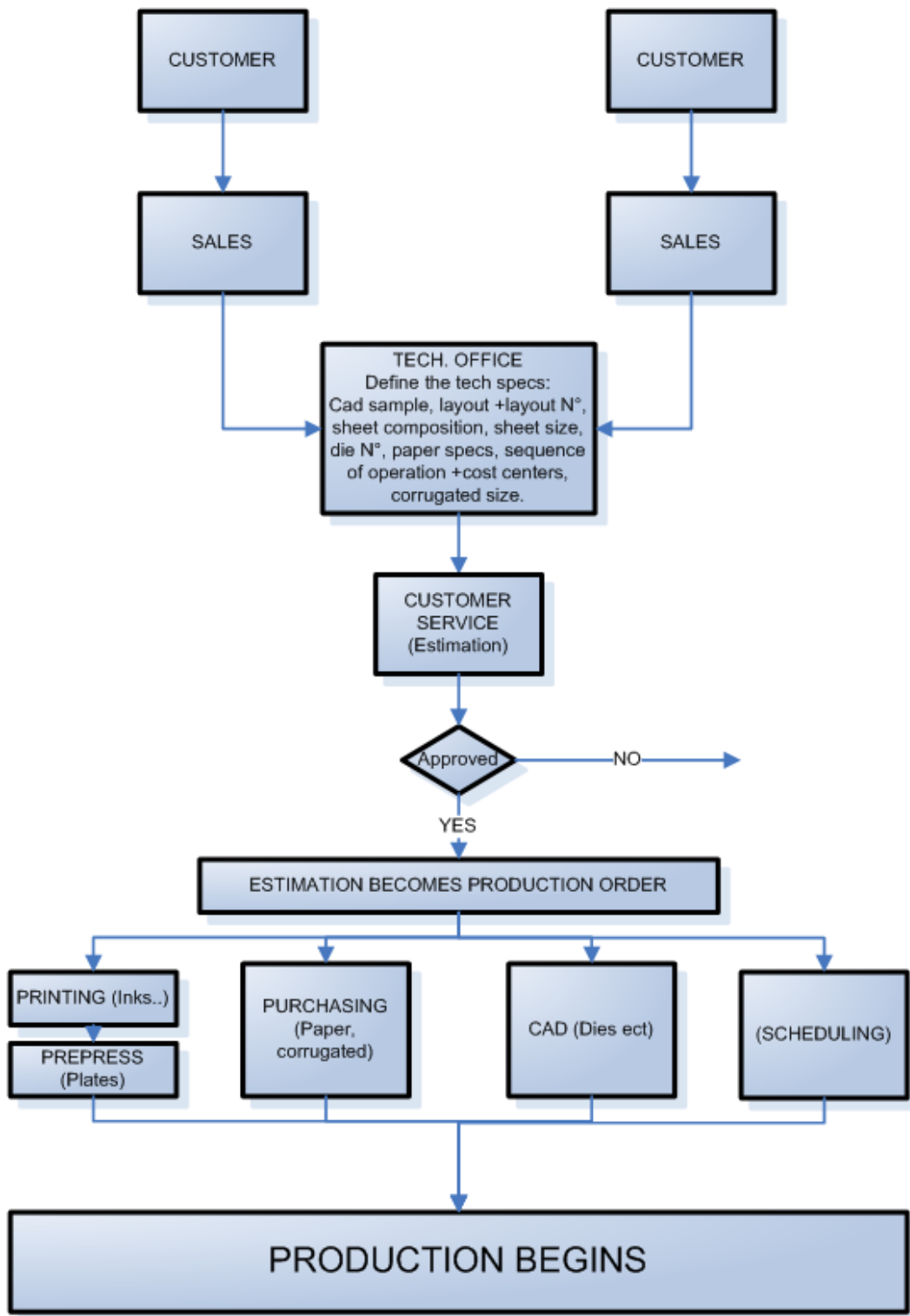


Figure 21 Microsoft Visio flow chart that shows the TO-BE Work Flow for a new job

This is instead the flow of an existing job. What is possible to notice is that all the phase of technical specifications is missing. That's because we have to run a job already done before.

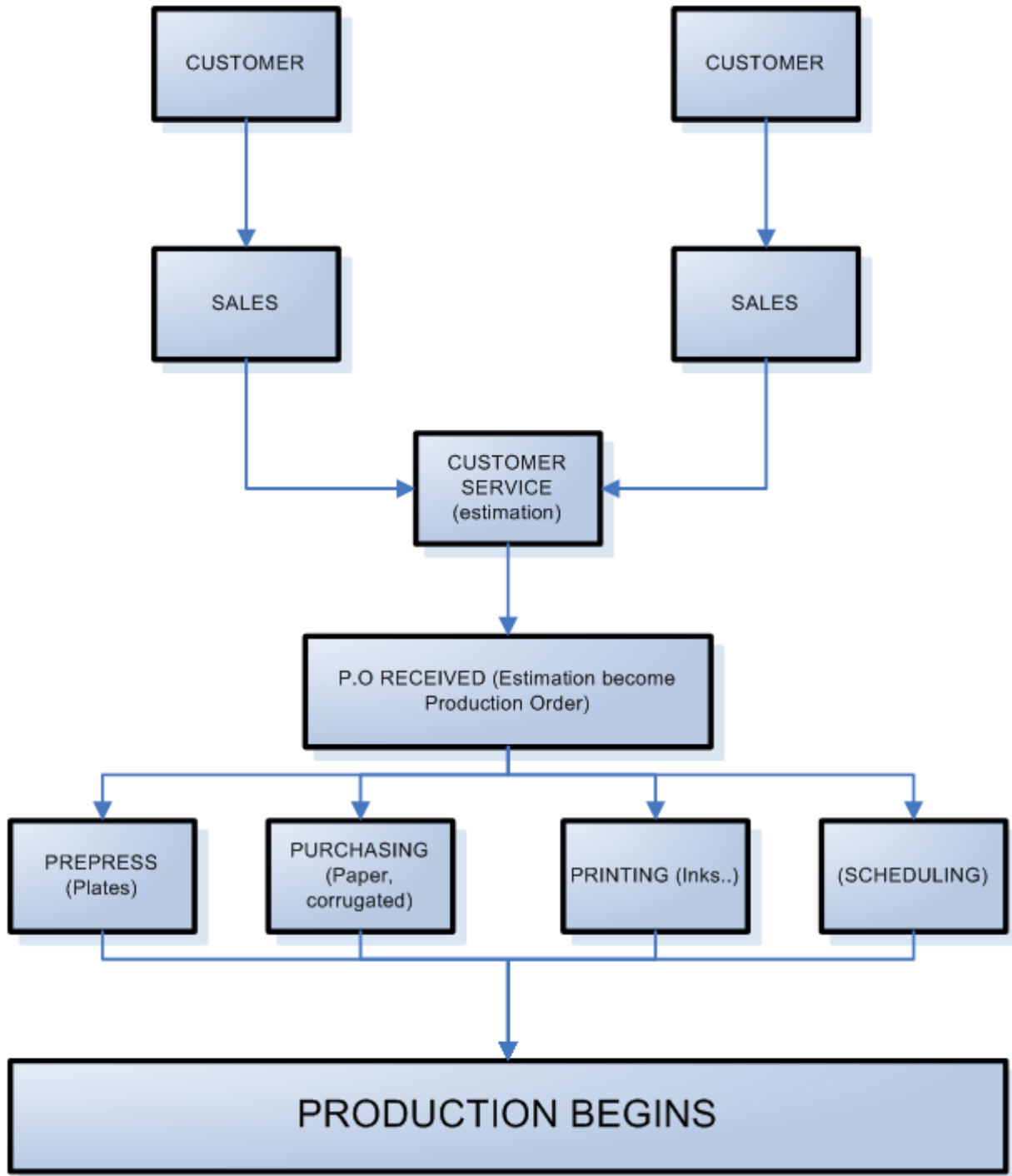


Figure 22 Microsoft Visio flow chart that shows the TO-BE Work Flow for an existing job

This is the module we designed for the technical office. Our idea was to provide to the technical office a standard module easy to fill and as you can see there are all the specifics and information of the job that the customer service needs to do the estimation.


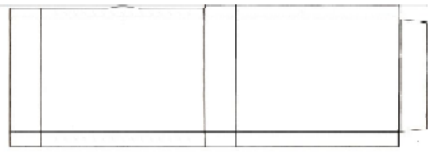
		CUSTOMER:	DATE:
Description: .....		ITEM #:	PROJECT #:
Cad #:	Size:	Corrugated: Glue: Foil: Die: Stripping: Blanking: Embossing: Foil Stamping: Offset Plate: Glue Plate: Layout 	
Layout #:	Area:		
Designer:	Graphic log:		
Q.ty:			
Customer Approval:			
Stock:	Style:		
Sheet size:	# On:		
Fibers:	Die #:		
Ink/ Coating:			
Sales Rep:			
Definition of the production flow:			

Figure 23 New technical Office module

The next module is the Design Request that is filled by the sales or customer service department. It contain a project description of the job, the quantity, the size and other general information that the technical office will need to study the product and identify the technical specs. There are also important field to specify if the item need extra processing phase like embossing or foil stamping.

**TWO C Pack** **DESIGN REQUEST**  
Your Partner for Innovative Packaging Sales Department

<b>Date:</b> _____		<b>Customer:</b> _____	
<b>Project description:</b> _____ _____ _____ _____ _____ _____			
<b>Q.ty:</b> _____	<b>Stock:</b> _____	<b>Size</b> _____	
<b>Additional details:</b> Foil Stamping <input type="checkbox"/> Embossing <input type="checkbox"/> Thermoformed <input type="checkbox"/> Ska <input type="checkbox"/>			
<b>Notes/attachments:</b> _____ _____ _____ _____			

**Samples needed:** \_\_\_\_\_      **Sales Rep:** \_\_\_\_\_  
**Samples due:** \_\_\_\_\_      **Signature:** \_\_\_\_\_

Figure 24 New design request module.



## 4. CARTOTECNICA CHIERESE



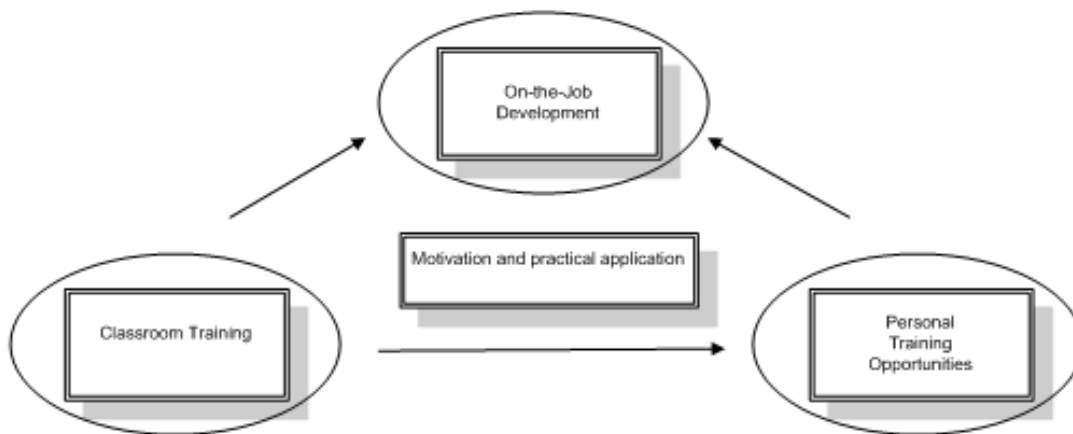
It was founded in 1900 in Chieri by an uncle of the current owners, it was called Fabbrica Scatole LUIGI BENEDECENTI. In 1947 the company was rebuilt after the damage suffered during the second world war and gradually enlarged. In 1966 the construction of a new facility gave an industrial impression to the activity. As I said in the previous chapter two months ago it just started to move to a new plant.

This project of “ERP implementation” in Cartotecnica Chierese began at the beginning of 2012 when the company was still located in the old site. During January the system was installed in the company and then Columbus Consulting started the training. A support of consultants within the company has certainly helped to decrease resistance and fighting within the firm due to objective difficulties regarding the understanding of the effectiveness of the new organizational philosophies, to resistance from those who working the organization and that feels more comfortable, more secure the status quo, and finally the lack of a proper commitment, or pressure, commitment and willingness to change on the part of all management.

They followed the way they used in the other company; they started the training to the department responsible which in turn teach to the other employees. At the beginning they were focused on customer service, that’s because doing estimation in the correct way nowadays is considered necessary and also because in the previous company of the group they had found some difficulties and resistances in teaching. Doing an estimation filling an excel spread sheet is completely different from AX system that require for sure more attention and more steps. They have to change completely their way to work and for 50/60 years old people could be so difficult and a lot of time is needed.

During this period they continued to work the old system and in parallel practice on the new in order to get used. Slowly in the following months the department responsible start to teach to the other employees and in case of problem they asked help to Columbus consultants.

After the orientation, team members are assigned to their home department and trained by their responsible to do the actual jobs they will be performing as part of the team. When we consider training, we usually think about a group of people sitting in a classroom with a teacher in front using visual aid and presenting, or if we think on-the-job-training, we usually picture someone being sent off to do the job with a little bit of instruction and someone else watching over him until he gets it. Columbus way to train people follows in some way Toyota Training Approaches.



**Figure 25 Human Resources Development Modes**

On-the-Job Development is considered one of the most important Toyota principle.

Going to any successful working family farm you will find that the parents or grandparents are teachers. They teach those with less experience how to do a multitude of tasks needed to run the farm. The young person who may one day take over the firm, needs real skills in each production phase and will benefit from the accumulated knowledge of generations of farmers. That happens very often also in a manufacturing plant, the expert employee train the young on the job.

Toyota uses the term “development” because it is broader than what we often think of as training. Training is what you do so the worker can perform the job and meet the numbers. Development is growing the team member so they become increasingly capable at doing the job, at critiquing how to do the job, at improving how the job is done, and eventually at training others.

That’s the way Columbus Consulting and Fincarta group follow during this project. As I said before the first phase of training was very close to a classroom training where the consultants taught first to the dept manager that in turn taught to their employees.

The training and development phase is continuing right now in a different way; on-the-Job Development. That means that consultants are present in the company and in case of problem they are available to solve them, help and do more training to the employees.

I started to work on that project since the April 1<sup>st</sup> and in this period we settled everything in the new plant in terms of network and computer and workplace. This case was much different from TwoCpack because there wasn’t the need to redesign the whole job flow process. It perfectly fitted in the ERP system and requirements. What we try to optimize were the employees work place both in the office and in production plant, the so called Gemba Kaizen. The Gemba Kaizen becomes the starting point to highlight the inadequacies of the other support departments, identifying internal systems and procedures that need improvement.

85% of the total cost of production is determined in the planning stages before production conditions but also by the quality and delivery are set out in that passage, then the upturn of upstream management is the key to obtaining quality, cost and delivery. The Gemba Kaizen, therefore, is only a starting point to change the most exciting, challenging and beneficial.

Define the location is a significant corporate decision because, once built, organization has to live with the consequences for a long time. Selecting the actual site required several considerations to take into account as:

- Well developed infrastructure: ease access to road and rail system, in particular where the inputs and outputs of the transportation process are high volume and bulky like in Cartotecnica Chierese case.
- Proximity to markets: it inherently sensible that services and goods are produced as close to the market for them as possible. The gain includes lower distribution and provisioning costs and shorter distances.
- Proximity to the supplier: as well as the obvious cost implications of distance, being a long way from the supplier also incur longer lead time and introduces a higher level of uncertainty.

Find and locate a company in a new site is a strategic decision, instead at operation level it's really important to determine office and plant layout. Create a efficient layout to make the flow faster without any stop of the job during all the process is really important, even more if you're working on job order. JIT become necessary, once you received the order from the customer you have to run the job as fast as possible to satisfy them. Addition to the time also the quality of the job is crucial because we are in a market and a situation where the auctions are online and downward. It means that the company that need a job will access to an auction and the supplier that will ask less with higher quality will win it.

As I introduced before the principles of Kaizen and the Toyota Production System can be applied effectively also in the office environment as well to improve performance and to eliminate waste. These concepts and topics are often linked to the plant because they are more immediate but also in the office are really important. It's here that we have most of the time big inefficiency and waste of time.

Office Kaizen can be implemented without affecting daily operations too much and can be split in 4 steps. We will have notable results improving transactional and administrative processes.

## 4.1. 5S TRAINING AND IMPLEMENTATION

This phase is focused on giving and teaching to the employees the 5S importance and their role inside the office. The 5S (Sort, Straighten, Shining, Standardize, Self-Discipline) are key to making an office more effective. We are always surprised at how much unnecessary items employees find and throw out during a designated 5S workshop. This was the phase analyzed in the better way.

### 4.1.1. SORT (Seiri)

Eliminate all unnecessary tools, parts, and instructions. Go through all tools, materials, and so forth in the plant and work area. Keep only essential items and eliminate what is not required, prioritizing things per requirements and keeping them in easily-accessible places. Everything else is stored or discarded

### 4.1.2. STRAIGHTEN (Seiton)

Eliminate all unnecessary tools, parts, and instructions. Go through all tools, materials, and so forth in the plant and work area. Keep only essential items and eliminate what is not required, prioritizing things per requirements and keeping them in easily-accessible places. Everything else is stored or discarded.

### 4.1.3. SHINING (Seiso)

Clean the workspace and all equipment, and keep it clean, tidy and organized. At the end of each shift, clean the work area and be sure everything is restored to its place. This makes it easy to know what goes where and ensures that everything is where it belongs. Spills, leaks, and other messes also then become a visual signal for equipment or process steps that need attention. A key point is that maintaining cleanliness should be part of the daily work – not an occasional activity initiated when things get too messy.

### 4.1.4. STANDARDIZE (Seiketsu)

Work practices should be consistent and standardized. All work stations for a particular job should be identical. All employees doing the same job should be able to work in any

station with the same tools that are in the same location in every station. Everyone should know exactly what his or her responsibilities are for adhering to the first 3 S's.

#### 4.1.5. SELF DISCIPLINE(Shitsuke)

Maintain and review standards. Once the previous 4 S's have been established, they become the new way to operate. Maintain focus on this new way and do not allow a gradual decline back to the old ways. While thinking about the new way, also be thinking about yet better ways. When an issue arises such as a suggested improvement, a new way of working, a new tool or a new output requirement, review the first 4 S's and make changes as appropriate.

## 4.2. PROCESS MAPPING AND MUDA IDENTIFICATION (Waste)

The process mapping first starts out with what the goal of the process should be. Since the office function is either a supporting function or offering a service, we need to define what good support is or what good service is. Once that is defined then we map the process looking for opportunities that hurt the quality of the service or that are just wasteful. Once the wastes are identified, the normal Kaizen tools are used to eliminate them and construct a new process.

### 4.2.1. ELIMINATION OF WASTES

We will take a process and re-construct it, leaving the waste out of the process. This is really the fun part of the Office Kaizen step as people are re-defining what their work ought to be based on the voice of the customer.

### 4.2.2. VISUAL MANAGEMENT (Mieruka)

Sharing information and everyone knowing what the status of critical elements is key to a well-functioning office.. Visual Control is any communication device used in the work environment that tells us at a glance how work should be done and whether it is deviating from the standard. We can make then the correct decisions faster which allows for more effective work. This should be used and introduced not just in the office but also in the plant. Here some example of tools. In the Figure 26<sup>8</sup> some post-it with different color to identify and signalize issues and in the Figure 27<sup>9</sup> an example of a tools cart . As you can see if a tool is missing you can immediately notice it.



Figure 26 Example 1 of visual management



Figure 27 Example 1 of visual management

### 4.2.3. CREATING A KAIZEN CULTURE

Once people understand the concepts of Kaizen and start making changes that make their work easier and more effective, that feeling needs to be nurtured so that it becomes part of the company culture.

Many companies are not that convinced on doing Kaizen in the office because of a feared disruption of work. What we are trying to do now is to change an office from one that is cluttered and confusing to one that is energetic and organized and eliminate as much as possible the wastes (Muda).

### 4.2.4. SEVEN MUDA 無駄

From Toyota Culture there are seven different type of muda that I will analyze one by one.:

<sup>8</sup> Source: [www.google.it](http://www.google.it)

<sup>9</sup> Picture taken in a Japanese company in 2009.

#### 4.2.4.1. Transportation

Each time a product is moved it stands the risk of being damaged, lost, delayed as well as being a cost for no added value. Transportation does not make any transformation to the product that the consumer is willing to pay for. For that reason all the plant was designed and the machines positioned following the flow of the job in order to make it as lean as possible.

All the transportation from the last operation that is Folding and Gluing the pack to the Final Good Warehouse is automated, that means no human errors, no waste of time but we have less flexibility in case we will redesign the processes.

#### 4.2.4.2. Inventory

Inventory, be it in the form of raw materials, work-in-progress (WIP), or finished goods, represents a capital outlay that has not yet produced an income either by the producer or for the consumer. Any of these three items not being actively processed to add value is waste. In a packaging company that work by job order we have very low inventory. It's possible that during some period, for instance before Christmas time, we have higher inventory because the Panettone campaign. They start to run these items on July/August and they have different shipping dates during the period but for sure the level of stock increase. To try to manage this issue we have to level the production. (Toyota principle). Since the printed paper most of the times is directed to a food market, for reasons of hygiene and quality of the paper cannot stand a long time in stock.

#### 4.2.4.3. Motion

In contrast to transportation, which refers to damage to products and transaction costs associated with moving them, motion refers to the damage that the production process inflicts on the entity that creates the product, either over time (wear and tear for equipment and repetitive stress injuries for workers) or during accidents that damage equipment or injure workers. In terms of motion and safety everything is well controlled and monitored.



#### 4.2.4.4. Waiting or (WIP) Work in Process

Whenever goods are not in transport or being processed, they are waiting. In traditional processes, a large part of an individual product's life is spent waiting to be worked on. Between an operation and another there are small WIP warehouse that because not all the machine have the same speed or can run the same format of sheet. For example there are 4 printing , 4 die-cutting and 7 folding-glue machines. Folding glue are faster and more than the other previous machines, a WIP warehouse before is required.

In a production flow where the processes are not continuous and machines have different speed it's really tough having no WIP. In my opinion it's better having a little quantity of wip and having all your machines running that waiting for a job. Sometimes if the waiting is long the machine has to switch off and after it will require a new set-up. A set up means waste of time but also waste of money, because the paper that is consumed during it is waste. Also ink is consumed with no value added. There's no problem if the machine idle switch in a status of stand-by in which is also energy saving.

#### 4.2.4.5. Over-processing

Over-processing occurs any time more work is done on a piece than what is required by the customer. This also includes using tools that are more precise, complex, or expensive than absolutely required. We have not muda in terms of over-processing thanks to long and good experience that the employees have doing their work. Each machine has machine responsible that supervise the work and know perfectly how it should be done. Also in the prepress phase the work is done as the customer want and require. It might happen that people can take more time than the required but just because some failure or drawback.

#### 4.2.4.6. Over-production

Overproduction occurs when more product is produced than is required at that time by your customers. One common practice that leads to this muda is the production of large batches, as often consumer needs change over the long times large batches require. Overproduction is considered the worst muda because it hides and/or generates all the others. Overproduction leads to excess inventory, which then requires the expenditure

of resources on storage space and preservation, activities that do not benefit the customer. In Cartotecnica Chierese never happened any over-production, it might happen some extra pieces that won't affect the inventory level and extra costs.

#### 4.2.4.7. Defects

Whenever defects occur, extra costs are incurred reworking the part, rescheduling production. This kind of waste is to take into consideration because in this kind of sector is not possible any reworking so if we have a defect in the folding and gluing phase we will reschedule the all job. That means a lot of time wasted.

#### 4.2.5. PDCA CYCLE

Working in the best way and aligning the process as much as possible to the ERP will be for sure a competitive advantage because when the workflow will be completely electronic, it will be even possible to have waste and it will be for sure harder to spot them. For that reason in this period where all the company employees are working with both the system in parallel it's better to go deeply in the problems and in the issues, fix them and create some standards and procedures.

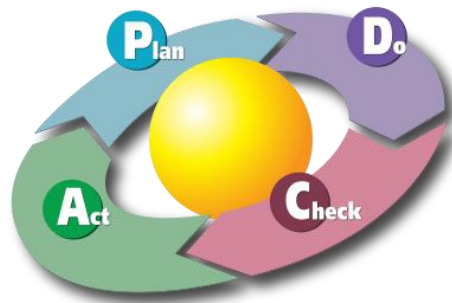


Figure 28 PDCA Cycle

A effectiveness method to do that is PDCA cycle. As you can see from the Figure 28<sup>10</sup>, PDCA cycle is an iterative four-step management method used in business for the control and continuous improvement of processes and products .It's also known as Deming cycle.

The steps in each successive PDCA cycle are:

##### 4.2.5.1. Plan

Establish the objectives and processes necessary to deliver results in accordance with the expected output (the target or goals). By establishing output expectations, the completeness and accuracy of the specification is also a part of the targeted improvement. When possible start on a small scale to test possible effects.

<sup>10</sup> Source: [www.google.com](http://www.google.com)

#### 4.2.5.2. Do

Implement the plan, execute the process, make the product. Collect data for charting and analysis in the following "CHECK" and "ACT" steps.

#### 4.2.5.3. Check

Study the actual results (measured and collected in "DO" above) and compare against the expected results (targets or goals from the "PLAN") to ascertain any differences. Look for deviation in implementation from the plan and also look for the appropriateness/completeness of the plan to enable the execution i.e., "Do". Charting data can make this much easier to see trends over several PDCA cycles and in order to convert the collected data into information. Information is what you need for the next step "ACT".

#### 4.2.5.4. Act

Request corrective actions on significant differences between actual and planned results. Analyze the differences to determine their root causes. Determine where to apply changes that will include improvement of the process or product.

When a pass through these four steps does not result in the need to improve, the scope to which PDCA is applied may be refined to plan and improve with more detail in the next iteration of the cycle, or attention needs to be placed in a different stage of the process.

PDCA cycle is not important just for the continuous improvement of the processes and products but also for Job Training. In many companies, managers do not understand the importance of making the on-the-job development of their subordinates a priority of their daily work. Training most of the time is viewed as the responsibility of a training department. Every senior person should be a teacher for their junior colleague, and those doing on-job-development are explicitly taught how to do such training. In the *Plan* stage, the supervisor needs to know his subordinates' strengths and weaknesses and know the work that needs to be done and then provide the work that "slightly stretches" the skills of the person. In the *Do*, the supervisor must motivate the person. This is done with good observation, follow up and feedback. Finally, in the *Check, Action* stages the supervisor can evaluate the work of the person and the two can discuss

progress toward desired personal growth and future action needed to meet each of their goals. The development process must be tailored for each individual because each person has different value, personalitie, and abilities and the training must be customized accordingly.

Most of the companies improve products and processes through the PDCA process. When there is a quality problem or team members are having difficulty achieving takt time, this will show up in a large number of andon cord pulls on a job. This leads to problem solving. Part of this problem solving process is to look at the standardized work and how well team members are trained to follow the standardized work. Sometimes this can be solved easilu by retraining team members people, the entire system of training is reevaluated.

Organized office, good use of Microsoft AX and standardized procedures from the first phases of the process will be for sure a competitive advantage.

The picture below represent an easy example of Kaizen applied in the office. On the left we have the situation before while on the right side after. From the table we can see the original walking distance walked by the employees to the fax and the one actual just after one week. The improvement is noticeable, around 73%.

#### 4.2.6. MEDTRONIC EXAMPLE

This an example of Medtronic Company that shows us how important can be the right collocation of the tools and the machine in a company. From the Table 3<sup>11</sup> and the Figure 29 is easy to see the improvement they had using the previous techniques.

Metrics	Original	Goal	Actual: 1 Week Later	Improvement
<b>Walking Distance</b>	Total/Day: 8381' (2346 m)	No Goal	Total/Day: 2232' (624 m)	73%

**Table 3 Medtronic Improvement**

<sup>11</sup> Source: <http://www.isixsigma.com/methodology/kaizen/kaizen-easiest-fastest-way-improve-office-processes/>

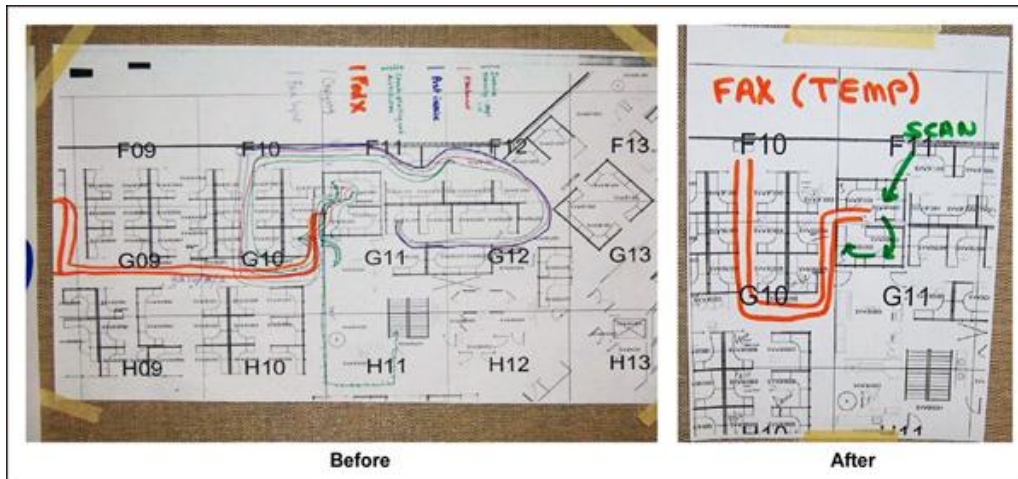


Figure 29 Walking distance before/after

#### 4.2.7. CURRENT SITUATION

Most of the job I responsible and I did was in fixing the new network in order to guarantee the maximum productivity from the first day in the new plant. Once everything was settled we switch to the production plant and we installed all the thin client on the machine and connected them to the network in order to collect all the production data.

In this company the ERP was introduced January, I started then in a situation where all the process were already re-engineered. What happened as I said above, the software was introduced, the processes were redesigned and they start to work in parallel with the two system. They abandoned the old system just one month ago.

The company started to use the ERP system in the offices and in the plant on May 2<sup>nd</sup> . For the two weeks all the company was working with the old system and in parallel start with the new. Once the estimations done by the customer service is accepted by the client become production order and goes to the scheduling office that plan the production. After the scheduling phase the order is released for the production. Now the employees that work on the machine can see on the machine screen the list with all the jobs released. During these two weeks the major problem we faced was a bottleneck in Customer Service. The list of the jobs to run wasn't aligned with the scheduled one.

Working in parallel made this misalignment, obviously the old way was much faster to do it, and despite the production request was not electronic, reached the production plant before the Microsoft AX one. This was a problem in the office, they were to slow in the procedure and sometimes big mistake were made. This caused a bottleneck, all the production orders were stacked there. To solved this problem as fast as possible people from PLV came to train and develop people on the job. After few days of training the situation changed completely, indeed from Monday 14<sup>th</sup> of May they completely abandon the old system.



**Figure 30 Paper documents**

That was possible thanks the good work and train made by Columbus in PLV. How i said before it was not just training but development.

It's growing the team member so they become increasingly capable at doing the job, at improving how the job is done, and like in our case at training others. These guys by turning will help also Tifernate that in this period is having some problem with the system. The Fincarta idea for the future is to create a team of 5/6 persons able to manage the system by itself without any help from external consulting company. It might possible to reach that they will hire the consultant that is helping and following them since the start-up in Plv.

## 5. CRITICAL ISSUES

I started to work on this project in Fincarta companies on September 2011 and during this 8 months period where I tried to give my maximum support to achieve the goal, first in TwoCpack and then in Cartotecnica Chierese I noticed some aspect that might be improved and introduced.

My experiences were not that long to get used in the philosophy and in the mood of the company and also in both of them I knew that they were just 3 months long, so I can say that I saw and I try to see everything from an external point of view. Doing in this way I always try to do my best and provide them where it was possible the some good solutions. Here some proposals and critical aspects of Fincarta Group:

- Improvements.
- Introduction of RFID system.
- ERP benefits
- Family Owned Business
- Importance of Genchi Gembutsu
- Manage and allocate resources
- Time Zone



## 5.1. IMPROVEMENTS

Right now, it's not possible and in some case just difficult to say that this project let to the companies of Fincarta Group high benefits in terms of time and costs. The ERP has been introduced but we need at least a year to see the results and the system fully operational.

Talking with the consultant it came out a really bad point about the performance and KPI of the company. Usually before introducing a big project like this one where the technology change radically the flow and the way the people work is a good thing analyzing the actual situation and the performance of the company. In this way there is a AS-IS situation that in the future will be compare to the new one to see the results. The consultant's answer about that point was that to do that would require weeks of work. They prefer then to skip this phase and begin immediately with the training and the implementation. For sure the managers have performances indicators to make the comparison in the future but they didn't let the consultant do their analysis before.

In the Table 4 is possible to see how the ERP impacts on the company performances. Right now is very difficult to say a percentage of improvement of this KPI. It will take a while to see it.

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### Efficiency









It increases due to the elimination of labor-intensive manual processes and current duplication of efforts. The ERP will also streamline critical business processes for many department like purchasing and customer service. More efficiency also in data collection, no more data entering by hand.



### Cost

It reduces cost only if the company took accounting and reporting seriously even before implementation and had put a lot of manual effort



	on it. Less cost of personnel for reporting and accounting.	
<b>Quality</b>	Increasing of the quality due to a real time data and information of the production.	
<b>Traceability</b>	Increasing of the traceability of the Wip and of the final product.	
<b>Inventory management</b>	Better management of the inventories, the company has a global visibility on the stock of Raw Material and Finished Goods.	
<b>Relation between employees.</b>	The introduction of a new system increases the interest of the people. More collaboration during the training phase and in case of problems to solve. This increases for sure the relationship between the employees.	
<b>Workload and walking distance</b>	The ERP eliminates labor intensive manual processes. No more paper job-bags that have to be carried by someone. Everything is digitalized. All the data are on the screen, the production manager has not to walk through the machine to check the production.	
<b>Integration/communication</b>	Integration of different system and data sourcing with a easier communication to internal and external entities.	
<b>Access to data</b>	Increasing of self-service for data needs, real time data and better access to information. This helps and allows a better decision making.	
<b>Security of the data</b>	ERP improves data integrity and security and it's also possible create data restrictions.	

**Table 4 KPI that will improve due to the ERP implementation.**

## 5.2. POSSIBLE RFID INTRODUCTION

Another aspect that I would like to highlight is the importance of the packaging traceability. The introduction of the ERP increased and improved it a lot but it would be better with the R-FID





In recent years, in multiple industries, has increased the interest in RFID technology and its ability in 'optimize inventory and manage the flow of supply chain.

Although lagging behind the rest of the west, in Italy many companies have started to be interested in this new technology, implementing the first systems. Despite the scattering process is going through the initial stages it's possible to see the great potential for improvement in the industrial chain.

As regards Fincarta Group, introducing RFID technology, there would be good results in the execution time of the inventory and a maximum accuracy.

All these data regarding the inventory level, the traceability and the quality of the products are constantly updated simultaneously with the physical handling of product.

From the customer point of view RFID technology helps to improve performances in terms of time and accuracy with:

<b>Supply time</b>	
<b>Availability of data traceability</b>	
<b>Time of manual inventory</b>	
<b>Time of upload and download to the system of the goods</b>	

**Table 5 Customer performances**

Is also possible a reduction of the inventory level using the visibility guaranteed by the RFID and EPC system and by the high collaboration between the parts.

An RFID system would be important also for the transaction inside the company and their traceability or for that kind of item that need some extra process done by external companies. Inside Fincarta Group it's also very common that some production process are done by another company of the group. For instance Plv is running a Ferrero job, it can run all the processes except the embossing so it will send the job to Cartotecnica Chierese that will do it. A good traceability is important because it permits to have the perfect history of the job in case of defect on the final product and claims from the customers.

To better evaluate the possible introduction of an RFID system, a general analysis of Fincarta Group Processes has to be done.

## 5.3. PROCESS ANALYSIS

### 5.3.1. AS-IS SITUATION

In the Figure 31, the main processes carried out in Fincarta Group are represented through a flow diagram in which each process is represented by a block and the physical flow by an arrow. The sequence in which these blocks are positioned represents the logical order. The processes described are:

- ✓ Production
- ✓ Labeling
- ✓ Quality Control/Put-away
- ✓ Palletizing
- ✓ Storage
- ✓ Shipping

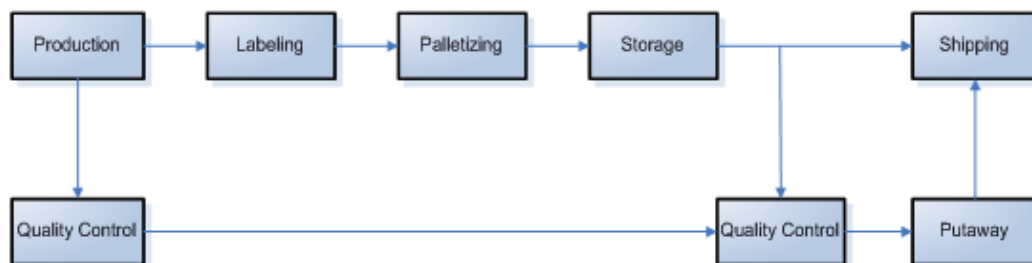


Figure 31 Microsoft Visio flow chart representing the current activities in Fincarta Companies

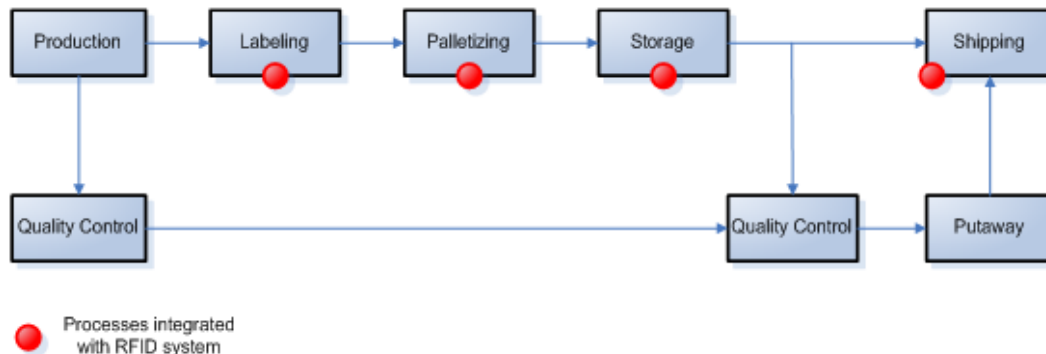
### 5.3.2. TO-BE SITUATION

Logistics processes identified through AS-IS analysis, previously done at Fincarta Group, can be affected differently by the introduction of R-FID technology.

In the Figure 32, the flow chart represents the Fincarta Group processes which are affected by the RFID technology.

In the next paragraph, I will describe the processes linked to RFID technology. The processes in which RFID will impact are:

- ✓ Labeling
- ✓ Palletizing
- ✓ Storage
- ✓ Shipping
- ✓



**Figure 32 Microsoft Visio Flow Chart representing the activities where RFID impact**

### 5.3.3. LABELING

The purpose of this process is to print and program tags for identification of the boxes, then associate the traceability data to the identification codes. At the end of the production process, the worker print the barcode label of the boxes. This barcode will

be read by an R-FID handheld terminal and then it will be sent directly to the R-FID printer. Now the tag must be applied to the box in the position that ensure maximum performances. The tag related to the pallet will be applied later. The Figure 33<sup>12</sup> shows a RFID tag.

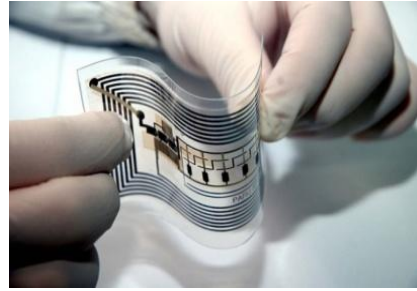


Figure 33 RFID tag



Figure 34 Boxes with RFID tag on a roll conveyor

#### 5.3.4. PALLETIZING

During this phase the worker has to apply the tag pallet on the cellophane film after the robot wrap it. The tag is printed by an RFID printer that create it just after the weighting phase and the reading of the barcode. The tag must be applied on the longer side of the pallet as you can see from the Figure 34<sup>13</sup>. From here we will manage just the pallet. When the pallet tag is created there's a process that saves all the data from the boxes tag and the pallet to ensure the maximum traceability.

#### 5.3.5. STORAGE

In this process the pallet is stocked in the warehouse (Figure 35<sup>14</sup>). Due to a door with RFID reader that separate the palletizing room from the Finished Goods Warehouse the tag is read and automatically load on the system. Next to this door there must be a light that with different colors gives a signal to the worker. Green light means that the tag is read otherwise it will be red. In case of breakdown must be possible the manual reading of the tag.



Figure 35 Pallets ready to be stocked

<sup>12</sup> Source: [www.google.com](http://www.google.com)

<sup>13</sup> Source: [www.google.com](http://www.google.com)

<sup>14</sup> Source: [www.google.com](http://www.google.com)

### 5.3.6. SHIPPING

Shipping process ensures the download from the system of the pallet and of the boxes that have to be shipped. This is possible due a door with an R-FID reader that read the tag before they are shipped.

When a pallet is read, the number of transport document is retrieved automatically.

Also here there must be a light that gives different signals to the worker:

- ✓ Green light: the tag was read and the transport document has been identified.
- ✓ Red light: the tag was read but the transport document has not been identified.
- ✓ Yellow light: the reader is about to read the tag.
- ✓ All the lights on: RFID door and reader are not switch on.
- ✓ Light off: the RFID reader doesn't work.

In the Figure 36, drawn with Microsoft Visio, is possible to have a general idea of how should be the warehouse with the introduction of the RFID technology.

As is possible to see from the Figure 36 the warehouse has two RFID gates equipped with readers. They will read the tags located on the pallets in order to maintain updated the stock level of the warehouse. The same will happen in the inbound customer warehouse. This maximize the visibility of the warehouse.



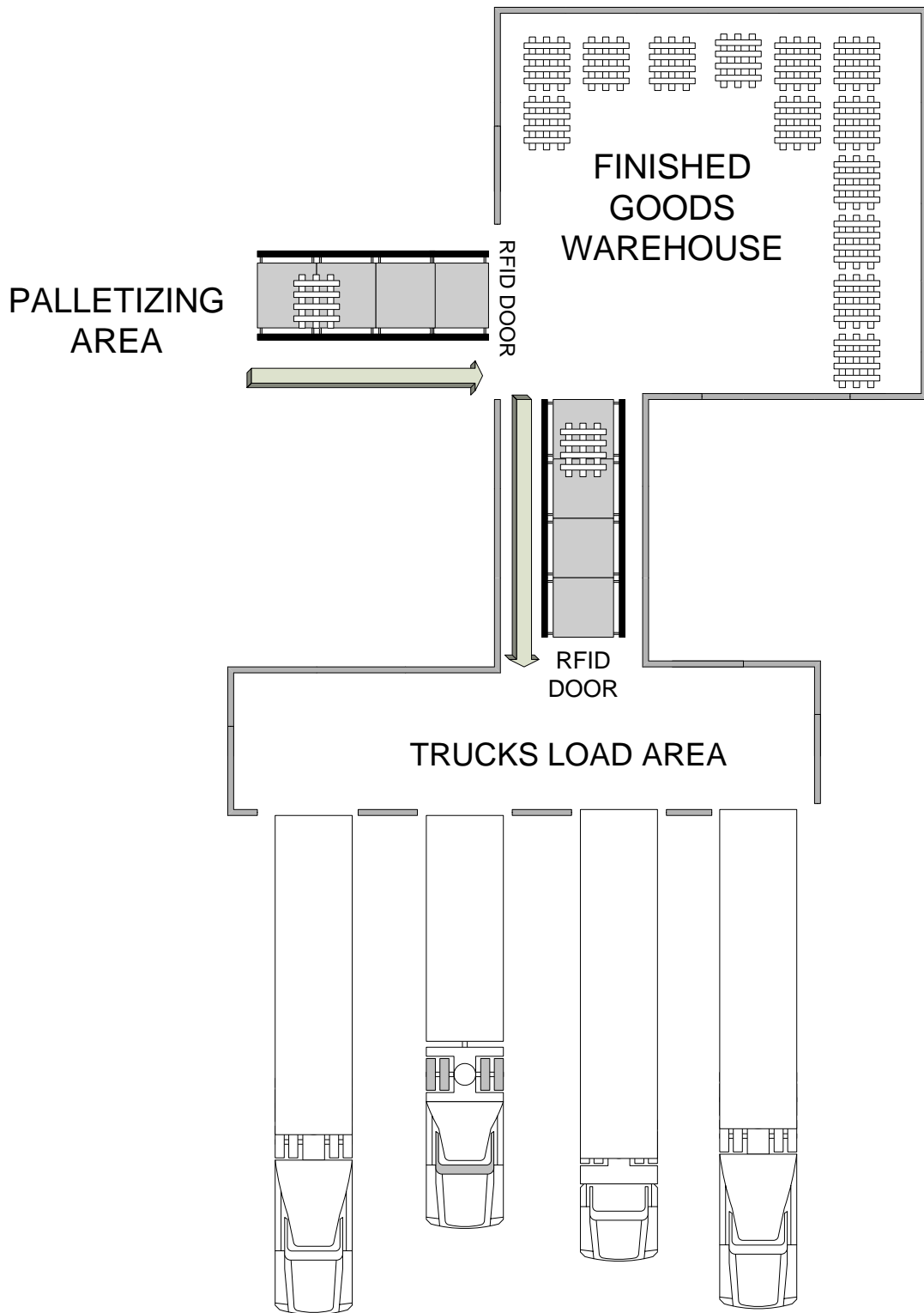


Figure 36 Microsoft Visio Map of the warehouse with the introduction of RFID system

### 5.3.7. IMPACT ON THE CUSTOMER ACTIVITIES AND PERFORMANCES

An RFID system won't be a benefit just for FINCARTA group but impacts also on the activities and performances of the customers. The activities where the RFID technology will impact are:

- ✓ Receiving
- ✓ Picking
- ✓ Returning

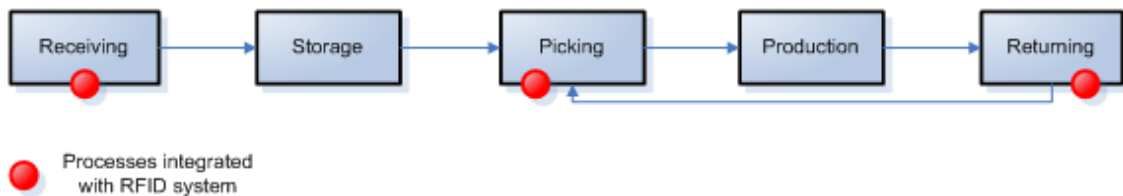


Figure 37 Microsoft Visio Flow Chart representing the customer activities on which the RFID impacts

In the Receiving activity RFID technology allows to check the inbound goods, to obtain all the data related to history of the good (traceability) and to update the inventory level.

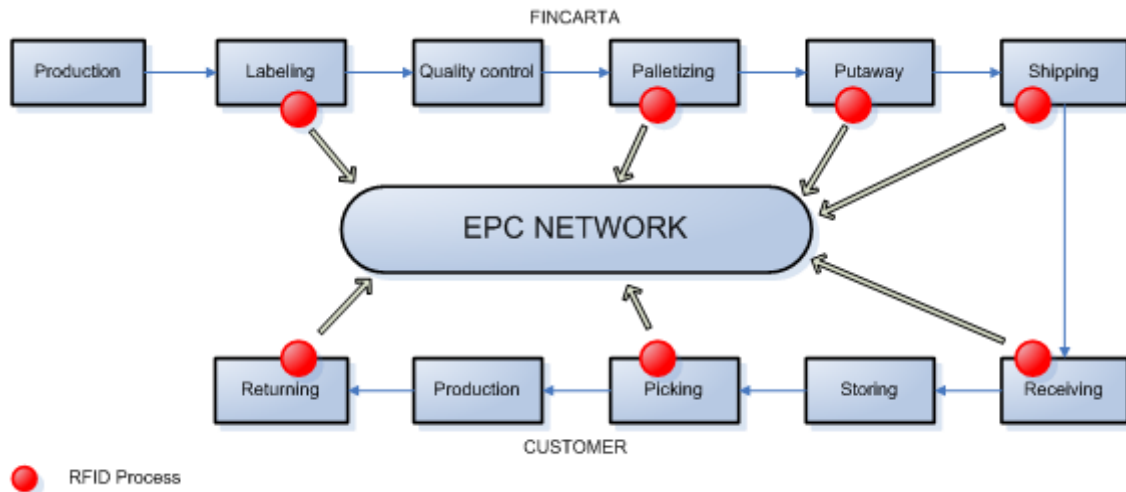
In the picking phase, RFID system allows to check if the retrieval from packaging material warehouse is proper and to update the inventory levels of the packaging material.

RFID has an impact also on the returning phase, indeed is possible to update the number of sheets remaining.

RFID technology is not easy and immediate to implement, so like all the big projects is better first of all implement a pilot one with one of the most fidelized customer or one that due to his ERP system can better support a new technology like this one.

The communication between the two companies works through EPC network. The two companies are integrated like in the Figure 38. The function of Electronic Product Code is to have a global network infrastructure- a layer integrated with the internet- that

would enable companies to look up basic information about items as they moved through the global supply chain. Additional data would be stored in secure database, so supply chain partners could share information about location of products..



**Figure 38 Microsoft Visio Flow Chart representing the integration between the customer and Fincarta companies.**

Due to the better visibility that Fincarta companies will have on the inventory level of the customer, through RFID system they will see in real time the inventory level of a determinate product that is stocked in the customer warehouse. This allows a better production scheduling which is reflected in a make-ready reduction.

### 5.3.8. INVESTMENT EVALUATION

The evaluation of the investment I'm providing is very simple but at the same time it gives an idea of the benefits it can bring.

Asking to the production manager, the estimated cost for a single make-ready in a each production process ( printing, die-cutting, folding-gluing) is around 1300 €.

Considering an investment cost of 45000 € , close to the investment incurred by Goglio Cofibox for the introduction of the R-FID technology with Luigi Lavazza S.p.A is possible to calculate our Break Even Point.

We can compare the possible Fincarta investment to the one Goglio Cofibox did, first of all because they are both printing company, the only difference is that Fincarta produces carton-board boxes and Cofibox flexible packaging. Number and types of production processes, company dimension and production volumes are very close too.

Considering 45000 € investment we will reach the breakeven point in almost 34 make-ready.

$$\text{Investment} / \text{Make-Ready Cost} = 45000\text{€} / 1300 \text{€} = 34 \text{ Make-Ready}$$

Assuming a reduction of one Make-ready per week the Pay Back Time is 1 year.

For the customer the main advantage is a considerable reduction of the inventory level. Usually companies like Ferrero or Luigi Lavazza have a safety stock equal to a month consumption.

Having a vision on the inventory level of Fincarta companies and a share of the stock, the customer will almost halve its level to a 15 days safety stock, with a reduction in fixed assets

## 5.4. ERP BENEFITS

Third important point I'm going to analyze is the function of a ERP.

An ERP is an integrated system that propose to overcome the problem of the fragmentation of the information. The problem of fragmentation originates from the fact that, although the transactions within a 'organization are linked to one another, for each of them are produced and collected by large amounts of data, which, however, are generally not contained in a single database and are often managed by separate information systems, which operate at the function levels, business unit or country.

The ERP solution try to integrate all business processes, replacing several legacy systems with one system that facilitates data management and ensures the continuous updating.

Sometimes, like in Fincarta Group, the ERP system cannot support some functionality as gathering data on the machine. For this kind of function there is a dedicated system called OPERA that interface with Microsoft AX. The ERP is a kind of platform where other system can interface.

All the companies of the group have an architecture like this except Cartotecnica Chierese that has in addition to Opera another system called Trascar that manage the automated warehouse.

With an architecture like this it might happen that there are some communication problems between the different systems and the management costs are higher. You need support from 3 different company in Cartotecnica Chierese case.

In my opinion to see the results of the implementation it will take at least one year and then it's necessary to deal simultaneously with tree challenges if you want to maintain and improve you r performances.

First of all the company has to continue to manage all the activities maintaining their performance and where is possible, thanks to the ERP, improve them in terms of efficiency and effectiveness.

A continuous improvement thinking must be the company long term philosophy.

The Figure 39<sup>15</sup> shows how the implementation of the ERP, that is a radical change in a company together with a continuous improvement philosophy can impact on the core business of the company improving the efficiency and the effectiveness

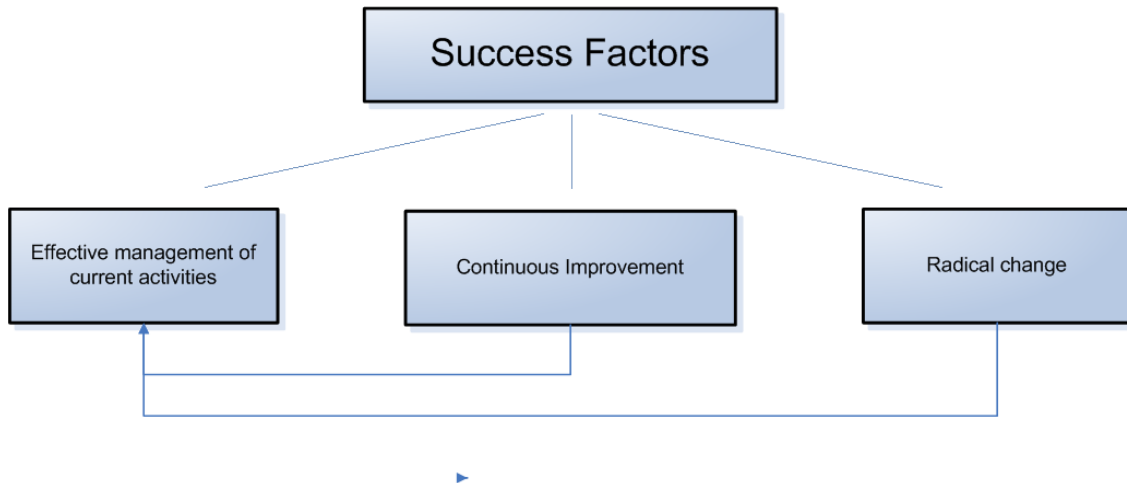


Figure 39 Success Factors to manage the innovation

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<sup>15</sup> Source: Emilio Bartesaghi, Dove va il BPR? L'innovazione organizzativa basata sulle ICT, Mondo Digitale, n.2, June 2002

## 5.5. FAMILY OWNED BUSINESS

Around 95 % of the Italian companies are SME and most of them were born thanks to two main factors:

- The ability to create and implement new products by the entrepreneur.
- The involvement and support, both economically and in terms of personal and family.

Focus on the product and “family” have allowed many companies to increase the number of their customers, turnover, number of employees, investments etc..

In Italy most of the owners of 110000 out of 240000 SMEs, created at the end of the '60 are around 60/65 years old. That's why in Italy right now ,the problem of business transfer is one of the most common.

The business transfer from the first generation to the next is always hard and there could be big conflicts. From some studies done by Il sole 24 Ore, if companies don't reach the third generation it's because the conflict inside the family. 90% of the companies don't reach the third generation, and 70% cease their activities between the first and second generation. Sometimes the best solution to solve and to avoid this issue is to hire external consultants for two main reasons:

- ✓ More awareness of business situation.
- ✓ Possibility to have inside the company a figure able to identify the best way and solutions to guide the company in the right direction during the business transition.

The consultant has also the role to find out some solution for mediation that will be better accept from an external then from an internal.

Grow the size of the company is inevitable spread functions of each family member in different and not overlapped roles, functions and responsibility. It's almost inevitably the need to place the relatives in key positions, regardless of competence, professionalism and attitude.

There are very few company in which the owners bring their children in the company only after a professional career and an external experience. A path of growth outside the family business is necessary. The persons concerned in this way will learn, without any favorable conditions, the role of subordinate, organizational virtues and vices completely different from those of their family business.

In parallel in the last years the organizational complexity, the need for more careful management, the complexity of the internal relationships between the departments continued to grow. The family become then inadequate but also an obstacle to the growth.

That pushes the companies to a managerial management.

That is exactly what is happening in the last years in most of the Fincarta Group companies. All the companies used and still have a family administration but they are trying to switch to a managerial management at group level. This change will take time. Time is needed because it won't be easy this kind of change, it is considered like a radical one.

In the table 6 I will analyze this change with different strategic factors. On the left column we have the strategic factors, in the middle one how family management does it work and in the right one how it should be in a managerial management.

The transition from family to managerial management, which seems simple to implement, represents one of the obstacles to be overcome in the process of growth by SME's. The difficulties will increase if there is a generation shift.

This kind of transition require the use of a precise, standardized and tested protocol intervention, the development of specific instruments.

It should finally emphasized that this step requires, first of all that entrepreneurs and the family change mentality and conduct. This is the main obstacle and must be tackled first.



<b>Strategic Factor</b>	<b>Family</b>	<b>Managerial Management</b>
<b>Strategy</b>	Entrepreneur decide the company strategy in relation with his ideas.	Strategy is decided by the top management. We need then specific roles and functions.
<b>Organizational structure/roles</b>	Confused.	Roles and structure of the company well defined by an organization chart.
<b>Relationship</b>	Related to the property and to the family relations.	Related to the competencies
<b>Administrative roles</b>	Family people not well educated	Good manager or family people good educated. Training and an hiring plan is needed.
<b>Assets</b>	The assets and income are not well defined between family and company one.	There's a clear distinction between company and familiar assets.
<b>Control</b>	Confused and most of the time is not defined	Precise and clear thanks to the budgets and a management control system.
<b>Values</b>	Familiar	Company values are well known and shared . Training is needed.
<b>Training</b>	Limited to the technical aspects and occasional	It's strategic and it's viewed like a support tool to the processes. ( Training on the job, seminar, meetings, coaching and managerial classes).

**Table 6 Differences between family and managerial management**

Another good point that I would analyze and actually is linked to previous one, is the importance of the propensity and commitment to change by the persons that are working inside the company.

It's not easy to have a whole-hearted commitment to any change, you must involve staff members. The employees who will be expected to implement the change, must be involved in the creation of the change. That doesn't mean they set the goal, but they must be significantly involved in the definition, in designing the changes, in implementing the changes and finally in evaluating the effectiveness of the changes. They will never whole-heartedly support a change they were not involved in creating. In my opinion the best way to involve them is to create team and let them work like a group. In this way there will be more motivation, more communication, they will find easily the solution but also the errors and mistakes.

Commitment is necessary. but the company needs also leaders that exhibit a unique blend of charisma, vision and character traits that attract people to follow them. Leaders recognize the need to attract followers.

To follow, people must feel confidence in the direction in which the leader is headed. They are enabled and empowered to do their part in accomplishing the stated objectives. The leader must help followers answer the question.

Usually, the leader is the person who is in charge or in case of, the founder of the business, the CEO, the president or department head. Leadership qualities combined with positional power magnify the ability of an individual to attract the all-important followers. Longevity, too, plays a role in attracting and retaining followers. People who have followed the leader for ten years will continue to follow unless they lose trust in the leader's direction.

As I said before Fincarta companies are switching to a managerial management. One of the main issue is that the leaders are still inside the company and they are part of the top management. The people that have followed them for decades still trust on them more than the new managers.

The new managers must be able due to their skills to convince the people to follow them and to consider them the new leaders. I think the best way to reach this objective is to create an organization composed by department team. Each department has to have a group leader that trust in the new vision and mission of the company and that is able

## 5.6. IMPORTANCE OF GENCHI GEMBUTSU

In the Figure 40 drawn with “Microsoft Visio” we have a general view of Cartotecnica Chierese Raw Material Warehouse.

With this picture I would like to show how important is to pay attention and studying as good as possible the layout and the flows of the processes of a company.

The red line is the path that the pallet with blank sheet does to arrive to the “Volta pila” that is a machine used to reverse the sheets to make them ready to be printed. After this operation the pallet goes straight to the printing machine.

Walking through the production plant every days, 8 hours per day it's much easier to notice what could be improved with a very simple changes. This is one of the 14 principles explained in the book “Toyota Way” written by J. Liker. The name of this principle is Genchi Genbutsu, literally it means actual place, actual thing. The most popular definition seems to be that Genchi Genbutsu means to go and see with your own eyes at the place the work is done.

The one I'm showing it's a very easy example that I faced during my staying in the company.

As you can see from the figure 40 there's a green line that shows the TO-BE solution in order to save transportation and time. As I mentioned in the first part of my document transportation is one of the main Muda. To avoid it, actually it's not complicated. The machine to reverse the sheets stack it's easily movable to another part of the plant and just change the path of the forklift.

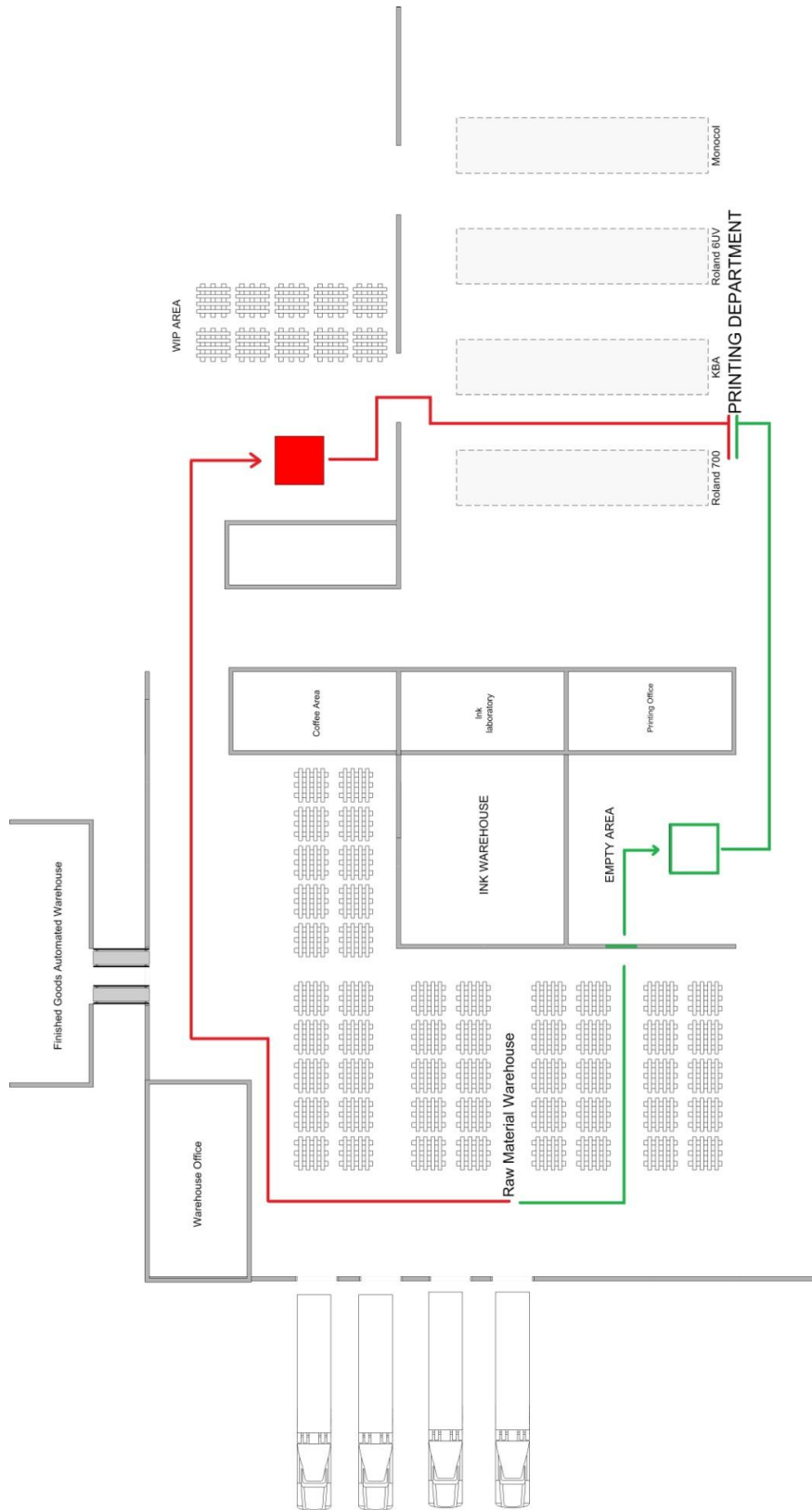


Figure 40 Microsoft Visio map that shows the AS-IS flow in red and the TO-BE one in green

Doing like that we will see soon better performances in terms of time and worker will have free time that can be dedicated to others value added activities.

Considering that Cartotecnica Chierese printing machines (Roland 700 and KBA ) runs 10000 sheets per hour and usually on a pallet there are 3000/4000 sheets, each machine runs maximum 2/3 pallets per hours. For this small analysis I will consider just these two machine because the other two runs just wip. They work printed sheets coming from Roland and KBA.

Considering then 3 pallets x hour per machine, knowing that the company work 2 shifts of eight hours we have:

$$2 \text{ machines} \times 3 \text{ pallets per hours} \times 2 \text{ shift} \times 8 \text{ hours} = 96 \text{ pallets} \times \text{day}$$

Knowing that:

$$\text{Path AS-IS} : 130 \text{ m}$$

$$\text{Total transportation distance per day AS-IS: } 130 \text{ m} \times 96 \text{ pallets} = 12480 \text{ Meters}$$

$$\text{Path TO-BE: } 60 \text{ m}$$

$$\text{Total transportation distance per day TO-BE: } 60 \text{ m} \times 96 \text{ pallets} = 5760 \text{ Meters}$$

$$\Delta (\text{AS-IS} - \text{TO-BE}) = 12480 \text{ Meters} - 5760 \text{ Meters} = 6720 \text{ Meters}$$

The differences between the to paths is almost 7 km per day, that can seem not a lot, but if we consider the entire year it will be a huge muda. Considering 52 weeks per year, we have then 260 working days per year (52 weeks x 5 days/week).

The whole distance we can save in one year is then :

$$260 \text{ days} * 6720 \text{ Meters} =$$

$$1747200 \text{ Meters} = 1747 \text{ Km}$$

In terms of time (assuming that a forklift goes 8/10 Km/h) it will be:

$$1747 \text{ km}/10 \text{ km/h} = 174.7 \text{ hours per year}$$

Considering 5 days a week and two shifts per day, 174.7 hours are equal to almost 11 days of just transportation.

Since a worker shift is 8 hours per day, 175 hours are more than a working month.

I can say that it's a big saving in terms of energy, money and time considering that there aren't extra cost in doing this very easy change.

Assuming that:

$$\text{Worker cost per year} = 25000/35000 \text{ Euro}$$

I can save in terms of cost of work 2085/2915 Euro per Year.

We should also consider the energy cost of the forklift.

According to an article written by Steve Munton<sup>16</sup> in January 2011 which the title is “*Electric forklift vs LP forklift – Reduce Operating Cost*” I can easily estimate the savings in terms of energy.

An electric vehicle consumption is usually around 40 KWh per day or 700 KWh per month, considering 8 hours per day. Let's calculate then the total consumption during the 175 hours of transportation:

$$N^{\circ} \text{ days} = 175 \text{ hours} / 8 \text{ hours} \times \text{day} = 21.87 = 22 \text{ days}$$

$$\text{Total Consumption} = 22 \text{ days} \times 40 \text{ KWh/day} = 880 \text{ KWh}$$



Figure 41 Italy map

<sup>16</sup> Source: [www.warehouseiq.com](http://www.warehouseiq.com)

Now according to the following table<sup>17</sup>, that shows all the energy cost in the European countries I can easily find out the saving.

From the Figure 42 the Energy cost in Italy is around 0.15 Euro/KWh.

**ELECTRICITY INDUSTRY**

**End-user energy prices for industrial consumers.**  
 Two consumption levels are identified. [Research methodology](#).  
 Price data mentioned may not reflect the latest insights found in the [commercial editions](#).

Reference month: November, 2011.  
 Historical price data going back to the year 2000, visit [EU Energy History](#)

Consumption: 2 GWh/year (± 50%)		Consumption: 20 GWh/year (± 50%)	
Country	€ per kWh Electricity	Country	€ per kWh Electricity
Austria	€ 0.1213	Austria	€ 0.1039
Belgium	€ 0.1182	Belgium	€ 0.1053
Bulgaria	€ 0.0746	Bulgaria	€ 0.0674
Cyprus	€ 0.1822	Cyprus	€ 0.1707
Czech Republic	€ 0.1195	Czech Republic	€ 0.1072
Denmark	€ 0.1091	Denmark	€ 0.1075
Estonia	€ 0.0817	Estonia	€ 0.0812
Finland	€ 0.0784	Finland	€ 0.0766
France	€ 0.0763	France	€ 0.0697
Germany	€ 0.1340	Germany	€ 0.1195
Greece	€ 0.1188	Greece	€ 0.1036
Hungary	€ 0.1194	Hungary	€ 0.1066
<b>Italy</b>			<b>€ 0.1565</b>
Lithuania	€ 0.1100	Lithuania	€ 0.1100
Luxembourg	€ 0.1180	Luxembourg	€ 0.0916
Malta	€ 0.1927	Malta	€ 0.1713
Netherlands	€ 0.1181	Netherlands	€ 0.1063
Poland	€ 0.1142	Poland	€ 0.0993
Portugal	€ 0.1064	Portugal	€ 0.0931
Romania	€ 0.0925	Romania	€ 0.0793
Slovakia	€ 0.1327	Slovakia	€ 0.1203
Slovenia	€ 0.1162	Slovenia	€ 0.1001
Spain	€ 0.1271	Spain	€ 0.1043
Sweden	€ 0.0887	Sweden	€ 0.0770
United Kingdom	€ 0.1149	United Kingdom	€ 0.1019

**Notes:**  
 - Amount is in euro (€) per kilowatthour (kWh).  
 - End-user price. Includes all duties, except recoverable taxes (e.g. VAT).  
 - Price data for non-eurozone countries are in euro. The average exchange rate valid for the referenced month is applied.

↑ TOP

Figure 42 Electricity cost table

<sup>17</sup> Source: www.energy.eu

The saving is equal to:

$$\text{Saving} = 0.1585 \text{ Euro/KWh} \times 880 \text{ KWh} = 140 \text{ Euro}$$

The total saving of this small change of the production flow is:

$$\text{Total} = 140 \text{ Euro} + 2085/2915 \text{ Euro} = 2225/3055 \text{ Euro/year}$$

This would be the cost that the company would save using my option. It's also good considering that the company can use the 175 hours saved in doing other activities that would add value to the production and finished goods. For value added activities I mean all those that the customer is willing to pay for.

One of the benefits the company can have is a reduction of the lead time. It will be more faster in satisfy the customer, this nowadays is necessary.

That's why manager should "live" the plant, and with that I mean staying more there than in the offices. They will notice a lot of problems that otherwise would be unthinkable.



## 5.7. MANAGING AND ALLOCATE RESOURCES

Second-last aspect I would like to highlight the importance of managing people and allocate them during the first phases of the project. Most of the times when you introduce a new technology you should consider that it will impact not just on the future performances and on the process flow of the company but also on the human resources. Their workload sometimes increase or decrease depending on the department so before the introduction and the start of the project it's always necessary a detailed analysis.

An example could be the problem that occurred in the office of the finished goods warehouse. If in the customer service or in the scheduling during the first period of the implementation it's not important how much time are you taking or if completed correct the way you are working in the warehouse office it's necessary. The transport document and everything they do must be perfect and in time. Trucks can't wait hours because employees are not enough or just slow in doing their job.

## 5.8. TIME ZONE

Last critical aspect coming from the implementation of the ERP in TwoCpack, located in USA, was the time difference between the two country, we were 6 hours ahead, this means that during a working day we could have help from Italian consultants just from 3 pm and we were not sure to have their support because most of the time they were busy.

## 6. CONCLUSION

All the previous topics I analyzed, were considerations and proposals related to the two companies I worked with.

In a difficult period like the one we are living, is important and sometime necessary to study and have all the tools to face and overcome the crisis.

Nowadays the competitiveness of the companies is measured on the efficiency of the production system and on the innovation of the product and of the processes.

Furthermore is based on the quality and professionalism of human resources of the companies. The level of specialization that the market ask is such exasperated that only with a careful planning of the training, companies are able to create a competitive advantage and gap with the emerging countries like China<sup>18</sup>, India and Brazil.

That's why in the previous topics I tried to analyzed and find solutions and proposals related to these aspects:

- Process Innovation (RFID)
- Product Flows in order to have more efficiency during the production
- Human Resources

This is the way Italian SMEs should follow to maintain the leadership and their competitiveness in the market.

The introduction of technological solution remains one of the points of weakness for the SMEs. Indeed, it's hard for them to meet the financial needs of the investment and the

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<sup>18</sup> China, since several years, is one of the largest manufacturing centers of the world. All European enterprises and in particular the Italian companies must confront with this reality. This challenge is very difficult for our SMEs, that for the first time compete with a reality which has much lower production cost, an internal market very large, a network infrastructure that is closest to that of a developed country than a developing country.

risk related to the uncertainty associated with the long period of recovery of the financial expenses. It's hard to define a Pay Back Time.

Most of the technological innovations require high initial investment, the large companies can cope them with minor difficulties, and they also hold the ability to initiate research projects, to apply and disseminate the results.

One of the best solution for the SMEs that want to sustain this kind of high investment to remain competitive and leader in the market is to create an enterprise network. An enterprise network is a group of companies that are legally independent, whose relations are based on relationships of trust. This improves the quality of the final product and cut costs. It resolves the problem of raising capital, it fractionates the risks and the application of the technologies will be much faster

The degree of confidence that can be established between the partners, the exchange of information and knowledge, the presence of a planning system will impact on the survival over time.

The enterprise networks is also risky when there is:

- Excessive reliance by the leader: when it goes into crisis jeopardizes the survival of all others.
- Opportunistic behavior.
- Divergence of objectives.
- Loss of know-how.

To conclude in my opinion, in such a period, increasing the size of the company is unthinkable, the only strategic alternative to increase the competitiveness and for the strengthening is represented by the collaboration with suppliers, competitors and customers.

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