

## **Cross Border Enterprises: Virtual and Extended!**

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### **Abstract**

Many industries today are facing the challenge of the concept of the “survival of the fittest”. In order to achieve success and market share enterprises must quickly adopt new ideas and concepts. Presently, cross border enterprises is the emerging topic for business and manufacturing research and application. Cross border enterprise can be seen as the broad name for two new manufacturing paradigms, the Extended Enterprise and the Virtual Enterprise.

### **Keywords**

Cross Border Enterprise, Extended Enterprise, Virtual Enterprise, EDI.

## 1 INTRODUCTION

In today's changing world, enterprises need to survive in an ever volatile competitive market environment. Their success will depend on the strategies they practice and adopt. Every year, new ideas and concepts are emerging in order for companies to become successful enterprises. Cross Border Enterprises is the new 'hot' topic arising in the business process world at present. Many terms have been coined together and are being driven in the popular business press to describe this new strategy of conducting business, i.e. Extended Enterprise (Browne et al., 1995; O'Neill and Sacket, 1994; Busby and Fan, 1993; Caskey, 1995), Virtual Enterprise (Goldmann and Preiss, 1991; Parunak, 1994; Goranson, 1995; Doumeings et al., 1995), Seamless Enterprise (Harrington, 1995), Inter-Enterprise Networking (Browne et al., 1993), Dynamic Enterprise (Weston, 1996) and so on. Many people have argued that they mean the same thing, just using different words. Others feel they are different. But how different are they? In this paper the authors will present some basic lines required from this new strategy for conducting and coordinating distributed business processes (DBP), as well as trying to clarify the particularities of two of the widest spread terms related to it: Virtual and Extended Enterprise.

## 2 CLUSTERS OF PRESSURES

The business world currently faces an increased trend towards globalisation, environmentally benign production and customisation of products and processes, forcing individual enterprises to work together across the value chain in order to cope with market influences.

International competition is rapidly increasing, therefore replacing national competition due to open markets, with increased size, accessibility and homogeneity. Now with the reduction in trade barriers, the harmonisation of standards and laws and with easy access to many markets, competitors can be in every quarter of the global market. So, the means of production are increasingly accessible throughout the world, regardless of national boundary: production technology, financial capital, marketing information, engineering capabilities, etc. Today products are being designed in Ireland, engineered for production in Portugal and produced in Brazil. Reflections of many organisation representatives show that fuelled by advances in information technology and improving communication infrastructures, this trend will continue at an accelerated rate. They ask: in order to support globally distributed manufacturing, what capabilities do the managers, the employees and the manufacturing systems need to have?

Society and government regulations are placing greater pressure on manufacturers to create processes and products that are environmentally friendly. Enterprises who develop processes and programmes that focus on waste management and its reduction, recycling and reconditioning etc. will gain a competitive edge over its competitors. Whereas ten years ago a producer saw his responsibility ending after sales service, more and more producers today are managing the entire life cycle of their product, from raw material back to raw material. Once again it is asked: to support this new environmental awareness, what capabilities do the managers, the employees and the manufacturing systems need to have?

The world is experiencing an explosion of product variety available to consumers today. The Japanese are now introducing new model cars in three years, from concept to showroom (Womack et al., 1990). Think of the computer business. There are thousands of software

applications, each one turns your portable PC into a different, customised product. Because the production methods and technologies are more flexible, companies are better able to produce what customers want, when and where they want it. Yet again they ask: to support this new customer orientation, what capabilities do the managers, the employees and the manufacturing systems need to have?

These global trends call for complete re-examination of the whole approach to production management methods, strategies and structures rather than continue focusing on perfecting methods or systems that implicitly assume that the manufacturing environment consists of one company, one location producing disposable products for stable mass markets. Increased globalisation, sensitivity to the environment and attention to customers demand a more holistic view of business, seeing them as part of a broad network of activities. The new reality in production management is that products can be designed, developed and produced virtually anywhere.

On the one hand, from an interorganizational view, this leads to the configuration of extended/virtual enterprises (Nagel and Dove, 1991; Goldman, Nagel and Preiss, 1995) whose success is based on flexibility, speed and the emerging paradigm of Agile Manufacturing to align and integrate processes with business partners in order to provide customers with exceptional value. On the other hand, from an intra-organisational view, it can be said, analogously, that this leads to the configuration of virtual production areas (Pereira Klen, 1996). From here now some important aspects related to the interorganizational view will be the subject of study.

### 3 WHAT IS A CROSS BORDER ENTERPRISE?

Theorists have spent a short time of their studies, considering the perspective of creating, operating and dissolving a network of enterprises; the accompanying quotations suggest that there is a considerable agreement in research being carried out in this area. Actually, the question is more related to the term used to define the networking of enterprises than to anything else. Should it be called 'extended' or 'virtual'?

Scholars have proposed a variety of definitions of cross border enterprises. Here is a small sample:

- "... where core product functionalities are provided separately by different companies who come together for the purpose of providing a customer-defined product/service." (Browne et al., 1995).
- "... it means integration on a grand scale - a scale that transcends traditional external and internal corporate boundaries." (Harrington, 1995).
- "... when a company uses electronic networking to form close ties with suppliers, distributors and customers." (Landon, 1994).
- "A rapidly configured multi-disciplinary network of small, process-specific firms configured to meet a window of opportunity to design & produce a specific product." (Parunak, 1994).
- "...when several enterprises at dispersed geographical location, engaged in the manufacture of various products at different scales of operations and possessing diverse recourses bind together. ... Problem solving and decision making are conducted by flexible teams cutting across the individual enterprises and distributed over time and space." (Janowski and Acebedo, 1996).

To answer the proposed question, perhaps it is interesting to begin studying the 'phenomena' and afterwards worrying about how to call it. The next section touches on some of the main topics related to the Extended/Virtual Enterprise.

## 4 NETWORKING ENTERPRISES

Browne et al. (1995) have identified five issues that represent for them the future shape of manufacturing systems. So, enterprises should be aware of the following points when moving in the direction of coordinating and conducting distributed process business:

- Reduced product life cycles,
- Time-based competition,
- Total product life cycle,
- High quality organisations and people,
- Manufacturing strategy.

### *Product Life Cycles*

Customer awareness of technological development on a global scale, electronic communications, close coupling of the customer to the manufacturing source have all led to reduced product life cycles. When moving in the direction of coordinating and conducting distributed process business, enterprises will have to be aware that the reduction in product life cycles will have to raise the flexibility in their enterprises to new levels. The flexibility required by enterprises will be through enterprise agility and accessing external resources through the cross border enterprise.

### *Time based-competition*

The quicker a product can be placed on the market the higher the price the product can demand. The generation, communication and application of ideas and their application in products is the core of fast time to market. When moving in the direction of coordinating and conducting distributed process business, enterprises must be open to the communication input increasing reliance on the cross border enterprise, including input from the customer.

### *Total Product Life Cycle*

Manufacturing enterprises are being forced to take responsibility for the total life cycle of the product, including the environmental effects and the costs of disassembly, disposal or refurbishment. Networking enterprises can be seen to be responsible for and involved in the integration of the whole product life cycle, from material procurement, to production, to customer service and finally to end-of-life product handling.

### *Creating effective organisations*

The cross border enterprise focuses on the horizontal communication chain in order to form effective organisations. Teams of people will cooperate across the value chain. Therefore each member (link) in the chain understands how its activities add value to the customer. Browne et

al. (1993) state that the hierarchical authority systems prevalent in vertically integrated industrial firms are slow to identify rapidly changing customer requirements and to react quickly with creative product offerings.

Now, the once upon a time vertical businesses and organisations, are quickly becoming a thing of the past. Businesses are now becoming flatter i.e. horizontal as opposed to vertical. The cross border enterprise welcomes the concept of a more closely knit environment for the integration of the enterprises.

### *Adopting an appropriate manufacturing strategy*

The determination and implementation of good manufacturing strategic decisions in any enterprise has and will be recognised as the one of the sources of advantage in today's competitive market.

Summarising, the greater the cooperation across the value chain, the greater the satisfaction of the customer needs. The challenge now in industry is to aspire to this new trend. But Browne et al. (1995) shows that many manufacturing industries have already been carrying out their business to allow for this new concept. For example, Just in Time (JIT), Manufacturing Resource Planning (MRP), World Class Manufacturing (WCM), Benchmarking, etc. have all helped in the understanding of this concept. Florida et al. (1993) tells us that in order to conduct and coordinate distributed business process the enterprise should be a knowledge-based organisation that uses the distributed intellectual strengths of its members, suppliers and customers. As well as its *technical* and *communication* resources the enterprise depends on *knowledge* and *trust* for its success.

## **4.1 Extended/Virtual Enterprise: Frameworks**

A framework can be used to give a broad view of complicated systems and concepts. The design of a framework for cross border enterprise concepts will aid in the understanding and application of Extended/Virtual Enterprise. It's beyond the scope of this paper to detail the description of frameworks for the Extended/Virtual Enterprise or to try to produce some new ones. It is hoped that in the near future an Extended/Virtual enterprise framework will be developed through the work carried out by the SCM+<sup>1</sup> consortium. Two of the existing frameworks which briefly describes the Extended/Virtual Enterprise concepts are presented here. They are shown in the following two figures. Figure 1 is a model of an Extended Enterprise framework which shows manufacturers, component suppliers, service providers, and customers integrated to provide quality products and services. The Extended Enterprise has a long term corporation among its business partners. Figure 2 is a model of a Virtual Enterprise framework which shows different organisations coming together to exploit market opportunities. These business partners are capable of prospering within the Virtual Enterprise environment.

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<sup>1</sup> SCM+: INCO-DC Project: 950880 Beyond Supply Chain Management in Food Industry.

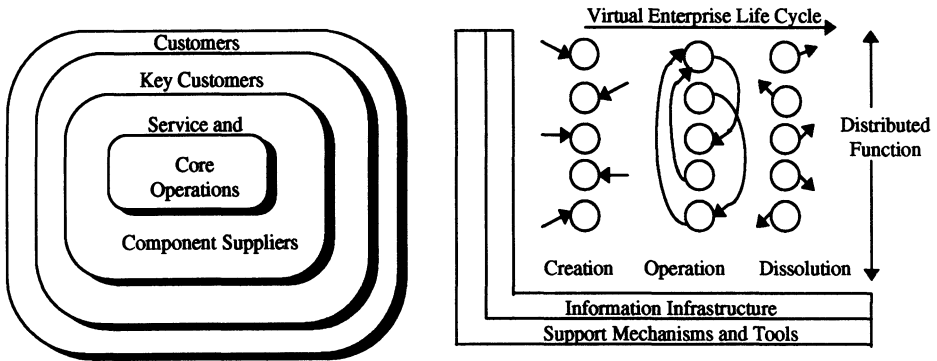


Figure 1 Extended Enterprise (Browne et al., 1995)      Figure 2 Virtual Enterprise (Parunak, 1994)

## 4.2 Helping to Keep Up the Good Work: the Technological Resources

The use of information in each enterprise transaction poses unique challenges. Each enterprise will have its own information residing in existing enterprise applications also called legacy systems and therefore it needs to be accessed by other partners, within the enterprise network, in a common format. The business process world welcomes the development and emergence of Electronic Data Interchange (EDI) which supports the networking of suppliers of raw materials, producers, processors, distributors and customers. EDI allows an efficient and inexpensive two-way flow of information between the 'nodes' (partners of the enterprises network). Tighter control over suppliers, distributors, manufacturers etc. in both local and global markets can be maintained.

So, the network of enterprises is enabled by state-of-the-art information and communication technology which are being used in today's business environment. According to the Forrester Research report (1994), by the year 2002, companies will spend 45% of their Information Systems and Information Technology (IS/IT) budget on applications spanning company boundaries, to include a complex web of relationships between a company, its partners, customers, suppliers and its markets. This reiterates what has been already said where the use of technology has to be encouraged for sharing and exchanging information right across individuals and organisations. Therefore, the new strategy of conducting business drives the requirements of communication technology to higher levels. Cassidy (1993), indicates that these requirements can be met, for instance, by the information super highways now being established.

It is perhaps clear that the concept of networking enterprises success should be built on a foundation of shared up to date information which is frequent and accurate. One would feel that without this information the concept would not be truly successful. But this is not enough. Even more, enterprises will have to take advantage of tacit knowledge and the art of trusting people whom you do not see.

### 4.3 Sustainable Competitive Advantage: the Human Being

O'Neill et al. (1994) quite rightly agree that the scope of managing the network of enterprises is global, which looks for the integration of the skills and contributions of those companies and individuals belonging to the value network. They continue to tell us that management of these networks explore the synergy necessary to satisfy the diversity demanded by customers and to innovate, not just products, but also management practices. In this way, this is a concept that many top managers have been trying to practice for many years, establishing closer links with customers, suppliers and trading partners. Therefore one would feel that this is not a really technical challenge but a good challenge for the management of these enterprises.

So, people are important in the success of this new concept of networking enterprises. In the extended and virtual manufacturing environment, customers are welcomed into the manufacturing process. The philosophy of this concept encourages people throughout the supply chain to participate in decision making for the product life or process. It has already been mentioned that the management hierarchy should be horizontal to succeed. The management hierarchy of the enterprises network aims for a flat decision making organisations.

But, do these networks have business and manufacturing strategies? Busby et al. (1993) describes the first as an incremental process, with planning, implementation, evaluation and revision representing small steps, done almost simultaneously. Goldman et al. (1991) defines the second as an approach called cooperative or proservice manufacturing.

So, cross border enterprises offers customer support with the *manufacturing seen as a specialised form of service*, where the integration of competencies of all the people involved in the manufacturing processes achieves economies of scale. Consequently, from these strategies the enterprises network is able to provide tailored products to satisfy the specific needs of their customers.

### 4.4 Extended/Virtual Enterprise examples

Although it is a trend today that enterprises are moving to become Extended and Virtual, sometimes it's difficult to clearly define the difference between conventional enterprises and Extended/Virtual enterprises. For many entrepreneurs the moving process is obvious and natural. Today enterprises have, both the traditional features and new emerging concepts. There are many enterprise partnerships today who operate in the Extended/Virtual enterprise environment. The followings are two examples of how organisations are moving towards the Extended/Virtual enterprise concept,

#### *Supply Chain Management (SCM) in food industries*

A recent SCM project is attempting to create an Extended Enterprise environment for food industries. The aim of the project is to integrate the supply chain of a food industries across their organisation's boundaries. The integration will include small food suppliers, a central distribution centre, warehouses, and supermarkets. This will lead to seamless information and product flow among all business partners in this organisation who are striving to achieve an Extended Enterprise environment.

### *A manufacturers' services company*

This company is a customer-oriented, world wide provider of electronics manufacturing services and support for emerging and multinational original equipment manufacturers (OEMs). They see their enterprise as a global service provider with a small-company philosophy. This enterprise wants to create a network of links with their customers through technology, which will help all of them to integrate and come together when necessary in order to provide products and services based on shared goals and shared rewards. Therefore, they are working towards a Virtual Enterprise concept which enables them to explore common market opportunities.

## 5 CONCLUSIONS

Now, enterprises can no longer be seen in total isolation. Individual enterprises must work together across the value chain in order to meet customer needs. The challenge for the future of any enterprises is to consider the new concept of conducting business and to facilitate inter-enterprise networking across the value chain. In doing so, smaller firms will be able to gain the economies of scale of larger companies.

Caskey (1995) describes the concept of the Extended Enterprise as no longer treating our suppliers and customers as 'them' instead they are treated as 'us'. When these Extended Enterprises become dynamic i.e. adapting their processes to the customer's current demands or particular product development then the enterprise can be called a Virtual Enterprise.

A different way of describing the terms 'virtual' and 'extended' is to focus on the word 'temporary'. The Virtual Enterprise can be seen as a temporary 'getting together' of enterprises who come together to put a product quickly on to the market while the Extended Enterprise gives us a more permanent 'togetherness' of enterprises. The Extended Enterprises depend on organisation stability and the relationships across the value chain. The Virtual Enterprise on the other hand depends on high technology and advanced information systems in order to successfully integrate the business partners.

The authors have come to the conclusion that the concepts discussed in this paper (virtual enterprise and extended enterprise) are complementary ones. Therefore, let us conclude that a successful Extended Enterprise should lead the way for an organisation to take the role of a successful Virtual Enterprise.

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