A New IT Organizational form for Multinational Enterprises

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A NEW IT ORGANIZATIONAL FORM FOR MULTINATIONAL ENTERPRISES

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Abstract

Globalization has been a major phenomenon since the 1980s. As many multinational enterprises (MNEs) grow their presence globally, they have been supported by distributed IT resources that are organized either as centralized IT, decentralized IT, or federated IT. However, despite the significant increase in business complexity in the last decade, there has been relatively little systematic research on new IT organizational forms capable of coping with the sophistication of today’s complex (e.g., multi-strategy, multi-product, and multi-geography) MNEs. Drawing from our understanding of the development of organization form in the organization design literature, we examine the applicability of a contemporary organization form, i.e., the multidimensional organization (Ackoff 1999; Galbraith 2009; Strikwerda & Stoelhorst 2009) to the organizing of IT function in MNEs. Through a revelatory case study of the global IT organization at Siemens, we demonstrate the possibility of a multidimensional design for IT organization in MNEs, where the IT organization is organized into IT Customer-, IT Product-, and IT Resource units. The strategic application of lean and flexible lateral coordination mechanisms enables the multidimensional IT organization to achieve multiple objectives in totality. Implications for research and practices are discussed.

Keywords: IT organization, IT structure, IT governance, Multinational enterprises
1 INTRODUCTION

Globalization has been a major phenomenon since the 1980s as many established multinational enterprises (MNEs) grow and expand their presence globally. A study of MNEs, for example, has shown a steady increase in the number of MNEs, up from 3,000 in 1990 to over 63,000 in 2003 (Gabel and Bruno, 2003). The rate of internationalization by these MNEs continues to grow. From 1998 to 2010, the top 100 MNEs’ sales from outside their home countries grew from 58% to 69% of total sales. MNEs also play an important role in the development of emerging economies - investment by the top 100 MNEs in developing economies jumped 23% from 2007-8 to 2009-10. In addition, emerging economies are also growing their own MNEs, which are rapidly expanding abroad; the largest 100 MNCs from developing economies increased their foreign assets by 11% from 2008 to 2009. Today, MNEs are playing a significant role in the global economy. A World Trade Organization report (2003), for example, revealed that almost 70% of the global trade can be attributed to the world’s top 500 MNEs.

MNEs’ increased international presence brings with it significant challenges. Internationally, MNEs must manage increased political, regulatory, and socio-economic risks. MNEs must also respond to increasingly sophisticated global customers as well as differences in regional cultures, tastes, and business practices. Such a complex and dynamic business context requires MNEs to pursue multiple, sometimes conflicting, strategic goals. The growing complexity of business demands have significantly increased MNEs’ reliance on information technology (IT) to meet their strategic goals. The IT function within MNEs has had to enable MNEs’ simultaneous pursuit of increased scale efficiency, innovation for market growth, and responsiveness to shifts in the global and local context. In order to meet these changing business demands, MNEs are increasingly recognizing the need to make changes to the way they organize their globally distributed IT resources (Sia et al. 2010; Markus et al. 2012). The crucial role of IT as the operating backbone points to the importance of innovative IT organization design as a new and distinct source of competitive advantage. Improved IT organization design will strengthen the efficiency, profitability and strategic capabilities for these MNEs.

However, there has been relatively little systematic research on innovations in the design of the IT organization (e.g., Sambamurthy & Zmud 2000). Our research agenda is thus to investigate emergent innovations in the design of the IT organization. Specifically, are there new IT organizational forms capable of addressing the increasingly sophisticated business demands of MNEs?

To address this question, we first reviewed the literature on IT organization form (Markus et al. 2012; Markus forthcoming). We noted that the emergence of the three dominant IT organization forms of centralized, decentralized, and federated IT paralleled the shifts in enterprise organization forms from U-form to M-form to Matrix form. We therefore examined the organization design literature for recent trends in organization design. Several prominent organizational researchers (e.g., Ackoff 1999; Galbraith 2009; Strikwerda & Stoelhorst 2009) argue that a new organization form – the Multidimensional (MDm) form – has emerged to enable enterprises to deal with the increased complexity of their environment. We then conducted an in-depth revelatory case of the IT organization in Siemens – a large and complex MNE – analyzing the data using the concepts from MDm.

Our study makes several contributions to the IT organization design literature. Drawing from the wider organization design literature, it introduces the Multidimensional form, as an IT organization form that is emerging in response to the business complexities faced by enterprises, particularly MNEs. Through theoretical extension and in-depth case study, we develop the main dimensions of the MDm IT organization form (IT Front, IT Back and IT Management) and the key interfaces across which coordination mechanisms must be deployed. Our analysis of the case also shows how the MDm IT organization form promotes agility in meeting changing organization demands. These concepts lay the foundation for further study of this emergent form, as well as provide guidelines for the practice of designing IT organizations for MNEs and other complex enterprises.

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1 Computed figures based on data released by the United Nations Conference on Trade and Development (UNCTAD) on Transnational Corporations (TNCs)
2 IT ORGANIZATIONAL FORMS FOR MNES

To understand the current emergent IT organizational form in MNEs, it is useful to first review the dominant IT organizational forms – centralized IT, decentralized IT, and federated IT - that have emerged in past decades. We briefly describe their key features, their strategic objectives, and their main shortcomings.

MNEs prior to 1970s tended to have a centralized IT organization form that emphasized functional specialization (e.g., systems development, systems operations, and systems management), with all IT units reporting directly to corporate IT (King 1983; Olsen and Chervany 1980). The centralized IT organizational form was optimized for achieving scale efficiencies. While the centralized IT organization form was functionally efficient, it suffered from the problem of “overload headquarters” (Williamson 1985), with central management having little time and attention to address local issues. The centralized IT organization thus lacked responsiveness and was limited in its capacity for local innovation and new market growth.

As MNEs sought greater responsiveness to local conditions, they created self-contained business units (BUs) focused on specific product-markets. The decentralized IT organization emerged, as IT activities were decentralized to the business units. Each BU’s IT unit provided dedicated IT support for operations and development (Brown and Magill 1994; Lee and Leifer 1992). The IT unit within each BU reported to the BU head. A decentralized IT structure enabled local responsiveness, and allowed tailoring of the IT resources to the specific needs of each distinctive business unit. However, while the decentralized IT organization was responsive to the growth and innovation needs of the local BU, it was limited in its ability to exploit synergies across business units, resulting in cost inefficiencies and resource duplication.

The federated IT organization emerged to balance between the strategic objectives of scale efficiency and business responsiveness. In the federated form (Brown 1999; Brown and Magill 1998; Sambamurthy and Zmud 1999), some IT functions with a greater potential for scale were provided by corporate IT (e.g., infrastructural services), and other IT functions that were more critical to business responsiveness were provided by business unit IT (e.g., application development). BU IT units usually have dual reporting lines to both BU Heads as well as to Corporate IT (e.g., to ensure compatibility between IT infrastructure and applications). However, the split in decision making and the ambiguous reporting to Corporate IT and BU IT inhibit communication and collaboration between them (Brown 1999), leading to higher costs, inefficiency, and inflexibility. This is due to incompatible technology architectures and business applications by different BUs, failure to integrate data and processes, and failure to pursue investments with highest value to the enterprise (Weill and Ross, 2004).

Agarwal and Sambamurthy (2002, p.2) have noted the inadequacies of traditional IT structures in supporting the collaboration needed between IT and the “ecosystem” of stakeholders. As MNEs face increasing complexity through operating in multiple geographies and business sectors and pursuing multiple strategies, their ecosystems of stakeholders have expanded greatly. The question is how the IT organization form is emerging to address the greater complexity faced by MNEs.

3 THE MULTIDIMENSIONAL ORGANIZATION

The three IT organizational forms described in the preceding section is parallel to the three main enterprise organizational forms that have been identified in the organizational design literature. These are the U-form, M-form, and Matrix organization (Table 1 summarizes the key features of these organizational forms). The parallel development is understandable given that studies have found that the IT organization is more effective when it is aligned with the business, and one important aspect of this alignment is structure (Chan and Reich, 2007). Therefore, it is not surprising that the IT organization form mirrors the changes in the enterprise organization form.
Table 1. Enterprise Organization Forms

We therefore looked to the organization design literature to understand the continuing shifts in enterprise organization design. The identification by the organizational design field in recent years of a fourth form - the Multidimensional organization – suggests that a similar shift in IT organization form may also be underway. Organization design researchers (e.g., Ackoff 1999; Galbraith 2009; Strikwerda and Stoelhorst 2009) have highlighted this emergence. The design of MDm organization follows the assumption of requisite variety, i.e., to match the business complexity, organizations must be capable of managing multiple business dimensions (e.g., markets/customers, products/services, functions) simultaneously.

The MDm organization is anchored in the organization design literature. In terms of differentiation, it is typically organized around multiple dimensions, often relatively stable enterprise dimensions of customer, product, and resource management. Customer dimensions are driven by front-end units that tap sales and growth opportunities and have market responsibilities. Product dimensions are driven by back-end units that offer quality products and responsive services and have product-line responsibilities. Resource dimensions are driven by traditional functional units that support and coordinate across the various units to ensure optimal resource and expertise management across the enterprise (See Figure 1.) Each unit is dedicated to its specific focus, with different managers accountable for performance on the respective dimensions.

With its differentiation into customer-centric, product-centric, and resource-centric units, greater integration is also needed in the MDm organization. Galbraith (2008) noted a continuum of lateral coordination mechanisms (from line management, matrix, integrator, formal group, e-coordination, and informal group) as a key consideration in organization design. Strikwerda and Stoelhorst (2009) also observed the importance of “running an integrated firm” in MDm organizations. Specifically, a necessary condition they noted is that performance data are recorded in an integrated system, reported over multiple dimensions, at different levels of the organization. Galbraith (2008) further stated how multidimensional IBM built on its lateral coordination mechanisms to facilitate a collective orientation in strategy reconciliation, product portfolio integration, standardized solution development, seamless solution fulfillment, and dynamic cross-unit team formation. The emphasis on "team play" in reward system and work culture is also noted by others (e.g., Strikwerda and Stoelhorst 2009).
The MDm organization has become increasingly popular among many global MNEs such as IBM, Procter & Gamble, and other companies (Galbraith 2009). Jimmy et. al. (2011) asserted that such MDm structures are commonly deployed in global IT vendor firms that seek to develop distinctive capabilities, exploit scale, and simultaneously nurture long-lasting relationships with their customers. These MNEs which embrace MDm enterprise structure are not only characterized by their multiple (related) businesses, with customers operating in multiple geographical markets, but they are also actively pursuing multiple customer-product-function strategies in a dynamic business environment.

However, the concept of the MDm organization has not yet been applied to the study of IT organizations. We therefore sought to study in-depth a complex multi-dimensional MNE, to understand the design of their IT organization.

4 METHODOLOGY

To address the question of whether new IT organizational forms are emerging to meet the increasingly sophisticated business demands of MNEs, we conducted a revelatory case study (Yin 1984) of a complex MNE. The in-depth case study enabled us to understand “how” some complex enterprises structure their IT organizations to facilitate business-IT alignment.

4.1 Case Selection and Company Background

We selected Siemens for several reasons. First, it is a very large and complex MNE, operating in multiple business sectors and many countries, that depends heavily on IT. Siemens has a large and sophisticated IT organization spread across the globe, and more importantly for this study, Siemens has been adapting the design of its IT organization in recent years in response to evolving business needs. These changes have enabled the IT function to be effective in enabling the business to achieve its goals. Finally, we were fortunate to gain access to senior IT and user managers who were involved in implementing these changes to the IT organization.

Siemens was founded more than a century ago and is one of the largest global electronics and engineering companies in the world. Through a long history of internal innovation and external acquisitions, Siemens has grown to become an industry leader in diverse technological segments. Since the mid-eighties, it has consistently expanded its operations globally, with deep local roots in
countries such as Russia, China, USA, Japan, UK, and South Africa. Today, with almost half a million employees, it operates in over 190 countries. In FY 2012, its net income was €4.45 billion, with global revenue of €78.29 billion. More than 80% of its revenue is generated outside its home country.

In terms of product and services, Siemens is grouped into 3 sectors - Industry, Energy, and Healthcare. Each sector manages a number of product divisions. The largest sector – Industry, for example, manages 6 product divisions which span a wide range of technologies. There are 16 product divisions in total, reflecting Siemens’ diversity of products and technologies. While there is significant depth of innovation in each technology, synergizing such diversity in technological innovation is recognized by senior management as a key competitive strategy. Geographically, the sales and service organizations of over 70 regional companies are also grouped into 17 clusters (e.g., Meso-America, Southern Africa, South West Europe, etc.). Each cluster manages a few countries. In addition, there are three major groups of business functions: corporate units (e.g., Finance, HR, IT), cross-sector businesses (e.g., Siemens Financial Services), cross-sector services (e.g., Global Shared Services). By harmonizing and consolidating common business functions, they provide cost-efficient, high-quality services to various business units.

The other criterion for our selection of Siemens is the effectiveness of their IT organization. IT is heavily embedded in Siemens’ business as product or technological innovation across the various divisions. Yet, with more than 6,400 employees and an annual IT budget of €2.5 billion, Siemens IT has been able to meet the demands of the large, complex, and global organization. Through the consolidation of IT platforms, it is continuously reaping the benefits of exploiting global and regional scale. IT spending is at 1.8% versus an industry average of 2.5% of the total revenue. The highly standardized IT platform not only reaps economies of scale but is also readily scalable so that if they “buy a company, (they) can have this company up and running in the SAP system within 3 months.” (Vice President, IT and MD&D Asia Pacific) Yet, the global IT organization can also cope with the diverse contexts of the business units. The senior management understands “cultural or infrastructural differences..., and will try and combine these issues and have a solution that still works for everyone, but not necessarily one solution.” (Head, IT Infrastructure, Asia Pacific) This is evident in the various customer satisfaction surveys conducted by Siemens IT. For example, in the 2009 and 2010 surveys, the average general satisfaction level of the Cluster CIOs with the Corporate IT for AAE (Asia, Australia, Middle East and Africa) was at 1.8 (1 being very high and 5 being very low satisfaction). In addition, a more coordinated IT innovation approach is also noted across its different product divisions, as noted by a senior VP at Siemens, “In the last several years, all of the Siemens business units (have adopted) the same software platform, so integration (across different products or regions) is easy!”

4.2 Data Collection

We collected information on Siemens’ business operations, the key business dimensions, and organization structure from publicly available sources of information such as annual reports, analyst reports, and news releases. Further details on business and IT structures were solicited through 9 intensive interview sessions with 6 key IT executives, each lasting at least an hour (see Table 2). The executives were selected as they were knowledgeable about the IT-customer, IT-product and IT-resource aspects of the organization. Most of the interviewees were from the regional IT headquarters located in Singapore. Interviews with executives from the other parts of the world (Germany and India) were conducted through conference calls. We first walked through the formal IT organization charts to understand the role of each unit, who the unit was accountable to, who the unit was interacting with, and the reason why the resources were grouped as such. We then asked more open-ended questions focusing on how these units were coordinated with one another, and the actual benefits and challenges of organizing IT in such a way. Where possible, these interviews were tape-recorded, transcribed, and promptly reviewed for accuracy. In addition, various internal documents (e.g., management meeting slides, management memo, user surveys) were also compiled and reviewed.
Table 2. Siemens Interviews

<table>
<thead>
<tr>
<th>Position</th>
<th># of Interviews</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector IT (IT Customer)</td>
<td>1</td>
<td>1 hour</td>
</tr>
<tr>
<td>Cluster IT (IT Customer)</td>
<td>1</td>
<td>1 hour 10 minutes</td>
</tr>
<tr>
<td>Regional CIO (IT Resource)</td>
<td>1</td>
<td>1 hour 20 minutes</td>
</tr>
<tr>
<td>IT Governance (IT Resource)</td>
<td>3</td>
<td>3 hours 30 minutes</td>
</tr>
<tr>
<td>IT Governance (IT Resource)</td>
<td>2</td>
<td>2 hours 30 minutes</td>
</tr>
<tr>
<td>Infrastructure Management Services (IT Product)</td>
<td>1</td>
<td>1 hour 15 minutes</td>
</tr>
</tbody>
</table>

4.3 Data analysis

We first ensured the accuracy of our understanding by writing a case that described the details of Siemens’ global IT organization. The case was given back to Siemens for verification, and they provided several rounds of inputs for further clarification before approving the case, thus increasing our confidence in the accuracy and completeness of the information (Golden-Biddle & Locke 1993).

The next step was to analyze the Siemens IT organization with reference to concepts from the literature on the MDm organizational form. To do this, we had to extrapolate the MDm concepts of customer, product and resource dimensions and units to the IT organization context. We termed these IT Customer, IT Product, and IT Resource units.

- **IT Customer** units were those that actively engage the different business units within the enterprise, i.e., the customers of IT organization. These units often had dedicated IT resources that facilitated the interaction with the IT customers for business-IT alignment, demand consolidation and prioritization, process optimization and product or service innovation.

- **IT Product** units were those units that offered and supplied a range of IT products, services, and solutions (e.g., provision of application and infrastructural services, application development, and implementation projects), whether the service provision was provided internally or outsourced to external vendors.

- **IT Resource** units were those units that focused on the optimal management of IT resources through strong IT leadership, strategic planning, integrated coordination, and policy frameworks, (e.g., IT finance and administration, IT procurement, IT governance, IT architecture, and IT project/program management).

Through this process, we gradually built a conceptual view of the IT organization in Siemens (see Figure 2). In contrast to the actual Siemens IT organization charts, which were unit-specific, with comprehensive operational details such as the actual appointments of heads of units, size of units, temporary vacant positions, and whose format also varied from unit to unit, this conceptual view sought to depict the broad grouping of the IT activities and resources, in a manner that is more consistent with the MDm conceptualization.

In addition, we also analyzed the data to identify the primary coordination mechanisms employed by Siemens IT to coordinate the various IT units. Following the organization design literature, we sought to identify both vertical coordination mechanisms or reporting lines (e.g., line management, matrix) and lateral formal and informal mechanisms (e.g., integrator, formal group, e-coordination, informal group, customer-orientation) (Ackoff 1999, Galbraith 2008, Strikwerda and Stoelhorst 2009). As we examined the range of coordination mechanisms identified, we found that they could be mapped to three key interfaces: between IT Front and businesses, between IT Back and suppliers, and among IT Front, IT Back, and IT Management.

5 Siemens IT as a Multidimensional IT Organization

Below, we describe Siemens’ IT multidimensional organizational structure (its Customer, Product and Resource units) and the coordination strategies used to integrate across units.

5.1 Multidimensionality: IT Customer, IT Product and IT Resource

Our analysis found a large number of IT Customer units that mirrored the diversity of Siemens business units. We also found several large, consolidated IT Product units, with an increasing move
towards the market for provision of IT services. Finally, we found increasingly professionalized IT Resource units that oversaw the coordination among the various IT units. Figure 2 provides an overview of the Siemens IT organization, which we present in more detail in the paragraphs that follow.

**Figure 2. The MDm IT Organization in Siemens**

5.1.1 **IT Customer Units**

In line with the customer-centricity of multidimensional organization, there were many IT Customer units that had been established to engage more closely with the business units. The structure of these units closely mirrored the business structure in Siemens. Often, these units were small in size, except for major geographical markets, key product lines, or primary business functions. The IT Customer units of Siemens serve three categories of IT customers, i.e., the regional clusters, business sectors, and corporate functions. These IT Customer units did not provide IT services, but focused on developing deep understanding of their "customers" and ensuring responsive IT services.

- **Cluster IT**: The IT requirements for the different regional markets were served through a Cluster IT structure. There were 17 Cluster ITs providing support to the over 70 regional companies distributed globally. Compared to the regional grouping by continent (e.g., Americas, Europe, Asia Pacific), the Cluster IT structure offered a more granular approach to meeting the needs of the different geographical markets. Each cluster IT unit was to be the “trusted business partner” of the respective cluster management. The ASEAN IT Cluster, for example, covered 11 countries. 6 of the 11 countries (i.e., Malaysia, Thailand, Singapore, Indonesia, Philippine, and Vietnam) had their own Country IT Heads. While the Country IT Heads were responsible for the local IT needs in their specific countries, as often as possible the IT requirements were consolidated at the cluster level.

- **Sector IT**: Similarly, each business sector (i.e., Industry, Energy, and Healthcare) had a corresponding Sector IT, which were responsible for developing sector-wide IT standards and architecture and managing strategic IT projects for the respective sector. There were 3 Sector ITs covering the three major business sectors for Siemens. Each sector in turn took charge of a few product divisions. Below the Sector ITs were the Division ITs whose roles were to handle all the divisional level IT requirements and ensure responsive IT service delivery for the respective divisions. Energy Sector IT, for example, had 6 Division ITs. With an employee size of 850, its IT
resources were distributed in approximately 35 locations worldwide where the energy business was active. These IT units handled the sectors’ IT requirements, ensuring that generic IT needs (e.g., IT infrastructure and common applications) were adequately provided for through Cluster ITs, and specific IT requirements were catered to as they coordinated with the IT Product units. For example, in the Energy Sector, these specific applications included specialized IT applications to support its field service engineers in maintaining power plant installations, the unique reporting customizations needed for air pollution control in compliance with environmental regulation.

- **Function IT**: Finally, the IT needs of the corporate units (i.e., corporate functions, cross-sector businesses/services) were catered to through the Corporate Automation unit under the Corporate IT. IT executives in this unit actively engaged the various groups of corporate functions (e.g., accounting & finance, human resource, IT, procurement & logistics) to ensure the needs of various business functions were met. Often, these were global or regional applications, e.g., mission-critical SAP applications for accounting and finance.

### 5.1.2 IT Product Units

At the same time, Siemens’ IT Product units ensured adequate IT service offerings and delivery. These units were typically fewer but larger, often with their operations standardized and consolidated to achieve greater economies of scale. The provision of these IT services was supplied through a mix of in-house system delivery and external sourcing to exploit market opportunities.

Specifically, the IT Product units of Siemens were organized around IT services, categorized into catalogues of infrastructural services (e.g., data center, network, desktop support), applications services (e.g., SAP, Nexus), and application development projects. The IT Product units had evolved from in-house system provision in its early days to a more professional IT shared service organization set up under Group Shared Services (GSS), an entity under the Cross-Sector Services in Siemens. GSS IT offered a range of IT services with different levels of quality assurance. It rationalized and pooled the IT resources enterprise-wide, provided greater cost transparency, and facilitated the buildup of a strong customer-service culture in Siemens IT.

> “Siemens is one of the (few) companies that implemented SAP on a global scale – we are talking about 2,000 odd sites worldwide. For a conglomerate engineering group like Siemens, I consider that as a very high level of standardization.” (Head of IT Infrastructure, Asia Pacific)

At one point, GSS IT was managing seven application management centers (AMCs) and three infrastructure management centers (IMCs) globally, some through its own shared service operation, others outsourced to Siemens IT Solutions and Services (SIS), an IT consulting entity established under Cross-Sector Businesses of Siemens (which provide total product and IT solutions to Siemens’ external customers). However, further restructuring resulted in the dissolution of GSS IT in July 2010. Its IT service delivery portion was parceled out completely to SIS for greater economies of scale and deeper technical competency. In absorbing the IT service delivery portion of GSS IT, SIS grew larger and was eventually spun off as a separate legal entity. With a presence in over 40 countries and annual revenue of about €5 billion, SIS joined other external vendors, e.g., Orange and T-Systems, in bidding competitively for Siemens projects. More recently, SIS entered into a strategic partnership with ATOS, an established Europe-based IT consultancy firm. The evolution of Siemens’ IT Product units thus revealed the different possibilities in structuring the IT service provision: either as centralized in-house system provision, as internal shared services, or outsourced to a separate but related entity and other external IT vendors. The primary focus was to standardize, rationalize, and consolidate to derive greater and greater economies of scale.

### 5.1.3 IT Resource Units

Besides the IT Customer and IT Product units, there were other IT units in Siemens that focus on the management of IT resources. To align the enterprise visions, they performed IT management functions such as planning, funding, staffing, sourcing, and controlling. However, unlike traditional IT management functions, these units carried a much stronger enterprise orientation and exhibited a
higher degree of professionalism. There were four such IT Resource units in Siemens IT, i.e., Governance, Business Administration, Procurement and Contract Execution, and Business Relations.

The **Governance** unit drove the strategic IT planning and enterprise IT architecture development processes for Siemens. It was responsible for the development, execution, and enforcement of IT governance (e.g., infrastructure, IT security standards) and business process governance (e.g., customer relationship management, supply chain management, product lifecycle management). These standards were deployed enterprise-wide to ensure enterprise-wide consistency and coherence and were applicable even to the sourcing contracts with SIS and other vendors. Deviations from such standards were brought to the Governance unit for deliberation and resolution.

The **Business Administration** unit operated closely with all IT units to provide accounting, controlling, and administrative support functions (e.g., costing and billing of IT services, user survey administration, compilation and reporting of IT performance score board). For example, IT financial KPIs were tracked globally by sectors and divisions, and by regions, clusters, and countries. Customer satisfaction surveys were also conducted with different business stakeholders (i.e., Sectors, Clusters, Functions) at regular intervals. Such feedback helped Corporate IT to review its resource allocation and business value contributions.

In addition, two units in IT Resource were dedicated to facilitate interactions among the IT units. The **Procurement and Contract Execution** unit dealt largely with the IT Back units. Driving the overall IT sourcing strategies and framework in Siemens, it played an active role in sourcing for vendors and facilitating negotiation of service level agreements. The **Business Relations** unit, on the other hand, dealt primarily with the IT Front units, in enabling interaction among Corporate IT, Sector ITs, and the Cluster ITs. One of its responsibilities was to consolidate the IT requirements from the respective Sector ITs and Cluster ITs in the region, and ensured adequate IT service delivery to meet their requirements. Both the Procurement and Contract Execution and Business Relations units managed about 400 service managers. Service managers in the Procurement and Contract Execution unit oversaw the delivery of IT infrastructure services while those in the Business Relations units oversaw the delivery of IT application services. These service managers tracked the IT service levels in accordance with service level agreements. They played an important role in brokering between the IT service requests from Sectors, Clusters and Corporate Functions, and the IT services delivered by SIS and other vendors. Where the volume justifies, these service managers were also co-located in specific clusters to ensure smooth service delivery. While about 70-80% of the IT services in Siemens were provided by SIS and other vendors, there were still services that were provided locally through pockets of service delivery functions within some Cluster ITs.

Thus, in line with the MDm organization concept, we saw the strong multidimensionality that had been designed into the Siemens IT organization, spanning IT Customer units (i.e., Sector ITs, Cluster ITs, Function ITs), IT Product units (i.e., IT infrastructure services, IT application services, IT application development services, and services offered by various vendors), and IT Resource units (i.e., Governance, Business Administration, Procurement and Contract Execution, and Business Relations). Each type of unit had dedicated resources to drive their agenda.

### 5.2 Coordination in the Siemens IT Organization

While the multidimensional differentiation in Siemens IT enabled stronger focus, it also created increased interdependencies across new interfaces. As asserted below, the coordination challenges were significant.

“We have many stakeholders in Siemens. I remember we have one discussion and we have 30 to 40 stakeholders in this ASEAN Cluster IT with head of this sector, head of this unit, cluster heads, cluster CFOs, local CFOs, CEOs....” (Vice President – IT, MD&D Asia Pacific)

“Who would talk to whom in this gigantic global matrix? One of the biggest challenges is to develop and establish a network of knowledge and relationship that all people would understand how the mechanisms run.” “It is important for
us to understand the bureaucracy in this complexity. It is important to see who the right person is and have the right person doing it, so that other people are filtered away from all these discussions. ... We have to feed this clarity into everyone’s mind.” (Vice President and CIO Asia, Australia, Middle East and Africa)

Where there was a conflict, each type of unit had an escalation pathway to carry its cause right up to the highest management level in the organization, i.e., the Siemens Managing Board. The Sector CIOs reported to Sector CEOs (through Sector CFOs) who sat on the Board. The Clusters CIOs, similarly, reported through Cluster CFOs and CEOs, to Regional Presidents who also sat on the Board. The views of corporate functions (including corporate IT) were also represented by various members in the Board. The distinct upward hierarchical lines thus significantly raised the visibility of all major business dimensions (i.e., customer, product, and resource) in strategic IT decision-making. The tension of multidimensionality was maintained all the way up to the most strategic level in Siemens.

However, it was also clear that whatever could be coordinated and resolved at a lower level should be encouraged, so as to minimize overload on top management. Over time, Siemens had developed an efficient approach in tackling these coordination challenges through selective structuring of reporting lines, and greater reliance on more flexible lateral coordination mechanisms. The aim was to “to make Siemens less complex” (Siemens CEO).

The first set of coordination mechanisms was in relation to the many IT Customer units that were dispersed geographically. A systematic vertical structure had been put in place within the IT Customer units to ensure close business-IT alignment. The 16 Division ITs reported to the 3 Sector ITs, which in turn reported to the respective Sector businesses. Similarly, Country ITs reported to the 17 Cluster ITs, which also reported to the respective Cluster businesses. Although Function ITs reported to Corporate IT (given the maturity of corporate functions and the responsibility of process governance by Corporate IT), they served the corporate functions with a strong client-service orientation. In addition, there were lateral mechanisms that complemented the vertical reporting lines to ensure close business-IT alignment. An integrated enterprise-wide strategic IT planning process, for instance, channeled all the IT demands from various parts of the Siemens business for resource prioritization decisions. Another example is the emergence of a guiding principle from deliberation about conflicts in the utilization of IT budget was that generic IT requirements arising from Sector IT or Function IT that could be provided by Cluster IT would first be addressed by Cluster IT budget. There were also formal roles, i.e., the Sector Cluster Leads in the Sector ITs and Demand Managers in the Cluster ITs who actively managed the tensions of IT requests from both the sector and cluster businesses, and worked towards supporting IT-enabled innovation for major sectors and clusters.

“...If you want something to be done in Siemens with its half a million employees, you have to find a channel of communication that is relatively simple. ...hence to talk at a cluster level, i.e., to each and every of the 17 clusters ..., we put the demand managers (for the sectors) on the left hand side of the cluster structure.” (Vice President and CIO Asia, Australia, Middle East and Africa)

The second set of coordination mechanisms was related to the IT Product units in managing their relationships with the IT suppliers and among the various IT Product units (e.g., among IT infrastructure, applications, application development). Interaction with SIS and other external IT vendors was guided by contractual or service level agreements that were developed in line with the procurement policies, IT governance mechanisms, and vendor management framework established by IT Resource units. Some board members of Siemens also sat on the board of directors for SIS. Vendor managers were also involved in various IT forums at both the operational and strategic levels.

Finally, there was also a set of mechanisms to promote coordination among IT Customer, IT Resource and IT Product units. The CIO Board, comprising the Corporate CIO and the three Sector CIOs, served as a critical forum for deliberating all strategic IT issues. It was supplemented by a large CIO council (comprising key executives from major IT units) and various ad-hoc task force teams that would focus on specific IT management issues that required dedicated attention. Typically, these task force teams would function for less than 10 weeks.
“(Referring to the task force teams) You have a project organization. You have a kick off, you have a clear charter and you have an end date. It is more a project approach versus a standing council or workgroup approach…. This is very powerful, because we can launch things quickly, overnight even, and put our best experts together and see how the result would come.” (Energy Head of IT Strategy and Governance)

There were also other customized coordination mechanisms depending on the type of IT units. For example, the respective IT Customer units (i.e., Sector ITs, Cluster ITs, and Function ITs) were integrated differently. Given Siemens’ strategic emphasis on Sector businesses, the Sector ITs reported only to Sector businesses and were integrated to Corporate IT via the CIO Board as a formal lateral mechanism. The Cluster ITs had dual reporting lines to both Cluster Businesses and Corporate IT. The Function ITs reported directly to Corporate IT (through a Corporate Automation unit under Corporate IT) but served the corporate functions with a strong client-service orientation.

In addition, many of the Siemens IT executives wore multiple hats in their job portfolio. For example, the Renewable Energy Division Head in the Energy Sector IT is also the IT Sector Cluster Lead for Africa, ASEAN and Japan. Similarly, the Cluster CIO for ASEAN is also the demand manager for the Healthcare Sector in the ASEAN Cluster. This “multi-hatting” strategy allows for an effective but lean way of coordinating and integrating across the various IT units. In general, there was a strong sense of identification and commitment to Siemens as an enterprise. Synergizing across diversity was a core value actively fostered by senior management.

6 DISCUSSION AND CONCLUSION

6.1 MDm IT as A More Sophisticated IT Organization Form

Through the case example of Siemens IT as an MDm IT organization, we thus see the possibility of a more sophisticated IT organization design in complex MNEs. The findings suggest an innovative organization form that is more highly differentiated along the key dimensions of IT customers, IT products, and IT resources. The mirroring of IT Customer units with the business structure allows a wider dispersal of “sensors” in various parts of the organization, and hence facilitates greater engagement with customers for higher IT responsiveness. On the other hand, the consolidation of IT delivery into dedicated IT Product units that offer a range of IT products and services enables the continuous improvement of IT service quality at greater cost efficiency. Often, such IT Product units operate in the form of professional IT shared services or outsourced IT service delivery. Yet, each of these units can still operate smoothly as a whole, facilitated by specialized IT Resource units that carry a stronger enterprise orientation and more professional expertise in optimizing enterprise IT resources.

Moreover, the MDm IT organization is also more sophisticated in availing a richer set of integration mechanisms comprising both vertical structure and lateral coordination mechanisms. Following the multi-dimensional differentiation, different integration mechanisms are applied along different interfaces (i.e., between Business and IT Customer units, between IT Product units and suppliers, and among IT Customer IT Resource, and IT Product units). Moreover, such integration mechanisms can be applied more granularly such that they can cater to different business priorities (e.g., the varying reporting lines of the IT Customer units in Siemens – direct to business units, dual reporting, direct to corporate IT).

The MDm org form suggests a different way of organizing IT in MNEs. MDm IT is different from decentralized IT. While the differentiated IT units are focused and have dedicated resources, the enterprise orientation remains strong as all IT units have a reporting line or connection back to the Corporate IT. They still operate with one coordinated perspective. MDm IT is also different from centralized IT as it is broken into multiple units, physically separated and logically differentiated, that each unit has its dedicated resources and focus to drive its agenda. Such embedded multidimensionality has the sophistication of catering to the diverse demands from business units, rather than a bureaucratic or less responsive centralized IT. Likewise, MDm IT is also different from a federated IT structure where application management is typically decentralized and infrastructure
management is centralized. MDm IT adopts a more sophisticated, more granular approach to organizing IT that is simultaneously IT customer-, IT product-, and IT resource-centric (not just splitting by application and infrastructure management as in the case of federated IT). In addition, MDm IT simultaneously imposes a stronger enterprise orientation, unlike Federated IT where decision domain are compartmentalized such that application-related decisions are made by business units while infrastructure-related decisions are made by corporate IT.

6.2 MDm IT as A Basis for Modular Organizing

In addition, the MDm IT organization is also inherently different from centralized IT, decentralized IT, and federated IT as it is organized for flexibility. The enhanced modularity from its differentiated or componentized design into IT Customer, IT Product, and IT Resource units provides a more robust platform to deal with business dynamism. For example, until recently, IT resource allocation in Siemens was steered largely towards meeting the needs of Cluster ITs. The growth of the geographical markets had lent the regional clusters a strong voice. With the increasing recognition that Sector businesses would drive future growth, the managing board felt the Sectors “should have the global mandate”. The strategic shift in emphasis was simply executed through a change in the composition of the CIO Board (which now comprised 3 Sector CIOs, with the Corporate CIO) and the new “Sector right of way” principle. The strategic change was effected swiftly because the embedded structures for Sector ITs did not need to be established from scratch, as they were already in place. The same strategic orientation could be seen for the various restructuring initiatives Siemens had over the years, e.g., in consolidating their clusters from more than 20 to the current 17, in parceling out the IT back-end from GSS IT to SIS, in the strategic partnership between SIS and ATOS. Such strategic transformations were “swift” (Vice President and CIO Asia, Australia, Middle East and Africa), with minimal service disruption and relatively little impact outside those restructured units. The embedding of customer, product, and resource dimensions as organizing options “in advance” thus enables MDm organizations to withstand or cope with environmental changes. Shifts in organizational strategies or priorities in response to market dynamism can be readily managed by rebalancing the emphasis in the portfolio of dimensions without the need for the otherwise slow and cumbersome structural change.

Furthermore, seeing MDm IT as a “modularized” organization offers a powerful perspective for the design of the IT organization in MNEs. It is possible to mix and match components of the MDm organization to create a specific profile for less complex MNEs. Guillemette and Pare (2012), for example, suggest several types of IT organization focus (e.g., business partner, innovation leader, systems provider, project coordinator, and architecture builder). Their descriptions suggest that some archetypes will have more elaborate IT Customer units (e.g., business partner), while others will have more differentiated IT Product units (e.g., system provider) or IT Resource units (e.g., project coordinator). In the same way, the rich repertoire of lateral coordination mechanisms can also be applied in varying degrees to coordinate across different interfaces. Hence, the MDm IT organization can provide a holistic design framework that is tailor able, depending on the business complexity of a specific MNE.

Future research is necessary in at least two directions, first, to better synthesize (or distinguish) the conceptualization of MDm organization with other emerging organizational forms, and second, to examine how contemporary developments in IT organizations can (or cannot) be explained from the MDm organization perspective. Making sense of these developments will not only help us advance theoretically in analyzing complex IT organizations, but also pragmatically in designing effective IT organizations that are capable of meeting diverse business demands of MNEs. This study is a first step towards achieving this objective.
References


Multinational companies tend to have more diverse workforces. As the world has become more globalized, more Americans work for multinational organizations. But a multinational company provides access to jobs around the world, in many cases. A marketing professional may have the opportunity to transfer to positions in Europe, Asia or other locations where the company has offices. Certain jobs are also available in an MNE that don't exist in domestic companies. Organizational culture includes the shared norms and values in a company that impact the overall morale of the workforce. While global companies can certainly have a positive culture, building shared values becomes much more challenging with a workforce spread across multiple countries. As many multinational enterprises (MNEs) grow their presence globally, they have been supported by distributed IT resources that are organized either as centralized IT, decentralized IT, or federated IT. However, drawing from our understanding of the development of organization form in the organization design literature, we examine the applicability of a contemporary organization form, i.e., the multidimensional organization (Ackoff 1999; Galbraith 2009; Strikwerda & Stoelhorst 2009) to the organizing of IT function in MNEs.