

## Global Enterprise Resource Planning Implementation

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### Abstract

*The globalisation of markets is having a profound effect on business and information technology strategies of individual organisations. The move away from nationally focused business units to a global product-market focus requires an effective international co-ordination of a firm's activities. To support a global outlook, many firms are implementing Enterprise Resource Planning (ERP) systems. Although ERP has become the de facto standard for international organisations there are few documented examples of implementation. This paper seeks to make a contribution to this important area. A case study analysis of the strategic context and implementation of a global ERP project in a multinational textiles group is presented. It illustrates the transformation of a conglomerate of nationally organised businesses into a pan-European organisation. The case analysis demonstrates the organisational and technical complexity of ERP implementation and identifies the factors that determined the total cost of the system. Opportunities for future research are outlined.*

### 1. Introduction

As organisations and markets become more international, individual firms must respond with appropriate market and IT strategies. A brief review of the literature reveals a diverse range of approaches to the problem of integrating global market strategies with IT infrastructures. Levitt (1983) proposes that there is a convergence in commonality and that standardised global consumer products are key to a firm's competitiveness. He believes that the days of national and regional preferences are

gone. This is predominantly the case with respect to the globally recognised brands and products of McDonalds and Coca-Cola. Conversely, O'hame (1989) states that tastes do not form an amorphous mass of universal appeal where the localisation of products is defunct. He proposes firms take an equidistant view of the global market which recognises its heterogeneity. Honda's world car strategy is one such example of this (Naughton et. al. 1997). As shown here, both ideas are plausible and the resulting strategic response will often require new ways of work and new organisational forms which are underpinned by information systems. More specifically, the strategic view of the global market taken by an organisation will affect the underlying IT infrastructure (Ives and Jarvenpaa 1991). Consequently, the legacy information systems in operation throughout the organisation may not be flexible enough to accommodate this shift and misalignment between business and IT strategies may occur. It is widely cited that business and IT strategies should be aligned (Henderson and Venkatraman 1991, Boynton et. al. 1992, Reich and Benbasat 1996). It is therefore clear that the globalisation of markets and firm business and IT strategies are inextricably linked with organisation wide and supply chain information systems.

Historically most international firms have managed their IT systems on a country by country basis with a few notable exceptions such as Hewlett Packard (Lee and Billington 1995) and Ford (Treece et. al. 1995). This was due in part to the natural historical evolution of local nationally based strategies and systems, and also because there was no obvious single solution that was globally acceptable. However, as globalisation pressures increase,

then international organisations have been forced to improve the levels of international co-ordination amongst national entities of the same firm and also with economic partners. This has been done to improve the management of global operations and employ innovative supply chain based competitive strategies such as time based competition (Vessey 1991), the formation of new types of industrial structures (Konsynksi and McFarlan 1990, Malone et al 1987, 1989) and mass customisation (Feitzinger and Lee 1997). However, to achieve this level of co-ordination, it is necessary to have some form of common IT infrastructure and business processes in place. Over the past ten years a dominant strategy within manufacturing based organisations has emerged - the adoption of a single vendor solution based on ERP.

Standard package ERP solutions provide integrated support throughout the broad range of business processes in organisations such as, sales and distribution, manufacture and supply, human resources and finance. According to Price Waterhouse (1996) approximately 80% of a firms software will be of the standard package variety by the year 2000. More specifically, there is little doubt that standard ERP packages are being viewed by the majority of firms as the key to overcoming the problems of their legacy systems and increasing global competitiveness. In 1997 the ERP market stood at US\$10 billion and continued growth is expected (Martin 1998). Furthermore, Deloitte and Touche LLP (1997) state that ERP packages such as SAP, Peoplesoft and Baan will be the preferred choice as a replacement for legacy systems. Although ERP has become the defacto strategic standard for international organisations there are few documented examples of implementation. This is an important area due to the phenomenal take up of ERP and the specific implementation issues associated with it. This paper seeks to make a contribution to this area.

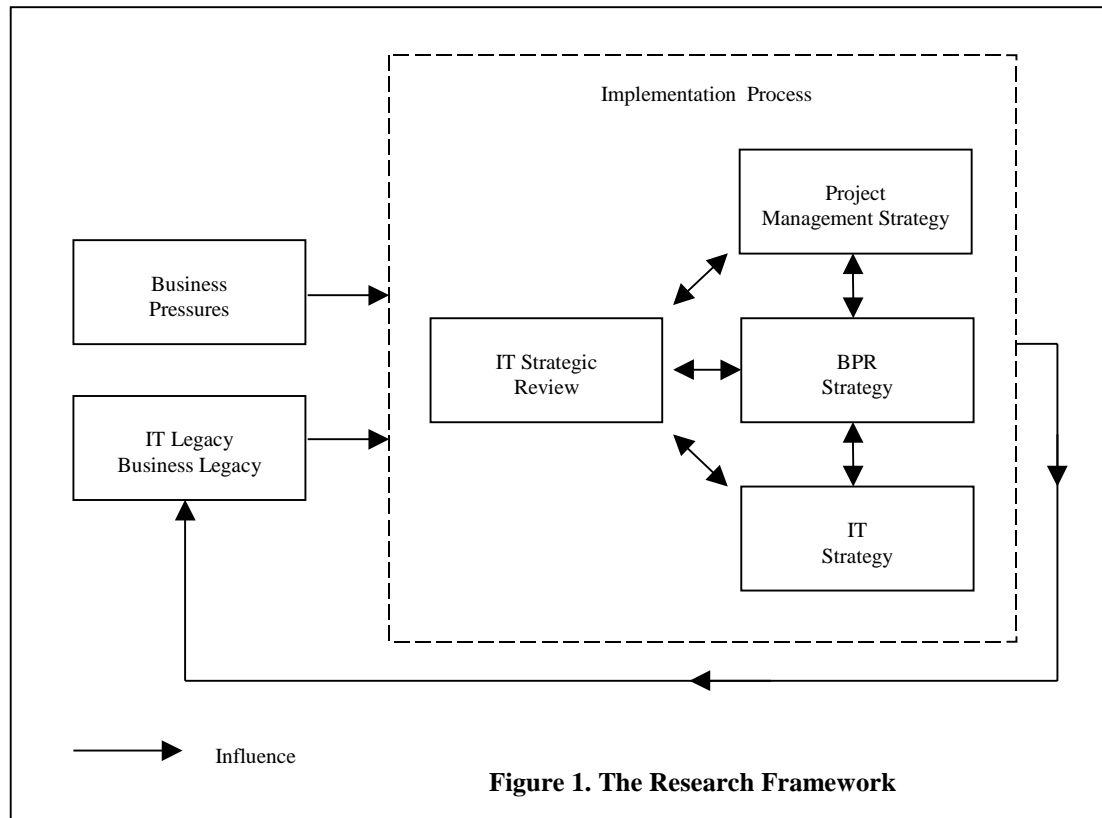
A case study analysis of the strategic context and implementation of a global ERP project in "Threads" a division of "Textiles PLC" a multinational textiles group is presented. The textiles industry's global customer base has specific cost and availability needs that are forcing suppliers to become more sophisticated in the management of manufacturing and marketing to make the supply chain as a whole more effective. This global, integrated vision of the supply chain is becoming increasingly dependent upon the successful choice and implementation of IT. The focus of this analysis is on the inter-relationships between business pressures, legacy information systems and future business and IT strategies. It illustrates the transformation of a conglomerate of nationally organised businesses into a pan-European organisation. The ultimate objective is to achieve a global business designed around common business processes and

an enterprise resource planning infrastructure. Case study evidence is used to highlight how the globalisation of customer markets and financial pressures forced a firm to align organisation structures with business processes and business strategy with IT strategy in order to compete. It also demonstrates the organisational and technical complexity of an ERP implementation project, identifies the factors which determined the total cost of the system and provides an analysis of the critical success factors for project.

## 2. The Research Method and Framework

A case study research strategy was employed as ERP implementation is a contemporary area and understanding the area requires the usage of explanatory 'how' and 'why' (process and context) questions which deal with operational links over time (Yin 1994). The case was compiled on the basis of material from two person interviews with the key informants of the global ERP project. Interview data were supplemented by documentary evidence collected over a three year period starting from the European IT strategy review and through to the live implementation of the project. Documentary evidence included IT and business plans, internal company presentations and briefings, consultancy reports and annual accounts.

A specification of a-priori constructs was developed to structure enquiry (Eisenhardt 1989). This facilitated accurate and efficient data collection and is shown in Figure 1. The framework also provides a structure for analysing the data and understanding the inter-relationships between the constructs. A brief description of each of the constructs is now provided. The business legacy is an extension of the idea of a cultural web (Johnson 1992). It is the characteristics of an organisation such as its structure, culture, business processes and strategy. The IT legacy is the existing IT based system/s that may inhibit organisational operations and performance due to a combination of factors such as their age, size and complexity (Bennet 1994, Young-Gul 1997). The business pressures are grouped into globalisation, deregulation, IT and competitive forces (Porter 1980, Moss Kanter 1989). The legacy systems and business pressures influence the implementation process, that is the enactment of the IT strategic review, project management strategy, Business Process Reengineering (BPR) strategy and IT strategy. The IT strategic review is similar to the notion of strategic choice (Johnson and Scholes 1993, Whittington 1993) only focussed upon IT rather than the whole business. The IT strategic review involves generating strategic options, evaluating those options and making a selection upon the basis of this. The project



management strategy details the philosophy for the project (Ward and Griffiths 1996). The BPR strategy outlines the nature of the business process change involved in the project (Hammer 1990, Hammer and Champy 1994, Grover and Kettinger 1995). The IT strategy is the IT chosen to be implemented (Earl 1989). Options include the adoption of standard packages, ringfencing – building around existing systems, business process rooted strategies such as outsourcing or merging, bespoke development and the maintenance or modification of existing systems.

### 3. The Case Data

#### 3.1. Textiles Plc

Textile Plc is an international group of companies that operates in the textile market. In 1992 it had an annual turnover of £1 billion. Textile Plc operated in over 40 countries and aimed to deliver quality products that were readily accessible by local markets. Its global presence was expanding through developments in both Eastern Europe and the Far East.

#### 3.2. The Threads Division

Threads was the largest division in the Group and had a major market presence. The division encompassed the

manufacture and distribution of industrial sewing threads, zips, hand-knitting and needlecraft products. In 1993, Threads sales were over £400 million and its operating profit was £30 million. Threads was composed of a large number of autonomous businesses as a result of an intensive series of mergers and acquisitions. Businesses focussed upon consumer or industrial markets. In 1991, the Consumer arm of the division accounted for around 30% of revenues and the industrial arm the remaining 70%. Threads activities spanned 35 countries and it aimed to pursue growth opportunities in new geographic markets.

#### 3.3. Business Pressures

The consumer division was targeted at domestic users, a market which has declined since the 1970's as the economy of domestic garment production has reduced. It has therefore been developed into a supplier of craft products such as embroidery pictures. The industrial division dealt mainly with mass production garment manufacturers such as Levi Strauss and those companies that supply large retail chain stores such as GAP. This market was growing as were the associated pressures of cost and availability. Threads industrial customers operated in a labour intensive business where costs and lead time are key business pressures. Trade tended to

respond to the delocalisation or offshore processing patterns of clothing manufacturers. That is the shifts in manufacturing capability to countries where it was possible to manufacture products at lower costs than others. This was usually due to lower labour costs which were generally found in developing countries. In addition manufacturers were being put under increasing pressure by retailers to be more responsive and flexible due to the reduction in the fashion lifecycle - the shelf life of products was decreasing and the consumer appetite for new styles was increasing. Threads was part of this supply chain (Figure 2), was affected by retail fashion trends and subsequently had to maintain low product and operational cost levels whilst ensuring timely availability on a world-wide basis.

IT was fuelling the globalisation process in parallel with the liberalisation of world trade in textiles and clothing. The multi fibre agreement (MFA) was set up in 1974 to achieve the progressive liberalisation of the textiles industry between developed and developing countries. As a result around 60% of the world's trade became subject to some form of restriction (Keynote 1997). Developed countries were expected to gradually remove trade restrictions between themselves and developing countries and encourage the restructuring of the non-profitable parts of the industry operating within their own countries. However, many developed countries were unhappy doing this as it would have impacted upon their respective economies. The MFA therefore had an opposite effect to that intended in that developing countries were reluctant to work with it thereby slowing down the liberalisation process. However, the liberalisation of trade was occurring in other industries and this trend could not be ignored as a possible impact upon the future business environment of Threads.

Threads had profitability problems in Europe due to excess and sub-scale capacity - the national firms that comprised the industrial part of the firm were manufacturing for fluctuating local markets and were not taking advantage of economies of scale. Threads needed

to reduce the overheads of its European operations. It also wanted to empower local marketing staff to make better more informed decisions. The group therefore decided that it needed to consider Europe as one market. The turning point came when Threads wanted to close a manufacturing plant and realised that it could not do this as it would be impossible to provide an equivalent level of service to its customers due to its legacy information systems. The position was summarised by the Finance and IT Director:

“The [IT] project team has two main objectives. To improve the interface with the customer by giving our sales staff access to on-line stock and production data across Europe and also to rationalise our manufacturing and administrative processes.”

### 3.4. IT Legacy

Threads Europe was comprised of national autonomous businesses that had disparate IT systems which the Finance and Technology Director described as:

“fragmented at best.”

In Europe alone there were 65 different systems in operation in 1993 and most were nearing the end of their useful lives. However, the systems were not aligned with the business strategy of becoming more responsive to market changes and the simplification of the international accounting and manufacturing systems. These were supposed to facilitate the management of the enterprise wide functions such as sales and distribution and manufacture and supply.

The systems were bespoke or heavily modified packages that ran on IBM AS400 technology and were no longer supported by the IT vendors. This meant that in addition to the complexity resulting from the variety of different systems, the level of entropy within each system was high. Systems were third, second and first generation in nature (Young-Gul 1997). Therefore in addition to the

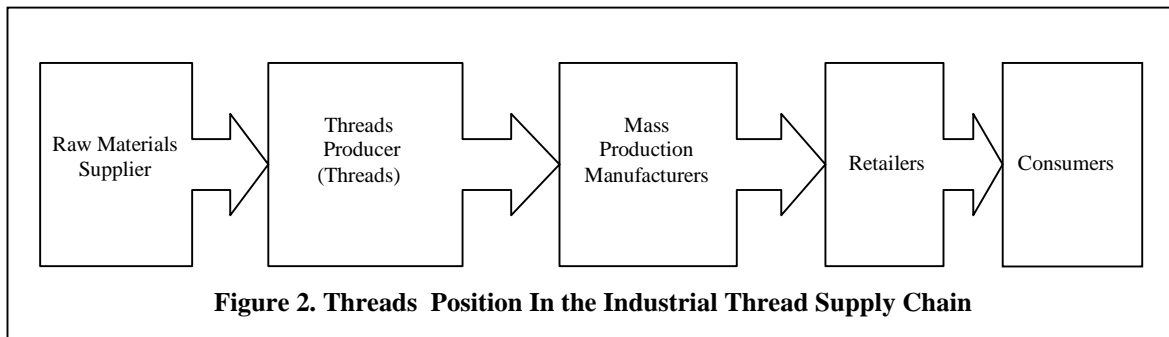


Figure 2. Threads Position In the Industrial Thread Supply Chain

complexity resulting from the nature of existing systems, it was likely that the system code was going to be complex and sizeable making it impossible to integrate them. The systems were also becoming increasingly expensive to maintain and the year 2000 was approaching bringing compliance issues. The Finance and Technology Director felt that:

“the best thing that we [Threads] could do with the existing systems was toss them out of the window.”

To add to the technical difficulties, IT spend was also very low as a result of a penny pinching attitude throughout the industry due to the pressures upon it and the fragmented and low level nature of the IT structure causing it to be viewed as an expense rather than a strategic opportunity.

### 3.5. Business Legacy

Threads had national organisation structures typical of a geographically dispersed product based company (see Figure 3). These were hierarchical in nature and aimed to control costs and employee resources on a national basis. It was not possible to obtain a global view of operations data and the national marketing unit could only see product and marketing data within their own country. Structures were not aligned with the core processes of the business. The process of sales through to distribution was, for example, not dealt with by one process team. Parts of the process were undertaken by different departments, that is sales activities would be conducted by sales and distribution activities by distribution. Processes were fragmented amongst departments that were functionally focused and inward looking. In summary,

Threads legacy structures and processes could not effectively meet the new global outlook of the firm.

The disparate cultures of the national business units also exacerbated the organisational structure and business process difficulties. A senior director at Threads said that:

“sites were run by Managing Directors who acted like Barons of their domains”.

The firm was also operating in a turbulent market and had, as stated earlier, been involved in a series of mergers and acquisitions. This had led to massive cultural and structural changes including staff reductions throughout the firm. There was a feeling of unease amongst the employees. Any change therefore had to be handled very carefully but effective action was urgently required.

### 3.6. IT Strategic Review

Given the immense changes in the business environment, the state of the European firm and its IT legacy systems, senior management at Threads Europe were acutely aware of the need for significant changes. Taking into account the existing state of the business at that time their action was quite radical. It involved massive technical and organisational change with the overall aim of transforming the company to enable it to meet its aim: maximising the benefits of its international operations and ensuring competitiveness through a focus on manufacturing excellence, customer service and cost effectiveness. In 1993 a strategic review commenced based upon developing a pan-European system that would

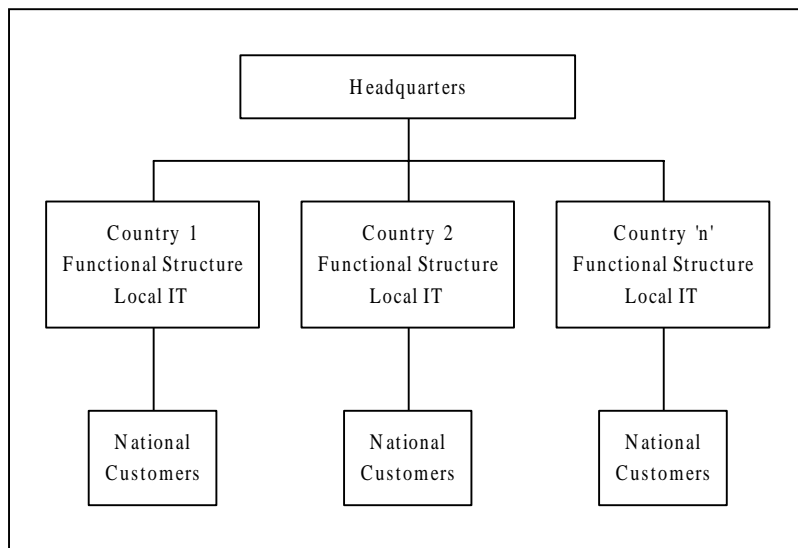


Figure 3. The Original Organisation Structure and Supporting IT

integrate the European industrial firms. The strategic review took three years due to senior management changes and the expansion of the scope of the project.

During the period 1993 to 1995 the group had looked around for a suitable system and implementation partner/s. The main options considered were the development of an existing national system, a new bespoke application and several standard package solutions. By 1995 they had decided to work with a medium sized player in the ERP market who could provide the software and manage the implementation process. However, it was at this time that a new IT Director was appointed with a different perspective about the way forward which led to a broadening of the search of products and implementation partners. By April 1996 it was decided that a different ERP system would be implemented and this required the recruitment of a separate implementation partner.

The senior members of the project team then decided that Threads needed a common process driven European organisation structure in order to maximise the benefits of international operations. Furthermore, the systems scope was extended in 1996 to include the crafts business throughout Threads Europe which meant implementing a common global system. This brought added complexity

for two reasons. First, the system was going to be imposed upon the crafts business since they had not been involved in the IT strategic review. Second, there were strong differences in the ways that the crafts and the industrial business operated. These changes to the project required a more complex evaluation of system requirements. Consequently, the Finance and Technology Director's original project cost estimate had risen five fold. After further consideration by the board, the project was approved in November 1996.

The intended organisation structure and supporting global ERP system is shown in Figure 4. The system aimed to improve customer links to stock and production information across Europe. It would also facilitate the rationalisation of manufacturing and administrative overheads, particularly in non-value added areas. For example, in Europe there were 30 accounting systems in comparison to one in the United States.

### 3.7. Project Management Strategy

Threads optimised internal and external expertise by entering into a partnership with consultants who aided change management and systems development. To complement this, and ensure that firm's interests were

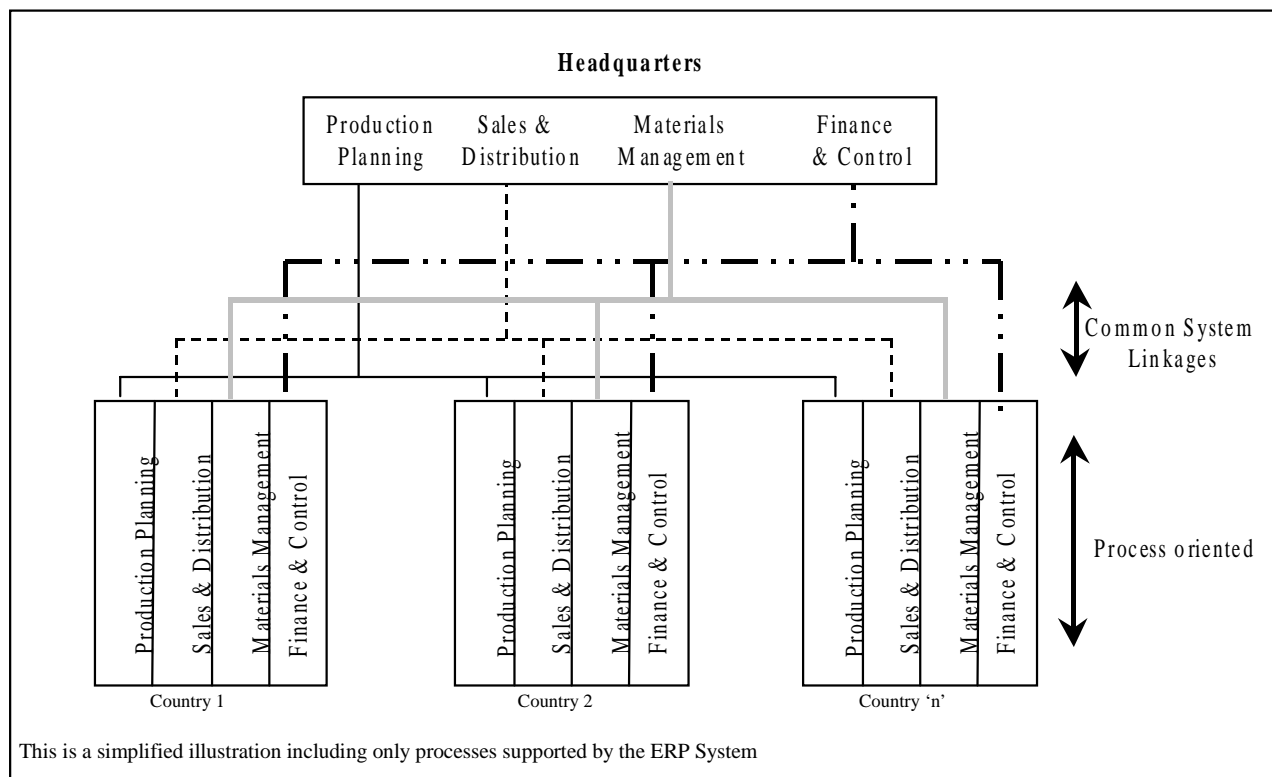


Figure 4. Global ERP and Planned Organisation Structure

served, the 'top people' from throughout the national businesses were brought into the project. A Project Manager was appointed in April 1996 and Threads also appointed a Change Manager, the existing Personnel Director. The project had Board level support which Threads felt was essential due to the criticality and pervasive nature of the changes being made throughout the organisation. The overall project management philosophy is summed up by the following aphorism developed by the project management team, and with specific input from outside consultants:

- A one hundred percent technical solution never works (80% benefit: 50% effort);
- I.S. professional should NOT design the system;
- Most systems are too complex;
- Publicity and action are vital;
- I.T. concerns organisational change;
- Support from the top is vital;
- Devils advocacy is necessary;
- Decision taking must be more distributed;
- Competition requires a speedier response;
- Organisation structure may change rapidly;
- No prizes - "whatever we do will be wrong".

The project team has seen significant growth since the project commenced. It originally totalled 30, which incorporated 18 Threads staff and 12 Consultants. The project team now stands at around 72. It includes 50 Threads staff and a mixture of 22 consultants employed freelance and by the implementation partner. The project has experienced delays due to the high turnover of consulting staff and Threads were warned by the implementation partner that they may see the same happening to their own project staff when they became more familiar with the ERP system.

The Change Manger felt it was important that a conscious effort to manage change was essential due to the scale and scope of the project. He stated:

"The group has taken the decision to change the organisation from within in an incremental way rather than attempt to transform the company overnight."

According to the Change Manager the consultants had their own model of change management which he viewed as mechanical and quite forceful. The Change Manager thought that the Threads Europe context needed more sensitivity and consequently change had to come from within the organisation in a less mechanistic and dramatic way. The latter approach has been adopted but the transformation of the company is still the ultimate aim.

### 3.8. Business Process Reengineering Strategy

The business radically reviewed the ways that it conducted its operations by developing macro level process ideas about the firm and then developing them at a micro level through the ERP system. From January 1998, the organisation was structured to reflect the process driven orientation of the management and the organisation. A new European-wide organisation structure was introduced based upon Manufacture and Supply, Finance, Personnel, IT, Industrial Sales and Distribution, Crafts Sales and Distribution. Although this was radical in comparison to the prior structure Threads wanted to continue to compete on cost and quality. The changes aimed to improve international co-ordination and local market responsiveness to facilitate this. Threads wanted to realise dramatic process improvements rather than change the face of the business.

An analysis of product variety and customer fragmentation reveals a complex picture from an information management perspective. The variety of sizes, thread types and dye colours means that product variety is potentially almost infinite though in practice the number of stock keeping units is approximately 10,000. There is also a high volume of data involved in dealing with customers because there are over 50,000 customers spread across 30 countries, and over 2 million invoices are generated per annum. A consultant described the organisation as:

"information rich, cash poor".

The BPR strategy was to implement common processes throughout the company and minimise the level of changes to fit local, national requirements. Business processes were modelled to match those inherent within the global ERP system. The objective was to achieve 90% global processes and 10% national specific ones to deal with national variances such as financial reporting, tax and customer preferences.

### 3.9. IT Strategy

By adopting an ERP strategy, and more specifically one of the leading packages, the Project Manager felt that Threads would be well placed to avoid legacy problems in the future. The Project Manager stated that setting in place core process modules and allowing a minimal amount of individual business configuration would afford the flexibility and responsiveness required in a global market.

Threads Europe will implement the ERP system on a common hardware platform and using the same implementation partner in each country. Globally, the core processes were to developed in the common ERP

system whilst peripheral processes were to be developed in either the common ERP system and/or other applications depending upon local preferences. Although global sites had a choice in terms of hardware provider and implementation partner, the Finance and Technology Director felt that sites would have to make quite a strong case to defer from the standard.

### 3.10. Implementation Process

The project assessment and planning phase took place from January until March 1997. This involved holding workshops with 150 staff which examined fairly generic business processes in order to ensure relevance to those involved and encourage ownership and participation. Thirty business processes were identified and understood in terms of their inputs, outputs, critical success factors and dependencies. The idea was to understand how each process worked and their national variances. Business events were then examined which contained more detail than the business processes. This led to the development of a big picture solution in the form of a conceptual design document. The Project Manager said that:

“It's like building a house, you have to get the foundations right... this wasn't the time to start worrying about the carpets and curtains.”

The configuration of the ERP system and the documenting of activities in processes began in April 1997. The project team worked in the business process areas corresponding with the ERP package – Production Planning, Sales and Distribution, Materials Management and Finance and Control. Each team had five Threads staff and one consultant and configured the business events detailed in the conceptual design document through the ERP system. The ERP system was used to drive through consensus in this area although this was problematic. Some business processes throughout the national businesses, such as sales and distribution, were similar and consequently easier to configure than others, such as production planning or warehousing where there were fewer commonalities requiring greater compromises. The project team have already identified and are attempting to deal with potential problems associated with national differences, particularly terminology, and are performing essential local modifications where necessary.

System testing started in November 1997 and involved users from pilot sites providing feedback on the intended system. The team is also developing training material and an on-line help file. Parts of the system will go live in May 1998. This will involve ten sites of the industrial business in the United Kingdom and includes 240 users. Sites in central Europe (Germany, Austria, Switzerland

and the Benelux countries) and the crafts business will be the next to follow in the fourth quarter of 1998.

## 4. Conclusion

Threads is undergoing a transformation which will reduce overheads and increase customer responsiveness and customer service levels throughout the firm. This has been facilitated by implementing a common ERP system throughout its European operation. Threads approach to managing IT corresponds with the organisational transformation that has taken place. The IT infrastructure has changed from one that was fragmented and unresponsive to business requirements into one that exploits the scale of the European organisation whilst retaining local responsiveness. This transformation has been extremely difficult and complex to manage because of the need to align business processes with the ERP system, the complexity of the organisation structure and the growth in the scale of the project from its original specification. Consequently, the cost of developing and implementing the common global system has risen dramatically over the life of the project. Current estimates of the project costs are 5 times higher than original estimates, reflecting both the learning curve of the project and its greater scope. Additional significant reorganisation costs are also expected to unlock the full potential of the project.

The globalisation of the textiles market exposes differences in cost structures, IT systems and business performances between different regions. This is also happening in other sectors such as automotive (Treece et. al. 1995), travel (Toy et. al. 1995), financial services (Sieber and Griese 1997) and corporate banking (Holland et. al. 1994). It is clear that in the textiles market, products and business processes are predominantly homogeneous. In the European context, it was not viable for Threads to retain national structures and systems, and the pattern of organisational change outlined in this paper is likely to occur in all European product markets in the near future. The cost dimensions for ERP implementation are the capital expenditure on IT (hardware, network and software), external consultants and organisational change. The reliance on consultants and the requirement for large numbers of internal staff is because of the need to transfer data from old systems, enter new data, design new business processes, configure software and test the resulting business systems. ERP therefore embodies the essence of the organisation, its structures, processes and the roles of individuals. It is clear that ERP implementation will affect not only individual organisational entities but will ultimately affect how organisations interact as ERP systems are connected along the supply chain. Furthermore, the level of investment in

ERP, both financial and organisational, means that they will be the dominant IT infrastructure for the next 10 years. Senior management involved in the implementation process view ERP as the foundation on which to build global customer responsive strategies that will link the firm with *all* of its economic partners.

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