Business Process Improvement for the E-Transition of the Apparel Industry 2000

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Abstract: - This is an account of work done in the RDBP (Research & Development Business Program) project funded by the Greek Government. A methodology is presented for the successful application of business improvement techniques on a pre-evaluated business process resulting in its upgrade from the support process level to the core process level supported by an IT-enabled solution. Corporate strategy guidelines in combination with well known techniques such as Value Chain Analysis are being used into assessing the process' chain value bottlenecks while modeling tools like IDEF0 is used for depicting both AS-IS and TO-BE business situations. The first goal within the RDBP project is to provide a methodology and IT solution for the implementation of newly emerged e-business models into well established traditional clothing industries along with presenting a true case study in the industrial pilot apparel industry.


1 Introduction

Today's global economy, enhanced and hastened by rapidly changing technologies of all types, is putting pressure on companies to increase the efficiencies of all their business processes [1]. The effort of the enterprises during the 80's to reduce production costs is not adequate anymore. During the last years, the analysis of business processes has attracted the attention of both researchers and practitioners. Methodologies such as Business Process Improvement, Activity Based Costing & Activity Based Management, Enterprise Modeling, Benchmarking and Best Practices are part of the toolkit used in order to analyze, design, improve and evaluate different business processes [2].

The clothing industry is the archetype of the extended enterprise, many years in advance of the emergence of the term in the international literature [3]. The Benetton story [4] is a well-referenced example of success that can be attributed to the extended-enterprise organisation concept. Benetton as well as many other clothing industries is a vertically de-integrated company, not only in manufacturing, but also in the other activities that make up the business system: styling and design, manufacturing, logistics and distribution, and sales. They rely on external people and companies for the major part of these crucial activities. A clothing enterprise, in order to be successful in the “industrial fashion” business, needs constant adaptation to its targeted groups’ tastes. It also needs to keep in extremely close contact with its customers, and to provide a fast response to changes.

This paper addresses the issue of how an apparel industry can overcome its organizational barriers by transforming itself into a fully decentralised third party depended production unit using newly emerged e-business techniques that will give the company a substantial comparative advantage. To achieve this goal, a certain methodology is suggested based on the Systems Design Framework [5]. This framework defines four layers in the technology dimension similarly to the ISO/OSI architecture concerning data communications systems: (1) Presentation layer, (2) Transport layer, (3) Application layer and (4) Database layer. Additionally, other techniques such as IDEF0 and value chain analysis are applied for modeling purposes.
2 Proposed Methodology

A systemic approach to identify architectures for business models can be based on value chain deconstruction and reconstruction. More specifically, that is identifying value chain elements, and identifying possible ways of integrating information along the chain. Value chain deconstruction means identifying the elements of the value chain [6]. Namely, as primary elements inbound logistics, operations, outbound logistics, marketing & sales, service; and as support activities technology development, procurement, human resource management, corporate infrastructure. This first step of the proposed methodology can be described as the value chain analysis of the As Is Situation.

The next step of the methodology is the identification of possible bottlenecks existing in the information flow among the value chain elements. The criteria for considering a bottleneck mainly concern the cost dimension, that is the definition of percentage of each separate value chain element to the final cost of the product.

Afterwards the modelling of the AS-IS situation follows focusing on the bottleneck areas of the value chain that appear to be susceptible of improvement. The key to the analysis of a problem is identifying what functions are performed and the relationships between those functions. The IDEF0 Function Modelling method [7] is designed to model the decisions, actions, and activities of a system and it is used in this step of our proposed methodology. Applying the IDEF0 method results in an organized representation in a non-temporal, non-departmentalized fashion of the activities performed and important relations between them.

The reconstruction of the value chain in the TO-BE situation comprises the next phase. The most important factor in this process is the strategy of the organisation, which defines clearly the vision and the objectives of the company. Additionally, an IDEF0 model is constructed to demonstrate the characteristics of the new situation (TO-BE) in interested areas of the value chain.

Finally, an IT solution model accompanied with the corresponding IT solution architecture is designed, in order to provide the environment where the re-engineered situation (TO-BE) will function.

3 A Greek Apparel Enterprise - Case Study

The case company belongs to the apparel sector. It was established in 1976 and is located in northern Greece. At that time it had an annual production of 100,000 T-shirts and hired 50 employees. Today it operates in a private building of 5,000 m2 with a personnel of 250 workers, being one of the biggest producing T-shirt, sweat-shirt factories in Greece, with an annual production of 2.5 million pieces which are 100% exported all over Europe. Its customers include the biggest department stores and wholesalers. It is in the strategic context of the company to deliver clothes only for major customers and not to retailers. It does not own any shops and does not make franchise agreements.

The company operates in a virtual enterprise environment, that is, it is a primary contractor with major European customers and as soon as an order is released, it is initially distributed in-house (approximately 20%) and afterwards in several smaller subcontracting companies. The production phases of the final product are: raw material purchasing, knitting, dyeing, cutting, sewing, quality control and packaging.

The continuously increasing production cost, the emergence and flourish of the Far East nightmare in combination with the pressures from West European customers to East European countries for faster deliveries, cheaper products and better quality, made clear to the company's decision makers that it was a case of either transformation or annihilation. It is this paper that describes how the proposed methodology led a company into successfully selecting a business process with the maximum value added potential, improve it and achieve a high percentage of reengineering outcome that helped not only the company to survive the competition but even to gain an advantage over it.

Following the proposed methodology, the first step was to perform the value chain analysis of the AS-IS situation, as it is depicted in Fig.1.

Fig.1: Value chain analysis of AS-IS

The bottleneck analysis, which is the next step, ranked the percentage to the final cost of both the core processes (design, procurement, in-house production, accounting and sales) and the support processes (human resource management, subcontracted production co-ordination, distribution and information systems management). The result of
this phase was the fact that the co-ordination of subcontracted production consumed many resources of the company, even though it was considered to be a support process. The bottleneck was detected in the information exchange among the company and its subcontractors. The limited use of information systems to support effective decision making was the reason for having a number of employees occupied in the co-ordination and monitoring of subcontractors.

In order to visualise the AS-IS situation in the interested areas the corresponding IDEFØ models where designed. A part of the model that refers to the production order assignment from the company to the subcontractors is seen in Fig.2.

Fig.2: IDEFØ Model of AS-IS situation

The strategic orientation of the company is to eliminate in-house production and to sustain those processes where is excellent at and cost-effective as well. In this context the new value chain is constructed taking into consideration the bottlenecks identified in the previous step of the methodology. The resulting value chain TO-BE model is depicted in Fig.3.

Fig.3: Value chain model of the TO-BE situation

As it is seen from Fig.3 the context of the TO-BE situation is differentiated radically from the AS-IS. The difference lies in the shift of the subcontracted production co-ordination process from the support area to the core area. There is also a new support process (E-Sales) as a result of the strategic decision of the company to sell through the internet to wholesale companies supported by the introduction of information technology.

The differences in the organisation are observed more vividly in the IDEFØ model of the TO-BE situation that is shown in Fig.4 below.

Fig.4: IDEFØ Model of TO-BE situation

In the reengineered system the employees that are involved in the co-ordination of the subcontracted production are limited to decision making instead of performing the activities as in the previous situation. The information system that handles the business dialogue among the company and the subcontractors is executing all the necessary actions in order to fulfil a production order.

The completion of this step suggests the framework where the reengineered situation is designed. What is needed necessarily is the enabler or the means to achieve the new status. Information technology fulfills this need and provides all the prerequisites to implement the new environment. In this new virtual enterprise environment the information exchange among the company and its subcontractors is very important as it is described in Fig.5.

Fig.5: Information exchange model for the Buyer (apparel company) and the Seller (subcontractor)

The model of Fig.5 represents a system of transactions performed in a business dialogue such as the one in our case that must be implemented in the TO-BE situation with an effective decision support tool. The areas of the model that were redesigned concern the subcontractor selection
process and the contract assignment, the contract fulfillment and the subcontractor performance evaluation process (Fig.6).

![Fig.6: Reengineered system and IT solution model](image)

Fig.6: Reengineered system and IT solution model

The portal is an integrated module that provides bilingual (Greek/English) information about the Greek clothing sector issues while empowered by a real-time Help utility. It is based on a thin client/server Internet architecture, utilising on the server-side a 3-tiered scaled structure: Web server, Application Server / Web-Database Connectivity Server and Relational Database Management System-RDBMS. This architecture offers the advantage of easy access to system users along with expandability and load balancing benefits to the platform of the system. This is achieved with the 3 tiers’ physical separation and the ODBC standard adoption that allows the migration of structured system data into any relational open-architecture platform.

The system uses a star topology: the clients (browsers) are connected to the main server through ISP’s (Internet Service Providers) and Backbone applications as intermediaries. The data packs are being transferred mostly with TCP/IP-based protocols (such as HTTP, HTTPS and FTP) while in the local network level, other data transfer protocols are supported. The system can produce dynamic HTML pages, the appearance and the context of which depend on the database content and the user-submitted criteria. The IT architecture is being depicted in Fig.7.

![Fig.7: IT architecture](image)

4 Conclusions

Enterprise information technology concerns the consolidation and harmonisation of the islands of discrete business processes and information systems scattered throughout an organization and its subcontractors into a unified whole, reaching by this way the notion of virtual enterprise. In our case we started analysing the current AS-IS situation of the company to identify its specific needs and concluded with reengineering the system by transferring the initially support activity of subcontracted production management to a core business process. The systems analysis was complemented with a strategic value chain analysis determining the virtual enterprise environment where this apparel industry operates.

References: