Standardization of Information Systems and Technology at Multinational Companies

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The purpose of this research is to explore how international companies adopt and enforce standards in information systems and technology. Standardization of hardware, software, and data is often perceived to be beneficial for an organization. However, for multinational companies, differences among nations in language and culture, law and regulation, and business practices and climate, among other factors, combine to thwart standardization efforts. This research examines the problems that a number of multinational companies have faced and the solutions they have pursued in attempting to standardize their systems. The lessons learned from these case studies offer a prescription for improving the standardization process.

The absence of hardware, software, and data standards is widely recognized as a major impediment to the development of global information systems (Alavi & Young, 1992; Barr et al., 1988; Palframan, 1991). The trade and academic literature has focused on standards that governments, vendors, and industry groups are struggling to adopt. By contrast, little research has addressed a related problem: even if such groups could agree on a consistent set of hardware and software standards worldwide, the absence of intra-organizational standards at many companies would continue to impede their ability to exchange and integrate data among their various, semi-autonomous information systems (Ives & Jarvenpaa, 1991; Karimi & Konsynski, 1991; McQuillan, 1989).

At many multinational companies, the absence of intra-organizational standards derives in part from the independent evolution of systems developed by subsidiaries in different countries at a time when the benefits of global integration were underappreciated and when global systems were technically difficult to implement (Roche, 1992). Recently, managers have increasingly recognized that global information systems are necessary to support global strategies (Alavi & Young, 1992; Deans & Kane, 1992; Keen, 1992). Concurrently, technical hurdles to global integration have decreased (Kanter & Kesner, 1992). Nevertheless, many companies find that their subsidiaries in different countries continue to use different software packages and to operate them on different and incompatible platforms (Roche, 1992).

While divisionalized domestic corporations share a similar history of software and hardware incompatibility, domestic companies are driven to standardize primarily by business needs and economics, moderated perhaps by organizational considerations. The decision for multinational companies (MNCs) is likely to be more complicated because of differences among countries in a variety of factors including language and culture, regulation and law, and business practices and environment (Deans & Ricks, 1991). The purpose of this paper is to explore how global companies have addressed the standardization problem and to learn from their suc-
cesses and failures what pitfalls to avoid and what approaches to pursue.

For purposes of this paper, an “organizational standard” (hereafter referred to as a “standard”) is defined as a set of rules or policies governing the characteristics of data, software, and/or hardware that an organization may purchase, develop, or maintain. This concept differs from that of an “industry standard,” a set of rules adopted by a majority or large plurality of software and hardware vendors in a particular industry governing the characteristics of the products that they sell. Following Irwin (1991), we also distinguish between organizational standards and policies. Policies are rules relating to the management, rather than characteristics, of software and/or hardware. For example, the requirement that a license be obtained for all software purchased from third parties is a policy, whereas the requirement that all software purchased from third parties run under the UNIX operating system is a standard.

This paper is organized as follows. First, it describes the background for this research and outlines a normative model to motivate and support the research direction. Next, it addresses the methodology and presents the collected data. It then discusses the findings and suggests some approaches for improving the standardization process. Finally, it draws conclusions and presents some hypotheses for further study.

Background and Motivation

Extensive academic research and practitioner evidence indicates that companies operating in multiple countries face a variety of issues and constraints in the management of information technologies that companies operating solely in the domestic arena do not experience (see, for example, Carlyle, 1988; Deans & Kane, 1992; Freedman, 1985; Ives & Jarvenpaa, 1991; Keen, 1987; Reck, 1989; Roche, 1992; Sauter, 1992; Selig, 1982; and Tricker, 1988). Logically, then, companies seeking to impose and enforce standards across countries would face a different set of issues and constraints than those attempting to impose and enforce standards in a domestic organization. The objective of this research is to identify a set of factors that affect the standardization process and to propose a normative model that would enable practitioners to better understand and overcome the problems and constraints posed by the international environment in which they operate.

This research lies within the overall context of a standardization problem that extends beyond MNCs. When embarking on a standardization effort, most companies will attempt to answer three questions: 1) What benefits and costs should be anticipated? 2) What systems and technologies should be subject to standardization? and 3) What factors determine the overall success of a standardization effort? This paper briefly addresses these questions in the next two sections. It then elaborates on the reasons we should expect standardization at international firms to differ from standardization at domestic companies.

Benefits And Drawbacks Of Standardization

Although the information systems community often perceives standards to be beneficial (Kelly, 1991; Palframan, 1991), implementing and enforcing standards can create a variety of problems. Table 1 lists some of the benefits and drawbacks that have been identified.

<table>
<thead>
<tr>
<th>BENEFITS</th>
<th>DRAWBACKS</th>
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<tr>
<td>• Minimizes duplication of software development</td>
<td>• Reduces flexibility in applications</td>
</tr>
<tr>
<td>• Increases the quality of developed software</td>
<td>• Stifles innovation and creativity</td>
</tr>
<tr>
<td>• Increases integration of systems for improved efficiency</td>
<td>• Interferes with other requirements of applications</td>
</tr>
<tr>
<td>• Increases ability to exchange data among systems</td>
<td>• Reduces ability to go with lowest cost solution in each case</td>
</tr>
<tr>
<td>• Achieves economies of scale in purchasing and maintenance</td>
<td>• Consumes political good will</td>
</tr>
<tr>
<td>• Improves negotiating position for better pricing</td>
<td>• Increases frequency of revision and upgrade installation</td>
</tr>
<tr>
<td>• Promotes and facilitates coherent mission and strategy</td>
<td>• Decreases user comfort about opportunities to meet their direct needs</td>
</tr>
<tr>
<td>• Reduces applications development time and cost</td>
<td>• Increases impact of any major changes</td>
</tr>
<tr>
<td>• Reduces outside projects with run-away costs</td>
<td>• Decreases ability to make major changes</td>
</tr>
<tr>
<td>• Increases flexibility in use of IS personnel</td>
<td>• Requires more review and consensus for software/hardware selection</td>
</tr>
<tr>
<td>• Reduces the cost and increases the quality of support</td>
<td>• Increases impact of poor decisions</td>
</tr>
<tr>
<td>• Reduces training costs and time</td>
<td>• Increases costs of purchasing due to reduced supplier options</td>
</tr>
<tr>
<td>• Lifts burden of product research from the user</td>
<td>• Impedes the acquisition of new technology</td>
</tr>
<tr>
<td>• Reduces number of specially-built interfaces</td>
<td></td>
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</table>
Most benefits of standardization shown in Table 1 relate to reducing the cost of developing, purchasing, and maintaining the information infrastructure, including hardware, software, and staff. However, standards are often two-edged swords: they provide cost relief when done well and within a receptive environment, but increase costs when done poorly or within an adverse environment. For example, cost savings can be expected when economies of scale in purchasing are obtained or when standards improve purchasing power by creating larger purchases of fewer items. However, costs might increase if users who are forced to purchase the standard would have been equally satisfied by purchasing less expensive items.

Other benefits shown in Table 1 are managerial: standards increase management’s ability to obtain information, set policy, and control operations. These benefits are offset to some degree by the loss of flexibility and entrepreneurship among those who must submit to the standard.

Although the benefits listed in Table 1 apply equally in domestic and international settings, many of the drawbacks tend to be more prevalent in an international environment. For example, the loss of flexibility due to the imposition of standards affects international companies more than domestic companies because standard packages cannot easily address cultural and operational differences among foreign subsidiaries. Also, the loss of a company’s ability to select the lowest cost solution for every case costs MNCs more because their subsidiaries are more likely to be forced by law to use local vendors and products or to pay duties on imported software. Similarly, political goodwill may be more tenuous across political boundaries so that the likelihood of losing this goodwill when imposing standards may increase in an international setting.

**Types of Standardization**

After determining that their systems and technologies need to be rationalized, companies must still decide how far to take the standardization process. Table 2 identifies some key systems and technologies that are amenable to standardization (Henderson, 1987). Standardization can be implemented in selected domains or across the entire spectrum of information systems and technologies. No prior research exists to indicate that global companies differ from domestic companies in deciding what to standardize or in what order to standardize.

**Factors In The Success Of Standardization**

Three key factors — international strategy, organizational structure, and standardization practices — interact to affect the success of a program to establish information systems and technology standards, as shown in Figure 1. International strategy and organizational structure play major roles (Alavi & Young, 1992; Karimi & Konsynski, 1991; Reck, 1989) both directly and through their effect on information needs and flows. In addition, processes used to develop and implement standards likely will affect the success of a standardization effort, although little prior research supports this hypothesis.
Bartlett and Ghoshal’s (1989) model of business strategies, which distinguishes among multinational, global, international and transnational strategies, is useful for explaining the differences among companies in their need for standards (Alavi & Young, 1992). Multinational corporations (hereafter referred to as B&G multis to distinguish them from the more common definition, used in the title of this paper, of a company whose operations span the globe) are those that have built or acquired a portfolio of national companies which they operate and manage with sensitivity to their local environments. The subsidiaries operate autonomously, often in different business areas. The B&G multis have little need to share data or applications, and therefore have little to gain from standardization.

Global corporations are those that have rationalized their international operations to achieve greater efficiencies through central control. Their strategy and marketing are based on the concept of a “global market.” A headquarters organization makes major decisions. Standardization fits well with this internationalization strategy and should be relatively easy to achieve because of the autonomous control of headquarters.

International corporations are those whose strategy calls for exporting the expertise and knowledge of a parent company to subsidiaries that operate more autonomously than in global corporations. It is reasonable to assume that standardization might be successful in such international companies because standards enable the business units to leverage the research and knowledge of the parent company. However, the lack of parental control over subsidiaries means that the parent unit will need to work harder to convince subsidiaries that standards are appropriate for them.

Transnational companies are those that incorporate and integrate the B&G multi, global, and international strategies. By linking local operations to one another and to headquarters, transnational companies attempt to retain the flexibility to respond to local needs and opportunities while achieving global integration. Since transnationals operate on the premise of teamwork, standardization fits well with the corporate strategy. However, business units will need to be convinced that the benefit of playing with the team outweighs the loss of their individual control.

Structure also influences the information systems of MNCs. Many studies have established that organizational structure materially affects the success of strategy implementation at MNCs (Egelhoff, 1988; Galbraith & Nathanson, 1978; Stopford & Wells, 1972; Chandler, 1962). Egelhoff (1982, 1991), Levinson (1992), Cummings and Guynes (1992), and Roche (1992) conclude that organizational structure affects the information processing needs and activities of the organization as well as the structure and infrastructure of information resources management. For example, Levinson (1992, p. 4) finds, tentatively, that where subsidiaries in an organization share power unequally, “the dominant participating organization sets the standards and contains the amount of participation in shared interorganizational information systems.” Cummings and Guynes (1992) find that the structure of an organization (functional, product, geographical) affects the information flows and the degree of centralization of different types of information and information resources. Egelhoff (1991, p. 364), addressing the impact of international strategy through changes in structure, states that “there will be a much greater need for design rules at all levels of the organization” as a result of transnationalism.

Recent evidence suggests that a company’s process for developing and implementing standards affects the success of the standardization effort. For example, Levinson (1992) indicates that CIOs and their staff can affect standards. In particular, Levinson suggests the use of third-party providers and high-level, cross-organizational steering committees as ways to meet the challenge of developing and implementing standards.

Problems Unique to MNCs

Multinational companies of all types face a variety of hurdles to standardization that do not exist for their domestic counterparts. A common hurdle is that software vendors often do not support all languages that a company may desire. As a result, the company may need to certify different sets of software products as standards for different subsidiaries, or may need to select a standard that is inferior on other objectives. Language may also affect the setting of hardware standards, particularly for companies requiring applications in languages with large character sets, such as Chinese, Korean, or Japanese (O’Rorke, 1991).

Another problem is that vendor presence and support for desired products may not be available at all locations. Although this problem can exist for domestic companies as well, the difficulties of remote support are more complex when language, culture, and distance come into play. Furthermore, some countries prefer and others require subsidiary companies to purchase hardware and software from local vendors (McFarlan, 1992; Deans, et al., 1991), making standardization all but impossible.
Differences in laws, regulations, accounting practices, reporting requirements, and other regional or national characteristics may demand that software be customized to each country (Bruce, 1988). Some vendors have attempted to ameliorate this problem by broadening their applications. For example, Pan-European accounting systems are becoming widely available. However, users must pay for the complexity of such software, and updates can be frequent and complex. Even hardware is not immune to the differences among countries. Extremes in temperature or humidity may require special equipment for field personnel and offices. The absence of high-quality telephone lines may dictate the use of non-standard telecommunications hardware and software at remote locations.

The business climate and business practices among many third-world and South American countries may invalidate strategies implicit in domestically-developed inventory control, financial control, and ordering practices. The optimal operation in one country may be decidedly sub-optimal in another (Ives & Jarvenpaa, 1991; Keen et al., 1982).

Methodology and Findings

The present study was intended to propose rather than validate theory. The study used a qualitative case study approach. The methodology involved four steps: 1) analysis of the approaches of several multinational companies to their implementation of standards; 2) identification of those companies that had difficulty implementing standards due to international factors; 3) classification of the causes of such problems; and 4) identification of the solution processes that were most and least effective.

The companies for this study were selected based on their size, their international presence, and the author’s access to their CIOs. B&G multis were not considered to be candidates for inclusion since they have no reason to standardize. Selected CIOs were asked for contacts who could relate “war stories” about international standardization efforts within their companies. If a CIO expressed the belief that his or her organization had no difficulty imposing standards or no desire to impose standards, further discussion was held to determine the reasons for such a conclusion.

A total of eight interviews were held in six organizations. The results of these interviews are presented in Table 3. All six companies verified that they desired some degree of standardization and that they had attempted or succeeded in standardizing at least some of their systems or development. The next two sections relate, in some detail, tales of standardization difficulty at companies one and two. These examples are representative of the stories told to the author. The subsequent section provides additional information about companies three through six.

Minicase Number 1

Company number one is a major United States-based oil and gas company. The company operates as a transnational; some subsidiaries, primarily those involved in exploration, extraction, and refining, operate under tight control of headquarters, while others, primarily those involved in marketing and sales, are organized geographically and operate as separate entities. The company acquired the Japanese subsidiary many years ago. The subsidiary has regional sales and marketing responsibilities, some secondary manufacturing (refining) responsibilities, and carries the same product lines as its parent. The IS group at the subsidiary reports to management at the subsidiary, but has dotted-line responsibility to the IS group at headquarters.

This case describes a problem faced by the parent and its Japanese subsidiary when the parent adopted standards for expert systems development tools. The parent company, which maintains a large list of standard IS/IT products and services, did not have an expert system standard at the time that the subsidiary developed its first two expert systems applications. After a lengthy review process, the subsidiary selected for its expert systems development a rule-based package operating on a PC platform. The PC platform was important to the subsidiary because its end-user applications were PC based. The parent approved the subsidiary’s choice on an experimental basis.

About a year later, the parent, after a lengthy study of its own, decided to standardize on a different product for expert systems development, one that was object-oriented and that operated on both mainframe and PC platforms. A United States-based member of the worldwide international division to which the subsidiary reported represented the subsidiary in this standardization decision. The subsidiary was not directly involved in the analysis of alternatives or in the decision making.

When asked to comment on the parent’s choice, the subsidiary identified several potential problems. First, although the selected software was available in Kanji or English on the mainframe, it was only available in English on the PC. Also, the vendor had no existing Kanji installations, even on mainframes. The vendor
had a limited presence in Japan and expressed no interest in eventually producing a Kanji version for the PC. Finally, existing software could not easily be transferred because of the difference between the traditional and object-oriented environments of the development product. Despite these identified problems, the parent persisted in selecting the object-oriented expert system shell as the standard.

The subsidiary had three options in dealing with the standard. First, it could develop its expert system using only the object-oriented shell even if local (Japanese) use of the system would be compromised. Second, it could develop the expert system using only the rule-based shell, even if the interface with its parent’s worldwide expert system would be compromised. Third, it could develop its expert system in both shells despite the cost of cross-development and the possibility of inconsistencies in the final products.

### Table 3: Summary of Case Study Interviews

<table>
<thead>
<tr>
<th>Company Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title(s) of People Interviewed</td>
<td>Mktg. Systems Section Manager, at subsidiary</td>
<td>Asst. Director, Intl. Systems, MIS Director, Systems Planning and Resources</td>
<td>CIO Manager, Intl. Systems</td>
</tr>
<tr>
<td>Major Business(es)</td>
<td>Oil and Gas Extraction</td>
<td>Cutlery, Handtools and Hardware</td>
<td>Computer and Office Equipment</td>
</tr>
<tr>
<td>Global Strategy</td>
<td>Transnational</td>
<td>International</td>
<td>Global</td>
</tr>
<tr>
<td>Organization Structure</td>
<td>Matrix (Function/Geog.)</td>
<td>Matrix (Product/Geog.)</td>
<td>Function</td>
</tr>
<tr>
<td>MIS Structure</td>
<td>Decentralized</td>
<td>Distributed</td>
<td>Distributed</td>
</tr>
<tr>
<td>Standardization Success?</td>
<td>Partial</td>
<td>Partial</td>
<td>Yes</td>
</tr>
<tr>
<td>Reasons:</td>
<td>Language</td>
<td>Business Environment Culture</td>
<td>Culture HQ Control</td>
</tr>
</tbody>
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<tr>
<th>Company Number</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title(s) of People Interviewed</td>
<td>Manager, Software Services</td>
<td>Director, US Information Systems Operations</td>
<td>Manager, Information Services</td>
</tr>
<tr>
<td>Major Business(es)</td>
<td>Electronic Components and Accessories</td>
<td>Measuring &amp; Control Devices</td>
<td>Misc. Chemical Products</td>
</tr>
<tr>
<td>Global Strategy</td>
<td>International</td>
<td>Transnational</td>
<td>Global</td>
</tr>
<tr>
<td>Organization Structure</td>
<td>Product</td>
<td>Product</td>
<td>Product</td>
</tr>
<tr>
<td>MIS Structure</td>
<td>Distributed</td>
<td>Distributed</td>
<td>Decentralized</td>
</tr>
<tr>
<td>Standardization Success?</td>
<td>Partial</td>
<td>Yes, except BUs HQ’d in Japan and Germany</td>
<td>Yes</td>
</tr>
<tr>
<td>Reasons:</td>
<td>Used consultants Good Requirements Planning</td>
<td>Japan—cultural Good Requirements Planning</td>
<td>HQ Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>German—size of subsidiary; growth by acquisition</td>
<td></td>
</tr>
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</table>

had a limited presence in Japan and expressed no interest in eventually producing a Kanji version for the PC. Finally, existing software could not easily be transferred because of the difference between the traditional and object-oriented environments of the development product. Despite these identified problems, the parent persisted in selecting the object-oriented expert system shell as the standard.

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Of the three alternatives, only the second would avoid significant cost and compromise on the part of the subsidiary. However, the subsidiary would sacrifice goodwill if it selects this alternative and will not be acting with the transnational “team perspective” envisioned by its parent. As of this writing, the subsidiary has not yet decided how to proceed.

Minicase Number 2

Company number two is a personal products manufacturer and distributor that operates with an international strategy. Its subsidiaries operate along product and geographic lines. Most have their own IS capability, although many purchase services from headquarters. Headquarters currently exerts little direct power over subsidiaries, but aims to rationalize operations and sales and to transition to a transnational strategy.

This case describes the parent’s attempt to standardize the manufacturing, inventory, accounting, and purchasing packages of its Latin American (LA) subsidiaries. The subsidiaries mimic the functions of their parent, second-source to one another, and operate somewhat independently under the influence of a LA headquarters organization. LA operations are on a much smaller scale than U.S. and other world-wide operations.

The parent believed that it would be beneficial for its LA subsidiaries to standardize manufacturing resource planning (MRP), inventory, accounting, and purchasing on a LAN-based system. They selected a software package that accommodated all required subsystems at the low level of complexity dictated by the situation. Representatives of all subsidiaries attended sessions at headquarters to examine the software, concluding that it appeared suitable. They then successfully piloted the software at one of the subsidiaries.

Concurrently, a new position was created at corporate headquarters to oversee the LA subsidiaries as a “division.” A member of one of the LA subsidiaries staffed the position; as one of his first activities, this staff member undertook a reexamination of the LAN-based solution. Ultimately, he concluded that the proposed software could not account for hyper-inflation as well as the home-grown software from his own subsidiary, and that failure to account for hyper-inflation would lead to sub-optimal ordering policies. Unfortunately, the home-grown system ran on minicomputers and did not have an MRP component.

Several meetings were held between Corporate IS and managers of the LA subsidiaries with Corporate encouraging adoption of a standard LAN-based solution and the LA division encouraging the adoption of the mini-computer software to be supplemented by a non-standard, internally-developed MRP package. Headquarters responded by creating a standardization committee, with representation from headquarters and from each of the major subsidiaries. The committee was charged with evaluating opportunities for standards throughout the company and did not focus on the stand-off between headquarters and the LA division.

Eventually, with the help of the standardization committee, a compromise was reached that allowed the LA subsidiaries to adopt the mini-computer purchasing and inventory control systems optimized for hyper-inflation and the LAN-based software for MRP and accounting. It was agreed that Corporate would assist the LA division in developing the requisite software and procedures to upload and download data between the LAN and minicomputer packages.

Four Other Companies

Company three is a computer and peripherals manufacturer that reported few problems with standardizing its hardware and software. The company has one foreign manufacturing operation and many small marketing operations. Headquarters manages all operations and makes all decisions. The company is relatively young and has grown rapidly from its central location, continuing to operate as a global company. Headquarters’ IS staff does all software development and all major hardware purchases.

Company four is also a relatively young company that has grown rapidly. However, unlike company three, it has several business units that had been given entrepreneurial freedom but were in the process of being brought under more central control at the time of interview. Also, unlike company three, acquisition fueled its growth. Company four operated with a large number of hardware platforms and a variety of software products that performed similar functions for different parts of the organization. This variety posed no major difficulties because the company’s division along product lines limited interactions among the divisions. However, headquarters was becoming frustrated by its inability to leverage its learning across business units, and the company was searching for opportunities to rationalize its operations. Nevertheless, standardization was against the corporate culture. As a result, the headquarters proceeded to develop “recommendations” that they hoped subsidiaries would follow with regard to hardware and software.

At the time of the interview, the results of the
recommendation strategy were unclear, although indications were that it would succeed. For example, the company recommended Banyan as the provider of its network systems. The Irish subsidiary, however, had major concerns about Banyan’s support capability in Ireland. However, after concessions from Banyan, support from headquarters in the purchasing and on-site storage of spare parts, and promises from headquarters for continuing operational support, the subsidiary adopted the standard.

Company five is an established manufacturer of analytical instruments with a unique product niche. It has recently migrated to a transnational strategy from a combination of B&G multi and transnational strategies. It has grown significantly through acquisition, but has not bought or sold companies on a large scale (more that 10% of sales) in the past five years. Integrating the information systems of its acquisitions has been a major struggle for the parent IS group.

The move to standardization has been partially achieved through the concerted effort of the IS group at headquarters to adopt the use of the Oracle DDBMS and Oracle application packages. The decision to outsource development of new systems and conversion of legacy systems eased the transition. German and Japanese subsidiaries, however, have not accepted the standard. The Japanese have always developed systems on their own, even though their applications are substantially the same as the parent’s. The German subsidiary was acquired many years ago, but is almost as large as the other divisions combined, accounting for about 40% of the company’s sales. The German subsidiary believes that it has a critical mass sufficient to support its own systems and that its product groups are sufficiently different from the others that it would not benefit by standardization.

Company six is a chemical manufacturer that has adopted a global strategy. Manufacturing and sales units exist around the world, but all information is centralized and distributed to subsidiaries according to their need. Large foreign units operate IBM AS/400 minicomputers, while smaller sales units operate with personal computers or no computers. All IS development is done at headquarters. The centralization of IS due to the global strategy has made standardization a moot issue. The company has not observed this strategy causing any difficulties in reacting to local conditions.

Discussion of Findings

International strategy appears to have a major impact on companies’ ability to standardize. Of the six sample companies, the only two who did not experience difficulties in setting standards were the two companies who pursued a global strategy. This outcome was expected. At these companies, headquarters’ control extended to information systems and technology, so headquarters could set standards by edict. At companies pursuing international or transnational strategies, the imposition of standards was generally not a smooth process. Although transnational companies exerted more control over their subsidiaries, they did not appear to be any more or less amenable to standardization than international companies. Perhaps this similarity existed because the subsidiaries of international companies relied more upon their parent for knowledge and advice, including suggestions relating to standards.

Standardization seemed more successful among subsidiaries organized geographically as opposed to those organized by function or product. This comparison was true even within the same organization when both geographic and other divisions existed side by side. One explanation may be that the geographic subsidiaries usually felt a strong need to share product and functional information among themselves and their parent. Also, geographic units tended to be smaller and less self-sufficient than other types of business units.

The relative size of subsidiaries also appeared to have an impact on the success of a standardization effort. Large, mature business units have less incentive to standardize, particularly if they were acquired rather than internally grown.

Among the sample companies, standardization appeared to be driven by headquarters rather than by subsidiaries. This finding may be biased by the fact that most interviews were held with the parent rather than the subsidiaries. Nevertheless, it is clear that corporate-wide benefits are most easily appreciated from the perspective of headquarters. Although some foreign subsidiaries may benefit from standards, particularly through the sharing of expertise, there will usually be others who have disincentives to conform and genuine difficulties adopting at least some of the standards.

The data indicate that the success of standards depends on the standardization process adopted. One approach to maximizing the quality of standards and their likelihood of adoption is to establish a standardization advisory committee to address coordination issues. This approach was successfully used by companies two and four to overcome potential problems. A standardization committee could meet annually or semi-annually at headquarters or at rotating subsidiary locations. Its
intent should be to ensure that all subsidiaries have an opportunity to address concerns about the adoption of any standard under consideration. Even if not all concerns can be satisfactorily addressed, affected subsidiaries will more readily understand the tradeoffs involved, will more likely compromise, and will less likely sabotage the standardization effort. Case study one illustrates that the mere existence of a standardization committee is not enough to ensure the success of standards. The committee must include representation from among the subsidiaries who would be most affected by standards.

Another process to improve the acceptance of standards is the creation of a champion of standardization at headquarters with a budget or staff that can be used to help subsidiaries convert existing systems. Effectively, company number five used such a process. This approach could have been useful in case study one — the parent might have overcome the resistance of the subsidiary by using its own funds and staff to develop parallel systems using the two expert systems tools. A standardization champion can also be charged with searching for applications where standardization can be beneficial to the corporation. The budget could also be used for education and lobbying with regard to the benefits of standardization.

A third effective standardizing process, as suggested by Levinson (1992), is to use outside consultants for development and outsourcing for development and operations. Company number four used consultants effectively to secure confirmation for its selected standard and to remove the onus of having headquarters suggest the standard. Company number five used outsourcing extensively to ease the burden of conversion to a standard.

Finally, there are cases when standardization is not successful because it is inappropriate. Companies must always compare the desirability of standardizing against the requirements for flexibility locally (Ives & Jarvenpaa, 1991). As illustrated in case study one, it may be desirable to compromise standards in response to local requirements. All interviewees stressed that enforcing standards rigorously can lead to paralysis at the local level, a sense of disenfranchisement, and eventually the failure of headquarters and subsidiaries to cooperate as an enterprise with a global mission.

Conclusions and Recommendation for Future Research

This study has provided support for the model structure illustrated in Figure 1. It has shown that international strategy, organizational structure, and standardization process can, and are likely to affect the success of programs to standardize information systems and technology within an organization.

The study has also suggested several hypotheses that would make the model more complete. Further research will be necessary to verify these hypotheses statistically. For example, this research suggests that companies pursuing a global strategy are likely to have more success with standardization than those pursuing international or transnational strategies and that international and transnational companies face similar degrees of difficulty in establishing standards. Second, it hypothesizes that companies with geographically organized business units are more likely to succeed with standardization than are companies organized by function or product. Third, it suggests that having a dominant subsidiary may cause problems in implementing standards. Fourth, it proposes that a variety of processes, such as the use of standardization committees, standardization champions, third party opinions, and outsourcing, can be used to improve standardization success. Finally, it supports the assertion that MNCs must be flexible about enforcing standards, sensitive to the tradeoff between global benefits and local conditions, and able to compromise on the extent and methods by which standards are applied.

Endnote

1. For example, of over 150 periodical references on standards in the 1991 Computer Literature Index (Applied Computer Research, 1992), all but eight appear to be devoted to industry standards.

References


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