



**Supply Chain Management and Industrial Production
Innovation Double Master Degree Thesis**


*The Implementation of a
4PL Supply Chain Solution*

Industrial Production and Technological Innovation Course

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Summary

SUMMARY	2
1. GLOSSARY	4
2. SPECIAL THANKS TO:	6
3. INTRODUCTION	8
4. SUPPLY CHAIN MANAGEMENT (SCM) OVER TIME	11
4.1. Supply chain management, multi-level and multi-dimensional value creation	11
4.2. Supply chain environment changes	17
4.3. Problems faced in SCM	20
5. EXTERNALIZATION SOLUTIONS	26
5.1. Different externalization levels:	26
5.2. From competition to cooperation, to 4PL solutions	31
6. THE TECHNOLOGY, A KEY PILLAR IN A 4PL APPROACH	34
6.1. Old technological tools limits	34
6.2. New tools benefits	35
6.3. New tools solutions	36
7. WHY EXTERNALIZE AT A 4PL LEVEL?	39
8. WHICH ARE THE CONSTRAINTS/RISKS IN A 4PL SC EXTERNALIZATION?	44
8.1. From the client point of view	44
8.2. From the provider point of view	47
9. HOW TO PRESENT AND IMPLEMENT A 4PL SOLUTION?	51
9.1. How to present a 4PL solution to a client?	51
9.2. How is manage the strategic aspects?	53
9.3. How to make the link between the different functions?	54
9.4. Why and how to measure the performance of the solution?	56

10. CASE STUDY: MY INTERNSHIP IN ACCENTURE	59
10.1. Accenture	59
10.2. Consultancy	62
10.3. The project	63
10.4. The implementation roadmap	66
10.5. The roll-out approach	70
10.6. My role in the consulting team	76
10.7. Problems faced, used resolution methods, and results	79
11. IN THE FUTURE, 5PL SOLUTIONS?	83

1. Glossary

Systematic approach: Methodical approach that is repeatable and learnable through a step-by-step procedure. The goal of this type of approach is to identify the most efficient means to generate consistent, optimum results.

Integrated approach: With this type of approach you are looking at complex systems as a whole. Trying to see individual components fulfill the organization or system main objectives. The aim is for all different functions and different disciplinary fields to reach a collective optimum performance at minimum cost in a sustainable manner and that also results in long term benefit to the environment.

Transversal: Which covers several areas of knowledge. Indeed, Supply Chain includes several activities and functions that need different knowledge.

Reverse logistic: Reverse logistic is the client merchandize return processes optimization. This particular logistic is called reversed because it concerns the good route from the customers to the seller. This reverse the usual logistic problematic. The orders are not progressively split from the expedition site. They are progressively grouped toward the return site that can be the expedition site or another.

NICTs: New Information and Communication Technologies is an expression that refers to informatics, audiovisual, multimedia, Internet, and telecommunication techniques that allow to users to communicate, access information sources, stock, manipulate, produce, and transfer information in different forms.

BUs (Business units): A business unit is a subsection of an organization that is dedicated to a specific market, confronted to particular competitive conditions, and that has to roll-out a particular competitive strategy.

Ubiquity: It is the capacity to be in different locations at the same time.

Plants: Manufacturing factories.

DCs: Distribution network warehouses that are meant to prepare the orders and to distribute the goods that come from one or several plants or providers.

Synergy: Coordinated action of several elements that contribute for this shared action.

IT: Information Technology indicates the use of computers, storage, networks, and of electronic devices, infrastructures and processes to create, process, stock, secure, and exchange all kind of electronic data.

Incoterm: Within the scope of international commercial contracts, incoterms refer to the responsibilities and obligations of the seller and the buyer. The responsibilities and obligations are in the following domains: loading, transport, merchandize delivery, and the formalities and costs (insurances) linked to those operations.

The applicable rule is enacted and published by the International Chamber of Commerce (ICC) in Paris. The last rule, Incoterm 2020 that will come into effect the 1st of January 2020 will replace the previous rule, Incoterm 2010, in effect since the 1st of January 2011.

2. Special thanks to:

This thesis is marking of the end of my five years cursus of studies. Before starting this discussion, I would like to take a moment to give a special thanks to all the people that supported me in any way during this important period.

I thank all the people that have contributed to the success of my internship and that gave their support for the redaction of this discussion.

First, I would like to give a special thanks to my internship supervisor, Carmen Valmaseda and to my thesis supervisor, Professore Maurizio Schenone for their support during my internship and the redaction of this discussion.

My internship supervisor has been of precious support during all my internship. She has been very attentive that my internship allows me to extend my skills and gain experience. This is why I would like to give to her and Pol, my internship manager, special thanks for providing me with all their help. Their attentiveness and advices enabled me to progress quickly and to enrich my knowledge. Thanks to this, I was able to success in the missions that were entrusted to me.

My thesis supervisor has been of precious help and support concerning the redaction of this discussion. I would like to give him a special thank for his advices that helped me to improve the quality of this thesis. I would also like to thank him for answering rapidly to my questions.

I would also like to give special thanks to all the teams members that I worked with for their warm welcomes into the project team and for all the help they provided me during all my internship experience. I had a very nice experience, doing my internship in Accenture in this project. All the project members made this experience as a enjoyable and educative at I had expected it. All my colleagues really helped me to understand the problematic and objectives of the different missions that were entrusted to us.

I also have to thank the Politecnico di Torino and the IPAG Business School for the opportunity to follow those studies. Thanks to all the teachers, students,

speakers, and administrative people I meet during my studies, I had the opportunity to learn a lot in term of theoretical knowledge, self-knowledge and relationships. All this education will be a good support for me in my future career.

Next, I would like to give special thanks to all the people that supported me into the redaction of this thesis. I would like to thank my university close friends, Alexandra, Tanguy, Pénélope and Camille for those five years spent together and the help we provided each other's.

To finish, I would like to thank my family and my friends for supporting me as for the redaction, as emotionally. I would like to thank Virginie Degrutère and Laurent Degrutère, my parents, for their help and support during my entire academic career and before that. They enabled me to become the woman that I'm today. I am very grateful to have their support and for the love and help they always provided me.

3. Introduction

To conclude my Supply Chain Management and Industrial Production five years of studies in the Politecnico di Torino and the IPAG Business School, I had the opportunity to perform an internship in the distribution management field. I was hired by Accenture to join a consulting team that was working on designing and implementing a 4PL solution for a health and hygiene company.

The subject of this discussion will be to answer the problematic: How to design and implement a 4PL Supply Chain Solution? To answer this question, we will have to explore and analyze different topics.

First, we will discuss the Supply Chain Management environment over time. We will see why it become more and more important for companies to align their supply chain management processes and operations to the current supply chain environment. By making the link of the changing environment and the problems faced in Supply Chain Management.

To conduct this analysis, in a first time, we will see how supply chain management has evolved over time and which are the stakes linked to this function. Then, we will see that the reasons of those changes are coming from the supply chain continuously changing environment. To finish the supply chain management over time analysis, we will discuss the problems faced in Supply Chain Management.

Today companies most chosen solutions to improve their Supply Chain Management processes and operations are the externalization solutions. Externalization or outsourcing is the transfer of all or a part of the function of an organization to an external partner. It is a strategic management solution that results in the company activities reorganization, the focus is putted on the core competencies to entrust a partner with the activities that are not part of the company core competencies.

To discuss the externalization subject, we will in a first place, learn about the different externalization solution levels. We will develop the advantages and

inconvenient of the different externalization levels in order to be able to assess to which kind of company the externalization level could correspond. The 4PL solution is the highest level of externalization solution. It includes the externalization of all or a part of the supply chain management activities. The other levels are just including operational activities. Then, we will see that the rise of 4PL solutions is a marker of the supply chain actors' relationship evolution. We will see that it requires cooperation between actors that wasn't possible few years ago.

We will also discuss the importance of technologies in 4PL solutions. Those solutions are based on very efficient technological tools that are enabling to improve the activities results in term of performance.

To be able to observe how technological tools are important for those new 4PL solutions, we will see the old tools limits compared to the new tools benefits in responding to the actual Supply Chain Management objectives. We will also develop the solutions that are providing the new tools more in detail.

Next, we will develop the reasons to choose a 4PL solution for a company. We will also develop the constraints into externalizing at a 4PL level from the client point of view and from the solution provider point of view. This part will enable us to understand what can be the motivations and the impediments that can face the company or the solution provider into starting to design and implement a new 4PL solution.

In a next part, we will question ourselves about how to present and implement a 4PL solution. Indeed, it is important to understand how the provider is designing and implemented the solution, and how the client is involved in this entire project.

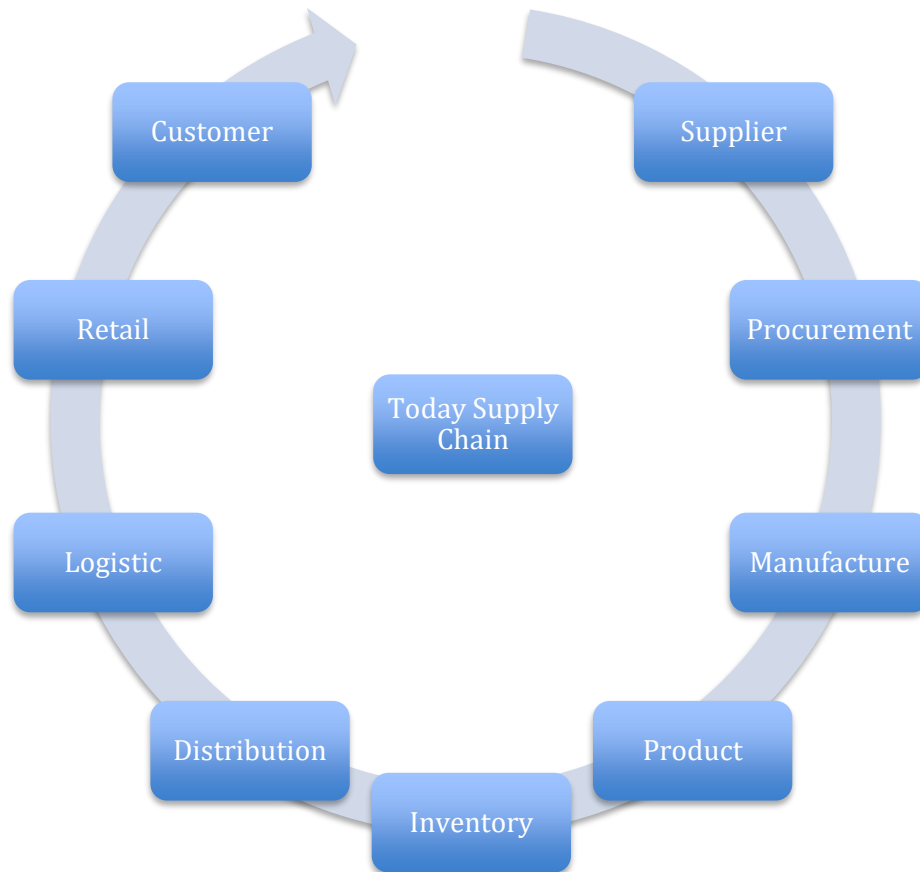
To detail this part, we will see how a 4PL solution is presented, how the strategic aspects are managed, how the link is made between the different functions including the new solution, and why the solution performance is measure and how.

To finish this discussion, we will see the case study of my internship in Accenture where I will be able to present practical examples. In this part, I will

present Accenture and I will develop what is consulting. Then, I will present the project, the implementation roadmap and the roll-out approach used. Next, I will explain my role in the consulting teams and the problems we faced. It will give a practical example of the problems that can be faced in this kind of project.

To conclude, we will discuss what could be the future 5PL solution based on the actual technological innovation and Supply Chain management trends.

4. Supply Chain Management (SCM) over time

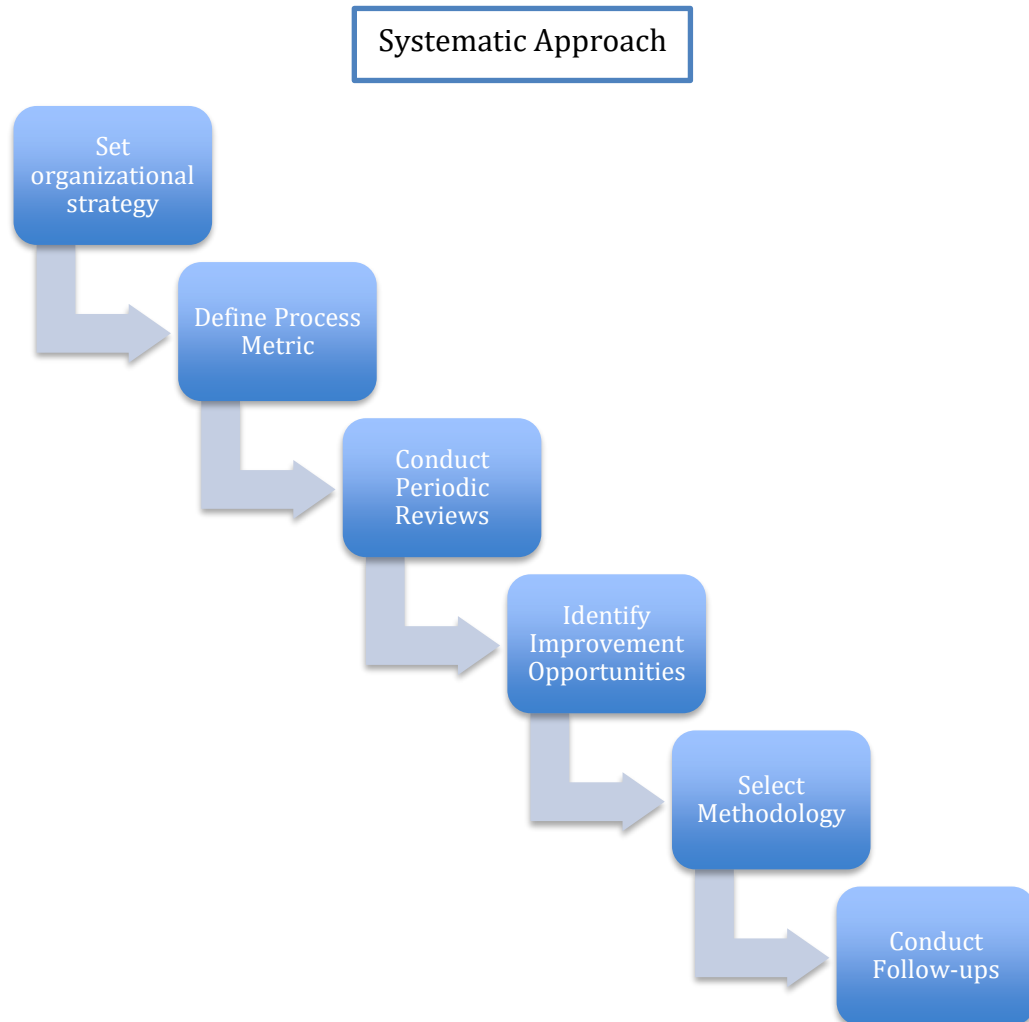


4.1. Supply chain management, multi-level and multi-dimensional value creation

The Supply Chain Management concept was created early 1980's. Before that, logistics concerns were fragmented, each function like production, procurement, or distribution were managing their operations locally with punctual responses.

It is in the 1980's that people progressively started to realize that all the logistics problems to resolve by the different functions of the company could only be managed efficiently by a systematic* and integrated approach* of the logistic chain.

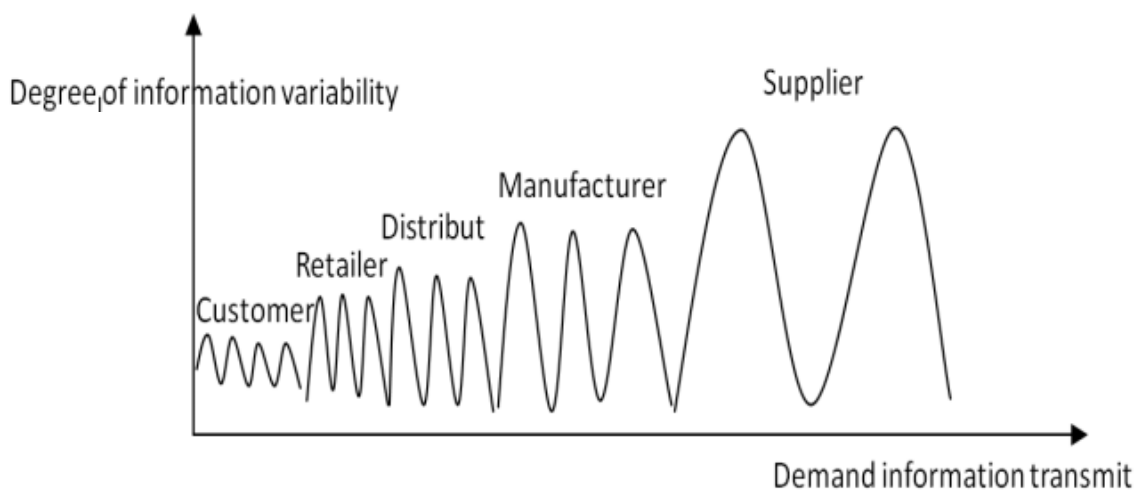
The goal of a systematic approach is to identify the most efficient means to generate consistent, optimum results.



Only a transversal vision of logistics can allow flows analysis and management that enables to improve the specific value of each function involved in those flows (physical and information flows). The logistic chain has to be driven by synchronizing the actors' actions so that it can take advantage of security stocks constraints. As the different functions are communicating, they are able to know the exact needs of their clients. We do not speak here about the final client of the product but the internal function toward which your actions are fulfilled. This situation allows to eliminate numerous security stocks between the different internal

functions, to optimize the stocks. It enables, for example, to avoid the Bullwhip effect.

The Bullwhip effect is linked to the fact that each link of the flow chain needs an elevated stock level to anticipate demand uncertainty and avoid stock-outs. This phenomenon creates an elevated and excessive stock level at all levels. This is the result of an insufficient level of communication and information sharing. This situation can lead to overproduction and affect the enterprise profitability.

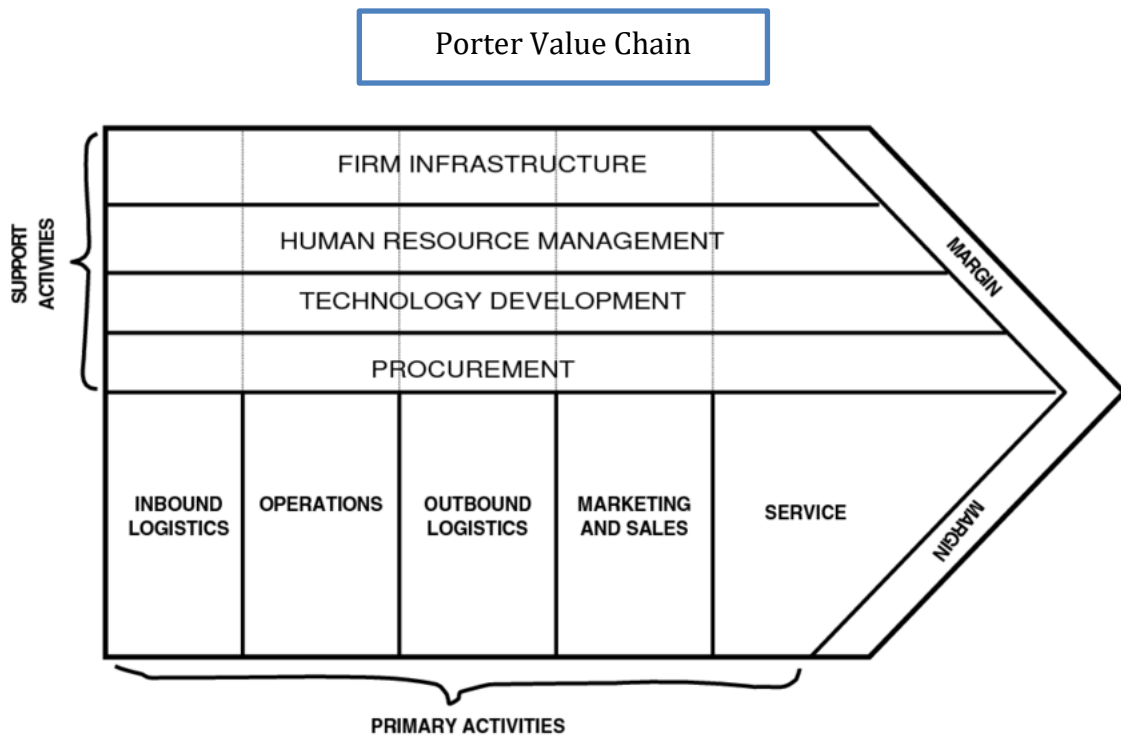


Managing supply chain in an efficient way also allows to improve the final client service level. It helps in the objective of reducing the supply chain in term of time in order to deliver the products/services faster and in a more adapted way. By having a better understanding of the needs in the current situation, companies can eliminate wastes of time, and therefore deliver a better service level and take advantage of costs reductions.

The goal of this new vision was to start to properly manage flows by conciliating and coordinating activities linked to procurement, production, physical distribution, and after-sale service. This vision, principally intra-organizational, is linked to the value chain concept (Porter, 1985).

Porter value chain is a systematic approach with the aim to investigate in which activities is located the value creation. This tool is a general representation of the

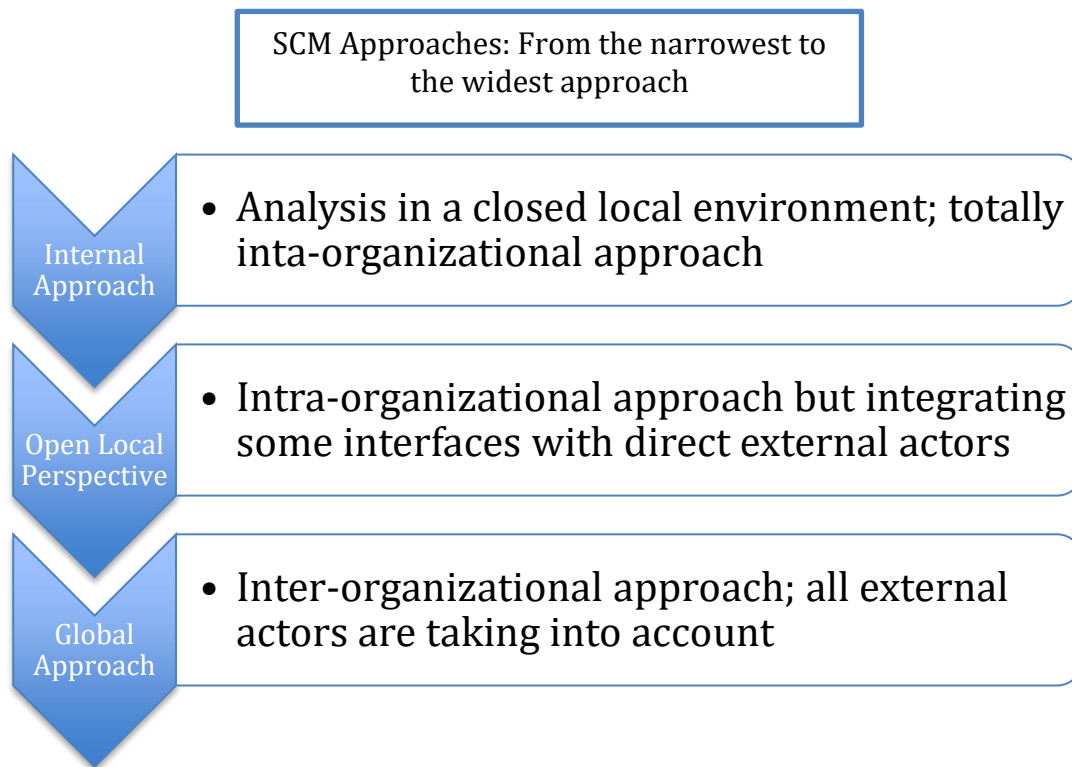
company that relies on the process composed of the different activities that transform inputs into outputs bought by consumers. Those activities are divided into two types, the principal activities, and the support activities. All those activities creates value, all together they represent the total value provided by the company.



The principal activities are, inbound logistic, production, outbound logistic, marketing and sales, and services. The support activities are, procurement, human resources management, technology development, and the firm infrastructures. The appearance of those kind of approach are supported the fact that supply chain management has to be transversal*.

This vision has been enriched by an inter-organizational dimension in the 1990/2000. First, the concentration has been putted on the interfaces with the company direct upstream and downstream partner. Then, this perspective has been extended to all the actors concerned by the SCM, considering the raw materials provider actors until the final client, the final user of the product. This vision also integrates logistics support regarding sustainable products and end-life product management, meaning reverse logistic*, wastes proceeding, recycling.

However, today SCM notion is not the subject of a unified approach. Companies adopt various perspectives. Some are focused on an internal approach of SCM and chose to fulfill their analyses in a closed local environment. Others also favor an intra-organizational approach but integrating some interfaces with external actors. This could be called an open local perspective. Regarding the lasts, they adopt a global approach of SCM. They fulfill their analyses at an inter-organizational level, taking all external actors concerned in the SCM into account. But we have to find a way to understand what is SCM exactly and more importantly, which are the SCM objectives.



To define SCM goals, we have to identify which are the SC parties that could benefit value creation and appreciate it, positively or negatively.

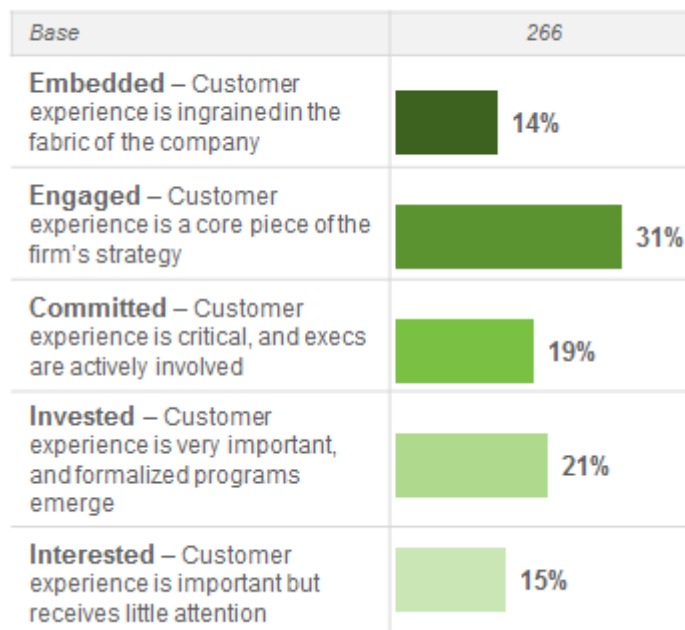
Most of SCM classic definitions are highlighting the client. As we saw, the client notion as to be clarified because it can be direct clients or the clients of clients, different client levels can be considered. The best is to consider them until the last one, meaning until the final client, the one the pull flows. A second party that benefit

value creation is the shareholder. They can benefit from costs reductions that allow better incomes.

SCM can be defined as the key business processes integration, from the final user going back to the initial suppliers that offer the products, the services, and information that contributes to value augmentation for clients and shareholders. The aim is to reduce costs and to improve service levels in the same time while keeping firms' flexibility in a long-time scale. SCM ambition is to act simultaneously on the added value augmentation, the costs production control, and the engaged capital control, to improve the global profitability of the company.

It is essential to consider customer satisfaction, even in a B2B environment as for some supply chain activities. As we said, the highlight is often putted on the final client satisfaction. B2B International made researches that shows that B2B customer satisfaction is considered but not enough:

How Customer Centric Are B2B Organizations?



This analysis shows that a notable part of companies do not put enough important in their B2B clients' satisfaction. This implies that those companies must progress in this area. Indeed, it is important, even more in the supply chain environment, to

consider the B2B customer satisfaction because it will impact the final client satisfaction level.

To conclude this discussion on SCM evolutions, we can say that today holds challenges as important as they are difficult to implement. Important because the costs/services competitiveness challenge can benefit a lot to companies, even more in businesses where logistic costs represent an important part in the costs structure. And difficult to implement because a transversal approach has to be used. This is difficult due to the different hierarchical structures, whether they are functional, products related, market related or geographical.

4.2. Supply chain environment changes

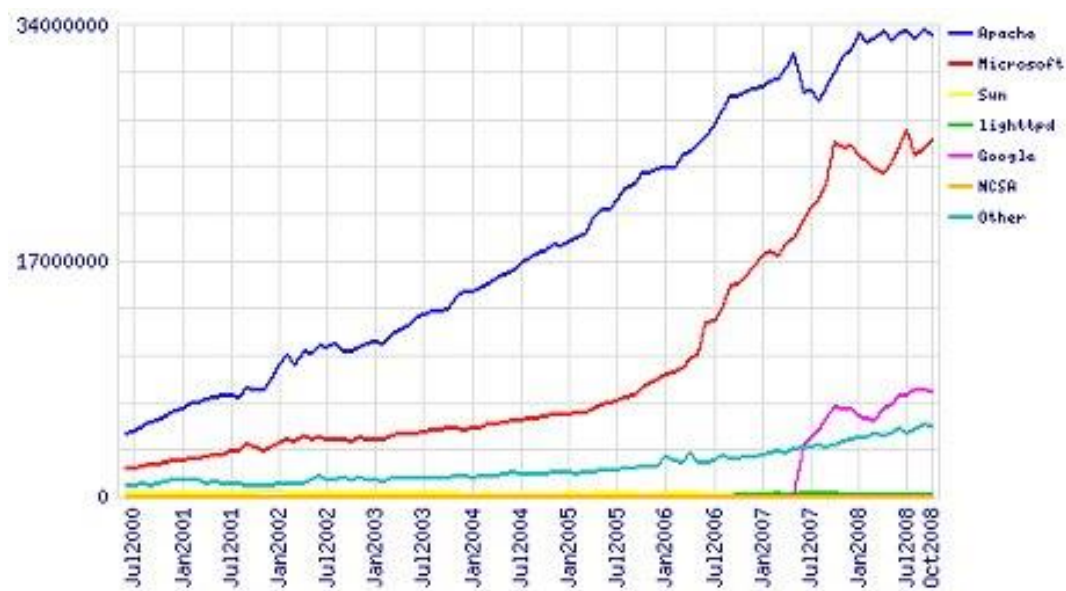
As we said, the supply chain management has evolved over time. This evolution has been caused by different environment changes. An enormous disrupting event has been the rising of the NICTs*, the New Information and Communication Technologies. The NICTs are defined like the tools that come from the new information and communication technologies. It points all modern tools that help communication and information sharing, like mobile phones, information technologies, or Internet.

Those technologies have changed two main “things” that have an impact on Supply Chain Management (SCM). First, it has led to globalization. It has also deeply changed consumer expectations and behaviors.

Globalization as two main definitions, a geographical definition, and an economical one. Geographically, globalization is the world nations interdependence intensification, at the activities and politic systems level. Here, it's the activities level that is interested because it explains a part of the economic globalization. The economic globalization corresponds to the commercial and financial exchanges acceleration worldwide. Globalization results from exchange liberalization, transport means development for people and goods, and the benefits of NICTs.

The rise of NICTs has enabled enterprises to communicate much more easily with each other. This has led to two main advantages. It allowed to have a more centralized management other a same function in different regions of the world. They are not managed separately anymore but as one business unit (BU)*. This new opportunity also helped companies to extend easily their internal geographical scope. There is less need for specialized employees in each region, the implementation is easier. It also allowed to extend businesses relationships beyond physical boundaries. Companies had the opportunity to work with companies abroad in an efficient way.

To give an example of the NICTs rise, we can see below the evolution of the web companies' servers in time:



Source: ZDNet

We can see that there is a big growth in the number of sites used. This is an indicator that support the fact that the NICTs have become an essential support in order to communicate for individuals and businesses.

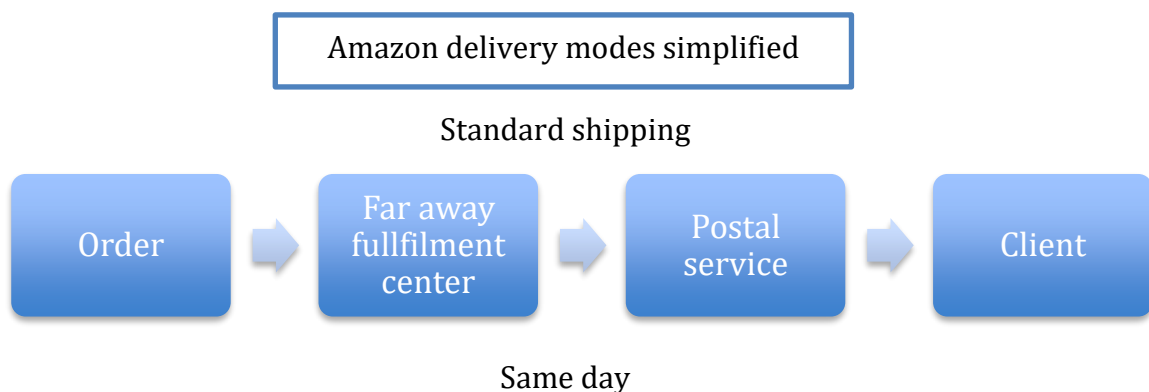
However, this growth has made the scheme more complex. First, the number of actors in the supply chain has considerably increased. In today's world, the number of international suppliers and consumers is constantly growing. Then, globalization also has led to change companies' strategies. The growth is not the only explanation

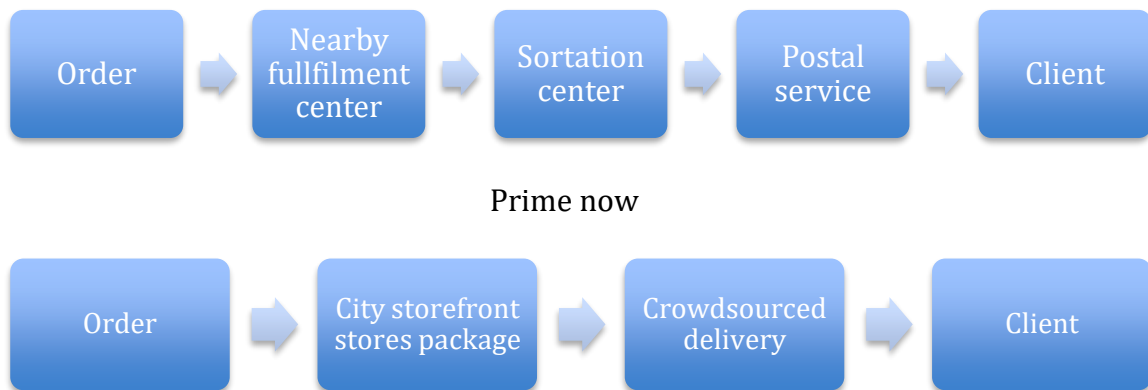
to the complexity. The flows logics putted in place to support industrial, commercials, or purchases strategies generate a more complex scheme.

To resume the globalization effects, the globalized economy is more and more complex. The business landscape is global and increasing. This is a first warning for companies to ensure that they have efficient supply chain strategies and operations that suits today's supply chain environment.

The NICTs have changed consumer behaviors. Consumers have access to many more solutions to solve their need due to the growing number of providers. There is one particular type of provider that deeply change consumer behaviors, the e-commerce solution providers. They provide Internet buying and delivery solutions to the consumers. The consumer expected service level rises owing to the fact that those providers are constantly trying to improve the time response to demand.

To illustrate, we can use the example of Amazon. The company provides a very wide product selection to the consumers. It is an e-commerce distributor. Nowadays, a consumer can be delivered one or two days after its order using Amazon special services. It is an expectation that was unbelievable few years ago. Amazon last delivery service improvement is the creation of a delivery service that enables consumers to be delivered the evening of their order during a predefined period of time. Due to the evident complexity of those deliveries' management, this service is available only in defined cities.





To sum-up this part, we can say today consumer have higher expectations. They have access to many different information and consumption solutions just using a “click” on Internet. There is a rhythm acceleration that impacted each individual in his ways of living or working. It has conducted, in an imperceptible way, everyone to wait for, in the physical flows’ domain, the same experience we have in the information flows domain. Meaning speed, instantaneity, and ubiquity*.

All those changes lead to new concerns regarding supply chain management. The key factors to success into providing a good service level to the consumers have changed too. This shows that companies have to take an effort into aligning they supply chain management strategy to the actual problems faced by SCM.

4.3. Problems faced in SCM

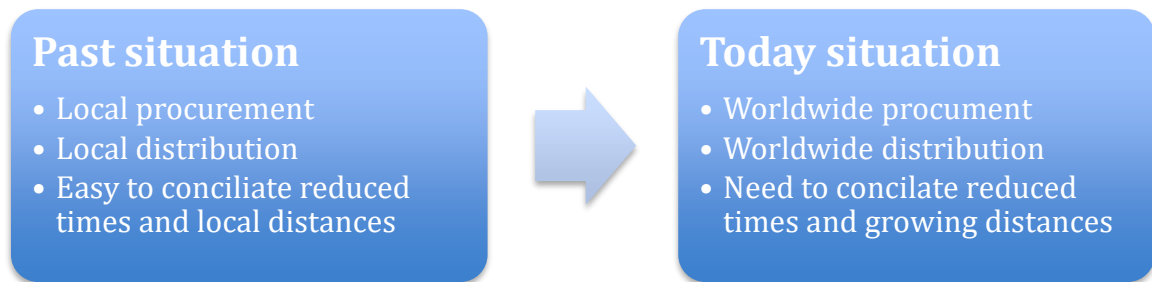
Now that we know that supply chain management concerns have changed, we need to identify which are the main concerns faced by SCM. Here, we are going to discuss three main concerns. First, globalization has led SCM to face a new duality between space and time realities. Then, there is the question about the supply chain system capacity to execute day-to-day operations considering long time. Finally, the aspect that supply chain must be a transversal function has to be considered.

One of the biggest actual supply chain management problematics is to bring compatibility between the supply chain geographical extension and the expected

reduced delays. It is really important to understand that this simple concept is one of nowadays crucial key to success in your SCM.

The fact that the business territory has increased, as the number of actors in the supply chain, must be overcome for one simple reason. Because it also means that the distances have increased. We can deduct from this situation that companies have to be much more efficient into their supply chain operations and processes. They have to move and deliver products on a continuously growing zone, being quicker and quicker into the response time to demand. In addition, according to the location, crossing hundreds of kilometers doesn't have the same value in term of costs. The situation is not heterogenic and depends on the location level of implication into the globalization.

Past situation vs. today situation simplified

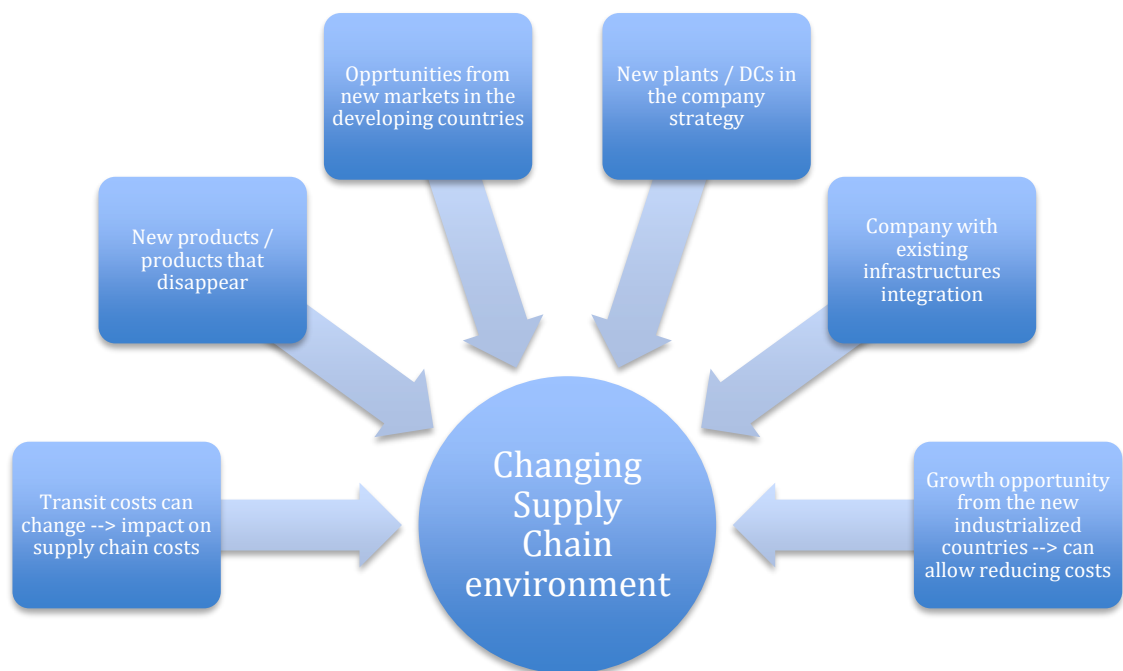


This situation, constantly evolving, must be understood well by the people managing the supply chain. Taking advantage on the situation by choosing the supply chain management strategy that fits the best to the company requirements is a real benefit for a company. Succeeding in having a quick response time to demand, on large geographical distances, by reducing costs as much as possible, allows being competitive against other actors and attracting consumers because of the service satisfaction level.

Next, there is the question about the supply chain system capacity to manage and execute daily operations.

When a company is choosing a solution to manage and execute its supply chain function, no matter the solution chosen, it has expectations. One of those expectations is that once the solution is designed and implemented, the company would like to be able to only manage daily incidents.

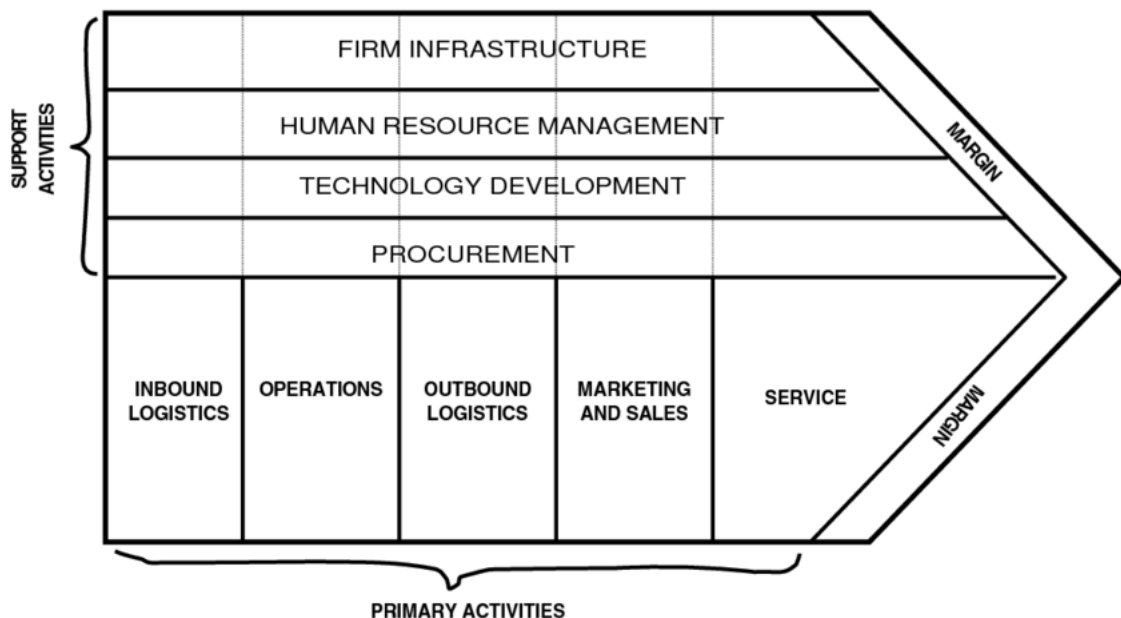
However, the supply chain environment reality doesn't allow this comfort. The inductors conditioning supply chain responses volatility is growing. The changing environment dictates to supply chain managers to regularly modify the supply chain strategies in order to fit to the current situation. Those strategies can be upstream like procurement strategies or downstream like business partners relationship strategies. Another matter regarding changes is the life of the company other time. New products can appear as products can disappear from the catalog. A company can also enter new market locations, add a plant or a distribution center (DC)*, or buy companies with existing infrastructures.



To overcome this continuous changing environment situation, companies have to carefully choose their supply chain solutions. The chosen system has to take into consideration one of the fundamental supply chain management paradox. This has to combine a strong and accurate planning with a good reactivity to changes.

This opens the subject of the importance to have an efficient technological solution for information sharing among other applications. We will develop the technological aspects in a following part of this discussion.

To finish, we have to discuss about the supply chain as a transversal function. As we said, supply chain is crossing companies from end to end. The crosscutting approach is complex due to the multitude of parameter to manage. This creates knowledge needs that can go from general to extremely precise knowledge and a negligible mistake can have big consequences.



The porter value chain shows the transversal aspect of SCM. Indeed, supply chain is the sequence of processes that allows to create and distribute the final good. It is also the sequence of processes that gives its value to the final good. The fulfilled processes are operated by different functions inside the company. And those functions require many different knowledge and skills in order to be managed.

SCM demands to be in a transversal management position in which some companies are not prepared. They have to know how to implement transversal and multi-actor

practices. It is totally different to manage a transversal function compared to a “normal” function.

Indeed, managers have to be able to manage different profiles because of the different knowledge needs. Managers have to be prepared to this because it implies from them to understand the aspects of the work of all those different profiles. The management style cannot be the same in supply chain than in other functions. A “transversal manager” has to act like a coordinator in order to endure a good communication between services of the trainings and the understanding of the objectives of each entity.

Today supply chain is global. SCM strategies have to consider external actors. In addition, they must know how to implement intern transversal practices. This implies trans-functional languages development to be able to have a strong arbitration on the balance between costs and service at the inter-business units level. Thinking at the intra-business unit model does not enable to perform a precise and accurate arbitration.

Supply chain goods, information and actions flows fluidity defines economic consequences. Flows have to be as smooth as possible. Product availability, delays reductions, reliability, and quality, for example, are driven by flows quality. Flow interruptions have a strong impact on organizations, means, or expected results. This leads to a negative economic impact.

The aim of performing SCM using transversal practices is to be able to find logistics economies of scale. But as we said, this goal is not easy to reach, multiple knowledge are needed in a supply chain environment that is constantly evolving. Enterprises have to find solutions to come over those difficulties.

To conclude this part, SCM, in the evolutions that it knew, went from means management to services production management. Companies must be agile and flexible in order to respond to the demand with a good response time, quality and service level. They also must reduce to the minimum the costs of procurements and operations. This confirms that SCM is key in an economy where the added value core is services activities. Being able to provide an efficient and suitable supply chain service provides a strong competitive advantage to a company.

But in practice, not all companies are able to implement and manage strong supply chain management solutions. Due to all the difficulties we saw in this part, many companies have difficulties into supply chain management.

Nowadays, SCM requires many skills and knowledge in order to be able to implement and manage an efficient solution. Those companies can use the externalization solutions to fill their lack of knowledge, skills or means.

5. Externalization solutions

5.1. Different externalization levels:

In order to be efficient, companies have an interest to focus of their real knowledge, on the operations where they will be able to bring the most value. To do so, companies usually choose to outsource the operations that are not their core competencies.

Let's now consider the level of externalization that exists in the supply chain process. Each of them has different advantages and inconvenient. The company chooses the strategy that corresponds the best to its needs.

The first level is the first-party logistic (1PL). It means the externalization of all transportation operations. The entire logistics and distribution processes are still managed internally by the business, the company keeps its own logistic operations. The advantages are:

- The company keeps the complete control of the logistic processes.
- The company control the quality processes.
- The company has control over packaging.

The inconvenient are:

- The company must be responsible for every facet of the logistics processes. This involves a wider expertise.
- Keeping a high-quality level is expensive and requires additional infrastructures, staff, equipment, etc.

But most businesses today outsource their logistics operations to external providers.

Internal for the client	External for the client
<ul style="list-style-type: none">• All the supply chain management• All operations except for the transportation operations	<ul style="list-style-type: none">• Transportation operations

The second level of externalization is the second-party logistic (2PL). This means the externalization of transportation and storage. The logistic actor handles clearly defined transport or logistic tasks. The organization and follow-up remain the responsibility of the manufacturer.

This type of relation with suppliers as for the 1PL, is often only cost driven and short term. The provider is doing what the client instructs and is being paid accordingly.

The advantages are:

- As those are not strong relationships, the company keeps flexibility in terms of what components of the supply chain are externalized and which are totally managed internally.
- It allows to take advantage of the numerous transportation means of the providers. It is even more important for companies that export their products to other countries.

The inconvenient is:

- This is typically not a full-service logistics solution. The company is still responsible for a large part of the logistic processes that need strong means and knowledge to be managed efficiently.

Internal for the client	External for the client
<ul style="list-style-type: none">• All the supply chain management• All operations except for the transportation and storage operations	<ul style="list-style-type: none">• Transportation operations• Storage operations

The third level is the third-party logistic (3PL). The supplier provides a notable part of the logistic operations. The amount of externalized processes and operations are defined by the company strategy.

The logistic services that a 3PL supplier provides can be the inventory storage and management, the picking and packaging, the freight forwarding, the shipping/distribution, contract management, IT solutions, etc.

The advantages are:

- The company can really focus on its core competencies as the workload of those operations is managed by the logistic service provider.
- Finding the right 3PL supplier can save time and money to a company. It can use the economy of scale combined with the provider expertise to lower the costs.
- The company benefits from the suppliers numerous local and international storage locations. The shipments are delivered more quickly to their destination due to the equipment quality and expertise of the supplier.
- As the company can make economies of scale, this solution works well for fast growing business with large volume orders or large order volumes.
- The company can still control the customer service and returns in order to approximate the perceived service level.

The inconvenient are:

- The company has less control over inventory and customer experience.
- It can be difficult and time consuming to find the right provider. A company has to be able to trust and rely on its supplier.
- This solution doesn't fit with a company with small quantities orders. It is too much expensive.
- In general, 3PL suppliers do not handle perishable, hazardous, or flammable goods. It will be much more time consuming for companies that provides this type of products to find the right 3PL provider.

Generally, this solution is suited to small to medium sized businesses. It allows them to take advantage of the operational power of an external logistic company. It also allows keeping some control over the supply chain, depending on the logistic strategy.

Internal for the client	External for the client
<ul style="list-style-type: none">•All the supply chain management•Part of the operations	<ul style="list-style-type: none">•Notable part of the operations. The amount is defined by the company strategy.•Can be the inventory storage and management, the picking and packaging, the freight forwarding, the distribution, etc.

The fourth level is the four-party logistic. Those service providers take a step further regarding the 3PL suppliers. They manage resources, technology, infrastructure, and even manage external 3PL providers to design, build and provide supply chain solutions for businesses. Often, 4PL service providers have no transport means and warehouses. They usually use 3PL providers for those tasks. Their more precious asset is the knowledge they have. Their first mission is to monitor logistic processes. In this solution, not only operations are externalized but also the functions.

It exists different level of 4PL externalization that will again depend on the company strategy. The company chose which supply chain functions must be externalized and which ones must stay internal.

The 4PL provider has to coordinate the different actors into the supply chain of a company. The arrival of this type of provider is considerably supported by the new information and communication technologies and by the rising of innovation.

The services that offer those providers are numerous:

- Logistics strategy consulting;
- Analytics including transportation spend analysis, capacity utilization, and carrier performance;
- Network analysis and design;
- Consultancy;

- Business planning;
- Inventory planning and management;
- Reverse logistics management

The advantages are:

- The company has the opportunity to externalize an entire logistics segment of a business.
- The company can use the strategic advice and take advantage of it, in top of the operational support.

The inconvenient are:

- The company must be able to rely on its 4PL provider as it has little control over logistics and fulfillment processes.
- This type of solution as to be chosen wisely because it is expensive.

The 4PL providers are a good opportunity for medium to large sized businesses. It is a solution that is complete. It covers both the operational and the strategic perspectives.

The 4PL Supply Chain Solution

- Some supply chain functions are externalized to the 4PL solution provider. The scope of the externalized functions will depend on the client company needs and objectives.
- 4PL provider has to manage 3PL parties.
- 4PL provider has an impact over the client supply chain management. It manage part of the supply chain according to what the client wants.

To conclude, each successive type of logistics provider offers a greater involvement in the supply chain than the previous one. The choice of the level of implication will depend on the company business model, infrastructure, budget, and how much control it wants over its supply chain. The 4PL externalization solution is a great opportunitie for companies. In particular for those that are exposed the most to globalization, that have to be reactive in front of the fast-changing supply chain

environment. They need 4PL providers' knowledge in order to fill their own lacks and face the fast-changing supply chain environment.

5.2. From competition to cooperation, to 4PL solutions

As we said before, a supply chain is a network by definition. It is group of actors working together in order to create value to the client. Therefore, a centered approach can unbalance the network benefits and hurt the value chain. The solution as to enable a win-win situation for every party involved.



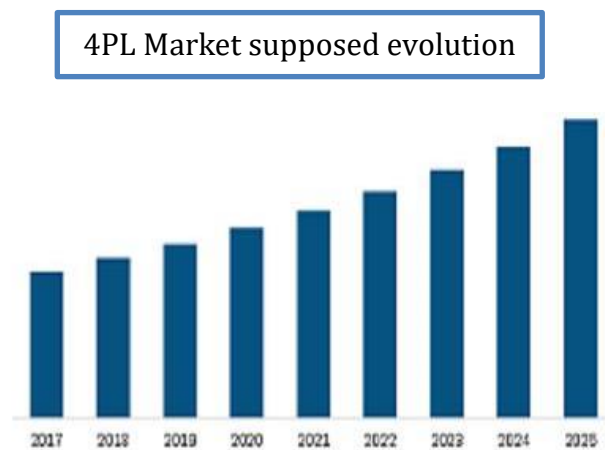
A used solution to modern supply chain needs is the multi-party network. Companies are working as a community, using their knowledge in order to improve the customer satisfaction. The different supply chain entities are working for the same-shared objective. This solution has already proven that it delivers stronger and deeper benefits than old solutions. A “multi-party network” is, in a more precise way, a network of multiple companies, where each enterprise is represented once on the network. A multi-party data model that provides a single version of the truth for all parties at any time must support this solution.

This community-based network leads parties to collaborate. More importantly, they are changing the way business is done by allowing companies to better manage

capacity and keep their focus on the end-goal of customer satisfaction. Multi-party networks are powering business processes quicker and more effectively.

For this collaboration to work, the supply chain actors have to move towards multi-party orchestration using multi-party technological solutions. Planning and execution around the supply chain has to be collaborative, moving these multi-party processes to the network to drive more value, much faster and at a much lower cost.

The rise of 4PL solutions is a supply chain actors' relationship evolution marker. Companies are choosing to discuss about strategic matters with another company in order to take advantage of its expertise. Different analysis has proven that the 4PL market size is rising. This trend evidence the fact that companies are more and more disposed to collaborate with each other's.



This relationship implies for companies to trust their 4PL solution provider. In fact, companies are entrusting their provider in all or some of their supply chain function management. In order to look after this relationship, it is crucial that companies build a strong and long-term relationship with the company they are working with, in opposition with the short-term relationships between actors at the beginning of SCM. Companies are collaborating and becoming partners in order to create more value using fewer resources.

To conclude, 4PL solutions are a proof that companies are now ready to entrust functions management to external providers. This shows that relationships have changed. Companies are now using collaborative practices in order to bring the most value to the consumer.

6. The technology, a key pillar in a 4PL approach

The most important asset for a successful 4PL solution is technology. New technologies lead to new possibilities and new ways of doing business and, as we said, relationships between companies have changed. This means that it has created new technological needs compared to old supply chain management practices. Innovation has led to new supply chain technological solutions that allows surpassing old tools limits.

6.1. Old technological tools limits

Old supply chain management tools like Enterprise Resource Planning tools (ERP) are unsuitable to the actual supply chain landscape. Those tools miss automation and ask many human actions. The managers have to do a part of the planning manually and this makes waist a lot of precious time.

In addition, they were designed to handle private processes and we will see that it becomes a constraint for companies. ERP solutions don't allow to communicate easily with other actors in the supply chain. The supply chain is mainly driven by the customer sentiments and perception. Consequently, the chosen strategy must take external factors into consideration. It has to be much broader and more collaborative using new technologies.

Another constraint is the actual global business landscape. Many functions are externalized; an enterprise-centric software is an obstacle. All the supply chain actors have to think in term of chain, to coordinate their communication and information sharing means in order to be able to work together for the same goal, bringing a good service level to the final customer. It means that all the supply chain actors have to be connected, from the first supplier to the final distributor. So, supply chain management has to be supported by connected and intelligent software.

In conclusion, the technological platforms that use companies to be more effective has to recognize these basic facts and facilitate all the operations within and among the multiple parties. It will allow companies to be more agile, to have a quicker response time to the demand. In order to do so, they have to revise and change their old technological tools. Companies can now get access and implement more easily new supply chain management tools that are much more automated and adapted to the current environment.

6.2. New tools benefits

As we said, innovation in time as lead to new supply chain management tools that are more adapted to the current supply chain environment needs. Forgetting old habits and adopting new, can be a big challenge. But the interests and benefits that the companies can take advantage of moving to those new tools are significant. Using new technological tool solutions allows surpassing old tools limits. They enable to surpass a major problem linked to the multi-party aspect of supply chain. They allow information sharing between actors. Companies need to get information from other parties that also need to get information from them.

This advantage importance is supported by another phenomenon. In fact, due to the changing supply chain environment, the big data itself is changing too. The volume of information that is shared is increasing and so, become more complex but creates also new opportunities.

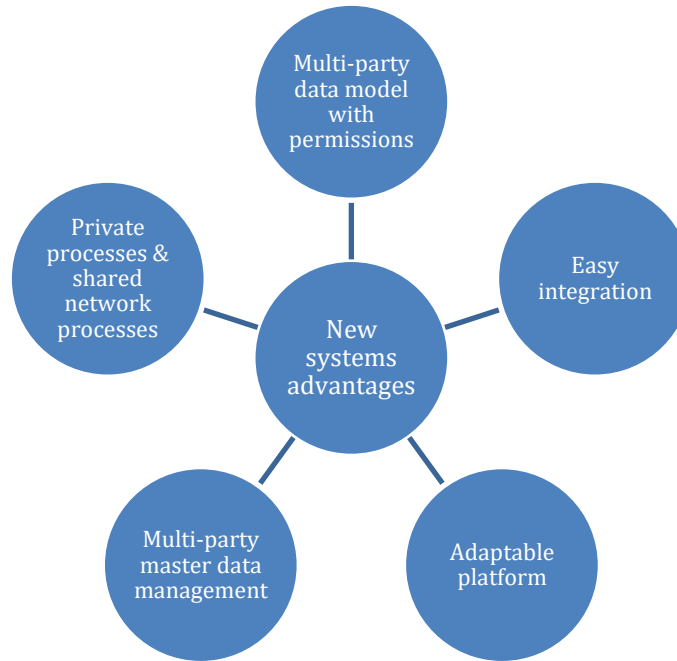
We can here take the example of the consumer sentiment data that comes from all social medias. This data must be taken into consideration and as to be analyzed in order to provide the most adapted customer experience. We could for example try to understand how the customers want to receive or buy their products and adapt the distribution channels accordingly. Today long and global supply chains, in order to be managed efficiently, need data capture at multiple points. This allows having a better understanding of the situation.

6.3. New tools solutions

New supply chain technological solutions are multi-party technological solutions. Those solutions are designed to incorporate all the supply chain actors. In the top of that, it is designed to represent the data only one time for all parties to have the same information at any time. This extends the visibility and collaboration across the supply chain.

Those solutions are systems that manage workflows across multiple systems, internal and external. They are based on:

- A Multi-party data model with permissions: The data accessing is based on permissions. Each actor has access to the information he needs to perform its part.
- Easy integration: Companies can easily align. Oppositely to the old ERP where breaking away is not easy.
- Adaptable platform: The systems can easily be adapted to different industries with different modules.
- Multi-party master data management: This provides a single version of truth of the current situation. This simplifies data representation and so, reduces significantly the possibility of errors. Using a real time database for all parties allows to everybody to access the right information at any time, and so, get a clearer view of the current situation.
- Private processes that can be independently updated on top of shared network processes.



Those solutions are countering the master data management (MDM) problem brought by the evolution of master data. As we said, the quantity of data is increasing, but there is also the fact that systems are sharing master data, as product, clients, suppliers, or financial information, within and outside the organization. So, it is essential for companies to use those master data in a coherent way through each of those systems. The problems are that data can be dispersed among the systems. As a consequence, there is a data incoherence risk, and companies have to be able to determine which is the correct information.

Master data management aims to improve the master data quality and accessibility, at any time and at any level of an organization. Master data is holed in a unique location and regularly delivered to client systems depending of the needed frequency.

This brings another question that is: Which is the master system, the one that keeps the master data? New supply chain technological solutions enable a multi-party master data management that is essential for a 4PL solution. Sharing information and MDM among supply chain actor has been eased by web technologies and cloud computing. Those technologies allow companies to exchange all over the world information.

In conclusion, new supply chain management tools are more connected, intelligent and rapid. They allow sharing an enormous amount of data between the supply chain actors in real time. Manufacturers, carriers and retailers can exchange essential information like availability, unexpected events, etc. Supply chain capabilities are harmonized beyond physical boundaries.

Those solutions help to make “intelligent” decisions based on the current situation. Planning incorporates real time execution data for more precise and practical plans, while execution is informed by planning. They also allow the network to be agile, not just the company. It is not useful to be agile if your delivery network is not.

7. Why externalize at a 4PL level?

It exists several benefits into choosing 4PL externalization solutions. As we said, supply chain management is a difficult concept. The aim is to always try to increase the customer satisfaction level while trying to lower the costs as much as possible. In order to do so, companies have to focus on their core business.

It enables to concentrate the company resources on the activities where the company creates the most value for its final offer. Consequently, the company is able to be more productive and so, more efficient into value creation.

To keep the focus on its core business, a company can choose to externalize its supply chain functions. But why is it convenient for a company to choose a 4PL solution? First, it helps to bring synergy and allow to consequently reduce costs.

It also allows getting access to knowledge and talents. In addition, companies can lack cultural knowledge, depending on the globalization level of the company that chose to externalize. And to finish, companies have to face many environment evolutions they are not always ready to confront with.

As a first advantage, we can talk about synergy and costs. Companies that provide 4PL supply chain externalization solutions have, as first strength, their own expertise on supply chain subjects. Actually, those companies know how to design and implement efficient supply chain management solutions. Companies can take advantage of this knowledge they miss in order to increase value creation and decrease costs.

By using supply chain economies of scale, managing efficiently supply chain functions, companies take the benefit of lower costs. But as we said, this situation is only possible if supply chain is managed as a transversal function. 4PL solutions providers know own to bring synergy between the different supply chain actions by means of their expertise level.

To sum-up, 4PL solutions enables to bring synergy between supply chain actions that is essential due to the supply chain cross-functional perspective. This allows taking advantage of costs reduction by using supply chain economies of scale.

4PL solutions also enable to get access to efficient new technological solutions. We know that the technological aspect is crucial to implement suitable and productive supply chain processes. As supply chain management is the core business of 4PL solution providers, they have access to new powerful supply chain management tools. This means that those companies can provide extremely efficient technological solutions to their clients.

To conclude, entrusting a 4PL provider with its supply chain functions can allow a company to take advantage of new supply chain management technological solutions. In addition, as those kinds of relationships between companies are long-term relationships, it can enable to get access to complex technologies as deep learning in the future.

This last advantage about technologies leads to another advantage that is finding and keeping the right talents. Companies' employees don't always have supply chain management expertise, as it is not the company core business. Besides, human resources that companies need today are people capable of performing higher-level tasks compared to some years ago.

Today enterprises need people that can translate business requirements into these new technologies that require new skills and knowledge. Moreover, this situation will be worst as the technology expand. Innovation will grow and new solutions are going to appear. This will make the scheme more and more complicated in terms of needed skills.

To illustrate, we can take the example of a transportation planner job. Let's see the needed skills evolution before and after the implementation of a technological solution.

Previous needed skills	Future needed skills
<ul style="list-style-type: none">• Planning skills• Carrier tariffs depending on the lanes• Shipments constraints depending on the clients• Day to day issues management skills	<ul style="list-style-type: none">• Knowledge on the new system used• Analytic skills• Day to day issues management skills

We can see that all the basic skills and knowledge previously needed in order to succeed in the planning job are replaced by the need of having knowledge on the new system used. Indeed, as the planning operations are performed by the new system, the job of the planner become analytic. The planner has to be able to use the systems used in order to make the solution work and to analyze the planning that provides the system. But this implies that new profiles are needed in addition. To design and implement the new systems to be used, the company will need employees that are able to perform those tasks. Those job profiles were not needed with the old solution.

Consequently, companies that are able to train employees or attract the right talents with these skills will have a distinct advantage among their competitors as we move towards these innovations. In order to help the transition, implementing the right training for existing employees whose roles are likely to be impacted is really important for it to be smoother and more sustainable.

4PL providers know how to find and keep those talents. They can also provide training in order to help to align the company employees' skills with the new supply chain management needs. Trainings can be done in various forms and subjects, depending on the needs.

4PL providers also have an advantage on most of the companies regarding cultural knowledge. SCM is immersed in a world that involve relations that need intercultural management knowledge. Many analyses show that business teams are becoming more and more inter-cultural. Let's now see the cultural diversity stakes in a business environment.

Cultural diversity stakes



- Multi-cultural teams formation and management
- Multi-cultural team productivity can be higher or lower than mono-cultural team depending on the management
- Conflicts can appear in a multi-cultural team (for example a misunderstanding about a message or an attitude). They have to be avoided
- Synergy obtention by combining the different cultural approaches in the issue resolutions
- Stereotype existence problem: people not open minded that have prejudice about a person depending on its culture and environment

All those stakes have to be considered in order for a multi-cultural team to be efficient. Companies have to know how to manage those kinds of teams. In reality, few companies have this needed knowledge. In addition, supply chain managers directors have trainings and professional experiences in their academic career that allows them to progress easily in this environment. But on the contrary, some of their close collaborators and the employees from operational activities do not have the needed knowledge to get the full picture of intercultural management aspects. Above their primary image, logistic activities connect actors that come from very different countries. Badly prepared, the organization would put the supply chain function in conflict of interests due to the different visions caused by the different cultures.

This would lead to decrease the communication quality level within the supply chain function, and to a lack of productivity. Well prepared, the supply chain function will create debates, on the matters that form a divergence of opinion, in an organized way. The transversal aspect of supply chain supports this assessment; it is the confrontation of disciplines.

It is important to daily organize knowledge sharing, knowledge from different forms. This has to be shared between different actors that come from different jobs, different companies, and different cultures. It shows again that SCM is difficult to handle partly because of this knowledge need.

Another convenience from choosing a 4PL solution provider is its ability to manage supply chain environment changes efficiently. As we previously said, supply chain responses are volatile because of the fast supply chain environment changes. This means that designed supply chain solutions must constantly be reassessed in order to evaluate if it fit the actual environment characteristics and needs. Providers have the habit to constantly challenge supply chain solutions in order to improve them.

To conclude, the most precious advantage that comes from 4PL solutions are the provider knowledge and the technological assets that the company takes advantages of knowledge are from various subjects and forms. Technological solutions are essential to 4PL supply chain solutions.

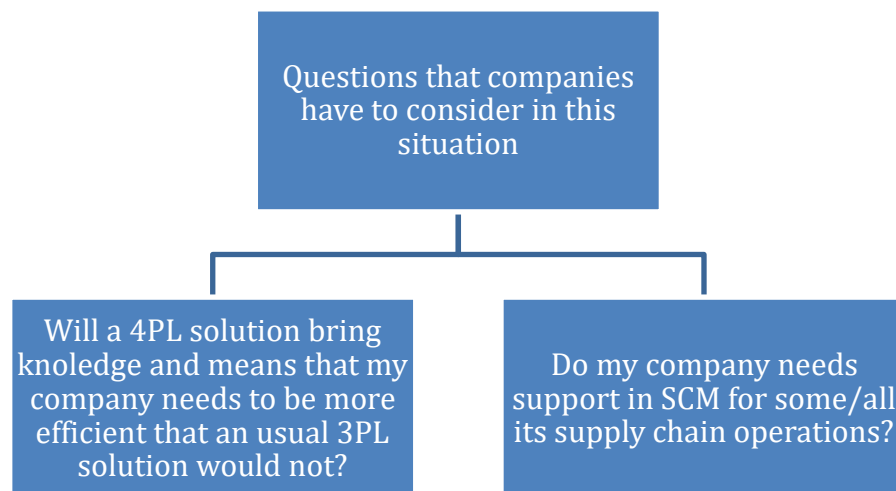
8. Which are the constraints/risks in a 4PL SC externalization?

8.1. From the client point of view

We saw which the advantages were into choosing a 4PL solution for a company. We, now, have to question ourselves about the risks and constraints into choosing this type of solution. Indeed, implementing this type of solution means considerable changes for a company. Also, those are not easy changes to make. As we said, designing and implementing a 4PL solution, as well as managing the new tools, is not an easy situation to manage, there is a real need for knowledge and means.

One of the biggest constraints for the client in this type of solution is the economical constraint. In fact, 4PL solutions are very costly. Companies have to think carefully before choosing this solution in order to avoid sending money vainly. It is essential that companies determine which are their goals in order to be able to assess the competencies and means they need.

Having done that, they will be able to consider if a 4PL solution could be the good support to reach the wanted results. If the company business is global and supply chain is not its core business, 4PL is a solution that can bring good results.



Another constraint is the control loss sensation from the client side. In fact, clients constantly desire to be comforted about the services realized in order to be able to confirm they made the right choice. It is really difficult for a company to give up a part of its activities even if it is to gain efficiency and reactivity.

The client is losing control on all its relationships at different levels in the supply chain:

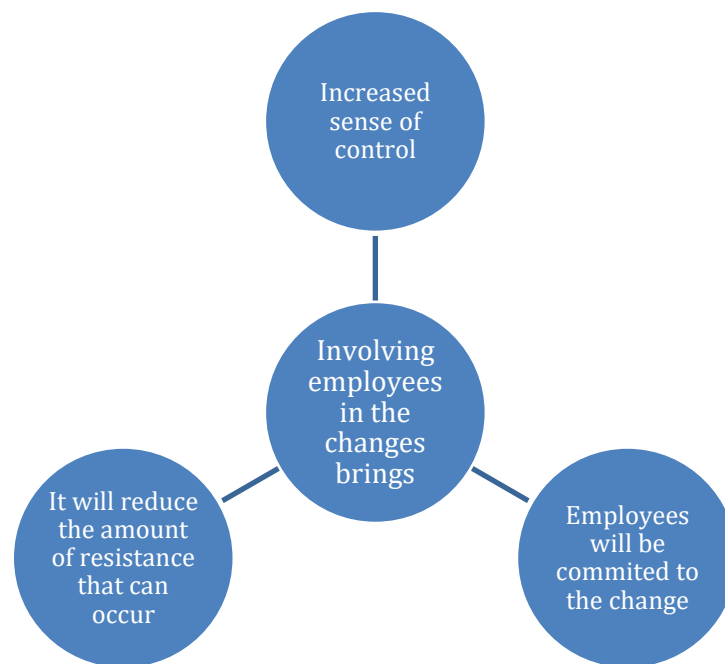
- With the carriers with whom it had permanent contacts,
- With the storage companies,
- With packaging companies.

All those services are integrated in the 4PL and we can think about the difficulty to come back to an internal management in case there is a problem with the 4PL. The only solution in order to overcome this problem is for the client to trust its 4PL provider.

Linked to the control loss sensation constraint, we can think about the knowledge loss for the client. Choosing a 4PL solution, as we saw, allows taking advantage of the 4PL provider knowledge. But, as the client is entrusting the provider with its activities' management, it brings the risk to lose those knowledges. The service provider is managing the supply chain operations. It suggests that the client is not using the knowledge internally for the externalized operations anymore. The risk is that the knowledge is not transferred from the 4PL provider to the client, and that the client ends losing knowledge in supply chain operation management. Vigilance has to be putted on knowledge transfer between parties.

Another constraint for the client is to be able to engage its employees into the new solution. As the solution is bringing automation, it has impacts on the client internal position. The risk is that employees lose motivation due to concerns about their own places in this new solution. It is essential for companies to be able to precisely explain why the new solution is needed and how it will bring efficiency and work comfort for employees.

Employees need to understand that they are part of the change and that those new ways will help them to achieve their objectives easily. In order to do so, companies have to build a strong communication on the project in order for all the concerned internal parties to understand all the aspects of the change that operates. It is also really important to conduct regularly internal communications about the advancements and updates. Summing up, to be really involved in the change, employees need internal communications on the choices made to understand the full purposes.



The solution reversibility can also be a concern for the company. Indeed, we can ask ourselves if it could be possible for a company to come back to the old solution in case the objectives are not reached with the new solution. Here, two aspects are important, the technological means and the knowledge possessed by the company. Regarding the technological aspect, there can be a concern about the technological solution reversibility. In fact, a new technological solution is coming with the 4PL solution.



Companies can be afraid that it would be possible to implement the old technological solution again after having changed for the new one. But this fear can easily be excluded because new technological solutions can communicate with the old ones. This means that new technological solutions are totally reversible.

The second concern is the knowledge the company owns, as we previously said, if the client company is not careful, it can lose knowledge. It can lose managerial knowledge as it is entrusting another company to conduct some/all of its supply chain activities, operational knowledge for the same reasons, and the service provider also manages technological knowledge as the technological tools.

If the company has lost the knowledge it needs in order to conduct and manage its supply chain operations, it will be difficult to exit the new solution and to come back to a complete internal management. This shows again that it is very important for the client to be attentive about the knowledge transfer.

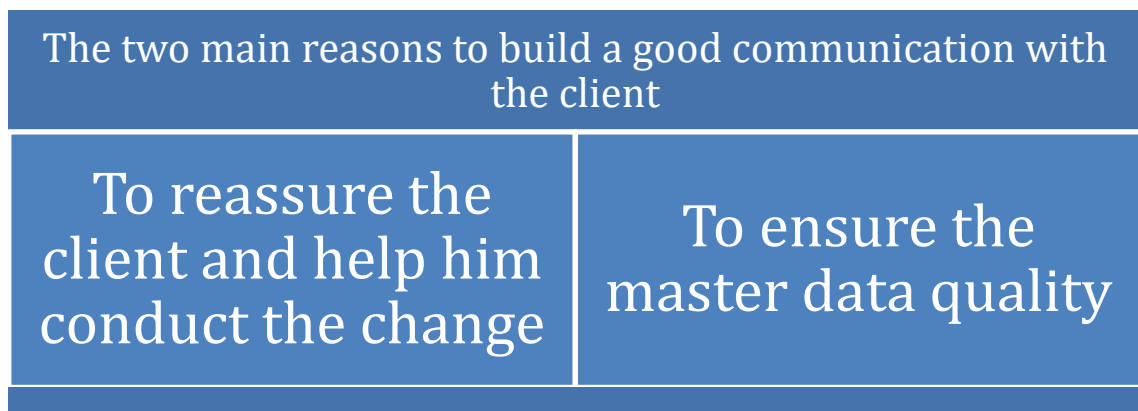
To conclude, 4PL solutions arouse several risks for the client. Consequently, they have to be prepared to face those constraints using anticipation. But using a 4PL solution, they can also be helped by the provider to be prepared and overcome risks.

8.2. From the provider point of view

In the previous part, we saw the constraints from the client point of view. Let's now focus on the risks 4PL providers are exposed to. In fact, the clients are not

the only ones that are threatened by risks. Some of those are linked to the client's risks and others are associated to the provider activities and the environment situation.

One of the notable risks regarding the 4PL provider is the lack of efficiency in the communication with its client. Indeed, for this solution to work, it is fundamental that communication has a maximum efficiency for several reasons. First, in order to be able to reassure the client and help him conduct the change. But also to enable to ensure master data quality.



As we said, it is really important for the clients to be reassured on its choice for a 4PL solution. In order to do so, the provider company has to ensure a perfect communication between them. It is essential that the provider construct a well-designed communication plan in order to be able to understand the real needs of the client, and for the client to be able to understand perfectly the ins and outs of all aspects of the project with the aim to be perfectly aligned on the final objective.

A lack of communication would lead to a trust decrease and so, the client would start to doubt the benefits of this solution and fear the failure. At the end, it is important that the provider understands the client's fears and be comprehensive by providing good answers or explanations to any doubts that can appear.

Another important point for the client is the knowledge transfer. We saw that the client is risking knowledge losses using this solution. In order for this cooperation to be successful, the 4PL provider has to ensure the knowledge transfer.

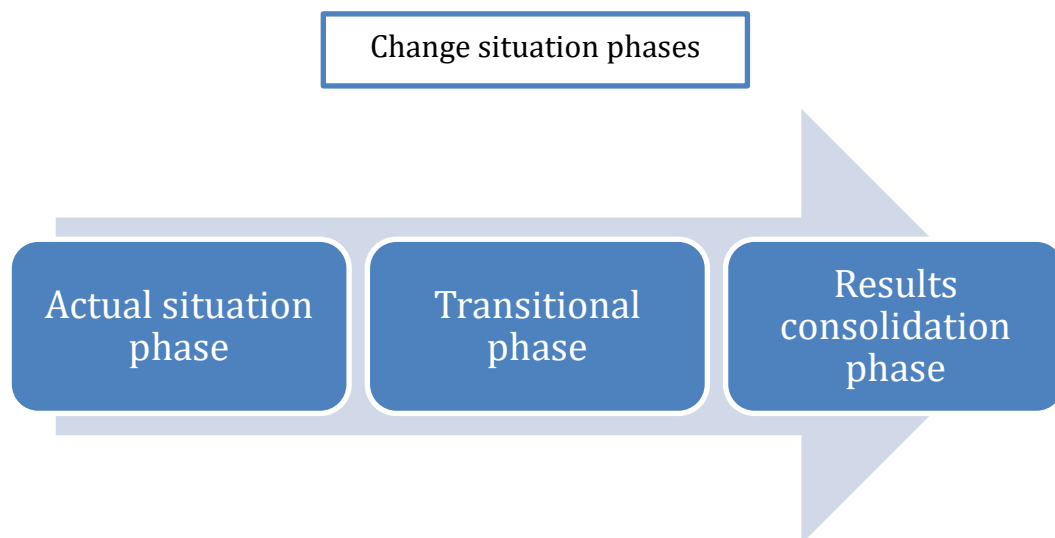
The client needs to acquire knowledge on several aspects as, technological knowledge, management knowledge etc. In order to transfer knowledge, the provider has to know how to train the client employees by designing and conducting adapted trainings depending on the needs. Regarding trainings, we will see examples in the practical case.

As we said, it is important for the client company to manage the transition between solutions regarding the employees, the individual. Here comes out the change management concept.

Change is not an event. It's a process that has to be run by steps at different levels in the organization. In other terms, it requires specific actions adapted to the impacted groups at a time t.

An efficient change management must enable to make the number of people involved in the transformation rise. It must speed up the new models, the new working practices adoption and, in the end, improve the teams' productivity by stimulating the change toward desired states of minds and behaviors.

They are three phases in a change situation, the actual situation phase was the company has to prepare the means to support the change, the transitional phase was the company has to conduct the change, and the results consolidation phase were the company has to reinforce the changes obtained. In a 4PL solution, the provider has to be able to support its client on change management. As an example, it has to be able to design and conduct trainings for the client employees.



Another key point into succeeding into this kind of project is the master data quality. The solution provider has to collect the master data that will be used in the new technological tools used for the solution. This collection is made from the client data. As a consequence, communication between the two parties is fundamental in order to be certain of the master data quality. Indeed, master data will be the pillar on which the tools are based on. If the master data quality is poor, many mistakes will occur and this would put the solution success at a risk.

The changing environment can be a big risk for 4PL providers if their technological solutions are not adaptive. The technological tools have to be flexible and not permanent. As we said, the supply chain environment is constantly evolving due to the changes brought by globalization. As a result, the provider has to be able to modify the systems used in order to fit to new strategies or any changes. But this risk is eliminated by actual evolved systems and efficient IT teams. This support the fact that it is essential for 4PL providers to be able to find, train and keep the right talents.

To conclude this part, the solution provider has to be very attentive about its communication with the client and about the flexibility of the solution. The communication quality has to be optimum in order to enable an efficient communication. The systems and other means of the solution must be flexible to ensure that it fits with the supply chain environment on a long-time scale.

9. How to present and implement a 4PL solution?

Now that we saw the environment, the advantages, and the inconvenient of 4PL solutions, we can ask ourselves about how to present and implement a 4PL solution for a client. How to present this solution? How to manage the strategic aspects? How to make the link between the different functions? How to measure the performance of the solution? All those are questions we can ask ourselves about a 4PL solution implementation.

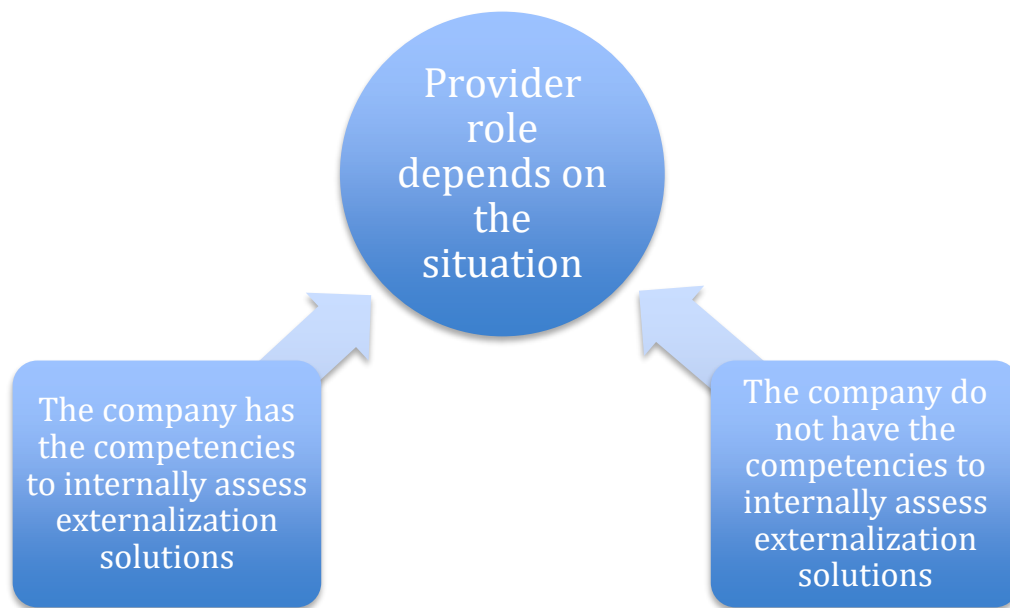
9.1. How to present a 4PL solution to a client?

4PL providers are the owners of the solutions knowledge and means. We can think that they have to present their solutions to the client but as the client is the decision maker, the provider role is more a councilor role. Indeed, the provider has to evaluate with the client which are the objectives into choosing a new supply chain management solution. It is essential to assess the requirements in order to success into reaching the objectives.

Some of the clients already have an idea of the solution they need for their company. In fact, some companies have the competencies to internally evaluate the different externalization solutions and to choose the one that can fit better with the company requirements. If the chosen solution is a 4PL solution, the company will find the 4PL provider company that it trusts the most to design and implement the new solution. In this case, the role of the provider will be to design the solution with the client, discussing with him on the requirements of the project. Doing this, the 4PL provider will be able to use its knowledge and means to design and implement the solution that suits the most to reach the company objectives.

Others don't have the competencies to internally assess the different externalization solutions. They just know that they need organizational changes in order to improve their supply chain operations. In this situation, the company could

use the help of a consulting company (we will explain consultancy later in this discussion). Indeed, here, the company would need support from a company that could guide it into choosing the right externalization solution according to its objectives. If the suitable solution is a 4PL solution, the role of the provider will be to continue to guide the client into designing and implementing the right 4PL solution.



Generally, a 4PL is chosen if the client company needs support into managing its supply chain activities. The company can choose to externalize all or some of its supply chain activities. The scope of the externalization has to be defined. Supply chain activities can be divided geographically, or by products, by function, etc. For example, a company can choose to externalize some of its products supply chain activities using a 4PL solution. This choice will depend on the client company, on its knowledge and competencies.

To conclude, 4PL providers cannot present 4PL solutions to clients because each solution as to fit the client requirement to achieve its objectives. Therefore, the provider role is to learn the client requirements in order to guide him into choosing the right externalization solution, and to design and implement the solution that will enables to reach the client objectives.

9.2. How is manage the strategic aspects?

Supply chain is now the backbone of the company. The strategic stakes carried by the new supply chain management objectives are going way further than only technical considerations. SMC is not limited to choosing the right technological tools and their uses. It is a decisive factor into acquiring competitive advantages.

Supply chain strategy also includes:

- Choosing the supply chain structure. Defining the activities each stage of the supply chain will perform.
- Choosing the locations and capacities of the facilities.
- Deciding the products production frequencies and products storages locations.
- Deciding on the transportation modes used.
- Choosing the source of the information, defining from where the information has to be collected.

Those decisions are made on a long-term scale and are expensive to reverse. Knowing this, it is really important that the decision maker take the market uncertainty into account.

The new strategic stakes support the fact that holding low prices on its products is not the only argument that can attract clients. Rapidity and innovation are also decisive. As we saw, it is essential that the supply chain actors become partners in order to cooperate in order to achieve the same objective: serve the client with as much efficiency as it's possible. Only strong partnerships with mutual trust based on a true cooperation can ensure the conservation of the supply chain equation optimum: reduced prices * fluidity * regularity * reactivity to changes. To sum-up, supply chain strategic approach is indivisible from the cooperation aspect.

So how is involved the 4PL provider in those strategy decisions? The answer is that the strategic aspects are not in the scope of a 4PL solution. As we saw, the decision makers of the client company make the decisions. The 4PL provider role is to design and implement the 4PL solution, including the technological and managerial aspects with the aim to support the client supply chain strategies. Eventually, the solution

provider can give its vision on some strategic aspects, but the decision maker is the client.

9.3. How to make the link between the different functions?

As some of the client supply chain functions are externalized, the link has to be made between the client internal functions and the externalized ones.

In practice, thanks to new technological tools, the systems are easily communicating between each other's. The information is shared by systems in order to enable each activity to be performed. But this means that communication between systems has to be irrefragable.

This need for a perfect communication between systems brings several questions that have to be answered for the solution to perform well. We saw that new technological tools are providing a multi-party data model with permissions and that they were a single version of the truth, a single version of the information. This means that the information is saved in one system that provides the authorization to other systems to access the information they need to perform their activities.

This brings the need to choose where to save the information. A "master system" has to be chosen. The information will be kept in this system and it will provide the only version of the truth. This ensures to avoid mistakes caused by incorrect, or not updated information.

Linked to the master data matter, an important question is: How often the master data must be updated? In order to ensure the master data quality, the master data has to be updated on a regular basis. So, the period of time after which the master data must be updated has to be defined. This will depend on several factors, as the data criticality, the data type, the data source, etc.

Having answered the previous questions, the way in which systems are communicating between each other's must be defined. Knowing from where the correct master data is coming; the path that the data is using to get to each supply chain activity can be determined. It is a critical step because we saw that a perfectly

efficient communication between systems is fundamental for the solution to be profitable for the client.

We now have to put the focus on two of the functions that are linked to supply chain activities. The first is a supply chain function, procurement. The second is the financial function that is the only support function that can be partly managed by the 4PL provider.

Procurement can be externalized as the other supply chain functions. But generally, companies don't externalize this function. The reason of this phenomenon is that procurement is managing one of the most important strategic supply chain activities, negotiation. 4PL providers are mainly in support for this function, as an example, helping with the technological solutions or conducting procurement analysis. Negotiation is one of the most strategic activities in supply chain. So companies mainly choose to keep this function as an internal function to have the control.

Regarding the financial function, it can be partly integrated into the 4PL solution. The solution provider can manage a part of supply chain financial activities, using match pay or auto pay processes. Or, the financial function can be totally managed internally.

When the shipments are completed, the freight invoices are arriving. Those invoices can be composed of a lot of different parts such as the transportation costs (long haul/short haul rate), fuel surcharges, or any accessorial costs that have to be paid in case of waiting time or any other inconvenient for the carrier that has to be covered by the company. Therefore, the company has to carefully process those freight invoices manually to ensure their accuracy. So, this activity can have substantial costs.

4PL providers can help their clients by managing this activity by using automated freight audit and verification processes. Transportation management tools generally support those processes. Those technological tools are able to ensure that the invoices are verified against actual shipments and their statuses depending on the agreed incoterm. They also enable to ensure that the invoices have been

computed using the correct shipping rates, fuel surcharge rates, and accessorial costs according to the agreed contract between the shipper and the carrier.

The payment process has two different processes variations used for this activity. In the match pay process, the shipment invoice is paid after its reception from the shipment carrier, and after that the shipper have matched it with the shipment statuses and conditions. In the auto pay process, the shipper chooses to pay immediately after having received the proof of delivery from the carrier that is the final shipment status update. The shipper pays immediately after the completion of each shipment.

These automated processes are reducing the invoices verification costs as they are substantially reducing the headcount required to manually process and verify all the freight invoices that is receiving the company. It also allows to avoid manual processing errors and to support a transparent and on-time payment. This helps to foster stronger partner relationships.

9.4. Why and how to measure the performance of the solution?

If the design and implementation of the 4PL solution is a contract between two parties, the performance brought by the new solution as to be measured. It is essential to measure the solution performance in order to secure both parties in the contract realization. So, how can be measured this performance? Both parties have to agree on the solution performance measurement process and on the objectives that must be achieved.

It is essential that both parties agreed on the process chosen for measuring the performance of the solution. It has to be concluded and pointed out in the 4PL solution design and implementation contract. The used solution in order to assess the solution performance is using KPIs.

KPI is an acronym for Key Performance Indicator. KPIs can be used to measure performance in many different fields, from marketing to supply chain, and many other functions. They are used to determine the factors taken into account to

measure the global efficiency of a solution or a particular action. Therefore, they can, or be used in a punctual way, for an advertising campaign for example, or in a permanent way, to measure a solution performance for example. To ensure the management of an activity, KPIs can be gathered in a dashboard. The dashboard is an efficient management tool, it allows having an other view on all the KPIs.

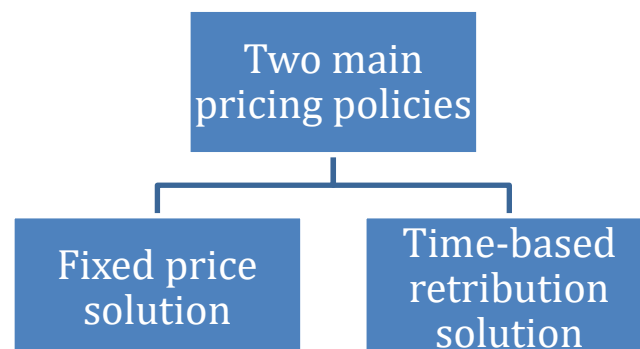
After having assessed the requirements for the solution, both parties have to define the contract of the project. It is important to define the role of each actor of the project and, as we said, to define the objectives and the KPIs that are going to be used to measure the solution performance. They also as to define how the provider will be retributed for its services.

When designing the contract, the Service Level Agreement (SLA) has to be created. An SLA is the negotiated agreement between client and provider formalization.

It documents the parties' expectations on the services, the execution methods, the parties' responsibilities and, guarantees. In other words, it is a document that contains the clauses based on the contract that define the expected precise objectives and service level from the client and that set responsibilities.

Having formalized all the clauses, the needed resources can be defined and valued in the form of services based on the common agreement that can also include pricing policies or needed resources property definition.

Regarding the pricing policies, they are two that are usually used. One is the fixed price solution, the other is the implementation time-based retribution solution.



In the fixed price solution, the amount to be paid to the provider in order to design and implement the solution is agreed at the same time than the contract and it is fixed. The costs inherent to the means needed for the project also have to be define. They have to be summed to the agreed service cost.

The fixed objectives have to be achieved. But what happen if the 4PL provider fail into reaching those objectives? If objectives are not filled in time, penalties can be applied. Those penalties can take different forms, they can be financial or not.

But those penalties to be applied have to be defined and agreed between the client and the service provider. They have to be documented in the SLA by describing the penalties and the situations in which they have to be applied.

To conclude, the performance has to be measured in order to assess the actual service level against the expected service level. KPIs are used in order to measure the solution performance. If the objectives are not filled in time, penalties can be applied but they have to be carefully defined and agreed between parties. KPIs have to be regularly analyzed, thanks to new technologies, this process can be automated. It exists systems that are able to calculate and analyze KPIs in order to provide a regular feedback on the actual service level of the project.

10. Case study: My Internship in Accenture

10.1. Accenture



Accenture is a service company considered as one of the largest consulting company in the world. It is, more precisely, an international consulting and technological company. It is a Fortune Global 500 company. Being in this ranking list means that the company is one of the 500 largest companies in the world.

The Fortune Global 500 is established by the American economic magazine “Fortune”. It is based on the companies’ turnovers and is published each year.

The company made a turnover of more than 1,5 billion in 2018.

The enterprise operates in more than 120 countries with about 435 000 employees. It has many clients. Indeed, more than three-quarter of the Fortune Global 500 companies including the 100 largest businesses are Accenture clients.

We can see that Accenture operates mostly in North America and Europe by looking at its turnover by region. Indeed, in 2017, 47% of its turnover comes from activities in North America, 34% comes from its activities in Europe and the last 19% are coming from the rest of the world.

The head office is in Chicago in the United States. However, Accenture has a singularity, it doesn’t have a headquarter. Its executive committee is dispersed in the entire world. They are meeting physically four times a year and digitally once a week.

It is in the early 2010 that the company made significant transformations on its activities by investing massively in the technologies and the numerical.

Accenture consultants are operating in different areas of expertise. Since 2017, the activities are organized in five areas of expertise:

- Business and technology strategy (Accenture Strategy): commercial, technologic or operational strategy;

accenturestrategy

- Management and technology consulting (Accenture Consulting): business and administration transformation in the numerical revolution context;

accentureconsulting

- Numerical transformations (Accenture Digital): numerical marketing, customer relationship, big data, mobile technologies, contents management, e-commerce;

accenturedigital

- Technologies (Accenture Technology): technological services, consulting, research and development;

accenturetechnology

- Operations (Accenture Operations): management for third parties: information systems, computer and cloud services, IT security, intelligent marketing.

accentureoperations

Accenture applies those areas of expertise in more than 40 industries across 19 industry groups.

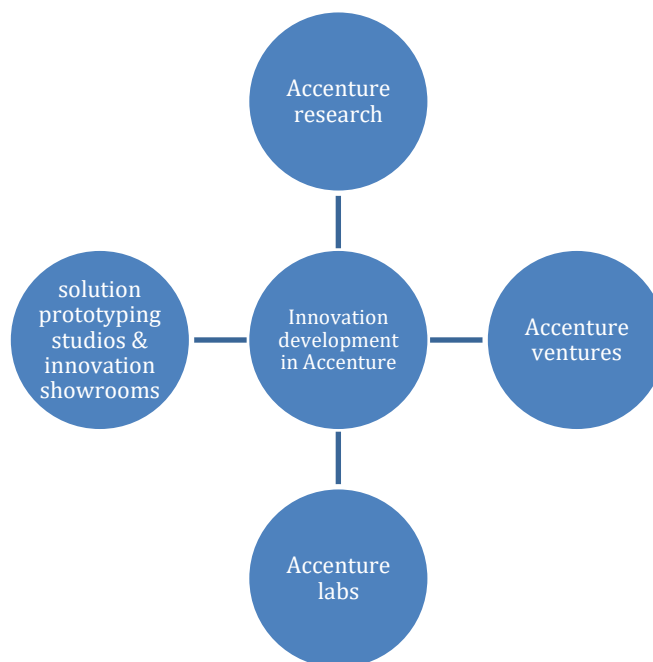
Accenture is also really involved in the research and development and in the innovation. It has putted in place different structures to develop innovation.

First, Accenture Research is a program created to make researches on economic and technological trends. This program regroupes 250 researchers in the world and collaborates with universities like the MIT.

Next, Accenture Ventures that is an open innovation program. This structure allows another way to innovate. The innovation here is based on sharing knowledge and information with start-ups for example.

Accenture Labs is a program that cluster seven research laboratories. Those laboratories are centered on emerging technologies like immersive virtual reality, block chain, cyber security, artificial intelligence, quantum computing, cloud, smart grids, etc.

To finish, solution prototyping studios and innovation showrooms where implemented.



In total, Accenture invests 600 million of dollars each year for research and development. It also registered more than 6000 patents in 44 different countries.

To continue the company development, Accenture uses acquisitions as an advantage. To give an example, between 2015 and 2017, the company invested 3.4 billion of dollars, acquiring 70 entities during this same period.

In order to support its position in the technology ecosystem, Accenture has putted in place strategic alliances with other large technological companies. They are sharing best practices and are collaborating on development with technology providers. Sharing that knowledge allows to rapidly tailor solutions to meet clients' specific needs.

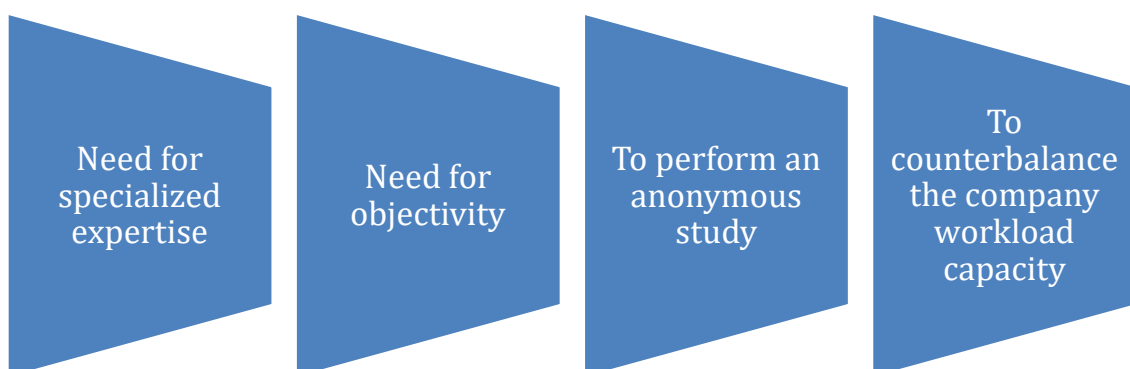
10.2. Consultancy

For my internship, I was hired in Accenture as an intern consultant. A consultant is an experienced professional that provides recommendations to companies with the aim of improving the company performance. He also helps companies to change and implement new solutions. He can work as an individual or for a consulting company like Accenture. Each consultant is specialized in an area of expertise. The area concerned by consulting are very numerous.

During a consulting mission, the consultant must bring the solutions to the company and implement them in order to improve the company performance. We must make the distinction between consulting and coaching. The consultant brings solutions to a company and implement them. A coach is focused on an individual and help him to find the solution himself.

Those solutions are recommendations based on the consultant or group of consultant experience. A diagnostic of the situation is made in order to put an action plan in place. During the implementation, the consultant must involve the company employees. This allows to the company members to have a better understanding of the project.

It exists several motivations for a company to hire a consultant.



The most important is a specialized expertise. It can happen that the internal employees don't have the necessary competences in order to find the adequate solution to enhance the performance. For example, there can be a lack of skills

regarding new technologies or new management methods. Therefore, hiring a consultant would bring the needed expertise to lead the project.

The objectivity could also be a motivation. If there is a complex situation involving several employees, an internal person could be influenced in the problem analysis and the solution definition. The fact that he depends on the company could lead him to make choices based on his own point of view and habits. On the other side, the consultant doesn't depend on the company so he can be impartial and provide an objective analysis of the situation.

If the company management wants to make an anonymous study, they can ask to an external consultant to conduct it for the company. It allows keeping it confidential. Sometimes, the company management knows what is needed and which decisions to make but they can need credibility to make everybody take part into the transformation. In this case, a consultant could be useful by presenting a report that support a decision taken by the company management. This helps employees to get involved into the transformation.

The last motivation could be the workload capacity. The client company often misses available people to realize a study or an intern project. The use of consultants helps to fill this gap of capacity.

10.3. The project

I had the chance to enter a team of consultants to work on a supply chain project. The team is divided into three parts, the IT (Information Technology) team and the business team for the consulting side. The IT team is taking care of all the matters that concern the master data or the systems design, changes and updates. The business team is working on the other matters to support the IT team like collecting all the needed master data and test the new systems. The third team takes care of all the operational side, the day to day tasks after the go-lives.

Those tasks can be the day to day planning or incidents management for example.

The project aim is to implement a new supply chain management system for a Hygiene and Health company. The company wanted to change its supply chain management because of several reasons:

- First, it needs for a more centralized network control due to the increased complexity of the structure (number of warehouses and carriers have doubled in the last 10 years).
- There is also a requirement to gain agility and efficiency in distribution, to improve services and optimize costs due to overall transport capacity shrinkage and higher demand volatility.
- Next, there is a need to centralize transport planning and execution on site level. Currently, no system and no standardized processes are in place. The synergies between flows is not captured.
- Then, the company must gain full visibility on operational level (Where is my truck?) and infrastructures (What is the maximum loading-capacity per warehouse?).
- To finish, it's good for the company to search for technologies and capabilities to implement innovative distribution solutions (dedicated fleets, spot-market, visibility platforms).

The Client Needs

More centralized network

Gain agility and efficiency in the distribution operations

Centralize transport planning and execution on site level

Gain full visibility on operational level

Technologies and capabilities to implement innovative distribution solutions

According to those needs, the objectives are:

- Securing the service by minimizing distribution disruptions (truck availability, volume-volatility, capabilities) by a higher focus with one team and specific processes, tools and systems.
- Reaching synergies and economies of scale to increase efficiency.
- Introduce technological innovation to harmonize, standardize and automate to increase visibility and transparency.
- Implement modern, innovative systems to facilitate professional working.

The Client Objectives	Minimizing distribution disruptions
	Reaching synergies and economies of scale
	Harmonize, standardize and automate
	Implement modern, innovative systems.

According to the company requirements and objectives, the consultant team had to find the better solution. They had to investigate to find the tools and systems that will have the better fit with the client requirements. In accordance with the company team, they chose to implement a 4PL solution with a new system that will allow a better supply chain management. Additional tools and processes will also be implemented in order to support operational management. We will talk about the solution more in detail in one of the following parts of this discussion.

For the client, this solution will bring several benefits. First, the transport availability. It will allow to maintain and improve service levels minimizing distribution disruptions.

It will also bring visibility with one common visibility-platform for all carriers as a base to build a pro-active workflow on transport-disruptions to customer service/supply service.

Next, it will create innovation. Creating processes to manage own-fleets (dedicated fleet, rental-trucks), integrating transport-platforms (Uber for trucks) and enabling real tracking (integrate telematics data).

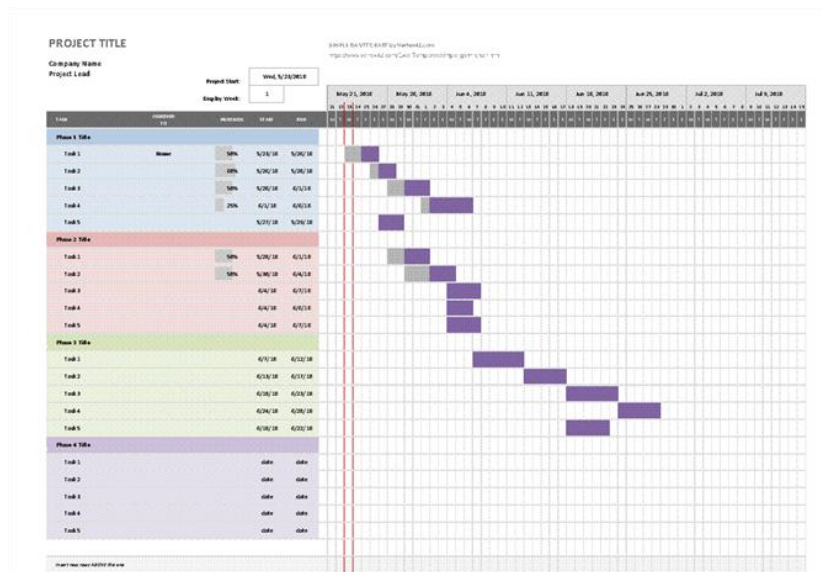
To finish, improved transport performance by optimizing business on a client-level, mainly coming for reduce the number of shipments (system driven consolidation), improved carrier- and tariff-compliance and improved transport-design (round-trips, multi-drops) will bring efficiency.

10.4. The implementation roadmap

In order to design and implement the solution, a roadmap has to be defined. The roadmap is document that contains the project main steps with their starting and ending dates, and all the noteworthy events of the project life. This document enables to efficiently communicate the strategic plan to all the parties involved in the project, from the activities to perform to the time when they have to be performed.

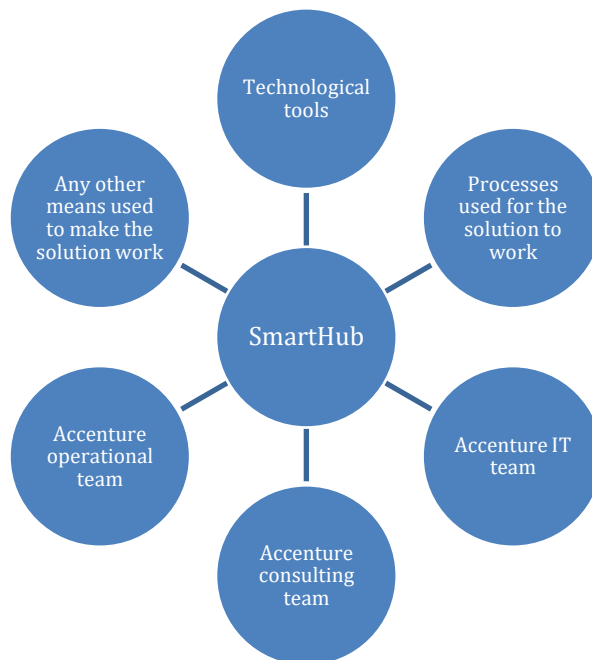
After having concluded the contract for the design and implementation of the client new solution, the SmartHub roadmap has to be defined. I will explain later what is SmartHub exactly. The project roadmap takes the form of a Gantt chart:

Gantt Chart Template example



On the left column, the tasks to perform are listed. The calendar is putted on the first top line. Then, the chart is compiled matching the tasks with their starting and ending dates. Thanks to the roadmap, every party involved in the project can see which are the tasks to perform, when they have to be performed and how much time it should take. This also allows to have an estimation on the project completion time. This roadmap is explaining how the solution will be designed and implemented. I will now develop the main phases in this roadmap. The first step is the SmartHub design. Then, the SmartHub processes and systems development. Next, the pilot step. And the last is the SmartHub setup and roll-out, and the adjustments.

The first phase is the SmartHub design. SmartHub is the group of people, tools, processes and any other means that are going to be used by the provider company in order to make the solution work.



Therefore, in this phase, the business team and the IT team are working together in order to precisely define the resources that are going to be used to efficiently run the 4PL solution. All the general aspects are defined and agreed between both parties.

It has been decided that SmartHub will be composed of a group of Accenture operational employees divided by regions. Indeed, the solution were implemented by region, so the operational activities are also divided by region.

The client company was internally working by regions and the countries that were in the scope of the project were already grouped in 9 different regions.

It has been chosen to keep this division method the 4PL solution implementation. Each region has particularities that have to be taken in account in order to maximize the overall efficiency of the solution. The number of operational people working on each region depends on the amount of work needed, so the region weight in term of activities.

SmartHub in order to be efficient will also be composed of different tools in order to support the Accenture employees and the client employees into running the solution. It has been decided to implement two new tools.

First, to design and implement a Transport Management System (TMS) adapted to the client needs and objectives. Has the TMS is designed by Accenture entirely to meet the client requirements, it will fit its needs. But those new tools also have to be able to communicate with the client existing tools. It has also been decided to implement a ticketing tool in order to help the communication between the different services.

This first phase is in fact the last part of the agreement between parties. After having agreed that the needed solution is a 4PL solution, the provider with the client are discussing in order for the provider to assess what will be needed to create and run an optimal solution. They agree on which objectives the new tools and processes will have to reach.

The second phase is the SmartHub processes and systems development. In this phase Accenture IT team and consulting team, after having defined the objectives with the client, are starting to design the tools and processes that will be used to run the solution.

Accenture teams had to determine the technical and technological aspects of what would be the new TMS and the ticketing tool. The technical aspects are all the activities that would need to perform the new tools.

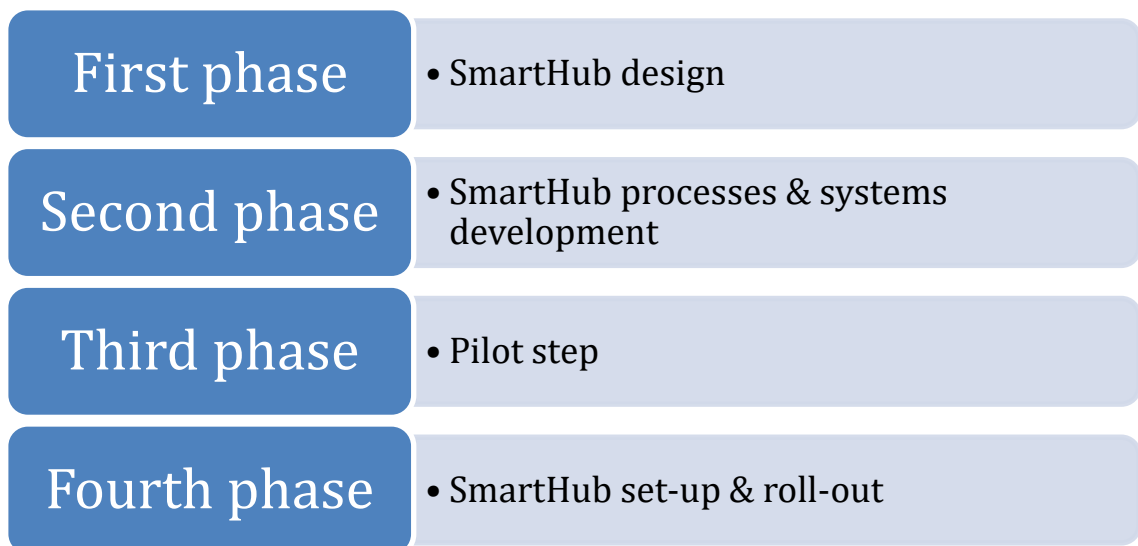
Regarding the technological aspect, the focus is putted on which existing technologies will be used in order to create the new tools. After having defined and agreed the technical and technological aspects, the teams have to start to design the new systems with the chosen technologies in order to be able to perform the determined activities. The systems design is made by the IT team with the support of the consulting team.

The processes that will be use in order to create an efficient solution also had to be determined. This is the consulting team role to define in accordance with the client which will be the different processes used to perform the different activities in the new solution. Processes have to be defined in order to minimize error possibility and to maximize productivity and efficiency.

In this second phase, the TMS system and the ticketing tool system were designed, and the processes were defined. The TMS system is a system able to manage the deliveries, to automate the shipments planning optimization and also to manually manage deliveries. The ticketing tool system is a system that enables to create and manage tickets that are used to raise problems and incidents that can occur in the activities. It allows to all the services concerned by the problem to be informed so they can act to help in the resolution quickly. For confidentiality reasons I cannot develop on the used processes details, but the processes were created in order to align at most the processes in the different regions where the solution was implemented.

After having designed the tools and processes, comes the pilot step. A pilot is a small-scale preliminary study is conducted so that feasibility, times, costs, risks and the plan can be determined before conducting a similar project on a larger scale. As a consequence, this is a critical step. It enables to check if the designed solution will answer the client needs and requirements. They allow to collect precious quantitative and qualitative precise information that will enable to bring improvements before the project roll-out. It is necessary to conduct a pilot project before launching new services or products. It is a way to take better decisions as for choosing the resources, avoid fails or unnecessary expenses.

The roll-out is the step where the implementation of the solution is conducted on a large scale. After having tested the designed solution on a small scale, the solution has to be implemented to all the activities in the scope of the project. The roll-out step is really important. In this step, the consulting and IT teams have to conduct many different activities in order to implement the solution and made the needed adjustments in order to make the solution work with the better efficiency possible. In the next part of this discussion, we will discuss the different roll-out phases and their specificities and aims.



10.5. The roll-out approach

We saw that the roll-out is a critical step for the solution implementation. We will now see the roll-out approach that was used in the project. As the solution implementation is divided by region, a roll-out has been performed for each region in the project scope. First, there is the mobilization phase. Next, there is the market kick-off. The next phase is the master data gathering and implementation step. Then, there is the parallel run phase. After all of those, there

is the go live. The solution has, then, to be stabilized. To finish, lessons learned have to be taken into account.

The mobilization phase is the phase where all the resources that are going to be used for the implementation are gathered. We speak here about the human resources, the technological resources, etc. All the resources have to be carefully prepared in order to simplify the implementation, to avoid difficulties caused by lack of resources.

The next phase is the market kick-off. The kick-off is an expression used to designate a launching operation. It can be a product launching, a campaign launching, a strategy launch, a project launching, etc.

The kick-off can take a kick-off meeting form. It is supposed to send the signal that it is the official beginning of operations. A starting point that will also be the reference point for next results evaluation.

The project kick-off meeting is the first meeting between the provider project team and the client employees that participate to the activities. Its goal is to present the team members to the client employees and to clarify each one role in the implementation. Other project key elements that involve the client can also be part of the meeting like calendar, progress reports form, etc. In project management, it is fundamental that the team members that are going to work on a project have a clear and precise global vision of the project.

Therefore, the goal is to organize a first meeting that will allow to explain the project dynamic, the methodology definition, and the tools they are going to work with. Wherefore, the composition of the meeting is large, including the client and the services providers. This meeting is not the first meeting between clients and the project team. It follows on from the needs and requirements definition meetings and the project key elements definition and planification meetings. Indeed, those elements have to be previously defined in order to allow the kick-off to be efficient and limit its duration at a maximum.

The principal objective of the kick-off meeting is to present the project stakes and to define the roles and expected contributions from all parties. Are also approached the subject of the risks and problems that can occur.

Particularly those that can influence the project calendar and have an impact of the client satisfaction. This is the moment where the interested parties can clearly report their needs. Finally, the method used to evaluate the project progresses as well as the work quality are also agreed in this occasion.

The meeting stakes are going other technical and organizational questions. Indeed, it is also a moment where both parties can show their respective interest and motivation for the well-being of the project.

Consequently, the kick-off meeting has an impact on the client relationship quality. On the management perspective, this meeting is also important because it allows to managers to involve and motivate all the people involved in the project.

In this next phase, the implementation operations are really starting. It is the step where the master data is gathered, where the implementation is made, and where the different trainings are dispensed to the different parties.

This phase was also ran by region. The consulting team members, by regions, were conducting meetings with the client employees in order to gather all the needed data in order to run the solution efficiently. For example, Accenture teams in order to implement the new TMS systems, had to collect all the information on the carriers that the client were using, on the clients that the client company had, etc. This phase is fundamental because the gathered data is the one that will be used to run the solution. If this master data is incorrect, it can lead to serious problems during the solution running. Many errors would occur, and it will have severe consequences on the client activities.

During the collection of all this master data, the IT team is working on the tools' implementation. Using the master data, the IT team is entering all the needed information in the news systems in order to make it work as the client demands. For the TMS tool, the team is programming the system in order for it to be able to optimize the deliveries into shipments using constraints defined by each region. Those constraints can come from the client or the client client.

For example, depending on the delivery location, there can be a constraint on the truck type that has to deliver. But there are many other constraints that have to be taken into account. Regarding the ticketing tool, the consulting team had to gather

the parties' contacts information, from the client internal services to the third parties involved in the activities. The aim what to be able to create working groups into the ticketing tool in order to ease the communication.

During this phase, the consulting team also has to create trainings that will be used in order to explain the new tools utilization for concerned parties. Therefore, different trainings have to be made. The training that will be dispensed to each concerned employee will depend on two factors.

First, on the new tools he will use. Depending on the activities that he performs, the employee will receive a different training. He will receive the training that covers its activities. Another constraint in the training to dispense is the language.

Depending on the region you are working with, some concerned parties not always speak English. Therefore, trainings have to be translated into different languages.

It is also the role of the consulting team to dispense the trainings. In our project, trainings have been made regarding the ticketing tool, but I will develop this aspect in a next part of the discussion.

To ensure that the solution will work efficiently, the next phase is the parallel run. This phase is still conducted by region in our project. During this step, the new system is tested by the consulting team in order to assess if the system is working correctly. This is a solution to manage mistakes made during the system implementation and to add missing data.

The aim is to verify if the system will optimize the deliveries into shipments with the optimization constraints asked by the client. The process is to run the new solution in parallel of the old one. The solution is not live but real results can be measured. The parallel run results are measured using defined KPIs that have to be constructed by the consultants. We will develop the parallel run process in another part of this discussion.

After having performed the parallel run and made the needed adjustments, the go-live can take place. The day where you put to use all the tools and processes designed and implemented, all the efforts putted in place by the team. All the means deployed during the project can be destroyed at the go-live moment.

The problem is that on the D-day, many unpredictable problems can occur putting all the project in danger even if the project was conducted perfectly. The provider company has to success into the transition, success into going from the old situation to the after-project situation. The provider company has to be able to manage go-live crisis in order to ensure the project success.

Success into the go-live is like jumping in for the first time. In a moment, you go from a theoretical situation, a training situation, to a real situation where you don't have any choice to put into practice quickly the processes and solutions that will make the solution running perfectly. Whichever the complexity and the stakes of the project, the go-live is always a sensitive moment. It's the moment where the project "comes alive". All the looks are on the project success and the project is quickly questioned on its ability to reach the fixed objectives.

All the pressure is on the consulting team at this time. To sum-up, everything that matters for every party is that the new solution brings all the satisfactions and answers to the expectations of all parties.

After the solution go-live, it needs for stabilization and Hypercare. The stabilization phase is performed to ensure that the targeted changes are achieved and maintained. In the beginning of the project, we saw that the changes objectives were agreed in the contracting period using KPIs that have to be reached.

The consulting team is performing KPIs construction and analyses in order to measure the changes operated. If necessary, corrective actions are taken. From the change management perspective, it has to be verified that the client employees working with the new solution are able to operate as planned. Refresh trainings are dispensed to compensate lacks of knowledge of the new tools and processes.

The aim is to make the solution-interested parties loyal to the new solution by helping them. In this phase, key project management documents are also updated. The outcome of the stabilization phase is the measured changes that are achieved on an on-going basis and the business benefits that have started to flow in.

The Hypercare is the period of time immediately following a system go-live where an elevated level of support is available to ensure the seamless adoption of a new system. The success of a go-live also depends on the quality of the hypercare period.

Indeed, if the client is abandoned in the use of the new system, he won't be able to run its activities with efficiency.

The main purpose of the hypercare period is to closely monitor the client service level, data integrity and the smooth functioning of the implemented system. Hypercare is client-centered support during a critical period in the project lifecycle. It is designed to give a smooth landing to the client by providing them crucial end-user support that will guide them through the stabilization phase and ensure things continue according to what was planned.

The lessons learned in the last phase of the roll-out. During this period, the project has to be analyzed part by part, taking all the raised problems into account in order to learn lessons in order to be able to avoid those problems in the future. The lessons learned can help the provider company to construct solutions or risks evaluations in order to avoid or minimize errors and problems.

First phase	• Mobilization phase
Second phase	• Market kick-off
Third phase	• Master data gathering & implementation step
Fourth phase	• Parallel run phase
Fifth phase	• Go-live
Sixth phase	• Stabilization & Hypercare
Seventh phase	• Lessons learned

10.6. My role in the consulting team

Entering this project, my role was to support the consultant team in the system implementation. In order to do this, I had to learn how to use the different tools and systems needed for the solution. I mainly helped my colleagues by working on systems testing and trainings creations in order to support the IT team and the change management. I also had the chance to get a clearer view on the overall project proceedings.

One of my tasks has been the training creation. As we said, trainings are fundamental in order for the solution to be ran has planned. We saw that new systems and processes were used in order to run the new solution. The client employees that will use those new systems and processes need to learn how to use them from the consulting team.

This is important in order to make sure that the client employees are engaged in the solution running. In addition, we saw that the contents of those trainings depend on the services and regions. Depending on the processes, systems, and languages used, the contents will differ.

In the project, we had to create trainings regarding the new ticketing tool. We had to explain its interest into the communication processes, and how to use it. I was charged of creating French trainings for 3 different parties. In order to help me construct them, I had access to trainings created for other regions.

I had to make sure that all the important aspects were covered taking into account which part of the system each party would have to use. This task was also an opportunity for me to learn more about the system in order, in the future, to be able to use it and eventually be a support to others into its use.

Another task that I have been charged of is the ticketing tool users creation. As the ticketing tool is a communication tool, users profiles have to be created in order for the future users to be able to create tickets and answer to them.

To do that, my colleagues were, during their master data investigation, were collecting the future users contacts. Having done that, we were created groups, by services in order to organize the users. My role in the users' creation was to go on

the ticketing tool system in order to create the groups and the users' profiles. Then, I had to organize the users into the groups as decided with my colleagues.

I have also been charged of performing parallel runs for different regions. We saw that the parallel run is a roll-out phase where the new system is ran in parallel of the old systems. The aim is to make sure that the system is working correctly, has the systems were planned to work.

To run its activities, the company old processes were using an SAP system on which the company transport coordinators were building and sending the shipments. SAP (systems, applications and products for data processing) is an integrated management software. It's an ERP (Enterprise Resource Planning).

It means that that the different company professions are integrated into a centralized information system.

When I had to perform a parallel run, I had to do it on several weeks in order to make sure that most of the processed data was tested in the new transport management system.

Each day, I was receiving the deliveries to plan from the client transport coordinator. He was sending me SAP extractions of the deliveries. Based on those documents, I had to filter the deliveries that are in the project scope in order to create an Excel based document that will allow me to create those deliveries into the new system. I had to put several information into the document and then, upload this document into the transport management system.

Having done this, I had to optimize the deliveries into shipments. Depending on the region from where the deliveries were going, I had to select the optimization constraints created for the region. Then, the system was performing the deliveries optimization.

Next, I had to extract the information about the shipments that the system had created in order to construct KPIs in order to assess the system optimization performance. But before doing this, I had to revise with the transport coordinator if the deliveries optimization made by the new system were respecting the region optimization constraints.

This also is a solution to correct the optimization constraints created in the transport management system. To construct the KPIs, I had to compare the shipments created by the transport management system to the shipments created by the transport coordinators.

The shipments are the combination of deliveries created to be sent in the same truck. It exists different types of shipments. To do the comparison, I was using an excel tool. I had to enter the SAP extraction information and the TMS extraction information in the tool . The tool allowed me to perform the comparison and to create the desired KPIs in order to assess the new system performance.

Another of my missions was to perform cost optimization analysis. Taking into account the region optimization constraints, I had to assess the new system performance into costs optimizations. In order to do this, I had to optimize the deliveries into the system and then make an extraction of the created shipments information in order to evaluate the system costs optimization performance.

I was using a tool created with the tariffs existing for the different shipping lanes, that was enabling me to perform the cost optimization analysis. Then, I had to review shipment modifications propositions with the transport coordinator.

If those propositions were accepted, I had to inform the IT team about the needed modifications in order for them to improve the new transport management system performance. They had to modify the deliveries optimization strategy.

In order to design the constraints needed for the optimization strategy, the IT team was needing some information. For example, I had the task to translate and order different client shipments requirements information. I received data extractions that were composed of clients' names and ID codes, and comments linked to those clients' ID codes. First, I had to translate them into English in order for the other team members to be able to understand them.

Then, I had to classify the comments. They were composed of several information as trucks constraints information, scheduling constraints information, unloading planning processes relevant information, etc.

This information classification was enabling me to construct excel documents with classified master data information.

Those excel documents were allowing the IT team to enter this information into the new system in order for them to be able to consider those constraints for the optimization strategy.

Tasks performed
<ul style="list-style-type: none">• Training creation• Ticketing tool users creation• Parallel runs• Cost optimization analysis• Master data translation

10.7. Problems faced, used resolution methods, and results

In this part, we will discuss different problems we had to face in the project during my internship period. In a project, it is essential to be able to manage problems, to be able to find problem resolution processes. Succeeding into resolving the project faced problems helps to reduce project risks. Therefore, it helps to succeed into the new solution implementation.

As we previously saw, winning the client employees loyalty for the new solution is a fundamental step in implementing the solution. Indeed, if the client employees do not use the planned new processes, the solution cannot work efficiently. In our project, it has been chosen to change the communication processes between the distribution activities actors.

It has been decided to eliminate emails and calls between services to prefer a ticketing tool designed for the new solution. This new tool allows to keep a written trace of the communications to solve a particular issue.

The different actors have to write a different type of ticket depending on the issue that is assigned to the group of users that will be able to solve the problem. It eases communication because as the issue resolution communications are saved in the ticket, if another actor has to help in the problem resolution, he can understand the

full issue by reading the previous communication. Like this, we make sure that none of the resolution aspects are leaved out.

We had to face several difficulties with the ticketing tool users' loyalty for the new process. Some of the users were using the new communication tool with the processes planned. But other were not using correctly the tool and processes.

We face different scenarios. Some of the users were showing goodwill into using the new communication tool and processes but they were using them in the wrong way. For example, as I explained, they were different types of tickets depending on the raised issue. Some of the users were using the wrong ticket types.

Therefore, those tickets were assigned to the wrong people, this means that the issue were solved using the process planned.

As we took note of this issue, we decided to precise the concerned trainings and send updated trainings to the concerned users in order to correct the problem and make sure that the processes are respected. As a result, those users corrected there way of using the ticketing tool and the new raised issues have been solved using the planned processes.

Another scenario we had were users that knew how to use the ticketing tool but were not answering the tickets assigned to them in time. When we took note about this problem, we had to prepare reminder emails that explain that they have to answer to those tickets and more important, explaining why following those processes in time were important for the activities' performance. We had to make sure that arrangements were made in the client processes in order to answer the tickets in time. After this operation, we saw a significant amelioration in the time users were taking into answering their tickets.

The last scenarios we faced were the users that didn't knew how to use the ticketing tool. We received emails for several users that wanted to use the new tool and processes but didn't knew how to do it, or because they missed the trainings, or because they didn't had access to the correct training.

In order for them to be able to use the new tool and processes, we had to send the appropriate trainings to the users and to call them in order to help them fully understand the new ways if needed. We had to make sure that we brought them full support in order to solve the problem faced.

Another problem that had to be faced in the client company was that the distribution activities processes in place were very different depending on the region. During the all project, we had to take into consideration that we had to align processes as much as possible in order to ease activities. In order to be able to do this, the new transportation management system was containing all the regions specificities in the optimization strategies.

This enables us to align the processes in all the different regions as we do not have to consider the regions exceptions in the activities anymore. This way of proceeding has enabled us to align as much as possible processes in the different regions. It has corrected the issue of the old, not aligned processes of the client company.

In the project, it has been planned that the client company would keep using its SAP system in order to run its activities. Therefore, the issue here, we to make sure that the TMS created by Accenture would be able to communicate perfectly with the client SAP system and any other system linked to Accenture new system activities that the client use.

To make sure of this, the IT team had to perform tests. When we were facing a problem into systems communication, we were working with the IT team to understand the issue as fast as possible in order to solve it immediately.

Another problem we faced were an information-sharing problem. The issue did not came from direct communication, the client team and Accenture teams were communicating easily. But the issue came from the exchanged documents. Some of the document we received were unclear, so it has led to misunderstandings and master data errors.

For example, we received a document containing, among other information, information about final clients' delivery trucks type restrictions. The problem was that the document was unclear, and it has led to errors into implementing those new data into the new system. We took note of the problem when performing the parallel run.

When we were revising shipments planning, we saw that we entered those constraints for client that didn't had it. To resolve the problem, we asked the IT team

to correct those mistakes in the system after having revised the information with the client company.

Problem faced

- Winning loyalty into the ticketing tool
- People that doesn't know how to use the ticketing tool
- Processes not aligned in all the regions
- Communication between systems
- Information-sharing problems

11. In the future, 5PL solutions?

To conclude this discussion, we can tell that implementing a 4PL solution is not an easy project. This explains the high number of companies that buy the services of 4PL providers, of consulting companies that have a high level of knowledge and technical means. Managing a 4PL solution implementation until the end requires to be prepared to face many issues and difficulties. If not prepared, the company would risk failing into the 4PL solution implementation.

Regarding supply chain management, once the solution is designed and implemented, we would like to only face the day-to-day contingencies. But the indicators conditioning supply chain answers volatility is growing.

Supply chain strategies are changing fast, the product life cycles are shorter. Those aspects are questioning the designed and implemented solution at higher and higher frequencies.

This means that the implemented solution must take into consideration those fast changes for the solution to be performed well and in time.

Thus, a supply chain management solution lifespan is much less than a year, and it is important to know how to appropriate the new solutions components in very short delays. This means that it is important to understand the background logic of those new components, has contractual for example. But it is also fundamental to be sure that the company has the new components operational management knowledge and means.

This context is creating complexity in the logistic engineering phase, hence the need for strong supply chain planification. This underlines the key importance of supply chain planning systems and tools performance.

Today supply chain management trend is to speed up the adaptation capacity thanks to technological engineering and a large-scale project management capacity in order to be able to adapt the supply chain solutions to the fast-changing environment. Regarding this subject, the artificial intelligence technologies could be a very interesting aspect to analyze.

We can imagine that in the future, 5PL solutions could arise from this strong new technology. Artificial intelligence technologies could be developed to create supply chain management systems that would be able to make strategic changes propositions depending on the current supply chain environment.

This would mean that strategic choices would be supported by technological systems. As we saw, many companies do not have the means and knowledge to implement 4PL solution. Would this mean that in the future, the actual 4PL providers will propose 5PL solutions that would be a strategic solution as well as an operational solution?