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The launch of an environmental management system (EMS) into a Como's weaving mill -Project-

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Abstract

The main goal of this project is trying to design, set up and introduces a new environmental management system (EMS) into a Como's weaving mill. This project analyse the company from a horizontal point of view, which allowed me to have a broad overview on the functions and roles of the people working there. Planning and running new processes and improving the current ones is the final goal of this project; in this way we will be able to manage, track and provide environmental information crucial for the supply chain. Introduction showing the excursus of on environmental related measures and policies adopted in the last decades by both the governments and the companies; a discussion on the outstanding and promising results of the adoption of this kind of systems in the last few years. Detailed company profile, the description of the methods we adopt and the company growth during the passing of the time and a meaningful comparison with the academic literature, creating a scale between barriers and benefits. The last step shows the analysis AS-IS of Clerici Tessuto processes and the TO BE of the new and the revisited processes with the related conclusions, and the proposal of the valuation of a supply chain environmental informatics portal.

Estratto

L'obiettivo di questo progetto è stato quello di cercare di creare e applicare un sistema di gestione ambientale (SGA) a una tessitura serica comasca. Questo progetto ha avuto una visione orizzontale all'interno dell'azienda che mi ha permesso di vedere tutte le funzioni e ruoli. L'output di questo progetto è stato la progettazione e sarà la creazione di nuovi processi e il miglioramenti di quelli presenti che permettano di gestire, tracciare, comunicare le informazioni ambientali necessarie alla filiera. Nella parte iniziale è descritta l'origine del lavoro: Partendo Dal Protocollo di Kyoto, passando per il CNMI (Camera Nazionale Moda Italia) per poi arrivare alle grandi firme della moda e sulla loro Supply Chain. Un'analisi della letteratura accademica seguita dalla descrizione della metodologia

e dell'evoluzione dell'azienda e un confronto con l'analisi della letteratura accademica cercando di fare un bilancio tra vincoli e benefici. Un'ultima parte dove si analizzano le parti coinvolte attivamente nel progetto con un'analisi AS-IS dei processi della Clerici Tessuto e il TO BE dei processi rivisti e nuovi con relative conclusi. Si propone inoltre un'alternativa alle precedente soluzione con l'inserimento di un portale informativo per lo scambio di informazioni ambientali con i fornitori.

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Executive Summary

This project work is the result of the hard work of a student who aimed to end his university educational path by putting into practice the academic teachings acquired throughout the last 5 years and plunging into a real work situation.

The main goal of this project is trying to design, set up and introduces a new environmental management system into a Como's weaving mill.

This project analyse the company from a horizontal point of view, which allowed me to have a broad overview on the functions and roles of the people working there.

Planning and running new processes and improving the current ones is the final goal of this project; in this way we will be able to manage, track and provide environmental information crucial for the supply chain. By new processes we mean collecting information supposed to be analysed by designated people appointed to complete this task. Why are we talking about supply chain? Because there isn't any company able to cover all the production steps involved into the manufacture of the final fabric, consequently, each company focuses and specialises into a single phase of the supply chain of the cloth production but, off course, like in every field, there are many direct competitors for each phase of production. The literature review is focused on the analysis of the impact of this instrument in the small-medium companies and their strong and weak points in the global market. The analysis of the current situation and how it affects the different company systems in the last few decades helps us to discern the key processes to implement from the less relevant. The analysis of the environmental instruments already applied and the case studies enables us to understand the impact on the processes and catch the strong and the weak points.

The management system involves many issues faced during the university educational path, starting from the strategic to the operative level, in particular it range from processes analysis, to the business analysis, to the quality methods to the realization of the specific indicators. The concrete development of the

environmental management system takes 5 months; the candidate was used to go to the main quarter of the company at least once a week to work on the project.

Thanks to the helpfulness of the general director, Roberto Cozzi, the project advanced at a very fast rate and achieved a positive outcome from the employees.

In the chapter 1 there is an introduction more detail about my project and about the situation of fashion industry correlated with sustainability.

In the chapter 2 there is an introduction showing the excursus of on environmental related measures and policies adopted in the last decades by both the governments and the companies; through the analysis of interviews and articles discover that this project born like a micro object of a world's project correlated with Kyoto 2020 Protocol. With the help of government, CNMI(Camera Nazionale Moda Italia) and the biggest fashion brand they are involving all the supply chain to reach environmental results. Thanks to a global project like ZDHC (Zero Discharge of Hazardous Chemicals) promote by Greenpeace or Kering Pilot environmental project all the chain should be involved in the environment changing.

In the chapter 3 there is a discussion on the outstanding and promising results of the adoption of Environmental Management System in the last few years. Analysing articles I focus my attention on certifications ISO and EMAS because they represent the only method to track results about the adoption of EMS. In the end we focus on pro and con show up in the papers analysed. I focus my attention on benefits and barriers because represent the incentive to promote the development of an environmental system in a mill and the barriers that often can be difficult to go beyond especially in a project where there is a student to promote the changing.

In the chapter 4 there is a detailed company profile, the description of the methods we adopt and the company growth during the passing of the time and a meaningful comparison with the academic literature. In the begging there is a plan about my job and how develop it during the 5 months in Clerici Tessuto (The Weaving Mill), after a detailed analysis that show up the existent processes of the company useful to understand better how a company work and how is possible change something inside it. In the end of the chapter we find a scale that show how are distributed the barriers and benefits inside the Clerici Tessuto to adoption of Environmental

Management System. The result shows how Clerici Tessuto is not ready to adopt an entire EMS especially in production for two main reasons: Lack of awareness of benefits, Resistance to change. These two reasons born both from the low authority of the student that tries to bring the changing and the low intention to add some additional job to the already existent (This is justifiable because in a company where there are high economy of scale the volume of jobs are already huge).

Chapter 5 shows the work develop on the segment chosen by direction and me: the relationship with suppliers. Initially The analysis AS-IS of Clerici Tessuti processes permit to understand where is possible add new task ; the processes analysis are Weaving Mill and Quality Control, Suppliers, Ennoblers. The rewriting of the processes permit to suppose the hiring of a new resource. To weigh out the quantity of work and the role of the new employee we have done an analysis face of the volume of the work to be done form each new process. Later TO BE of the new and the revisited processes are explained with the related conclusions. Another process created is the management of waste result partially because there is an analysis of waste in production function.

In chapter 6 are shown shortly conclusion and consideration begging from the experience done in Clerici Tessuto . The realization of an Environmental Management System must be done from experts because it result in my experience more important the influence and ability to share the real value of a EMS than the result show up form a literature review without real experience. In conclusion has not been possible to apply a EMS to all the mill but only to specify processes, but a good basic on which beginning a complete implementation.

1. Introduction

1.1 Main introduction

The main goal of this project is trying to design, set up and introduces a new environmental management system into a Como's weaving mill.

In order to reach this goal I decided to keep working on a project already started by Lake Poli School ; it's a project lunched by the Polo Territoriale di Como (Como District) aiming to establish a dialogue and a partnership between University and Corporations, an approach that usually features the Politecnico di Milano inclination and aptitude.

It's difficult to find a more suitable project to put into practice the know-how I've been gaining during these last few years working on a real business situation.

This project analyse the company from a horizontal point of view, which allowed me to have a broad overview on the functions and roles of the people working there.

Planning and running new processes and improving the current ones is the final goal of this project; in this way we will be able to manage, track and provide environmental information crucial for the supply chain.

By new processes we mean collecting information supposed to be analysed by designated people appointed to complete this task. Why are we talking about supply chain?

Because there isn't any company able to cover all the production steps involved into the manufacture of the final fabric, consequently, each company focuses and specialises into a single phase of the supply chain of the cloth production but, off course, like in every field, there are many direct competitors for each phase of production.

The textile sector is one of the most profitable one in the Como district and nowadays counts about 700 companies into the production of high quality fabrics.

Although it is a globally renowned market, in the last decades, it has been facing a crisis because of the tough competition from overseas developing countries offering lower prices for the goods.

This market segment is mature and quite saturated; consequently being competitive on the market depends on the company structure and on the peculiarity of the products manufactured.

In our society there is strong connection between the environmental problems and the economic ones. More and more Media, Governments and common users opt for services and products adhering to ethical requirements.

The safeguard and the preservation of the environment is an important matter for the companies because in the future it will be the key of the success for the business competitiveness in the global market.

The figures confirms this thesis:

The Green Italy 2014 Report carried out by Symbols and Unioncamere shows how the industrial sector in Italy is gradually becoming more and more competitive going through sustainable and responsible processes. (Francesca Fumagalli, 2015)

Thanks to the “green investments” the companies aim to reduce the consumption and consequently the costs; they are constantly endeavouring to improve and make more efficient and effective the production system.

The interesting fact is that the companies which have adopted a green energy management system profit on average 11.3% more than the other the ones which didn't; in what concerns the exportations, those companies profit 21% more than the competitors. (Francesca Fumagalli, 2015)

It's comprehensible the leading multinational corporations are more sensible to the public opinion and want to extend their modus operandi to all the supply chain.

But it's unlikely to conceive a real sustainability if we don't involve the producers of raw materials and all the companies involved into the production chain.

The main limit to this process is that we can't have an overall global control of the process but we have to manage that each supplier builds its own system to control

and guarantee his supply chain's segment. It's the only way to get an effective environmental control.

The development of the environmental management system started with a in-depth review of the academic and mostly professional literature related to the ISO 14001- ISO 14004 and other cases of integrated quality- environmental management system of other companies. (Chiarini, 2012) (Rosita, 2012)

The literature review is focused on the analysis of the impact of this instrument in the small-medium companies and their strong and weak points in the global market.

The analysis of the current situation and how it affects the different company systems in the last few decades helps us to discern the key processes to implement from the less relevant. The analysis of the environmental instruments already applied and the case studies enables us to understand the impact on the processes and catch the strong and the weak points. An environmental management system is subdivided in many different segments with different levels of impact.

The management system involves many issues faced during the university educational path, starting from the strategic to the operative level, in particular it range from processes analysis, to the business analysis, to the quality methods to the realization of the specific indicators.

The accurate choice of the performance indicators to be adopted, their introduction and their communication, are crucial in order to let the employee work without oppressions and the supervisor monitor effectively his job.

The concrete development of the environmental management system takes 5 months; the candidate was used to go to the main quartier of the company at least once a week to work on the project.

Thanks to the helpfulness the of the general director, Roberto Cozzi, the project advanced at a very fast rate and achieved a positive outcome from the employees.

The analysis of the competitive market of Clerici Tessuto shows what are the key internal factors that contribute to the achievement of its goals.

The thesis reports all the phases of project subdivided in 5 macro areas:

- In the chapter 2 there is an introduction showing the excursus of on environmental related measures and policies adopted in the last decades by both the governments and the companies;
- In the chapter 3 there is a discussion on the outstanding and promising results of the adoption of this kind of systems in the last few years.
- In the chapter 4 there is a detailed company profile, the description of the methods we adopt and the company growth during the passing of the time and a meaningful comparison with the academic literature.
- Chapter 5 shows the analysis AS-IS of Clerici Tessuto processes and the TO BE of the new and the revisited processes with the related conclusions. The
- Chapter 6 proposes the final conclusions.

1.2 Overall view

The following chapter help me to speak more generally on what is happening globally, why this project born like a little piece of huge project that involve the Italian government to curve inwards in Kyoto 2020 Standards. (Podesta, 2014) What about international Kyoto protocol? The Kyoto protocol is an international treaty that commits State parties to reduce greenhouse gases emissions. The aim of the treaty is to reduce the man made emissions in a quantity 8,65% lower than production of protocol of 1985. This treaty engages all the biggest industrial Italian association to act directly through the state loan to reach this aim.

The biggest fashion industrial association, Camera Nazionale Moda Italia (CNMI), is involved directly because it gather the biggest Italian brand and indirectly on all the Italian supply chain.

So the reason why this project touch the energetic aspect as Francesca Mangano said for Italian and Swiss markets for “Made-By”, a U.K.-based non profit group that helps fashion and textile brands improve the life-cycle impact of their collection. “The sustainability transformation in the fashion and textile sector focus

mostly on (energy) efficiency, although the concept of a sustainable supply chain is growing, few Italian companies have taken a holistic approach with practices that include life-cycle assessments". (Emily, 2014)

Environmental sustainability is a delicate subject and a work in progress, with many firms still defining their strategies. Gucci, Valentino Armani And Prada serve on the national chamber of Italian fashion, or CNMI, sustainability commission. Gucci leads the group and is known for its consolidated experience in the field.

Its French parent, Kering has adopted group-wide targets affecting 21 top brands addressing Deforestation, carbon dioxide emissions waste water usage, responsibility raw materials sourcing. As well as eliminating hazardous chemicals throughout the global supply chain by 2020 according to its web site.

Micaela le divelec , Chief Corporate operating officer di Gucci communicate that Gucci will be able to create in 2016 its first "Environmental Profit and Loss "(Environmental P&L) document with real data taken in 2015. (Emily, 2014)

A Environmental P&L is a document that follow the del Global Report Institute (GRI) and permit to describe externally what a company done and what will be done inside the boundary of the company about environment.

Valentino e Burberry are doing something following the same way . thanks to a agreement done with Greenpeace in which they declare to eliminate the harmful chemical. "Zero Discharge of Hazardous Chemicals " (ZDHC) is a ambitious project that have the aim to eliminate completely all hazardous chemical substance from the supply chain, but not only because have the goal to create a new standard changing completely the fashion industry. (Valentino, 2014)

"To reach the aim of a holistic changing and the new green product commercialization we need to change all the chain starting from the raw materials and the process. This mean a huge partnership and collaboration between a thousand company" said Jessica Wollmuth ZDHC Programme Manager.

The CNMI's sustainability commissions developing a concrete framework of processes and procedures for members to follow Adherence to this strategy will be

optional, but it is expected to set an industry Standard among heavyweights at the top of the Italian supply chain. (Emily, 2014)

Gucci, Valentino, Armani, Prada are also among 11 major Italian maisons Serving on CNMI roundtable that hammered out the manifesto on Sustainability in 2012 a Document defining Common values and a sustainability agenda for made in Italy.

Gucci who chairs the CNMI Sustainability commission, explained that the luxury industry is taking environmental and social impact seriously. She said efforts are being made to reduce risks regarding reputation and price volatility while increasing opportunities, such as building brand value, sales and innovation. “To distinguish oneself from the competition is an element, but the main issue is to guarantee a sustainable long life to business”.

Greenpeace Italy’s Chiara Campione the heads up Fashion Duel Project – an initiative that has been a gadfly in recent years, Challenging fashion labels to communicate their practices and lobbying them to commit to purging environmentally unsound ones, said she believed the Italian fashion system had reached the tipping point. “We See behind the scenes the movements of very luxury goods reorganization processes, they are pushing their suppliers. At this point all the others will have to follow as completely change the rules of the production of garments, textile and handling of raw materials. The sector is really undergoing deep change and some brands will be left behind”. (Emily, 2014)

Very interesting is the model applies from Gucci to manage the supply chain. Gucci creates Supply Chain Management Information System in which there isn’t only the information of the process and about the product but all the useful secondary information to map the system on security, environmental, energetic point of view. (Pancioli, 2014)

Now I want to make the example of Hugo Boss to show how they think to create and develop their strategic plan concern the environment. (Boss, 2014)

The strategy is developed in 3 different phases:

1. Level One: Awareness and Compliance

- Basic management structure, with defined management responsibilities and controls in place
- Understanding of significant environmental aspect and impact, and applicable legal requirements
- Compliance with applicable legal requirements
- Information and training of workers on environmental and health issues and hazards

So Hugo Boss desire to see if the company know its process and if company is able to control them, attendance the legal requirements.

2. Level Two: Proactive management and Performance improvement

- Environmental Management System (EMS/ISO 14001) in place
- Engaging Workers
- Demonstrate management of all significant environmental aspects and impacts, and achievement of performance improvement targets
- Focus is broadened to consider how the site influences and interacts with the local environment

This represents the initial reason to realize the project, to create inside the company environmental processes engage employees and demonstrate the improvement.

3. Level three: Leading Practice

- Leading proactive environmental management and performance (beyond recognized industry standards)
- Engagement with key stakeholders to achieve significant performance improvement
- Demonstrable achievement of stretching performance improvement targets.

This is became the main object of my project because try to change environmental information with all the supply chain and trace all the information. These three phases are really realistic and help to follow a logical approach to the environmental problem. The first represent the information, the Second represent the internal approach and third the relation with suppliers.

2. Reference Context:

Environmental Certification

During the resource of literature I try to understand which should be the real impact of Environmental Management System and Certification on a company. Which should be the benefits, weaknesses and barriers on a mill and how manage them.

The idea to analyse ISO 14001 and not only a EMS permit me to have a big bucket of global paper to read and not only local paper about niche certification on small specialised company. In this resource I desire to analyse what certification is and why a certification needs a processes' engineer to be done and why processes' engineer can realize an environmental certification. A certification is built principally from procedures that describe factory's processes and the know-how of the company. These processes represent a good model for the company on which act and source improvement. This paragraphed on of the literate review has the role to describe the SGA and a certification ISO 14001, what it represents and which should be pro and con of a certification. Is difficult discuss about a EMS without enter in ISO or EMAS examples or principle. Because ISO or and EMAS represent the general overview of application EMS. (Chiarini, Guida alla realizzazione di un sistema di gestione ambientale secondo le norme ISO 14001 e regolamento EMAS III, 2012)

2.1 Presentation of Environmental Management System

Already in the 70s year most of industrialized countries have adopted environmental protection by government agencies, with regulation focus on control of water, air emission and waste disposal using a method of control "ending of pipe" (Rondinelli, 2001). During the following year there were a lot of changing in environmental regulations, starting to adopt voluntary pollution prevention practices. Some company started to integrate their environmental

management practices. Industry association and international organization saw advantages of setting standards that corporation can use a guidelines (David Morrow, 2002).

A management system is a framework of policy; processes and procedures used required achieving its objectives. Documented and tested step-by-step method aimed at smooth functioning thought standard practice. For instance, an environmental management system enables organizations to improve their environmental performance through a process of continuous improvement. A simplification is PDCA (Plan, Do, Check, Act) (Chiarini, Guida alla realizzazione di un sistema di gestione ambientale secondo le norme ISO 14001 e regolamento EMAS III, 2012) (Burke)

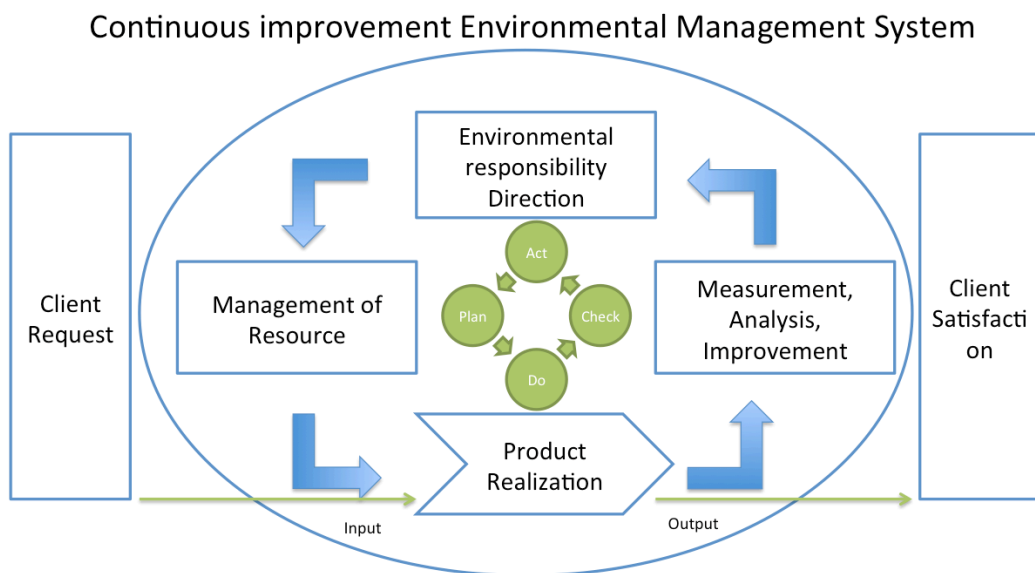


Figure 1 Continuous Improvement Cycle

Trying to be more detail-oriented a Management system specifies the methodology to manage a process. Of course It means the deep knowledge of the process (plan), know how understand if that process is productive or not through number (check), have the responsibility to change it (Act).

Kaplan and Norton have focalized different reason on why without a management system is difficult to reach result in every factory function. (Kaplan & Norton, 1996)

In our project Environmental Management System (EMS) is a management system that focalized the attention on a specific topic of the organization. EMS is a management system focalized in all the phases of the company from Prototype troughs Realization and Distribution on Environmental impact of the company, with specific documentation and strategy objectives. EMS Is the core of a ISO or EMAS because is focalized on the operative processes.

2.2 ISO presentation

ISO 14000 is a set of guidelines by which a facility (a single plant or a whole organization) can establish or strengthen its environmental policy, identify environmental aspects of its operations, define environmental objectives and targets, implement a program to attain environmental performance goals, monitor and measure effectiveness, correct deficiencies and problems, and review its management systems to promote continuous improvement (Jackson, 1997). ISO 14001 also requires a system of implementation and operation, including a clear structure of responsibility for environmental management, programs for training, awareness and competence among all employees of the facility, internal and external communication of the EMS, a system of environmental management documentation, a documentation control system, procedures for operational controls of environmental impacts, and emergency preparedness and response. ISO 14001 includes provisions for creating a system of checking and corrective action that includes monitoring and measurement, reporting non-conformance and taking corrective and preventative action, and record-keeping with regard to environmental management. It calls for EMS audits and a management review process through which senior management reassesses the suitability, effectiveness, and adequacy of the environmental management system at appropriate intervals to assure continuous improvement. (David Morrow, 2002)

At International level the system of certification manage by ISO (International Organization for Standardization) is an association not governative born in 1947 to unification and coordinate the international industrial protocol.

Nowadays, there are 130 countries in which normative associations hug ISO with the scope to promote the development of standardization in the world and cooperate in industrial, scientific, technical sector and business. (Chiarini, 2005) The main activity of ISO consists in the emission of protocols in different fields of implementation that provide indications on management systems of organizations to realize product or service. CEN (Comité Européen de Normalisation) is an association founded in 1961 that collaborates with ISO to try to unify the Technical protocols with those that the single country is prepared to understand in the same way. The international protocols are received from the single country thanks to the national organization, in Italy we have UNI (Ente Nazionale Italiano di Unificazione), founded in 1921 as an association to issue general technical protocols and promote the utilization of standard protocols.

UNI collaborates with ISO and CEN to favour the adoption of standard protocols and with national organizations like ACCREDIA (National System to Validation of Certification Organization) to credit the Certification Organization. (Chiarini, 2012)

The protocols of the Series 14000 are planning to provide:

- A guide line for the creation and improvement of the Environmental Management System;
 - This is a real knowledge book where all people can learn something on the technique of management, how systems are thought and how to apply
- Tool with which people outside the company can understand and value the specific aspects of their own management;
 - Generally there are two documents that must be taken into consideration. Procedure, all the steps inside the process, and Instruction, how to apply the procedures.
- Day-by-Day Management tool to give information on products about environmental information. With documents that define and standardize.

The following image represents how a documentation structure is built and how

must be apply ISO standard. This Scheme is apply independently from the type of certification. (Cordahi, 2015)

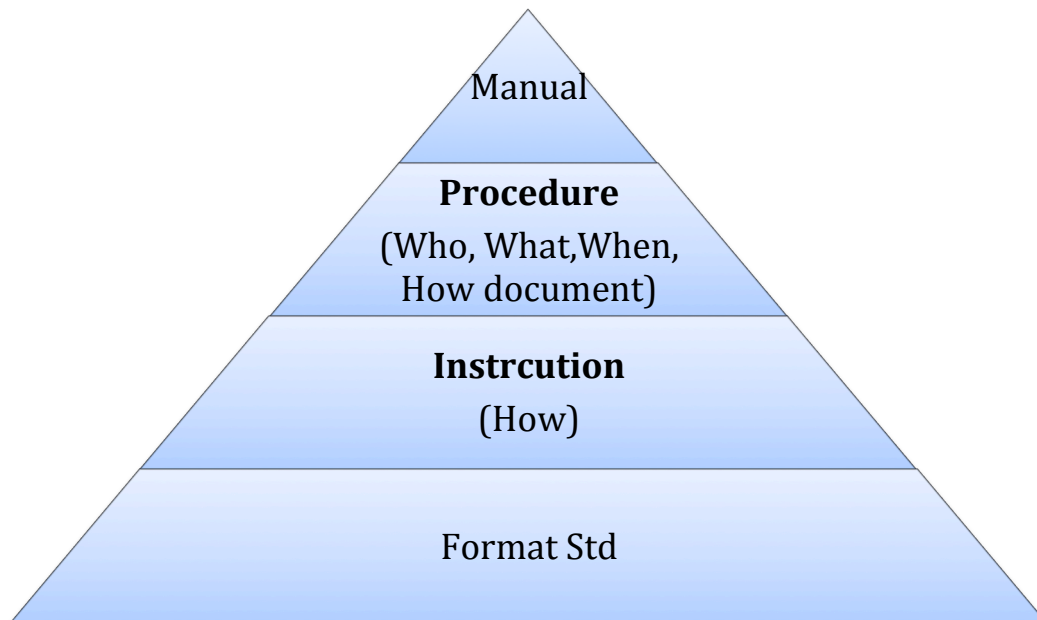


Figure 2 ISO Pyramid

The biggest competitor of ISO 14000 is EMAS that is a Certification built with peculiarity little different from ISO.

The Eco-Management and Audit Scheme (EMAS) is similar to ISO 14001 in its components and requirements (Sulzer, 1999). A main difference between ISO 14001 and the European standard, until recently, was that EMAS was applicable only at the site level, while ISO can be applied at the facility, company or organizational levels. Companies seeking EMAS registration (which is done by a State authority) must report environmental effects and legal requirements at the site, while ISO makes certification (by a private registrar) voluntary. (David Morrow, 2002)ISO 14001 certification allows the company to decide how to have its EMS verified and what information it should disclose. EMAS requires internal system compliance and performance audits, and external verification must be conducted at least once every three years. ISO only suggests system audits against

internal benchmarks. EMAS requires compliance with environmental regulations and stipulations on continuous environmental improvement. ISO 14001 elicits commitment to environmental improvement, but does not stipulate the extent to which performance must be improved.

In brief, ISO 14001 and EMAS have different aims. ISO 14001 provides guidelines that can be implemented by almost any type of organization in any country and was designed primarily to improve management. EMAS, on the other hand, is designed to bring about changes in environmental performance. (David Morrow, 2002).

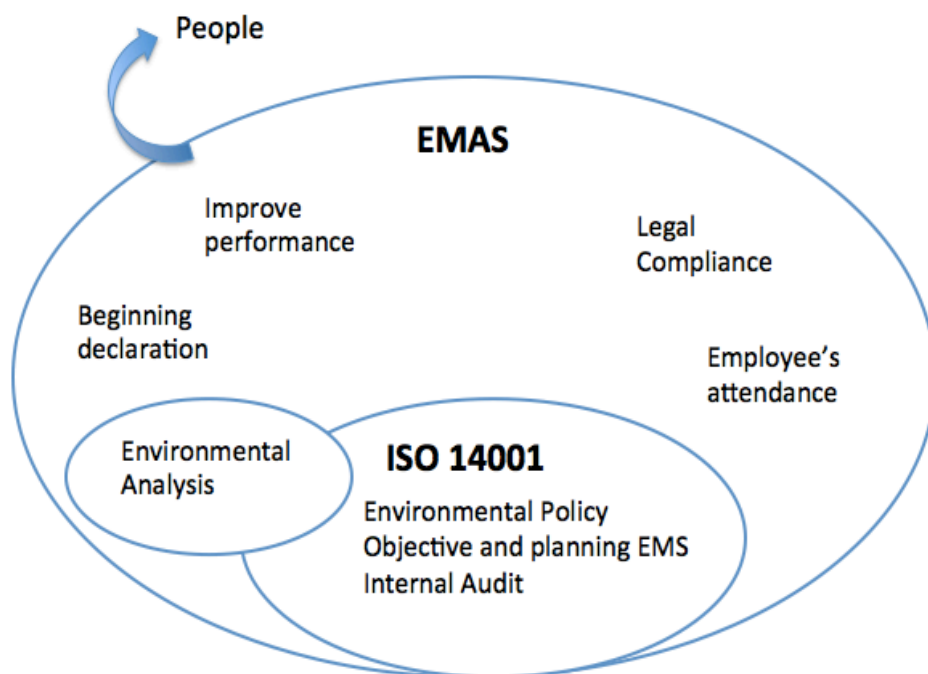


Figure 3 The main difference between EMAS and ISO 14001

There are a lot of certification that a company should take in consideration to do business: Gots (Biologic Product),Seri.Co (Silk Quality Product),FsC/PEFC (forestry Certification for the origin of cotton), Security certification like L'OHSAS 18000,SA8000.

2.3 Pro and Con

Numerous internal and external benefits are expected from the implementation of formal EMS such as EMAS, ISO 14001. In the review study, 22 studies identified benefits from EMS implementation experiences of Small and Medium Enterprises (SMEs) (R. H. , 1999)

2.3.1 Internal Benefits

Internal benefits that derive from the implementation of an EMS can be classify in three different categories:

1. Organisational benefits
2. Financial benefits
3. People benefits

Numerous organizational improvements and efficiencies are achieved in the Small and Medium Enterprises from the adoption of an EMS and are not solely related to the EMS. For Example, quality systems are improved (INEM, 1999), the overall quality of management rises (NALAD, 1997), training is introduced where previously there was none (INEM, 1999)and innovation is encouraged (WWF, 1997).

The range of financial savings and payback periods for investments generated are strictly related to the sector in which the EMS is apply (see for example [[(P., 1996), (R. H. , An assessment of the implementation status of council regulation (No 1836/93) eco-management and audit scheme(EMAS) in the European Union Member States (AIMS-EMAS), 1998) (Eliot & Patton, 1996; Smith A), (ETBPP, 1998.), (NALAD, 1997)]) The survey of EMAS sites identified cost savings as the top benefit cited by both large, medium-sized and small companies from the implementation of EMAS (R. H. , An assessment of the implementation status of council regulation (No 1836/93) eco-management and audit scheme(EMAS) in the European Union Member States (AIMS-EMAS), 1998). However, Small and Medium Enterprises place cost savings as the second ranked benefit behind better image. Communication channels, skills, knowledge and attitude are all improved in SMEs

adopting EMSs [(R. H. , An assessment of the implementation status of council regulation (No 1836/93) eco-management and audit scheme(EMAS) in the European Union Member States (AIMS-EMAS), 1998), (INEM, 1999), (NALAD, 1997)]. EMS implementation opens up new interactions between staff and management and provides intangible benefits like enhanced morale, which is seen as very important for both small firms and medium-sized ones. [(R. H. , An assessment of the implementation status of council regulation (No 1836/93) eco-management and audit scheme(EMAS) in the European Union Member States (AIMS-EMAS), 1998), (Smith A)]

Table 1 Internal benefits categories and examples

Organizational benefits	Financial benefits	People benefits
<p>EMS gives value to the quality and to the people.</p> <p>Improved quality of training</p> <p>Improved working conditions and safety</p> <p>Improved quality of environmental information</p> <p>Legal compliance is documented and can be demonstrated.</p> <p>Encourage innovation</p> <p>Review and improve procedures.</p> <p>Stimulate process, transport, raw materials and packaging changes.</p> <p>Demonstrate environmental responsibility Provide a strategic overview of</p>	<p>Cost savings from material, energy and waste reductions and efficiencies</p> <p>Improved economic condition</p>	<p>Increased employee motivation, awareness and qualifications Improved employee morale</p> <p>Enhanced skills and improved knowledge in SME</p> <p>Provides a forum for dialogue between staff and management</p>

environmental performance		
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2.3.2 External benefits

External benefits are positive outcomes from implementation of an EMS that relate to the external interactions of an SME. Benefits are classifiable in three different categories:

1. Commercial benefits
2. Environmental benefits
3. External benefit categories and examples

Key benefits are the attraction of new business and customers and the satisfaction of customer requirements [(EC, 1995), (Eliot & Patton, 1996), (R. H. , Small firms and the environment—a groundwork status report, 1995), (Mori, 1994)]. These benefits are closely linked to customers in their role as the paramount driver for the adoption of EMS.

Alongside the commercial benefits, SMEs found positive outcomes in terms of improved environmental performance [(R. H. , 1997), (NALAD, 1997)], assured legal compliance [(NALAD, 1997) (EMAS, 1997)], and energy and material efficiencies [(Eliot & Patton, 1996), (Smith A), (WWF, 1997)]. The most frequently cited improvements were those related to reduced energy consumption and waste minimization. SME found image was enhanced and dialogue and relationships with stakeholders improved [(Eliot & Patton, 1996), (R. H. , Small firms and the environment—a groundwork status report, 1995), (Mori, 1994)]. Improved image was the most important benefit for SME implementing EMAS cited in the pan-EU EMAS survey and this became more important as the size of the firm decreased; i.e. 38% of medium-sized companies and 54% of small companies cited it as the first benefit from the adoption of EMAS [(R. H. , 1998)].

Table 2 External benefit and examples

Commercial benefits	Environmental benefits	External benefit categories
Gain new customers/business and satisfy existing customers Gain a competitive/marketing advantage Receive discount on annual insurance premiums Stay in business Develop more environmental friendly products	Improved environmental performance Assured legal compliance Increased energy and material efficiencies Increased recycling Reduced pollution	Create a positive public image Develop better customer relationships Develop better co-operation and relationships with regulators and administrative bodies Improve communication with stakeholders Set an example for other companies in a sector

2.3.3 Disadvantage of Implementing EMS

Few studies in the review study identify Disadvantages [(R. H. , 1999)]. The probable cause of this is that many reports present best practice case studies and seek to “sell” EMS to the SME sector.

Disadvantages are negative outcomes or non-materialization of benefits from the adoption of EMSs: we can identify in 3 different categories:

1. Resources
2. Lack of rewards
3. EMS surprises

SMEs found that more resources than expected, in terms of cost, time and/or skills were required for EMS implementation [(E., The business benefits of EMS approaches., 1998), (EMAS, 1997)]. SME also faced implementation surprises that had impact on resources. Components of the EMS failed to meet their expectations or the EMS did not integrate smoothly into the quality systems [(R. H. , 1997), (EMAS)]. Major source of irritation for SMEs, surfacing in a number of studies, is the cost of certification/validation [(E., 1998), (R. H. , 1997), (R. H. , 1998), (KPMG, 1997)]. They are also aggrieved by the cost and quality of consultants advising them [(R. H. , 1997) (R. H. , 1997), (KPMG, 1997), (NALAD, 1997)]. Some studies tell us that results are not exactly like were thought. Such cases feed back into the general impression some SMEs have of the inappropriate nature of formal EMS for smaller firms, this was identified as an internal barrier in some studies[(Eliot & Patton, 1996), (EMAS, 1997)]

Table 3 Disadvantages of implementing EMSs in SMEs

Resources: costs/time/skills	Lack of rewards	EMS surprises
Higher than expected staff costs Unexpected capital expenditure required Certification fees higher than expected Time and cost required to develop EMS	Lack of market rewards	Consultants over-emphasises documentation and over complicate system Paper work emphasised instead of environmental performance Underestimation of external communication aspects of EMSs Problems meeting different stakeholders demands

		Linking the EMS to quality system restricted the scope of the EMS and disrupted the quality system
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2.3.4 Internal barriers

Internal barriers are obstacles that arise within the firms and prevent or impede EMS implementation. these are the four categories:

1. Resources
2. Understanding and perception
3. Implementation
4. Attitudes and company culture

Human rather than financial resources are the major barriers impeding EMS implementation and frequently cited in the studies [(K., 1998), (E., The business benefits of EMS approaches, 1998), (Poole M, 1999)]. Lack of human resources and the multifunctional nature of staff becomes ever-increasing importance as the size of the company decreases not only to the implementation but also to the maintenance of EMSs [(R. H. , 1997), (EMAS, 1997)]. SME are largely ill informed about EMSs, how they work and what benefits can be derived from their implementation [(Baylis R, 1997), (K., 1998), (KPMG, 1997), (Smith A)]. Negative corporate attitudes towards EMSs and an unfavourable company culture, often cited in SME, conspire to create a climate that deprives the EMS implementation process of support [(Harwell, 1996), (R. H. , 1995), (NALAD, 1997), (Rowe J, 1996)]. All is the hand of the top management [(K., 1998), (R. H. , 1995)]. Implementation in SME is an interrupted and interruptible process losing momentum and resources. Practical difficulties, such as how to achieve internal auditor independence and how to determine environmental aspects and assign significance, also scupper implementation [(CEG), (R. H. , 1997), (R. H. , 1998),

(EMAS, 1997)].

In the EMAS survey, the environmental review and the EMS elements took SMEs the most time to implement, were cited as the most difficult to understand and the elements which required additional guidelines [[(R. H. , An assessment of the implementation status of council regulation (No 1836/93) eco-management and audit scheme(EMAS) in the European Union Member States (AIMS-EMAS), 1998)]. Fear of de-registration for minor breaches of legislation also make EMAS an unattractive proposition for many firms [(Eliot & Patton, 1996)].

Table 4 Internal barriers to EMS implementation

Resources	Understanding and perception	Implementation	Attitudes and company culture
Lack of management and/or staff time for implementation and maintenance Inadequate technical knowledge and skills Lack of training Loss of environmental champion Lack of specialist staff Transient workforce	Lack of awareness of benefits Lack of understanding of environmental statement or value of reporting Lack of knowledge of formalised systems Uncertainty and concern over possible de-registration for minor breaches of legislation Perception of bureaucracy Perception of high cost for implementation and maintenance	Implementation is an interrupted and interruptible process Inability to see relevance of all stages Internal auditor independence difficult to achieve in a small firm Doubts about on going effectiveness of EMSs to deliver objectives Difficulties with environmental aspects/effects evaluation and the determination of significance Uncertainty about how to maintain continual	Inconsistent top management support for EMS implementation Management instability Low management status of person spearheading EMS implementation Resistance to change Lack of internal marketing of EMS

		improvement	
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2.3.5 External barriers of SMEs adopting EMSs

External barriers are obstacles that arise outside the firms and prevent or impede EMS implementation from the adoption of EMSs. There are of 4 types:

1. Certifiers/verifiers
2. Economics
3. Institutional weaknesses
4. Support and guidance

One of the biggest barriers is the external control that is felt with a grate criticism, because generally at the end of the control are list all the lack to reach the certification. This doesn't mean that the system is unperfected. SMEs found cost of certification to be a problem. In the EMAS survey, it was found that small firms were charged the most per day for their verification to EMAS (1085 ECU/day) and large firms the least (878 ECU/day) [(R. H. , 1998)]. Medium-sized enterprises were less critical of the scheme with 46% stating they had received market rewards whereas 54% of small enterprises stated they had not received any market benefits. In addition, the changing economic fortunes faced by SMEs alter their priorities and pushes the environment to the bottom of the list, further depressing interest in ISO 14001 and EMAS (ETBPP, 1998). Shortcomings in the institutional framework, which facilitates the operation of EMAS and ISO 14001, inhibit SME up take of the two initiatives. For example the essence of a single institute to certificate is the biggest barrier. Particular for the environmental review and environmental aspects and significance evaluation, but experience problems gaining consistent quality information and experienced consultants of good quality [(Baylis R, 1997), (Eliot & Patton, 1996), (KPMG, 1997), (NALAD, 1997)].

The lack of sector specific guidance and material tailored to different sizes of firms, especially very small firms, is a frequently referred to external barrier. [(Poole M, 1999)]

Table 5 External barriers to EMS implementation

Certifiers/verifiers	Economics	Institutional weaknesses	Support and guidance
<p>High cost of certification/verification which disproportionately penalises small firms</p> <p>Lack of experienced verifiers</p> <p>Duplication of effort between verifiers/certifiers and internal auditors</p> <p>Verifiers exceeding their role e.g. influencing audit cycle length</p> <p>Variations in verifiers approach to EMAS validation</p> <p>Distortion in the verifier market</p>	<p>Insufficient drivers and benefits</p> <p>Uncertainty about the value of an EMS in the market place</p>	<p>Lack of promotion of EMSs</p> <p>Lack of accessible financial support</p> <p>Lack of clear or strict legislative framework</p> <p>Absence of a central source of information on environmental legislation</p> <p>Absence of a single authoritative body</p>	<p>Lack of experienced consultants of quality to assist SMEs</p> <p>Inconsistent approach of consultants to EMS implementation External assistance, e.g. consultants needed to interpret ISO 14001 and required for environmental review and EMS implementation</p> <p>Lack of sector specific implementation tools and examples</p>

This analysis will be examined in depth in the next chapter with direct relation with the project.

3. Methodology

In this chapter I would like to present the company, my experience in the Clerici Tessuto, my role during the period of working and how project begin. Clerici Tessuto is one of the most important textiles manufacturers in the world for the luxury sector, with ranges for men's and women's clothing, accessories and home furnishing. Founded in 1923 by Rachele Clerici and her husband Alessandro Tessuto as a company for trading in silk fabrics, the company is now in its fourth generation, with the present Alessandro Tessuto as its CEO. The historical product is represented from the woman textiles. Principals markets are Europe (40%),Italy (45%), America(9%),East Asia(6%). CTC is the owner also of two office one in New York and one in Paris. Its headquarter is in Grandate in the historic silk district of Como where are active the administrative, commercial, and productive mill and other site in Villa Guardia where are quality control and warehouse.

3.1. Experience in Clerici Tessuto

My role inside the CTC has been to put order about the requirements and needs of customers and trying to catch the warning coming from the audits with clients done during my period of permanence in the company. The path in CTC has been long and complicated because the project has started with a model of EMS but during the analysis and the interaction with the key users my object is seen not the better way to face the necessity of the company so it eclipse form effective realization. The really output of my project has been finding only at the certain point of the experience in CTC. The experience in the first phase was very confused because there wasn't a really compression on the meaning of EMS and which where the best steps to do: In the following table is possible identify the three different main phases:

Table 6 Evolution of the project and role

Phases	Duratio n	Goal	Documentatio n	Meetings	My Role
Beginnin g phase	2 months	Beginning idea: create a EMS Procedures, Manual.	Procedure already present in the company. Certification and analysis of the competitor.	First Interview: Product Officer, Manageme nt Control, Textile	Study the processes and the EMS theory
Middle phase	4 months	Understand what the clients desire and how the impact of their aim.	Analysis of the documentation like contract and legal limitation	Hugo Boss, Gucci, Valentino	Study the Request and a methodolog y to respond to the request
Ending phase	3 Months	Create and review processes taking in consideratio n EMS realization and Desire of Clients and CTC	Revision of all procedures, Analysis of data coming from ERP	Direction Officer, Product officer, Textile, CED/IT, Commercial function.	Developing of new processes

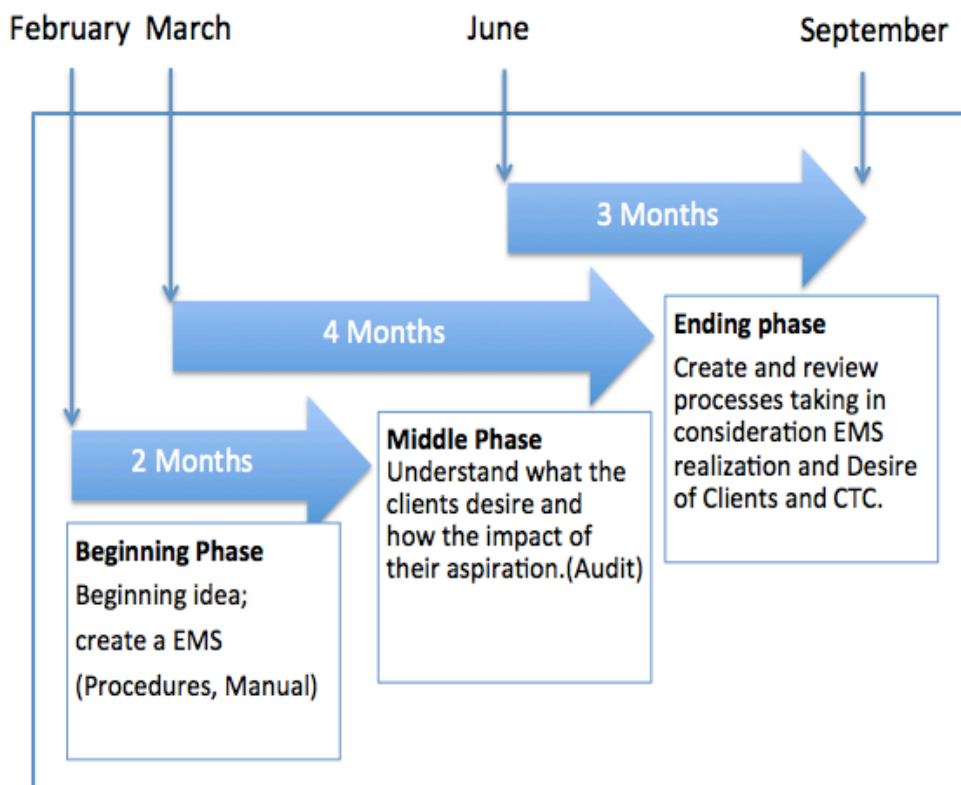


Figure 4 Phase of experience in CTC

The phases will be analysing in detail way in the following Chapter.

Initially my role in Clerici Tessuto were analyse how company works and understand how insert inside a textile company an environmental model.

Clerici Tessuto is a ideal company for processes' engineer because has got a little quantity of chemical material in its process. So the focus was more focalize on the documentation and the sharing of information.

3.2 LAPS Polischool

This project started thanks to Lake Poli School , an initiative of Politecnico di Milano (Como Campus), which aims at: nearing students to companies and real problems, providing further opportunities to best and motivated students and opening our minds, working in an international and multicultural context.

Lake Poli School is an interdisciplinary initiative, in collaboration with public and private entities, which involves selected and motivated students of Master of

Science in Environmental Engineering, Computer Science and Management.

The students, divided into interdisciplinary and international workgroups, under the guidance of researchers from the Politecnico di Milano and company tutors, develop the business case submitted by companies or by non-profit organizations in the area.

The Project is done on a Como silk supply chain “IL FILO D’ORO” that follow all the passage of the creation of the silk from the raw materials to the final product.

The result of this project is the realization of the environmental Report following GRI standard of a Global Institute(GRI) In which are describe, documented and analyse all the action carry out from the “IL FILO D’ORO” and all activities the are planned in the future.

This report permit to make an environmental analysis As-Is of all supply chain, Describing which is the begging point of a process that engage all the chain for the 5-6 years until Kyoto 2020.

Clerici Tessuto & C (CTC) is shown the company more interested in the evolution of this work.

The reason are to research in collocation CTC in the Supply chain because occupy the role of seller to final customer, like the image can show, that push always more on the sustainability.

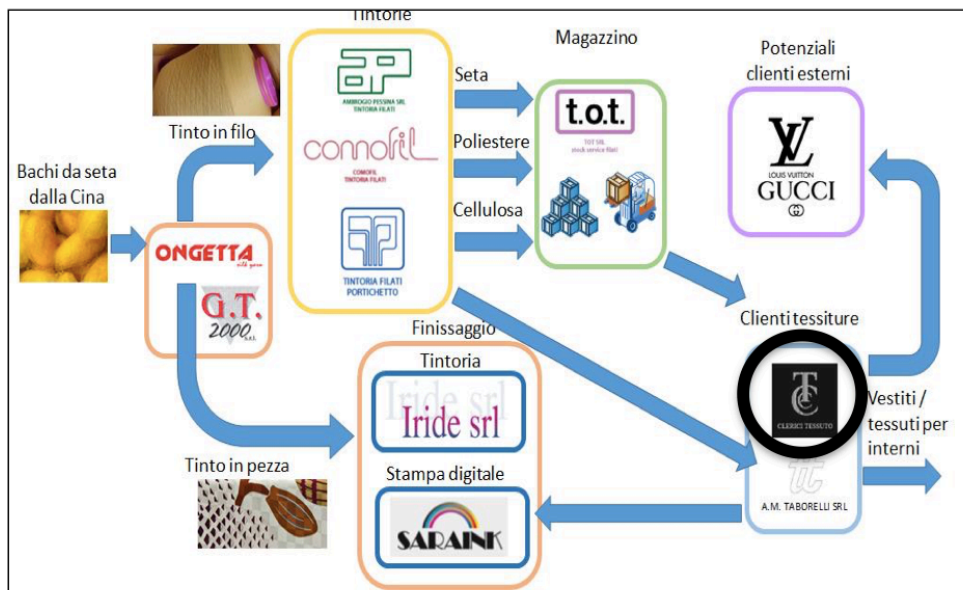


Figure 5 Supply chain “IL Filo D’oro”

To understand what mean became more green we must do an analyse on what it the meaning of the Environmental Management system and about certification.

3.3 The begging Idea and phase

In the begging the idea has been to continue the process starting with LAPS arriving to a creation of environmental management system inside the wear facility.

After a deep study of all the ISO Protocol and father understand that a completely environmental management system was impossible to implement due to the low will to realize it from employee.

So the management focus attention on the traceability of environmental information with customer and on all the supply chain. During the period spend in the company invest a lot of time to understand how really company work. In the company there were procedures created in 2004 with a little update so I restudy them with the aim to create a version with EMS and with the actual situation.

This work of mapping permits me to understand processes and how the company really work. Another step permit me to identify and highlight procedures to change.

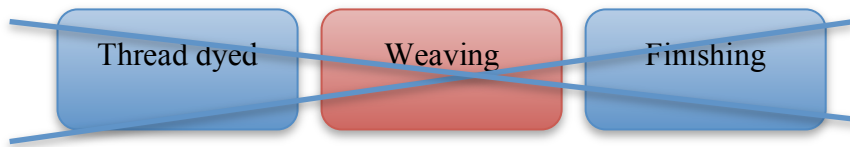
3.4 Preface

To understand better what is the perimeter of my project i want to do a clarification on the main way to produce the textile

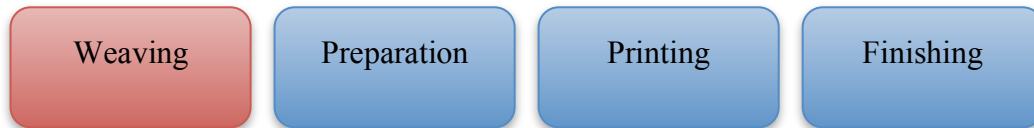
The first step to better understand on what my project focus is present which can generally be ways to produce a textiles:

There are 3 different define way to produce in more or less all the variables.

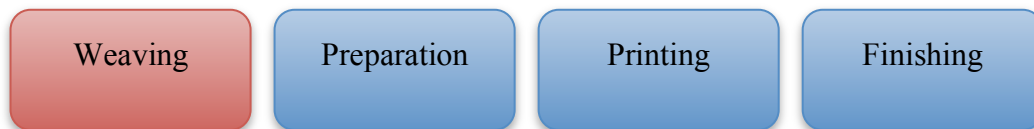
Thread Dyed:



Printing:



Piece-Dyed



The processes on which I focalize during the project: Printing, Piece-Dyed. During this 5 months the project is growing in two different ways, but whit only one final object:

- 1) Analyse the suppliers of the product: both final goods and “work in progress” products need environmental information and specific feature for each typology of textile
- 2) The entire external job should be guarantee, the way to guarantee the environmental conformities of the single working phase.

For both the ways a mapping of environmental situation is necessary. This work is important because in the supply chain doesn't exist company, which is enough big to produce all the type of textile obtaining also economy of scale, so the changing of information became a relevant problem.

So the object of this work is not creating a entire EMS inside but a system which can trace environmental situation with supplier.

Taking the procedures already present in the company I try to map the flows and understand the dynamics. These are the 11 original procedures had been created for reach Seri.Co Certification:

- 1- Responsibility and organization
- 2- Article subject of a certification
- 3- Supplier qualification
- 4- Managment of purchasing- external production
- 5- Internal Production
- 6- Logistic
- 7- Managing of not conformities
- 8- Identification and traceability
- 9- Machine
- 10- Test and controls on textile

Identify the processes on which will be possible modify and identify which can be the solution more confident to their implementation.

3.5 Organogram

Organogram is the first procedures of Seri.Co that I have analyse because starting from these I focalize inside the company especially on the task of each single function. The following two CTC Company's diagrams show; the first an AS-IS diagram, the second a future diagram in which is possible focalized environmental activity. Organogram is complete with the environmental task and responsibility.

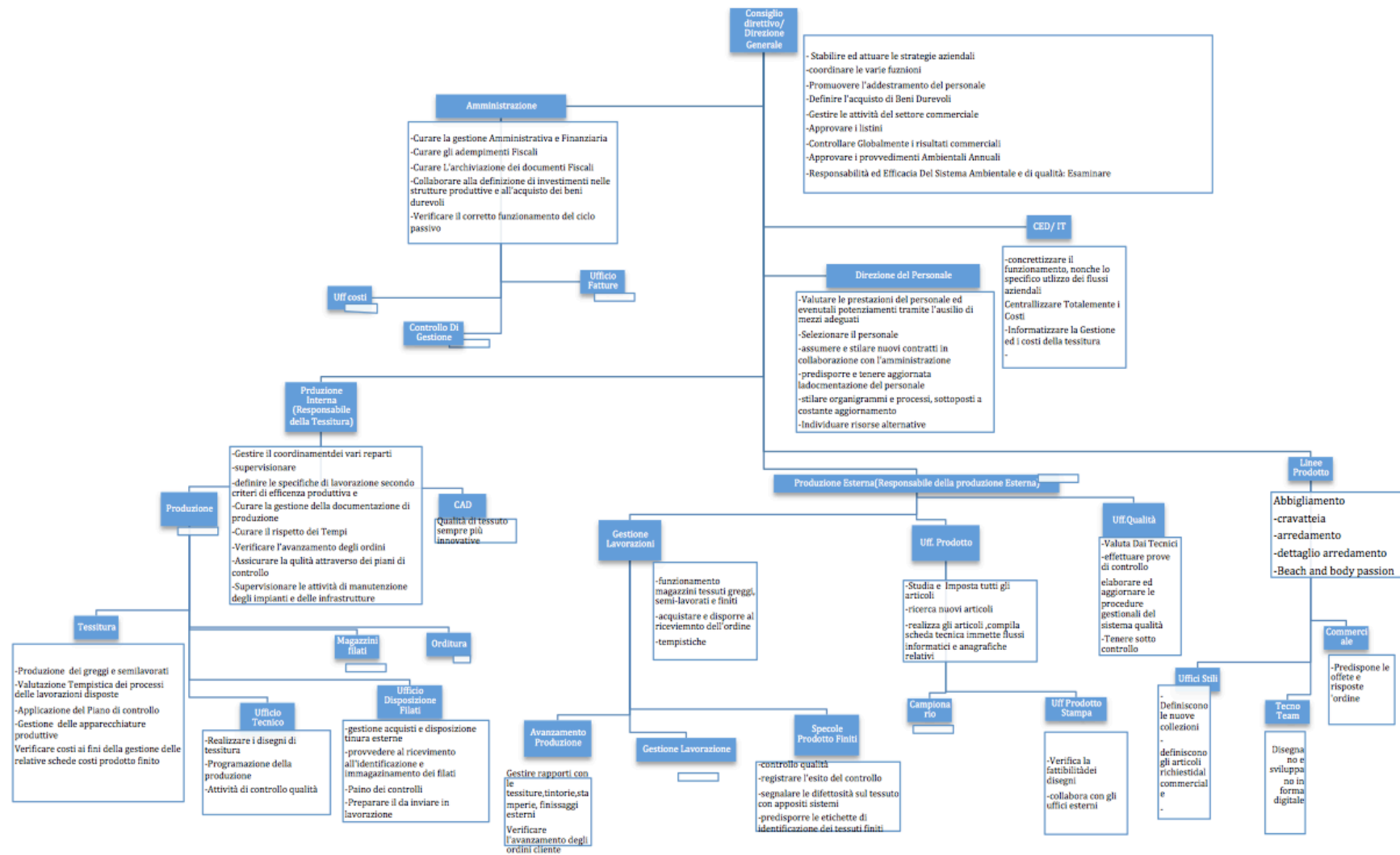


Figure 6 Organogram AS-IS

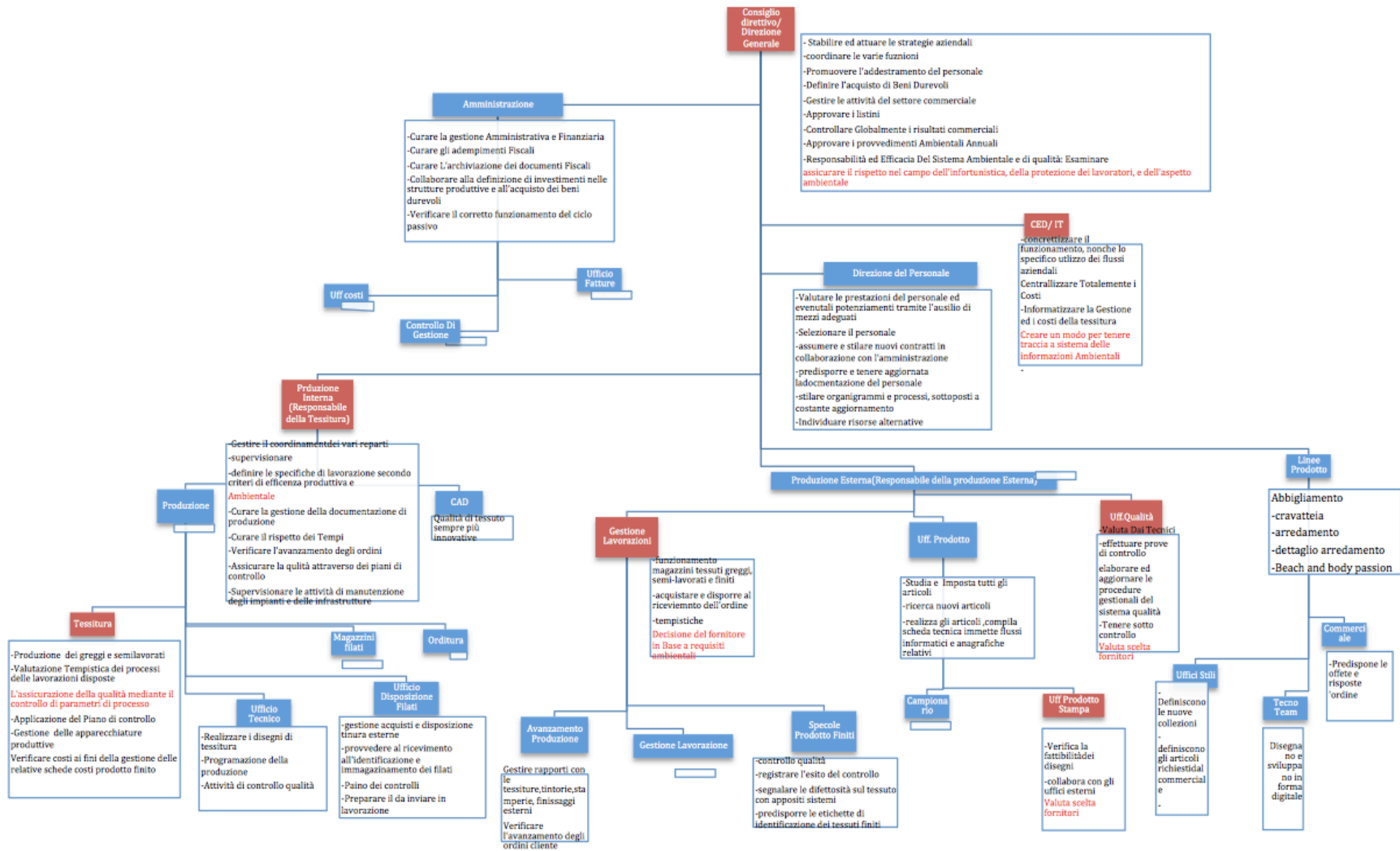


Figure 7 Organogram To Be

Organogram initially help me to understand which can be the functions that should be touch from an Environmental Management System:

- Managerial Directional: Guarantee a respect of security, protection and workers and the environmental aspect.
- CED/ IT: Create a way to trace environmental information.
- Quality Office: Valuate the chosen of the supplier
- Product Office: Decide of the supplier and of the textile also about environmental variable
- Internal Production (Weaving responsible): Define the specific of work following constrains of facticity and environmental
- Weaving : Guarantee the quality during the parameter of the process.

Of This list the function really involve in my project will be three: Product office, CED/IT, Managerial Directional and less impact for the other functions

4. Results

4.1 Mapping

These processes give me a vision to create and understand better which can be the functions interested by developing of the new environmental process and understand how is the real relationship between documents and reality

Identification of AS-IS processes permit to modify in the more suitable way the new environmental process.

In the graph underlying we find the macro activity:

- The black arrows represent the standard production
- the orange one show the prototype of new article.

The reason why I highlight these two paths is because are temporally separated and have an important differentiation about the average amount of meters in the order because on. Obviously of these two process there are the overlapping of the function and of the processes.

CTC's General map for standard production processes.

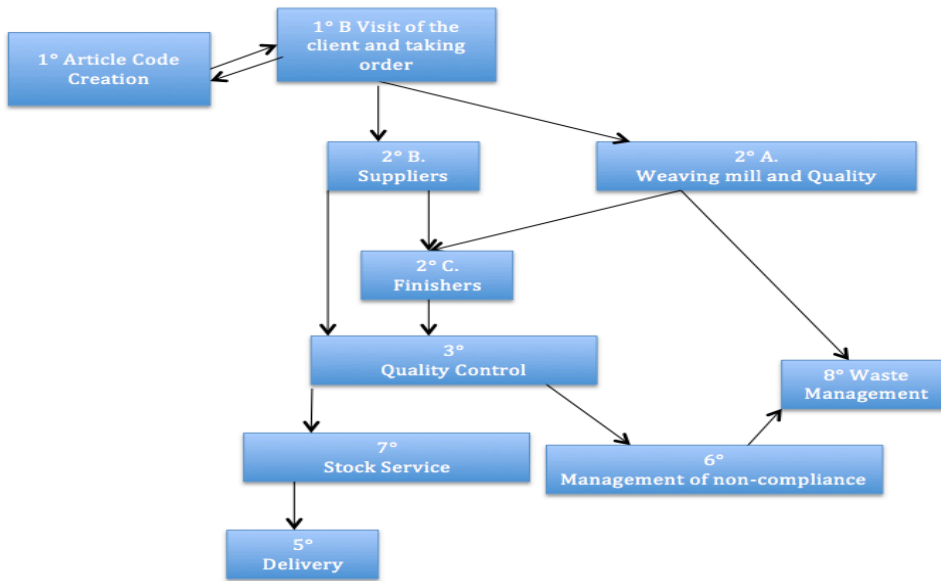


Figure 8 Production macro process.

CTC's General map for standard production processes.

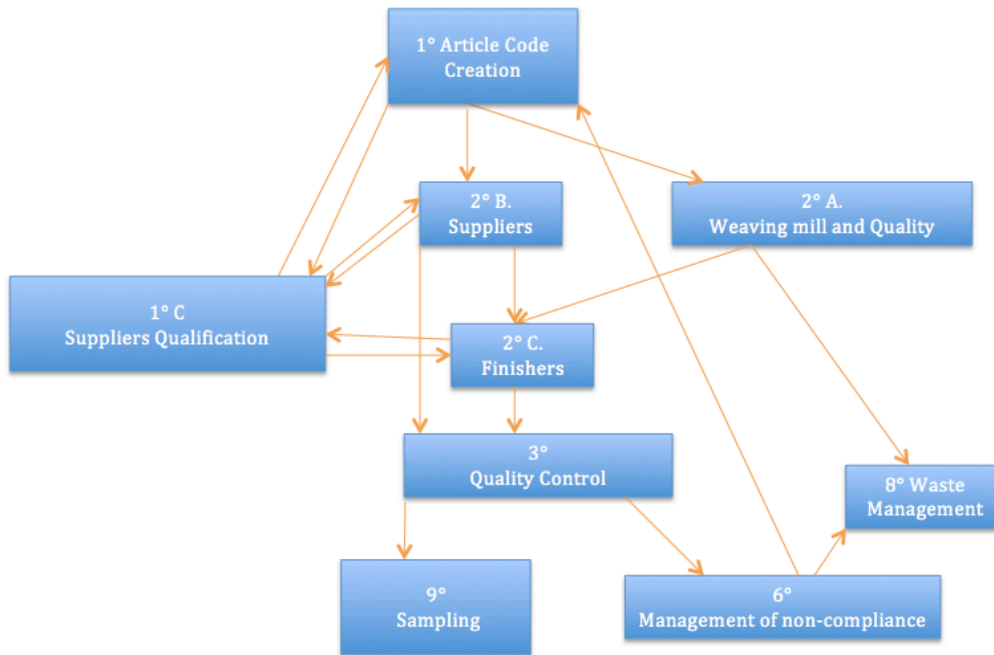


Figure 9 Sample macro process

This work gives us the following micro processes:

1° : Article Code Creation

1° B : Visit of the client and taking order

1° C : Suppliers Qualification

2° A: Weaving mill and Quality control

2° B: Suppliers

2° C: Ennoblers

3°: Quality Control

5° : Delivery

6° : Management of non-compliance

7° : Stock Service

8° : Waste Management

9° : Sampling

These are some of these processes that I map but on which there aren't environmental work.

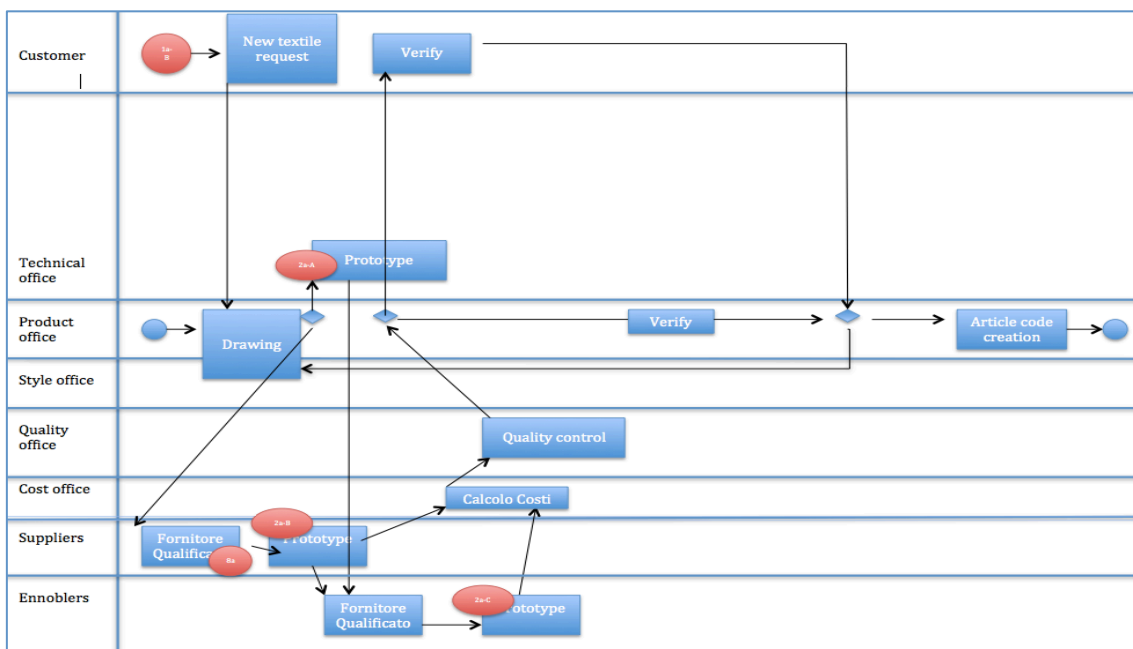


Figure 10 Article code creation

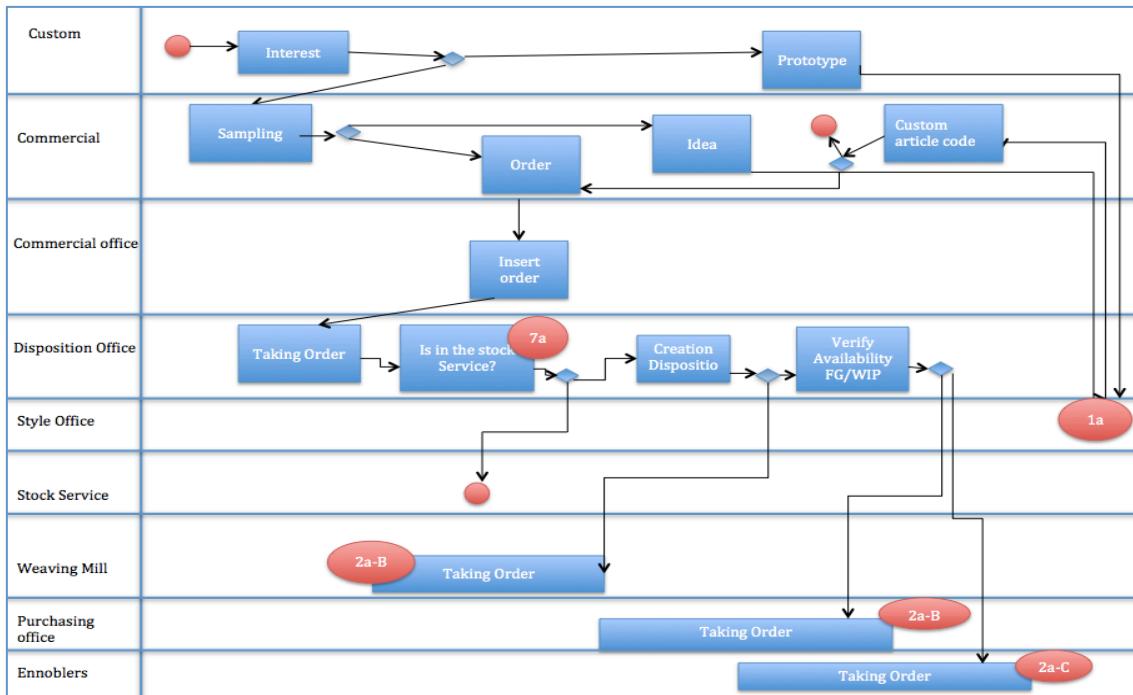


Figure 11 Visit of the client and taking Order

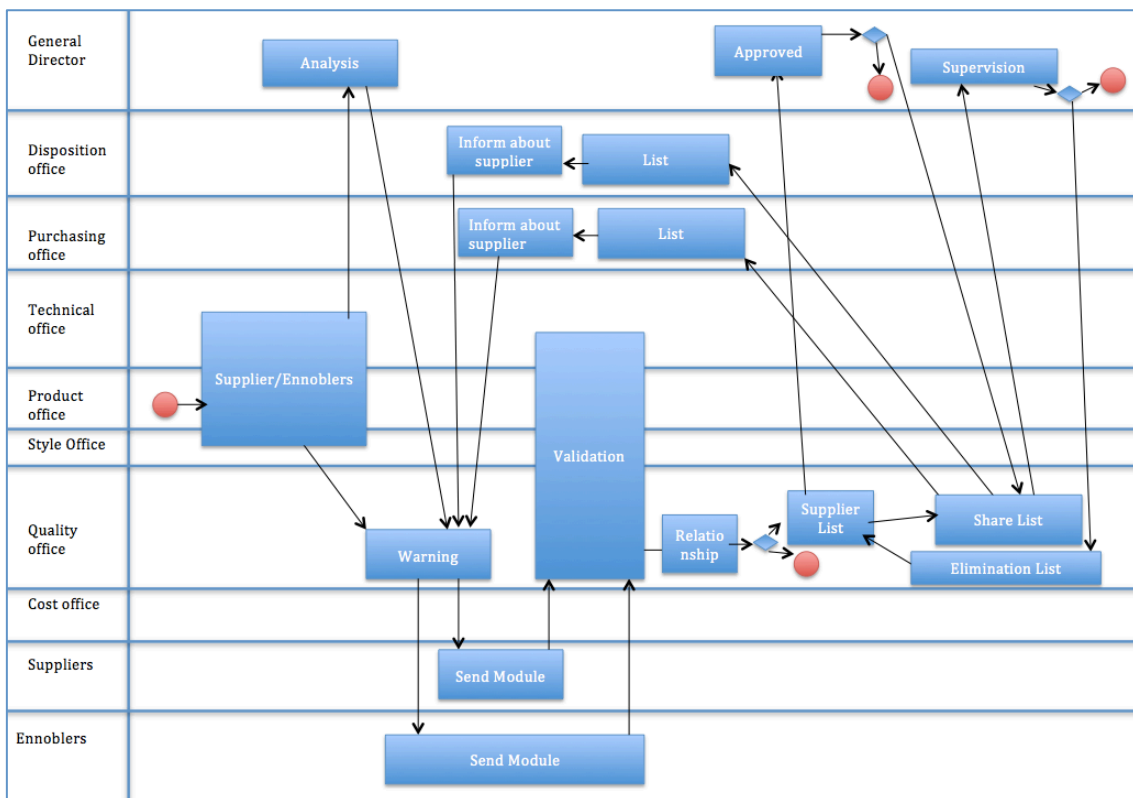


Figure 12 Suppliers Qualification

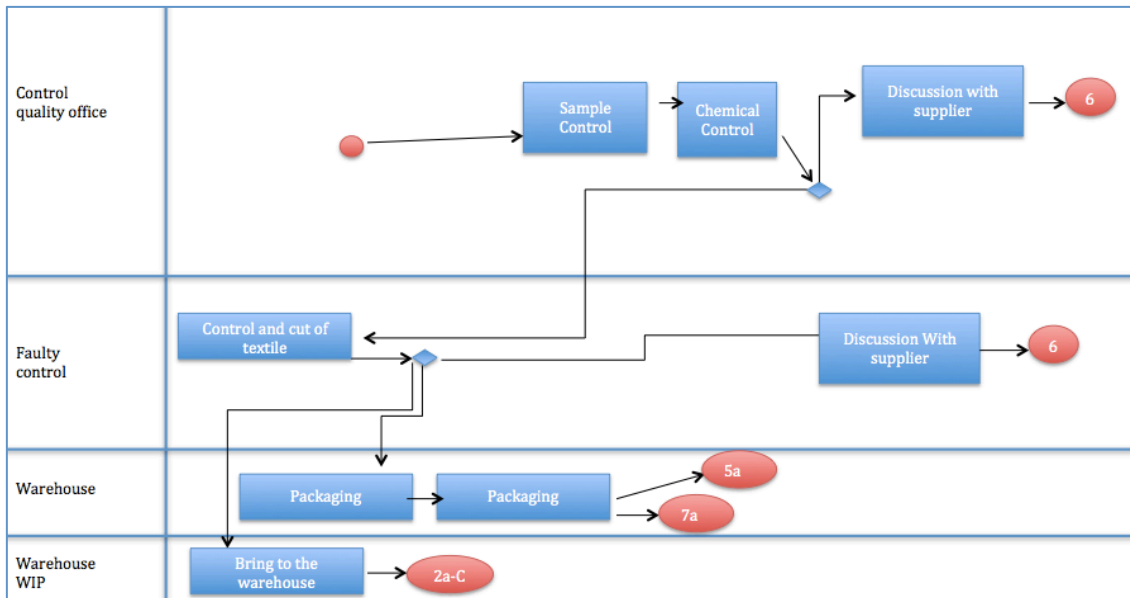


Figure 13 Quality Control

4.2 Middle phase: Audit

Analysing the audits carried out on a weekly bases in comparison with the mandatory companies has been interesting because it shows all the transitional phases the project went through.

I 'd like to mention few encounters tat we had with brands among with Burberry, Hugo Boss, Gucci, Valentino to show thoroughly both from an operational and strategic point of view how similar are their business objectives and strategies. Reducing the costs of the Kyoto2020 project is the main goal of their approach.

Burberry: The encounter with Burberry Consultants was very useful; they aim to raise awareness on the employment of chemical substances through two binding legal commitments (ManufacturingRestrictedSubstancesList-ProductRestrictedSubstancesList) to be fulfilled.

Burberry aims to remove the external consultants as the certifications providers in order to get an autonomous and reliable supply chain.

This approach can be interpreted as sign of low trust to the suppliers but from their point of view, it is right to double check the products no matter what company provided them.

In case of the goods don't follow the established parameters, by contract; they proceed with a double check. This mechanism in the long term offers significant advantages to the others competitors.

Burberry asks their suppliers to employ accurate methods to manage the relationships with their suppliers in terms of the environmental-related issues and the goods compliance test services.

At first we asked to make a list of the "hot" suppliers with we had been working for a while together with Burberry, then we provide the new Burberry requirements and asked for the signing of the contract.

Hugo Boss: Audit with HB results the most relevant on management prospective so represent an important push to my project, how is possible read in the second chapter, HB apply a method structured strough 3 audit different in which asks that the different phases can be done and environmental goal reach.

The strategy is developed in 3 different phases:

1. Level One: Awareness and Compliance

- Basic management structure, with defined management responsibilities and controls in place
- Understanding of significant environmental aspects and impact, and applicable legal requirements
- Compliance with applicable legal requirements
- Information and training of workers on environmental and health issues and hazards

So Hugo Boss desire to see if the company know its process and if company is able to control them.

2. Level Two: Proactive management and Performance improvement

- Environmental management system (EMS/ISO 14001) in place
- Engaging Workers
- Demonstrate management of all significant environmental aspects and impacts, and achievement of performance improvement targets

- Focus is broadened to consider how the site influences and interacts with the local environment

This represents the initial reason to realize the project, create inside the company an environmental process engage employee and demonstrate the improvement.

3. Level three: Leading Practice

- Leading proactive environmental management and performance (beyond recognized industry standards)
- Engagement with key stakeholders to achieve significant performance improvement
- Demonstrable achievement of stretching performance improvement targets.

This is became the main object of my project because try to change environmental information with all the supply chain and trace all the information.

Gucci: Audit with Gucci focus mainly on a energetic work and save of consumption of the ennoblers , so the work develop on accompany named Sara Ink. A team of environmental engineers ,D'Apollonia SPA consultants, are created a list of operative changing about energetic inefficiency,.

After a analysis done on the audit, with general direction of CTC we understand that all the request were a part of the same aim; the creation of an environmental information supplier's exchanging system.

So this is became my focus for the project: Analyse the company in an environmental prospective and find the a meted to trace environmental information between the facilities of the supply chain and Clerici Tessuto.

So thanks to the initial phase of the analysis has been possible work in this direction. The Initial Work of a complete EMS for all the company remains only a project; instead some environmental process like waste management and some processes review has done.

This explanation permits to understand the following paragraph where thanks to the literature review I realize a comparison with my personal experience academic paper.

4.3 Comparison with literature review

In this paragraph I like to take in consideration the experience in CTC and analyse benefit and barriers .

In the following tables will be show Internal, external benefit and shown below internal and external barriers show up during the experience. The disadvantages are impossible to find because generally must be found later the implementation.

To finish I will do a balancing between benefit and barriers to understand if the project brings the expected result or none. The methodology is the personal perception the student lives in comparison with the variable listed from the academic review.

4.3.1 Internal Benefit

Table 7 Internal benefits categories and examples

Organizational benefits	Financial benefits	People benefits
<p>EMS gives value to the quality and to the people.</p> <p>Improved quality of training</p> <p>Improved working conditions and safety</p> <p>Improved quality of environmental information</p> <p>Legal compliance is documented and can be demonstrated.</p>	<p>Cost savings from material, energy and waste reductions and efficiencies</p> <p>Improved economic condition</p>	<p>Increased employee motivation, awareness and qualifications Improved employee morale</p> <p>Enhanced skills and improved knowledge in SME</p> <p>Provides a forum for dialogue between staff and</p>

<p>Encourage innovation</p> <p>Review and improve procedures.</p> <p>Stimulate process, transport, raw materials and packaging changes.</p> <p>Demonstrate environmental responsibility Provide a strategic overview of environmental performance</p>		management
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Improved quality of environmental information: This project had permitted to create environmental information store and analysis something that before didn't collect.

Legal compliance is documented and can be demonstrated: Before this work didn't exist nothing about environmental documentation that can face of to the external need and can tells something about the environment.

Review and improve procedures: Of course a completely revision of the processes permit to improve and add the environmental communication with the entire supply chain.

Enhanced skills and improved knowledge in Small and medium enterprise: This work permit to understand better how the information are changing inside the mill.

4.3.2 External Benefit

Table 8 External benefit and examples

Commercial benefits	Environmental benefits	External benefit categories
<p>Gain new customers/business and satisfy existing customers</p> <p>Gain a</p>	<p>Improved environmental performance</p> <p>Assured legal compliance Increased</p>	<p>Create a positive public image</p>

competitive/marketing advantage	energy and material efficiencies	
Receive discount on annual insurance premiums	Increased recycling	Develop better customer relationships
Stay in business	Reduced pollution	
Develop more environmental friendly products		Develop better co-operation and relationships with regulators and administrative bodies
		Improve communication with stakeholders Set an example for other companies in a sector

Gain new customers/business and satisfy existing customers: All the project born from the customers need about reach a feedback on their supply chain about the environment

Assured legal compliance Increased energy and material efficiencies : and permit to anticipate some constrains that born in the future. Create a positive public image.

4.3.4 Internal Barriers

Table 9 Internal barriers to EMS implementation

Resources	Understanding and perception	Implementation	Attitudes and company culture
Lack of management and/or staff time for implementation and maintenance	Lack of awareness of benefits Lack of understanding of	Implementation is an interrupted and interruptible process Inability to see	Inconsistent top management support for EMS implementation

Inadequate technical knowledge and skills	environmental statement or value of reporting	relevance of all stages	Management instability
Lack of training	Lack of knowledge of formalised systems	Internal auditor independence difficult to achieve in a small firm	Low management status of person spearheading EMS implementation
Loss of environmental champion Lack of specialist staff	Uncertainty and concern over possible de-registration for minor breaches of legislation	Doubts about on going effectiveness of EMSs to deliver objectives	Resistance to change
Transient workforce	Perception of bureaucracy	Difficulties with environmental aspects/effects evaluation and the determination of significance	Lack of internal marketing of EMS
	Perception of high cost for implementation and maintenance	Uncertainty about how to maintain continual improvement	

Lack of management and/or staff time for implementation and maintenance : The main constrain has been found in the weaving function because result impossible open a real communication and discussion. Lack of awareness of benefits for the majority of the people is been difficult understand the benefit of a system very paper based and that doesn't give immediate result. Lack of compression about environmental statement or value of reporting. Difficulties with environmental aspects/effects evaluation and the determination of significance: For me was impossible do an environmental management system in a other companies for my lack of competences on environmental argument. Resistance to change: this represent the constrain for every management system. For internal reason and for dynamic in which a student can do anything part of the company doesn't want to follow the indication and doesn't understanding the

benefit. For this reason in the following chapter 5 I will analyse only a part of EMS.

4.3.5 External Barriers

Table 10 External barriers to EMS implementation

Certifiers/verifiers	Economics	Institutional weaknesses	Support and guidance
<p>High cost of certification/verification which disproportionately penalises small firms</p> <p>Lack of experienced verifiers</p> <p>Duplication of effort between verifiers/certifiers and internal auditors</p> <p>Verifiers exceeding their role e.g. influencing audit cycle length</p> <p>Variations in verifiers approach to EMAS validation</p> <p>Distortion in the verifier market</p>	<p>Insufficient drivers and benefits</p> <p>Uncertainty about the value of an EMS in the market place</p>	<p>Lack of promotion of EMSs</p> <p>Lack of accessible financial support</p> <p>Lack of clear or strict legislative framework</p> <p>Absence of a central source of information on environmental legislation</p> <p>Absence of a single authoritative body</p>	<p>Lack of experienced consultants of quality to assist SMEs</p> <p>Inconsistent approach of consultants to EMS implementation</p> <p>External assistance, e.g. consultants needed to interpret ISO 14001 and required for environmental review and EMS implementation</p> <p>Lack of sector specific implementation tools and examples</p>

Distortion in the verifier market: The value of the certification has big variability because people doesn't know what is and how obtain it and for this reason usually people see a certification only like a cost.

4.3.6 Balance

Now I would like to a balance between Benefit and Barrier Taking in consideration the analysis already done putting them on the same scale.

Table 11 Scale Benefits-Barriers

Benefits	Barriers
<p>Improved quality of environmental information</p> <p>Legal compliance is documented and can be demonstrated.</p> <p>Review and improve procedures.</p> <p>Enhanced skills and improved knowledge in SME</p> <p>Gain new customers/business and satisfy existing customers</p> <p>Assured legal compliance Increased energy and material efficiencies</p> <p>Create a positive public image</p>	<p>Lack of management and/or staff time for implementation and maintenance</p> <p>Lack of awareness of benefits</p> <p>Lack of understanding of environmental statement or value of reporting</p> <p>Difficulties with environmental aspects/effects evaluation and the determination of significance</p> <p>Resistance to change</p>

The experience in CTC left two objectives particular relevant , the creation of a environmental documentation to show and the creation inside the company of environmental processes. This represent a step award but will not be enough in the long period.

How the constrains I find the lack of compression of the value of external documentation, resistance to change, lack of awareness of benefit uncertain to hoe create a system of continuous improvement. These are correlate to the less experience of the student but isn't so obvious that the company change behaviour with external consultant.

This work permitted to introduce the environmental problem in the CTC engage all the employees.

The following scale show how actually the adding of the benefits are lighter than the adding of the barriers. The scale change only when create an EMS became a condition mandatory to stay in the market.

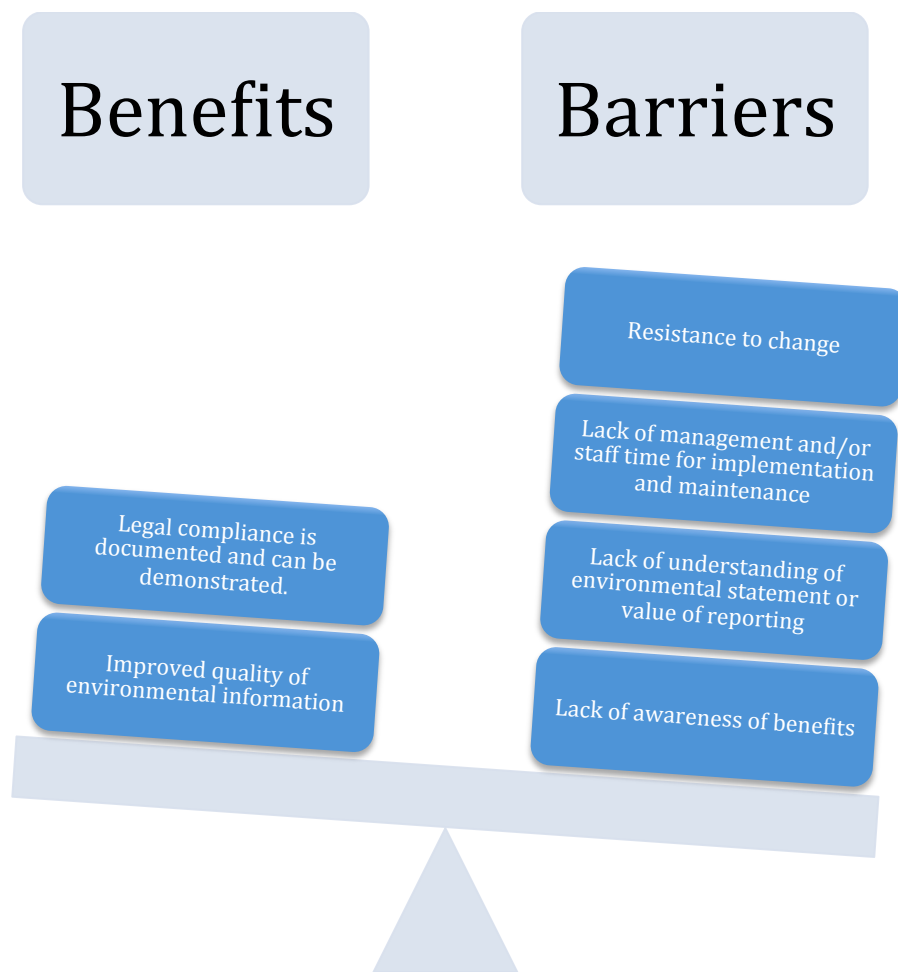


Figure 14 Scale Benefits-Barriers

4. 4 Procedures

Now I desire to go deep inside the technical problem and on the focus of my project. I decide to not work on the weaving function for CTC's internal reason and because the direction decide not to focalized on production but on the relationship with external suppliers and ennobles.

4.4.1 Ending Phase: AS-IS

In this Ending Phase I focalize my attention on the main touched processes:

As first step we look at AS-IS situation of 3 processes that have the role of communicate whit companies out of the own boundary:

2° A: Weaving Mill and Quality Control

2° B: Suppliers

2° C: Ennoblers

2° A: Weaving Mill and Quality Control

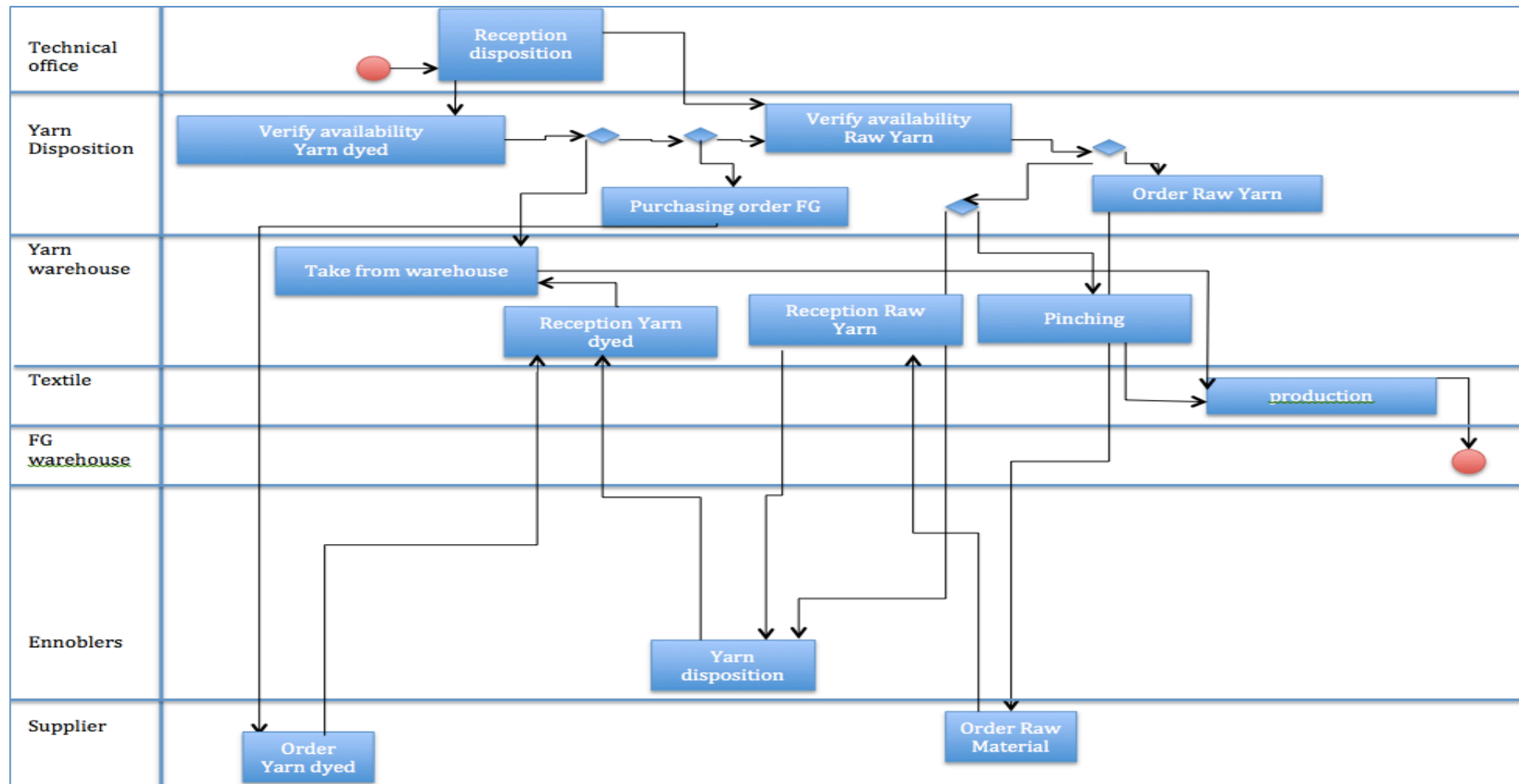


Figure 15 Weaving Mill and Quality Control AS-IS

2° B: Suppliers

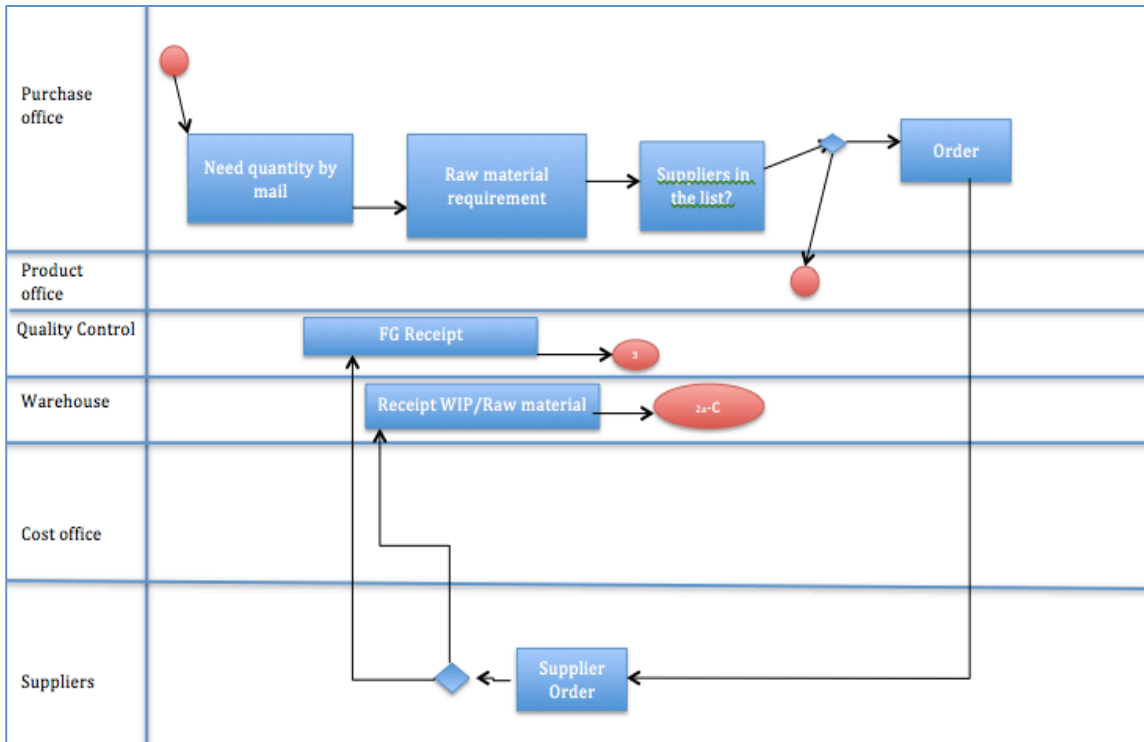


Figure 16 Suppliers

2° C: Ennobles

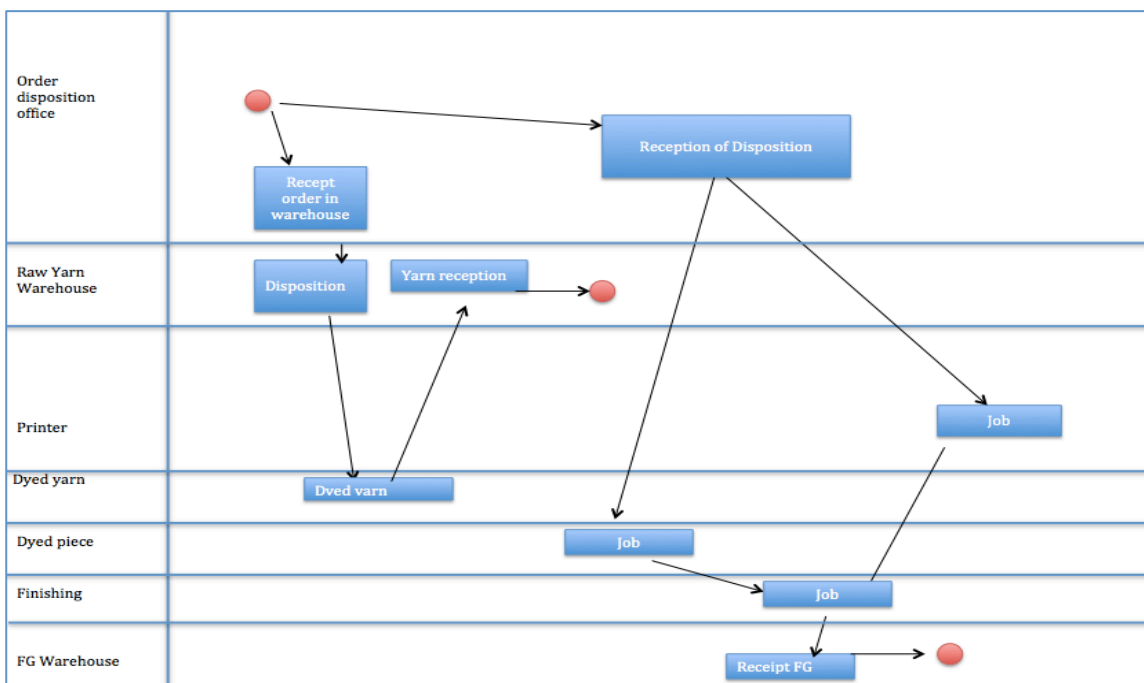


Figure 17 Ennobles

4.4.2 Ending phase: To be

This paragraph represents the processes in which I try to act.

How the company manage the relationship with supplier and external ennoblers to pass two different kind of information:

The first Information attends the environmental feature of the product. For This reason I analyse in detail way the process of supply of final goods and wip product both internal job and external

The second information attends the situation of the suppliers and of the ennoblers that will have the role to trace the entire conformity situation about the environmental.

In The processes that follow will be valuated the hire of a new resource that will have the role well define, and volume of work that will be calculated on the calculation done in the following paragraphed

4.4.2.1 Environmental product information

Environmental product information are a kind of feature that the company downstream supply chain haven't standardize yet, and for this reason are very difficult to receipt inside the company. However in the Future will became legally mandatory so have already develop a procedure with the Product function, general direction, CED complete in all the parts and result proactive of two or three year in comparison to competitor can became a POD (Point of Distinct)

Spett.le
 Grandate, Data Cod. Società
 Indirizzo
 Cap Città

Richiesta dichiarazione del fornitore per i prodotti aventi carattere originario nell'ambito di un regime preferenziale

Con la presente Vi richiediamo per il seguente articolo la compilazione del seguente modulo debitamente compilato e firmato:

P. on	Dis. Ts	Var. ts
Descrizione		
Vs. Articolo	Codice Doganale	
Composizione		
Indicare il paese di origine		Made in:
Indicare se il tessuto è di origine preferenziale o meno		
Preferenziale CEE <input type="checkbox"/>		NON Preferenziale CEE <input type="checkbox"/>
Cumulo applicato:		
SI <input type="checkbox"/>		NO <input type="checkbox"/>
Paesi		

Con la seguente dichiarazione l'articolo risponde alle norme in materia di origine che regolano gli scambi preferenziali con Ue, Norvegia, Islanda, Lichtenstein, Svizzera, Turchia, Isole Faeroer, Algeria, Tunisia, Marocco, Egitto, Giordania, Libano, Israele, Cisgiordania E Striscia Di Gaza, Albania, Bosnia Erzegovina, Macedonia, Montenegro, Serbia, Andorra, San Marino, Cile, Sud Africa Messico, Ceuta, Melilla, Corea Del Sud, ACP/EFTA, PTOM, SFG, Paesi America Centrale (Costa Rica, El Salvador, Guatemala, Honduras, Ucraina, Georgia, Moldavia, Nicaragua, Panama) Colombia, Perù - subordinatamente alla ratifica degli accordi-

Indicare la provenienza del filato, il tipo, la percentuale sul totale, se preferenziale o meno

Filato	Provenienza	Tipologia Seta			% Sul Totale	Preferenziale	
		Mulberry	Tussah	Altre		SI	no
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
10		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Questa parte riguarda le fibre di Cachemire

Indicare la provenienza del filato, il tipo, la percentuale sul totale, se preferenziale o meno

Cachemire	% Sul Totale	Nome Comune Animale	Nome Scientifico Animale	Paese di Origine
1				
2				
3				
4				

Validità	al
Data	Timbro e firma

Si impegna ad informare immediatamente CLERICI TESSUTO E C. SpA della perdita di validità della presente dichiarazione.

Ritornare la dichiarazione a documentazione@clericitessuto.it

Figure 18 Documents for national origin

There I map the new part of the process that will help the company to manage all the new Information.

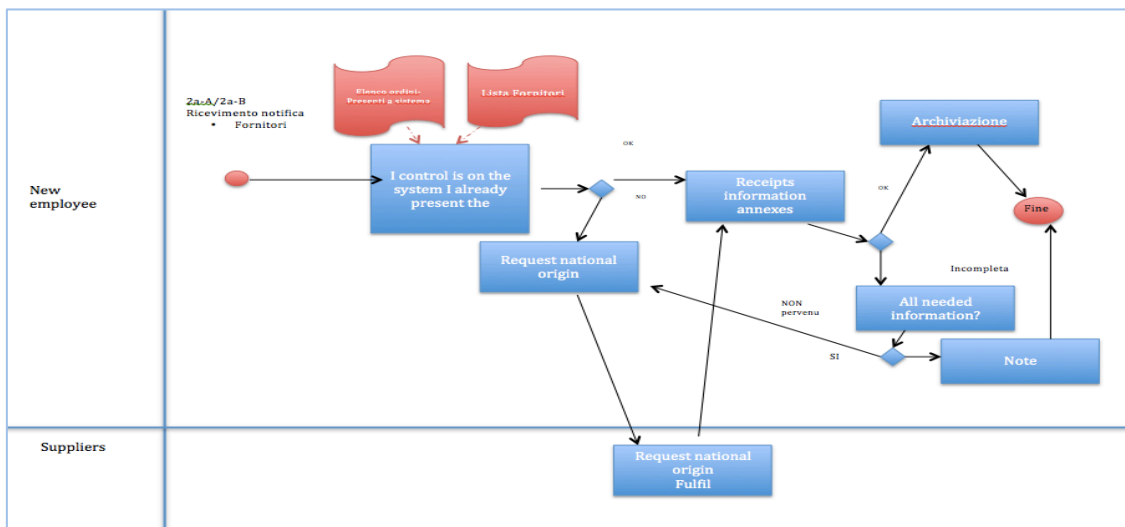


Figure 19 New processes to trace for the national origin

This micro process should go to complete all the processes already present for the : Supplier and supplier of yarn.

2° B: Suppliers

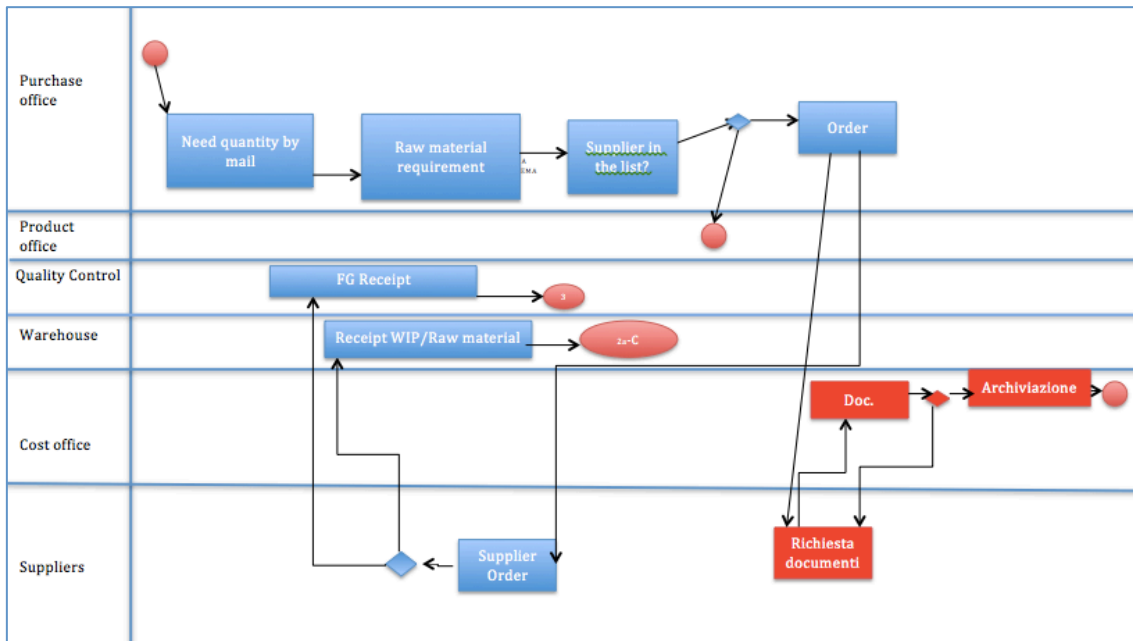


Figure 20 Suppliers

2° A: Weaving e Quality control

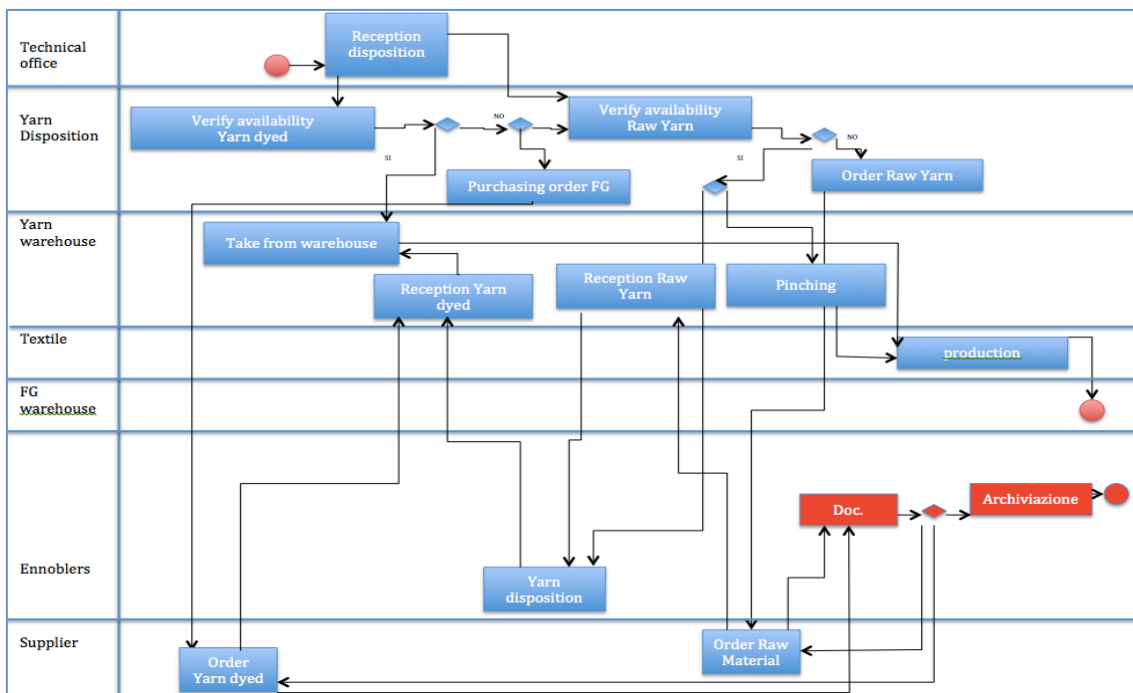
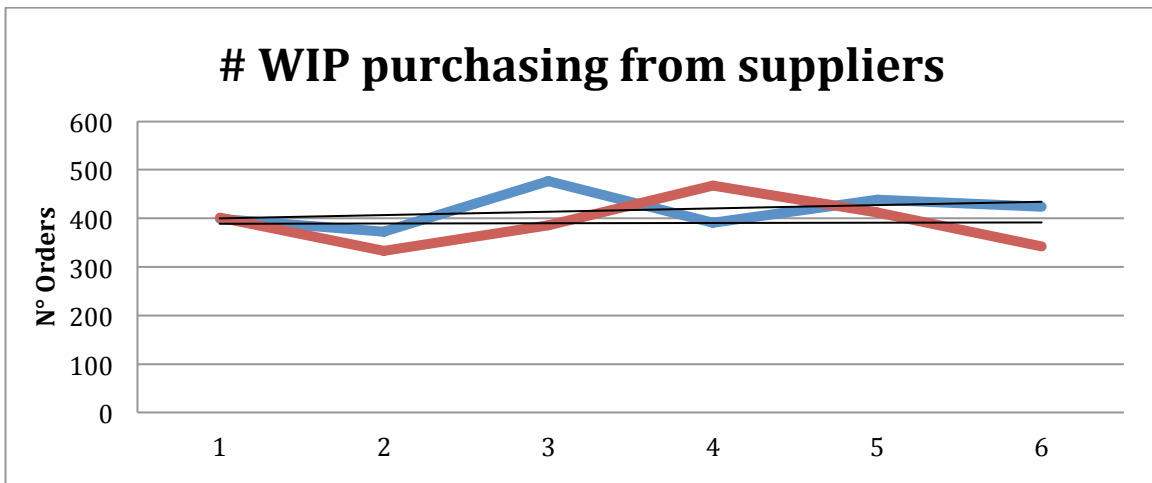


Figure 21 Weaving e Quality control

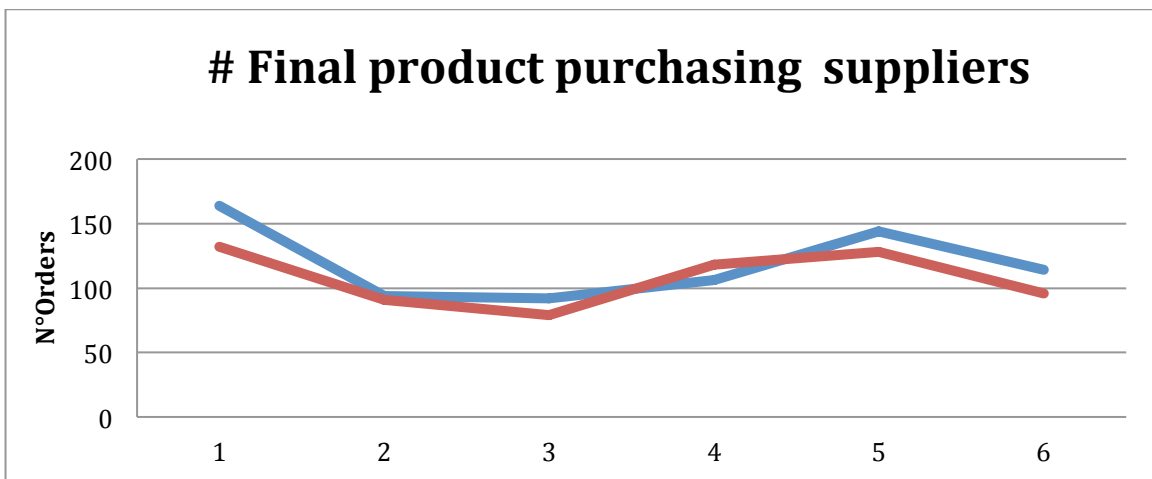
To understand if the new process is useful I have done a analysis of the data provide from the ERP of the Company for all the numbers that have to face the

purchase from supplier of final product and “WIP” product. This because is not possible take the weaving data’s form low cooperation to do the calculation for the dye part. For this reason the analysis result limited only to a part of the company.

The Analysis will be done with the intention to extrapolate the quantity of data that will be insert inside the system. The Outcome will be the estimation the quantities of work the new employee will be do to face this problem.



Graph 1 WIP purchasing from supplier



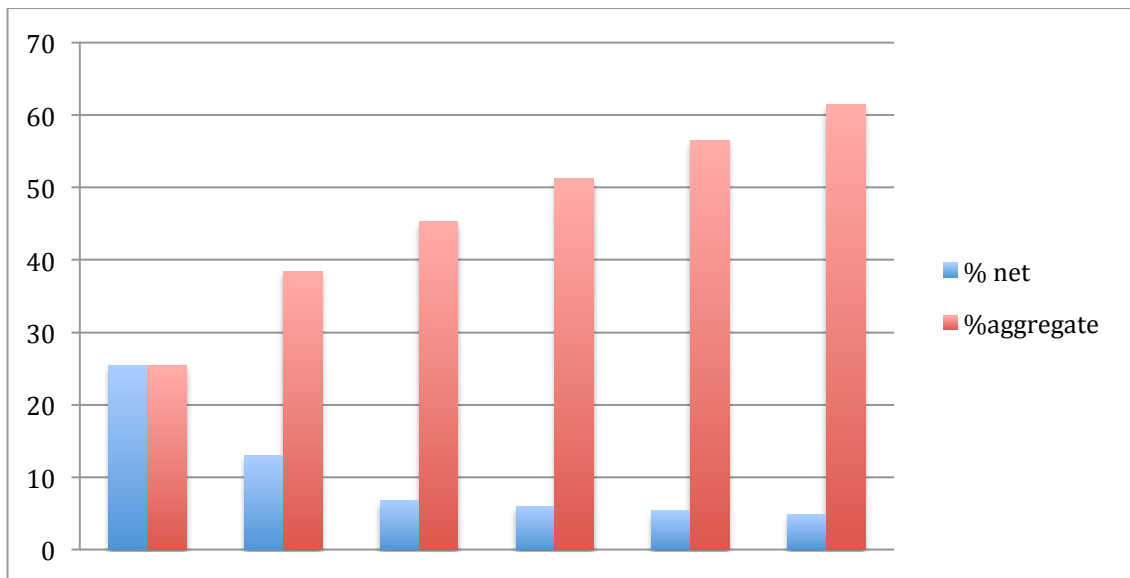
Graph 2 Final product-purchasing suppliers

The first conclusion is that putting in relationship the order of WIP product from January to June of 2014 and 2015 this remains constant for all the phase of the year. This helps me that the new resource will be engage the fill of 400 command every month.

How we can image the number of final product purchase will different in quantity and change seasonally. Considering the average quantity the number of command will be 100 for each month more or less.

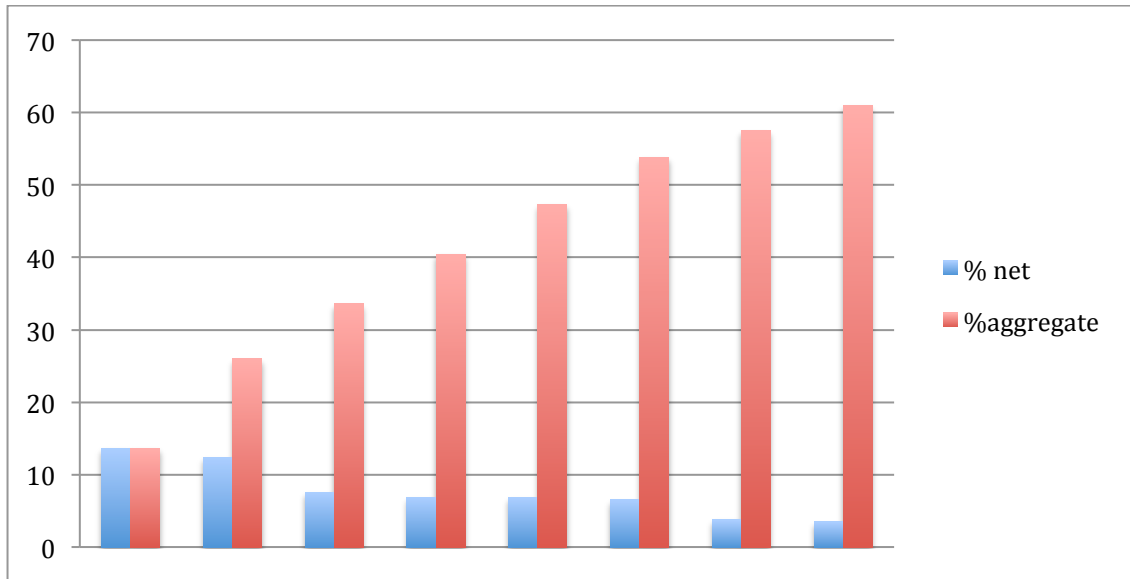
The main problem will be realize how in the order are distribute the information and if each order is compose with different lot coming from different country. This analysis should be complete examine the distribution of the weaving product bought.

Another important issue is the distribution between the supplier of the order. Our basin is compose by 156 supplier of weaving. But only 6 can be classify as most important considering that their adding reach the 60% of the total. For these suppliers of Clerici Tessuto should be done another analysis: Understand if there is the possibility to create a informatics direct channel .



Graph 3 WIP purchasing distribution

Instead for the final goods supplier the consideration is another because for them there isn't a pick as for WIP so the process created is perfectly aligned.



Graph 4 Final Product Purchasing distribution

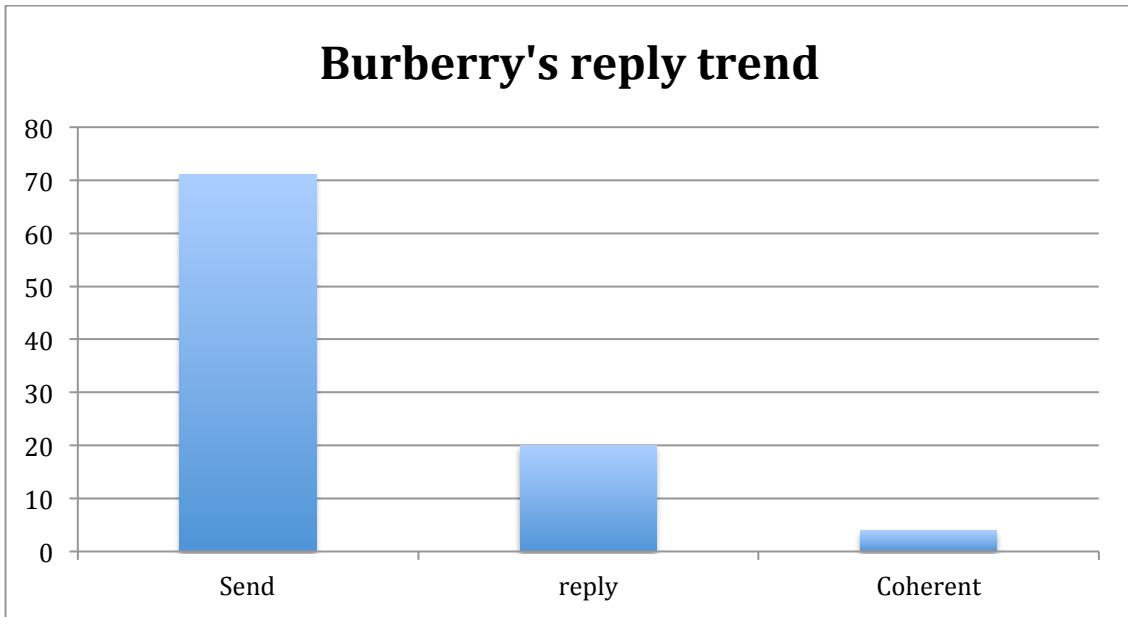
4.4.2.2 Environmental company's information

What we should obtain from this chapter is a responsible collaboration that must be done with all the chain. The objects are:

- Operate under international standard always recognized and in evolution
- Search sustainable agree
- Improve the perception of the supplier

In the beginning of my experience in CTC following the regulation of Burberry I try to send contracts for MSRL ((Manufacturing Restricted Substance List) and for PSRL (Product Restricted Substance List) to all supplier. These were contract on chemical limitation that should be sign before the new commercial season from all the suppliers as specify in chapter 4.

We sent email to 71 suppliers: the response was unsatisfying. On 71 mail only 20 responses. About these 20 answers only 4 were coherent. This is a clear signal of a supply chain fragmented.



Graph 5 Burberry's reply

The CTC so try to search a methodology to respond to this process in the way can take in consideration this type of situation with a very define process.

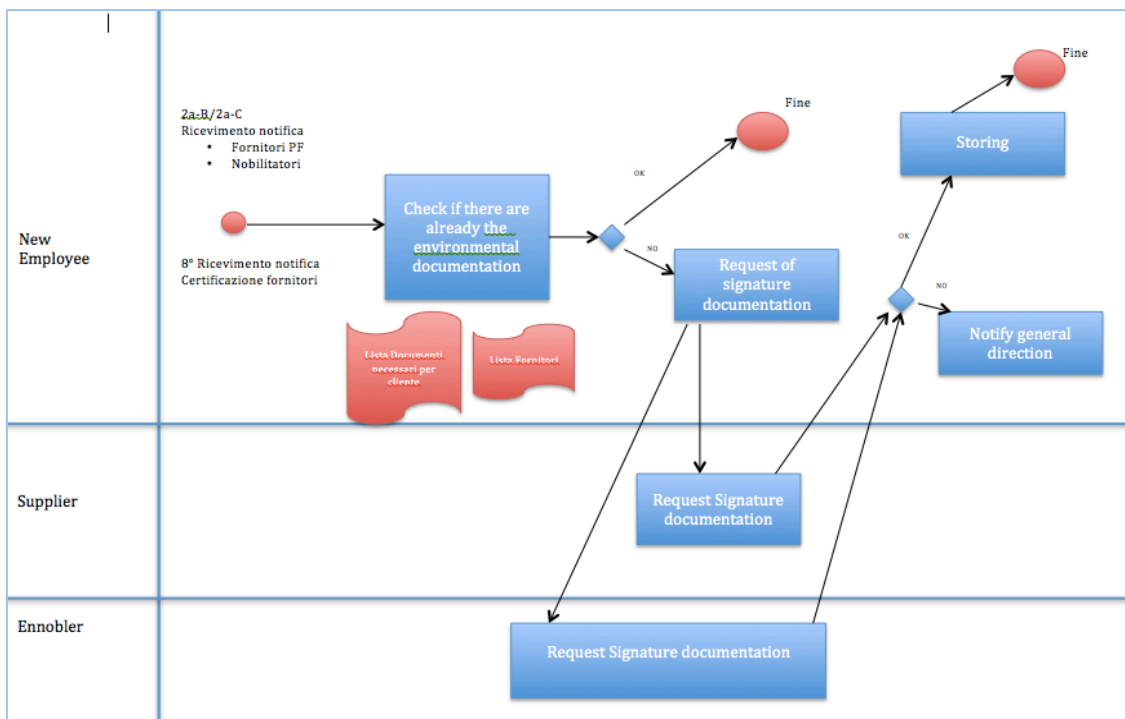
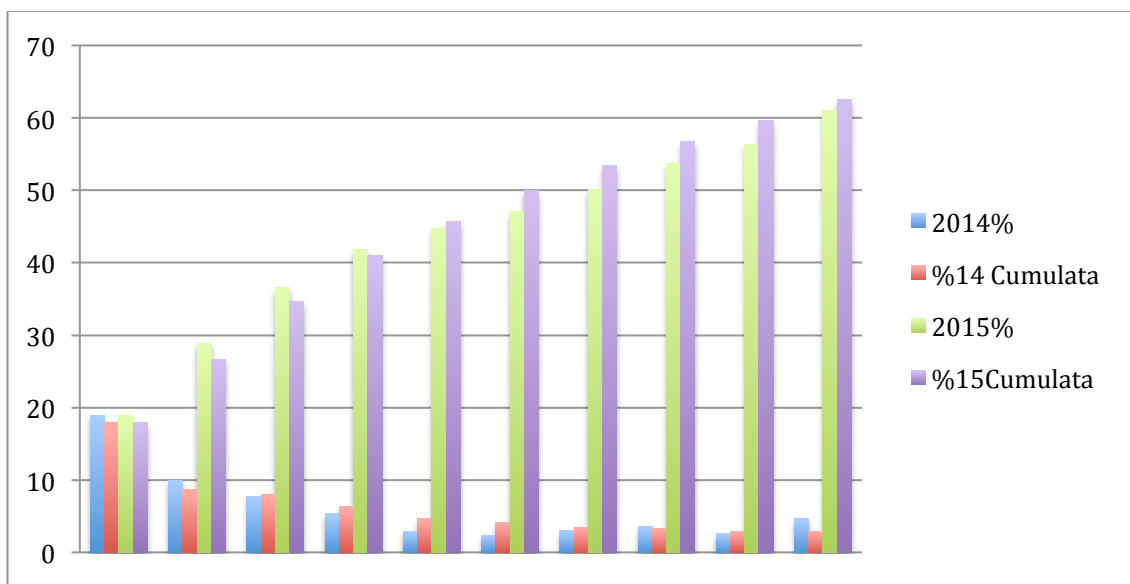


Figura 1 New process for Certification

With this process we try to trace and control the environmental suppliers and ennoblers situation. To be complete we ha done analyses also the ennobler to catch the volume of data that the employee should take in consideration

The ennobler are a essential passage for CTC, they represent the most important phase that never be done internally, if we analysed which is our interest for the supplier, we can count than number of the ennobler is about 137. With this suppliers only with someone there is a strong relation.

Taking the numbers:



Graph 6 Cumulative numbers about ennobler

What we can deduce from this graph is that Sara Ink represents an exception for the distribution of work along the supply chain is constantly and the margin between 2014 and 2015 are little.

I desire highlight that won't be this critical part of work of the new resource but will be more critic the management of the first part.

Indeed if we add ennobler to suppliers CTC should face a documentation for more or less 500 companies with theirs certification but to reach a good level of covering

will be enough a few number of company's to guarantee a good bucket for the production

4.5 Informatics System

The last step of my project is been the consideration about the idea that permit to CTC to do a improvement to the management of this environmental traceability. Taking the sample from the customer of CTC after have seen the procedures, The idea is been the creation of an informatics system that could be a valid alternative to the sending of mail and calling common of the procedures think before , replace it completely. The creation of the gate way in which every single supplier or ennobler, has got the own credential an in first person insert the information that CTC needs is the key passage that guarantee a quality.

Trough the website of CT is possible to access to this platform where supplier go to update their situation about , their environmental situation e about their product.

The graph in the process under represents how the CTC and Supplier communicate.

This system doesn't substitute the employee previously consider but change completely its way of work.

The true value of this system will be the capacity to change always more information from this channel not only about the environmental information but also about the order. The idea is that in long period CTC create a channel of changing not only the environmental information but also:

- Time of delivery
- Repositories of all the document about the supplier
- Product's information (included technical schema)

All in one gate manage CTC and Suppliers relationship

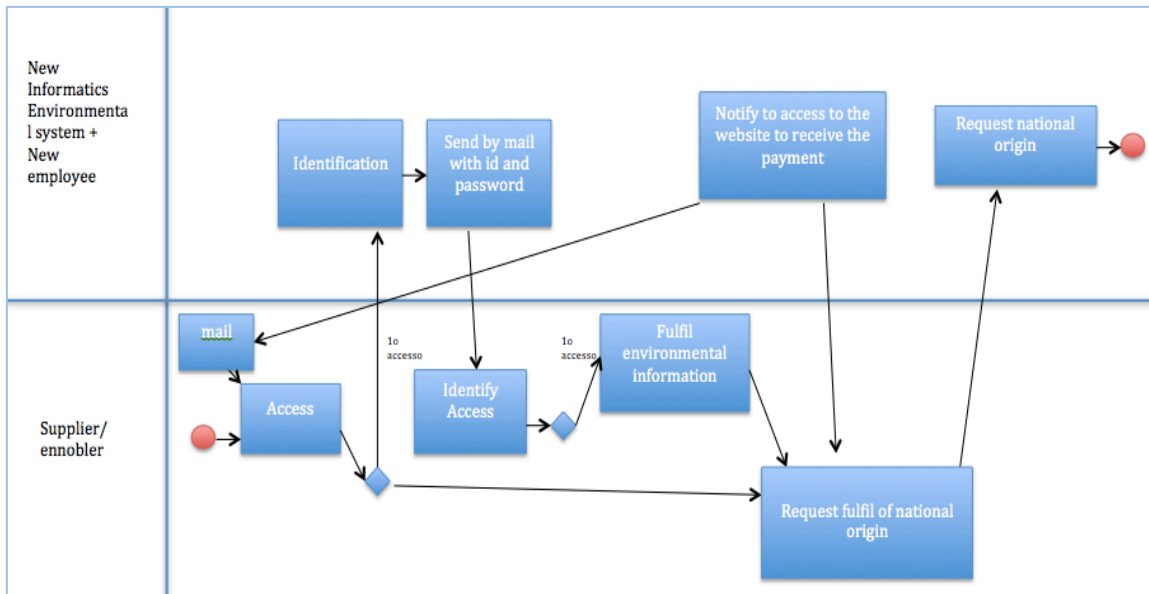


Figure 22 New Environmental process

Image represents the flow of the new process.

In the long period this system guarantee bigger volume and a better management inside the system. Of course the main issue will be the implementation but the wish of the supplier to complete this information created by CTC. CTC to avoid this option create series of constrains that bring until the elimination of the supplier from the panel and the delayed of the payment of the material respect determinate material

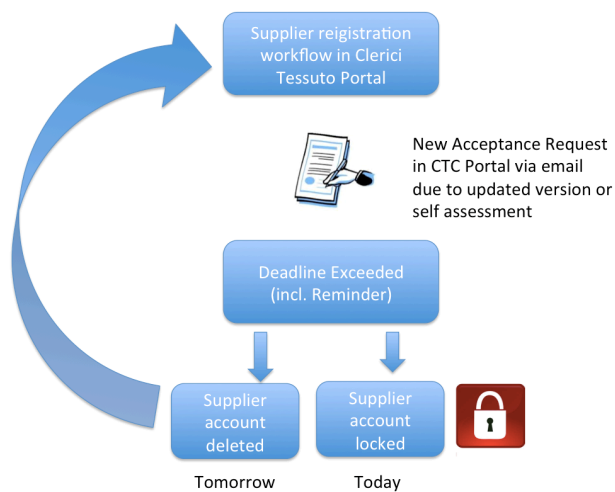


Figure 23 Process of eliminate

Obviously all must be think in correlation with each situation. This work represents an important evolution from the environmental management of supply chain.

The cost of implementation for a initial solution with the creation of the portal without the integration with ERP is limited around 4000 €. Suppliers and their approach to this new process represent the real problem.

4.6 Process of a management of the waste.

The really new process is be the writing of the process that there weren't in the company like a Refuse Process.

We have :

Waste list

Elenco Rifiuti gestiti dalla Clerici Tessuto						
Descrizione	Stato Fisico	Caratteristiche di Chimico Fisiche	Caratteristiche di pericolo	Recupero Smaltimento	Villa Guardia	Grandate
Carta e Cartone	Solido non Polverulento	inodore	-	R13(recuperato)	x	
Imballaggi di materiali misti	Solido non Polverulento	inodore	-	R13(recuperato)	x	
Ferro e Acciaio	Solido non Polverulento	inodore	-	R13-R4	x	x
Imballaggi in Plastica	Solido non Polverulento	inodore	-	R13	x	x
Imballaggi in Legno	Solido non Polverulento	inodore	-	R13	x	x
Rifiuti Da fibre Tessili Lavorati	Solido non Polverulento	inodore	-	R01	x	x

Figure 24 Waste list

- Supplier List

Elenco Trasportatori di Rifiuti dalla Clerici Tessuto

Ragione Sociale	Indirizzo	CAP	Città
Fermetal S.R.L.	Via Livescia 15	22070	Luisago (CO)
Setra S.R.L.	Via la Croce 10	23823	Colico (LC)

Figure 25 Supplier List

- Attach 1/3: Complete form for the budget this document is the document that describe the waste: type, quantity feature Europe code etc

Figure 26 Waste Document

- Attach 2/4: Complete formulary list of all the document of transaction

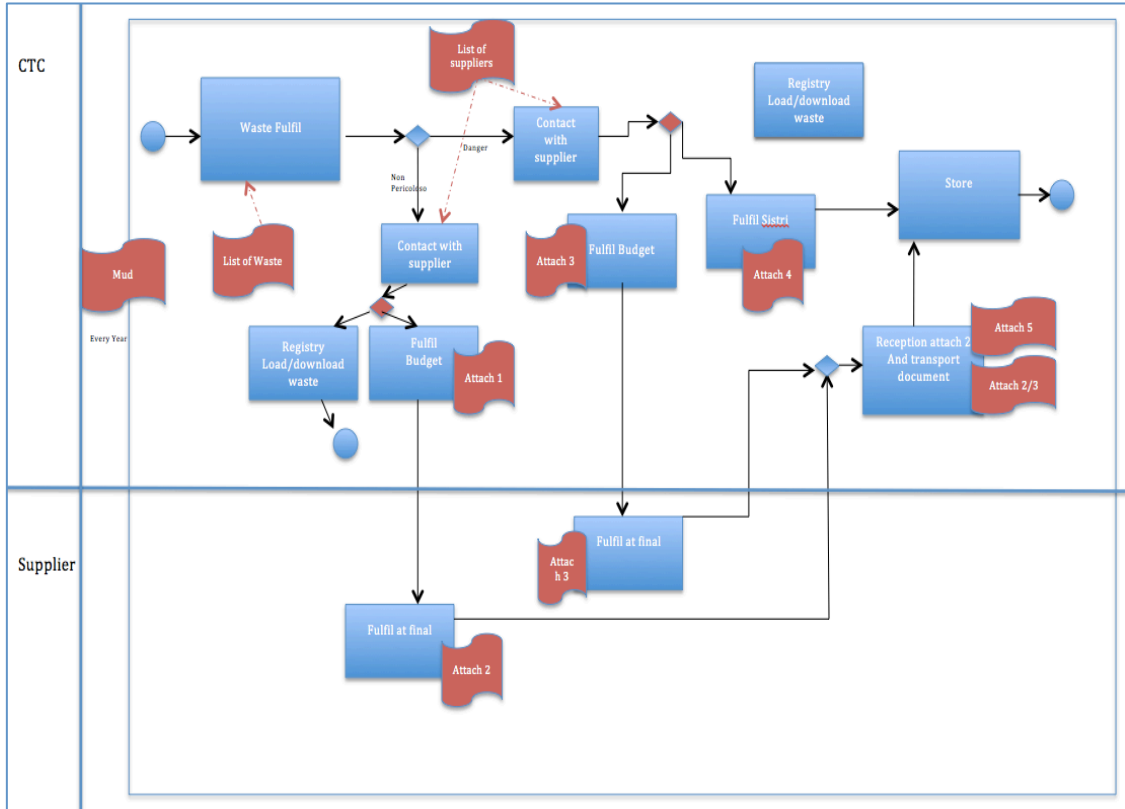


Figure 27 waste processes

4. Conclusion

Clerici Tessuto is the ideal company for processes' engineer because thanks to its little quantity of chemical material permit only to manage the environmental information. The beginning goal of project was an entire Environmental Management System both in production and in the relationship with supplier and ennoblers. What I would underline is the evolution of the effective goal of my project. After some interviews and considerations with the main director the object was cut to a creation of an environmental supplier communication system. The benefits that a partial EMS gives are listed in the underlying table.

Table 12 Goal achieved

Benefits	Goal achieved
Improved quality of environmental information	Yes
Legal compliance is documented and can be demonstrated	Yes
Review and improve procedures	Yes
Enhanced skills and improved knowledge in SME	No
Gain new customers/business and satisfy existing customers	Yes
Assured legal compliance Increased energy and material efficiencies	No
Create a positive public image	Yes

The table show up how the goals about environmental documentation and image with customer have been reached than the knowledge and efficiency of the processes have been impossible to achieve. I should discuss about some consideration on this project and about the

experience in a weaving's mill. Probably not all the solution presented and suggested in this project will be implemented the reason can be a lot. My personal considerations the reasons are two:

- The low experience of the students that tried to implement a system without solid basic and experience about the topic.
- The low compression of the benefit by employee about the implementation of an environmental management system. The main reason is indirect economic correlation between EMS and economic return.

In conclusion has not been possible to apply an complete EMS to all the mill but only to specify processes. This represents a good basic on which beginning a new process of implementation also in production. CTC is good structured and ready to make another quality step. This step must be done thought a professional experience team able to transmit better the vantages in less time of a management system.

From personal point of view this experience permit me to understand which is the reality of the production mill and understand how the main differences between the main functions, which can be the inefficiency, the adding value structure, decisional power role in the company. The lacks between best practises learn at university and the reality usually became a limit to the application of new concept and idea. Our lesson learnt is that this project represents a perfect sample of implementation of an environmental management system in a company not focalized on chemical material. So represent interesting experiment and experience for all the company of Como's weaving mill if they desire to apply an EMS.

Ringrazio la mia famiglia Luciana, Felice , Bianca e la MIA Federica che mi hanno sopportato e supportato durante tutti e cinque gli anni di corso in cui non sono mancati alti e bassi. Vorrei ringraziare i miei compagni di Corso MARCO e OSMAN che si sono dimostrati dei veri amici e Flaminia e Martina per la loro genuinità.

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