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How Multinational Firms Use IT to Manage Their Global Operations

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ABSTRACT

Despite a generally-acknowledged importance of IT in enabling global strategy and a broad understanding of the manner in which IT enhances coordination and reduces cost, few studies have focused precisely on how multinational firms use IT to facilitate globalization. We conduct a detailed case study across four major multinational firms, and use primary data to develop theoretical propositions on the characteristics of products, processes and customers that impact the ways in which multinational firms use IT to manage their global operations.

Keywords

Multinational firm, MNC, information technology, IT, international, globalization, value chain, coordination, configuration, responsiveness, case study.

INTRODUCTION

Over the past 50 years, international markets have contributed an increasing share of revenues and profits for multinational firms. For example, the share of international profits as a percentage of total profits for U.S. firms rose from 5% during the 1960s to over 25% in 2008. The increase has been particularly dramatic over the past decade, as U.S. corporate overseas profits increased at a double-digit pace for 22 consecutive quarters. U.S. firms increased their overseas quarterly profits from a total of \$0.9 trillion in Q1 2000 to \$1.8 trillion in Q4 2006. U.S. firms have also found higher returns on sales in foreign markets than in domestic markets, and less variability in earnings compared with domestic operations (Ito and Rose, 2010).

This trend is expected to continue and accelerate in the future, because globalization is an important vehicle for multinational firms to manage revenue growth and cost reduction (Farrell, 2004). Globalization provides opportunities for revenue growth by expanding operations into new geographical areas, and opportunities to reduce costs through economies of scale and scope. It presents multinational firms with strategic opportunities that are not available to purely domestic firms, such as the ability to acquire inputs from multiple locations and serve diverse markets. Globalization also enables firms to access global availability of talent to reduce cycle time, spur innovation, and maintain or improve quality (Oshri, Kotlarsky and Willcocks, 2007). Among the 30 companies in the Dow Jones Industrial Average, the 10 that get the largest share of their sales abroad are expected to see revenues grow by an average of 8.3% over the next year, and the 10 that do the least business outside the U.S. are expected to show much lower average revenue gains of 1.6%.

While globalization offers potential advantages, these advantages come with several risks in managing business operations across country borders. A presence in diverse locations presents multinational firms with higher levels of complexity, variability, unfamiliarity and uncertainty (Andersen and Foss, 2005). Entry into foreign markets creates local adaptation costs, and location differences create difficulties to transfer products, services, processes and information between headquarters and subsidiaries in various countries. Executives at multinational firms face the challenge to manage the operations of their subsidiaries with each other and with headquarters, to administer the firm as a coordinated global network. To manage these risks and achieve the desired level of administrative coordination, firms deploy a wide range of mechanisms, of which several include a critical role for information technology (IT) systems (Jaussad and Schapper, 2006).

The purpose of this paper is to build depth and understanding for the mechanisms through which firms use IT to enable globalization. We use case study data derived from interviews with the top IT executives in four multinational firms to identify differences in application of the mechanisms.

BACKGROUND AND THEORETICAL FRAMEWORK

Recent research highlights that IT enables firm to globalize their operations and achieve foreign revenues and foreign profits through three mechanisms – value chain configuration, value chain coordination, and local responsiveness (Mithas, Whitaker and Tafti, 2010). Value chain coordination refers to the coordination of similar value chain activities (e.g., research, production, logistics and marketing) across different geographic locations, and involves the management of information to make decisions related to the activities and the management and of knowledge and resources necessary to perform the activities (Ensign, 1999). IT systems facilitate value chain coordination and knowledge flows through provision of rich transmission channels and knowledge management systems for transfer and absorption of knowledge by headquarters and subsidiaries (King and Sethi, 1999). IT systems greatly expand the type, frequency, speed and volume with which multinational firms can input, store, extract and exchange structured information and unstructured knowledge throughout the firm (Finnegan and Longaigh, 2002). The systems enable firms to communicate knowledge to personnel in headquarters or subsidiaries who have the best experience and capabilities to make specific decisions, and provide infrastructure to share, distribute and absorb knowledge across geographic and functional boundaries, and to coordinate activities and develop strategic opportunities (Jean, Sinkovics and Kim, 2008).

Value chain configuration refers to the manner in which firms build the capacity to perform value chain activities globally and disperse those activities across different geographic locations (Kogut, 1985). By reconfiguring its value chain activities, a firm can achieve efficiencies through centralized administrative coordination, control of resources, and performance measurement (Sambharya, Kumaraswamy and Banerjee, 2005), and can produce and innovate in low cost markets and sell in high return markets. Firms can use IT to extract information and knowledge components of production inputs and business processes, and move those components around the world to perform each value chain activity in the location where it can be best accomplished (Boudreau, Loch, Robey and Straub, 1998). IT systems enable multinational firms to treat subsidiaries as component pieces, which allows firms to locate activities across subsidiaries and geographies as appropriate (Gupta and Govindarajan, 1991). In local responsiveness, firms implement changes in product features, production and distribution approaches, advertising messages and pricing to tailor for local markets (Ghemawat, 2007). IT systems are an integral component of a local responsiveness (Kettinger, Marchand and Davis, 2010). Firms can use their IT and communications architecture to draw together marketing, R&D and production experts with the unique skills and knowledge of a particular local market, which enables the firm to respond and adapt with products and services that are tailored for customers in that market (Ramarapu and Lado, 1995).

Early global IT research generated helpful insights by mapping IT configurations to Bartlett and Ghosal's (1989) strategy typologies of multinational, global, international and transnational. Subsequent research notes at least three reasons why there is a need to extend beyond the typologies. First, these typologies may not be able to explain the full set of considerations firms use to organize their foreign subsidiaries and global IT operations (King and Flor, 2008). Second, IT has increased the ability of firms to simultaneously achieve a degree of both global efficiencies and local responsiveness, which are the traditional strategy tradeoffs (Sia, Soh and Weill, 2010). As more firms use IT to pursue global efficiencies and local responsiveness (Peppard, 1999), traditional strategies increasingly become blurred. Third, the strategy typologies are difficult to operationalize, and there may be differences between a firm's actual positioning and its aspiration (King and Flor, 2008). Therefore, to complement prior research and generate further insights on global IT, we categorize firms based on more objective measures from the strategy literature, such as whether the firm's primary product is durable vs. non-durable, and whether the end user for the firm's primary product is industrial customers or individual consumers (Hitt and Ireland, 1985). Below we provide further background on the distinctions between durable vs. non-durable goods, industrial customers vs. individual consumers, and front-office processes vs. back office processes.

Durable Goods and Non-Durable Goods

Manufacturing firms can be classified on the basis of whether they make durable goods or non-durable goods. Durable goods last for a longer period of time, and non-durable goods last for a more limited period. The nature of goods impacts processes throughout the firm. Firms that manufacture durable goods must allocate more resources to research and development, and emphasize production efficiency and product quality (Hitt and Ireland, 1985). Firms that manufacture non-durable goods must focus on the acquisition of market share through competitive pricing, and the constant development of additional markets (Fornell, Johnson, Anderson, Cha and Bryant, 1996).

Industrial Customers and Individual Consumers

Firms can also be classified on the basis of whether they sell to industrial customers or individual consumers. The market for industrial customers is more concentrated than the market for individual consumers (Thietart and Vivas, 1984). Industrial customers generally have larger transaction volumes per customer, while individual consumers have intermittent transactions with lower dollar values per transaction (Weill, Subramani and Broadbent, 2002). While industrial products are more standardized because technical specifications do not vary across countries, consumer products are less standardized because consumer preferences are more idiosyncratic to local cultures and tastes (Schilke, Reimann and Thomas, 2009). Firm relationships with industrial customers are generally more prevalent, complex, balanced, and long-standing than relationships with individual consumers (Holm, Eriksson and Johanson, 1999).

Front-Office and Back-Office Processes

The operations of a firm can be viewed as two sets of business processes – front-office processes and back-office processes (Porter and Millar, 1985). Front-office processes are those through which the firm interacts directly with the customer, and include marketing, sales and service (Chase, 1978). While back-office processes are also important to the operations of the firm, they do not interact directly with the customer. Back-office processes including finance, accounting, IT and HR. The extent of customer contact influences the challenges inherent in each set of processes, and the resulting focus of the firm. Front-office processes must cope with uncertainty resulting from customer involvement and unique requests, which create inefficiencies and increase operating costs. Firms must configure their front-office processes to address the human relations aspect of customer contact, and to be flexible to customize products and services to customer requirements (Safizadeh, Field and Ritman, 2003). Because customers do not directly interact with back-office processes, customers may not perceive back-office processes as part of the firm's value proposition. Firms must then standardize and automate to enhance the efficiency and effectiveness of back office processes. Firms generally make larger capital investments related to back-office processes compared with front-office processes, with the objective to reduce the long-term cost of back-office processes.

METHODOLOGY AND CASE STUDY FIRMS

We selected four firms from a larger set of case studies conducted by the research team, for theoretical sampling reasons (Eisenhardt and Graebner, 2007). Based on the criteria above to segment firms based on the nature of products (durable vs. non-durable) and the nature of customers (industrial customers vs. individual consumers), we have one firm in each quadrant shown in Figure 1. All four firms are included on the *Forbes* Global 2000 list of largest global firms, and have annual revenue of over US \$1 billion. All four firms are headquartered in Northern Europe, have over 50% of sales outside the home country, and have North America as the first or second largest sales geography outside of Europe. The equities of all four firms are publicly traded on both European and U.S. exchanges. The firms are reasonably similar in size and geographic focus, yet different in terms of products and customers. These similarities and differences are desirable from a theoretical perspective, because they allow us to maintain a common context while exploring phenomena of interest (Eisenhardt, 1989).

To provide confidentiality, we provide an alias for each of the four firms in this study. Equipment firm manufactures and sells finished equipment to industrial customers. Parts firm manufactures and sells components to industrial customers. Household Goods firm manufactures and sells durable household goods. Consumer Products firm manufactures and sells consumer products.

	Industrial Customer	Individual Customer
Durable Product	Equipment Firm	Household Goods Firm
Non-Durable Product	Parts Firm	Consumer Products Firm

Table 1. Categorization of Firms by Product and Customer

Semi-structured interviews were the primary method of gathering evidence for this study. Key strengths of this method are that semi-structured interviews provide rich detail and allow researchers to probe to uncover new dimensions and follow new lines of inquiry for the research topic (Yin, 1994). A list of interviewees for the four firms is provided in Table 1. Table 1 indicates that our research team interviewed the most senior IT executives in each firm, including the Global CIO for all four firms (one former CIO departed the firm during our data collection). We interviewed multiple executives in Europe and North America to get a rich and varied perspective on the IT operations for each firm. In most cases, the research team initially contacted the CIO, and the CIO provided access and introduction to other IT executives in Europe and North America. Most interviews were conducted in person at the executive's offices in Europe and North America, most interviews lasted between one and two hours, and most interviews involved more than one researcher from the research team. While we interviewed most executives once, we met with some executives multiple times. In general, the research team followed a consistent interview pattern across firms by first meeting with European headquarters personnel, then meeting with North America subsidiary personnel, and then meeting again with European personnel. Most interviews were conducted over a period of 15 months from March 2009 to June 2010.

Before the interviews, the research team prepared structured interview guides to ensure that all important issues were covered during the interviews, and to increase consistency across firms. Similar to Ghosal and Nohria (1989), the research team formulated some different research questions for European headquarters and North American subsidiary personnel, to capture the respective headquarters and subsidiary perspectives on global business processes and IT operations. In addition to the semi-structured interviews, members of the research team reviewed some information in annual reports, news coverage, and websites to learn more about the firms and to provide context and corroboration for case study material (Chan and Huff, 1992). A number of executives showed and discussed confidential materials during the interviews (for example, one CIO presented material that was to be discussed with the Board of Directors the following week). While the research team took active notes on these materials during the interviews, we generally did not receive a paper or electronic copy of the materials due to confidentiality. Shortly after each interview, a team member prepared detailed notes from the interview. Other research team members reviewed, refined and added to the interview notes as necessary.

	Europe	North America
Equipment Firm	Global CIO Regional CIO	Regional IT VP Regional IT VP
Parts Firm	Global CIO (departed firm) Deputy CIO (2)	Regional Controller Regional Controller
Household Goods Firm	Global CIO (3) Global CTO Global IT Director (2)	Regional IT VP Regional Controller
Consumer Products Firm	Global CIO Deputy CIO (2)	Regional CIO Regional Director Regional Director

Numbers in parentheses indicate multiple meetings with an interviewee.

Table 2. List of Interviewees

Consistent with the case study approach articulated by Yin (1994) and Eisenhardt (1989), our research team took steps to strengthen reliability and validity of the data. We enhanced reliability through the use of a case protocol, and strengthened construct validity through multiple sources of evidence. We increased predictive validity through pattern matching and explanation building, and improved external validity through the use of multiple case studies. We triangulated data across interviewees and firms, and maintained a linkage between research questions, evidence, interpretations and conclusions.

Equipment firm is the largest business unit of a global equipment firm founded over 100 years ago, and is one of the world's three largest firms in this equipment segment. Parts firm was founded over 100 years ago, and quickly became a global firm. Parts firm now has over 100 manufacturing and operational sites in over 25 countries, and is supported by over 10,000 distributors in another 100 countries. Household Goods firm was formed almost 100 years ago, and is one of the top three global firms in its industry. Consumer Products firm was founded almost 100 years ago, and is a global leader in its segment.

PROPOSITIONS AND DISCUSSION

Building on prior research that more fully describes the mechanisms through which IT enables globalization (Mithas et al., 2010), in this paper we enhance understanding of the contexts in which mechanisms may be more applicable for firms with specific types of products, processes or customers. We build on prior literature described in section above and use examples from our case study firms to develop propositions related to the IT globalization mechanisms.

Value Chain Configuration

While IT systems enable multinational firms to disperse value chain activities across geographic locations (Jarvenpaa and Ives, 1994), the nature of IT use for value chain configuration will vary based on the type of product. For example, durable goods require higher levels of R&D and capital investment (Hitt and Ireland, 1985), which suggest a greater need for durable goods manufacturers to centralize production. Therefore, we can expect durable goods manufacturers to use IT to support centralized production. The two durable goods manufacturers in our case study have centralized production in low cost countries. Equipment firm produces its largest lines of equipment only in two low cost countries, and Household Goods firm has moved production to low cost countries in recent years.

These durable good manufacturers have used IT to support the centralization of production. For example, Equipment firm uses information from sales and marketing (customer demand, pricing, and aftermarket requirements) in the R&D and manufacturing for new products. Equipment firm has relied on acquisitions to round out its product portfolio, and the firm implements its global ERP system to integrate acquisitions into its global network. As Equipment firm brings its operations and acquisitions onto its global ERP system, it can leverage this data for configuration of other value chain activities. For example, Equipment firm can use data on its global supplier base to optimize procurement, data on its global customer base to optimize pricing, visibility to global manufacturing to optimize production and inventory management, and visibility to financial data to optimize profitability.

By comparison, we find that the non-durable goods manufacturers in our case study make less use of IT to configure their value chain activities. With lower required levels of R&D and capital investment, Parts firm and Consumer Products firm manufacture many of their products in the regions where they are sold. Accordingly, Parts firm applies a different set of business processes and a different set of IT systems in each region. While Parts firm has also made multiple acquisitions over time, the lack of a global ERP system and the nature of product make it infeasible and less necessary to configure value chain activities across regions. Based on this discussion and findings from our case study firms, we propose that:

Proposition 1: Global durable goods manufacturers place greater focus on using IT for value chain configuration than global non-durable goods manufacturers.

Value Chain Coordination

Once multinational firms configure their value chains, they need to coordinate activities across the value chain. While firms use IT to make decisions for activities and to manage knowledge and resources for activities (Ensign, 1999), the nature of IT use will vary based on the nature of activity. As discussed above, firms place greater emphasis on standardizing and automating back-office processes, because customers do not directly interact with back-office processes and may not perceive these processes to be part of the firm's value proposition (Safizadeh et al., 2003). Therefore, we expect firms to use IT more for the coordination and efficiency of back-office processes across regions.

Findings from our case study firms support this expectation, as all four of our case study firms actively use IT to coordinate back-office processes across regions. For example, Equipment firm uses its global ERP system to coordinate the full range of back-office processes related to order handling, capacity planning, material supply, inventory management, manufacturing, and invoicing, in addition to back-office processes such as HR and finance. Even as Household Goods firm is in process of implementing an ERP system for procurement, manufacturing, HR and finance, Household Goods firm maintains a common database for reporting financial information across regions. Parts firm and Consumer Products firm also exchange and consolidate financial data and results across regions. The CIO future visions for our case study firms indicate that the coordination of back-office processes through IT is likely to continue and increase. For example, the Household Goods CIO expects product development and procurement to become more global processes at the firm in the future, and the Consumer Products CIO envisions that administration and manufacturing will become more global processes at the firm in the future.

On the other hand, our case study firms have much more limited IT-based coordination of front-office processes across regions, for a variety of reasons. For example, the distribution channel for Equipment firm varies by region. While Equipment firm owns the distribution channel in one market, Equipment firm uses independent dealers in another market.

Accordingly, Equipment firm uses a different dealer management system in each region. Consumer Products firm has widely different market shares across regions. Consumer Products firm has almost 90% market share in its segment in one region, and only 20% in another region. Accordingly, Consumer Products firm uses different sales and marketing systems based on the needs of each market.

The Household Goods industry negotiates purchase terms and discounts differently in different countries, and accordingly has different order systems for each country. Even as Household Goods firm deploys other global systems as described above, Household Goods plans to maintain local IT solutions for sales and channel management. Parts firm is doing some work to move toward a global sales data warehouse, and unify some customer data and processes across regions. Based on this discussion of the much more prevalent use of IT to coordinate back-office processes, we propose that:

Proposition 2: Global firms place greater focus on using IT to coordinate back-office processes than front-office processes.

Local Responsiveness

Back-office processes are more amenable to global coordination and efficiencies in part because unique front-office processes are required to tailor products for different markets (Ramarapu and Lado, 1995). While industrial specifications have limited difference across markets, consumer preferences are more subject to local culture and tastes (Schilke et al., 2009). Accordingly, we expect that multinational firms with individual consumers as customers will make greater use of IT to adapt to local markets, and we find this to be the case for the firms in our study. Consumer Products firm currently allows each subsidiary to define its own IT processes. One region in which Consumer Products firm faces greater competition has a range of systems to increase its market share. For example, Consumer Products firm has an application for sales personnel to transmit data on competitor pricing and promotions on a real-time basis from a retail location. Consumer Products firm also has an application for the sales personnel to help the retail manager optimize profit mix and profitability for the category, including products from other manufacturers. In the meantime, the region in which Consumer Products firm faces less competition has a separate CRM system tailored for needs in that region. While Consumer Products firm plans to centralize administration and manufacturing as described above, in the future state the firm will still have separate sales and marketing applications by region. Household Goods firm currently has different CRM systems in various regions. Even though Household Goods firm plans to implement a single CRM system, the CIO will allow for CRM differences in different markets.

On the other hand, firms with industrial customers show less use of IT to tailor products and services to each market. For example, Parts firm has a global CRM system, and is in process of reorganizing its sales force to sell all products within a market. Further, Parts firm is increasingly relying on electronic commerce for sales in some of its product lines (approaching 100% for some products), and electronic commerce enforces a more standardized process in dealing with industrial customers across regions. In fact, the Parts firm Deputy CIO indicates that electronic commerce is also driving many IT projects to integrate with operational systems, rather than the future differences being anticipated at Household Goods firm and Consumer Products firm. Based on this discussion and findings from our case study firms, we propose that:

Proposition 3: Global firms that sell to individual consumers place greater focus on using IT to achieve local responsiveness than firms that sell to industrial customers.

CONCLUSION

We conducted case studies of four large multinational firms to learn about the ways in which MNCs use IT for globalization. Our case study firms represented a range of industries and products, and included a range of processes and customers. We make three theoretical propositions based on our case study findings. First, we propose that durable good manufacturers place relatively greater focus on the use of IT for value chain configuration than non-durable good manufacturers. Second, we propose that MNCs place relatively greater focus on using IT to coordinate back-office processes than front-office processes. Third, we propose that firms that sell to individual consumers place relatively greater focus on using IT for local responsiveness than firms that sell to industrial customers. These propositions will open the door for future analytical and empirical research, and are important as global firms earn an increasing portion of their revenue and profits from abroad.

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