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INFORMATION TECHNOLOGY AS A DETERMINANT OF COMPETITIVENESS

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Introduction

Information systems is an area of the business enterprise that is growing in terms of increased legitimacy. In fact, one would be hard pressed to find an organization that does not use information technology in some form or that is not affected by information systems.

In many instances the survival of the firm is at stake if technology is not used properly. Today, firms use technology to increase productivity, streamline organizations, and create electronic conglomerates.

Globalization of the business environment and continuous technological advances require top executives and functional area managers to participate in the development of information technology strategy and integrate it throughout the firm.

Organizations are beginning to appoint chief information officers (CIO) to executive management in order to identify information needs to support strategic decisions. CIOs should play a proactive role in the development of information technology strategy and involve top management as well as functional area managers in the strategic plan.

Top management's participation provides the necessary linkage between

corporate objectives and the information technology plan. In addition, participation of functional area managers in the development of information technology strategy creates an atmosphere to integrate information technology throughout the organization.

The CIO must lead information systems personnel in the development and implementation of systems which are required to meet strategic needs such as product strategy, marketing strategy, and human resource strategy.

Organizational responsiveness to market needs and continuous change has become a major element of the competitive strategy of many firms. Companies such as British Airways, Federal Express, Wal Mart, and Singapore Airlines have responded to the market needs in a timely fashion through integration of information technology in their respective businesses (Morton 1991).

An extensive survey of the literature demonstrated that no study has been conducted in the past to determine how major Swedish firms view the role of information technology in competitiveness.

The Study Objectives and Design

In order to assess the scope of information technology planning and its integration in large Swedish firms, a four-page questionnaire was mailed to top 500 Swedish organizations, with a cover letter explaining the objectives of the study, along with a return envelope. The total number of responses after two mailings was 153 (30.6%). However, 124 usable questionnaires furnished data for analysis.

This information technology research was conducted with the following objectives:

- To determine the proportion of information systems outsourcing by major Swedish firms.
- To determine the degree of participation by management in the development of information systems (IS) strategy.
- To find the level of involvement by functional areas in the implementation of IS programs.
- To determine drivers of change in the IS programs.

Results and Discussion

Information systems is a major contributor to the continuity and profitability of the organization. However, in recent years, many firms have decided to outsource all or part of the information systems functions to a third party. This decision to outsource information systems is generally based on economic reasons and does not diminish the strategic value of IS to the firm nor does it eliminate the need for a chief information officer. Table 1 depicts the percentage of outsourcing by the responding firms.

It is clear that many Swedish firms have opted for outsourcing information systems. Fifty-four percent of the responding organizations perform forty percent or less of their information systems function in house. However, all of the firms surveyed have an information systems department and a chief information officer. In determining how much outsourcing is necessary, the chief information officer and the top management must determine the core competencies of

information systems and maintain those functions in house. Non-core information systems functions are best suited for outsourcing.

TABLE 1
Outsourcing Information System

Percentage of Outsourcing	Percentage of Firms
0 - 10	4
11 - 20	10
21 - 40	20
41 - 60	12
61 - 80	8
81 - 99	17

Information Technology Planning and Implementation

An information systems plan includes factors such as: computer hardware and software requirements, systems definition, changes to the existing systems and procedures, and the schedules and resource requirements for each project.

Survey respondents were asked to rate the degree of participation by management in the overall information technology strategy on a scale ranging from 0 (no participation) to 4 (maximum participation). The highest degree was given to information systems, followed by top management (Table 2).

Clearly, the results show that top executives in Sweden have recognized the value and the role of information technology in gaining a competitive advantage. Finance and accounting also ranked high on the list. This is not surprising, however, since financial considerations are important in the

acquisition of the new technology, and accounting is one of the major users of information technology.

TABLE 2
Management Participation in Setting Overall Information Technology Policy

Participants	Average rating
Top Management	2.98
Finance and Accounting	2.61
Human Resource	1.21
Purchasing	1.26
Information Systems	3.22
Marketing	1.77
Distribution	1.48
Production/Operation	1.85
Technical Staff	1.53

The results demonstrate the existence of a working partnership between the information systems department and other users in the strategic planning process. This relationship enables the user management to recognize opportunities for efficiency or innovation that could lead to competitive advantage.

One of the questions in the survey dealt with was the degree of interaction that exists between the CIO and the top executives of the organization with regard to several IS activities shown in Table 3.

The highest level of interaction (2.93) between the CIO and the top management is in developing the long-range IS plan, allowing top management to identify technologies and the information needed to

achieve business strategies and objectives. Technology acquisition, systems development, and implementation is generally capital intensive, therefore it is not surprising to find that many CIOs spend a good portion of their time convincing the top executives to allocate financial resources for their projects while preparing the IS budget.

TABLE 3
Interaction Between CIO and Top Executives

IS Activities	Average Rating
Long range IS plan	2.93
Short range IS plan	2.59
IS mission statement	2.55
IS budget	2.81
System design	1.37
Security & back up plan	1.65
Setting priority	2.35

There is also a high degree of communication between CIO and top management in developing the IS mission, setting priorities for IS projects, and IS short-range plans.

One method of linking the corporate strategy to information systems strategy is the establishment of a steering committee for information technology planning. This committee is comprised of representatives from all major functional areas and top management. Formation of a steering committee provides a structure for determining how the information systems department interacts with other functional areas of the firm in systems planning and integration. The steering committee can also

assist the CIO to set priorities for projects to be implemented. The number of steering committee meetings per year is shown in Table 4.

TABLE 4
Number of Meetings of the Steering Committee Per Year

Number of Meetings	Percentage
1	35
2	10
3	9
4	27
5	4
6	11
12	4

The majority of the responding organizations (66%) confirmed the existence of a steering committee. The average number of meetings per year is two. It is assumed that those organizations which do not have a steering committee (34%) have other systems in place for involving management in information technology planning, since they all responded to information systems planning and implementation questions.

Successful implementation of an information technology plan requires leadership by the information systems department and the inclusion of the user departments in the process. Involvement of the functional units in the implementation process is particularly

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important since information technology applications cross functional unit lines. The user participation facilities implementation activities and a sense of ownership in the system, which leads to further use of technology. Table 5 shows that the Information Systems department in the responding organizations assumes a leadership role during the implementation phase with an average rating of 3.31.

TABLE 5
Participation in IS Program Implementation

Function	Average Rating
Top Management	1.95
Finance and Accounting	2.42
Human Resource	1.27
Purchasing	1.27
Information System	3.31
Marketing	1.89
Distribution	1.51
Production/Operation	1.76
Technical Staff	1.26

It is interesting to note that all areas involved in the strategy phase are also involved in the implementation aspects of the plan. With the exception of the Top Management, all organizational units have relatively the same degree of participation in the development of the strategy as they do in the implementation process. Once the implementation phase is

completed, the user management becomes responsible for preserving the integrity of the system and ensuring its application.

Top management participation during implementation ensures conformance to corporate policies and procedures. The Swedish top management shows a high degree of commitment (third highest) in this process. This level of support by top management also promotes a positive attitude in the user toward the new system and allows the information technology to make its maximum contribution to the organization.

Ideas for Change

Ever-changing technologies present new opportunities for the organization to incorporate competitive application of the new technology on all fronts in order to support its vision. Different functional areas of the organization should be active in the introduction of new ideas for change. Support for change could be for two reasons: (1) to remain competitive, or (2) to gain advantage over the competition. Clearly, the CIO and the information systems professionals must stay current with the latest development and future potentials of key technologies for change. However, any functional area in the firm can act as an agent of change and be a driver of change. Noticeable change requires a strategic response that includes a collection of factors such as the organizational structure, the strength of the competitive position, as well as the competitive environment of the industry.

The survey respondents were asked to identify the extent of responsibility exercised by various departments in the introduction of new ideas for change in the past five years.

Table 6 depicts the results.

It is apparent that the information systems department leads in this endeavor as expected followed by finance and accounting. Occupying the third level for the introduction of changes, the marketing professional of the Swedish firms exhibit their awareness of the marketplace that demand product variety and is characterized as time and cost sensitive. Shorter product life cycles and an increased frequency of new product design necessitate change in production and operations processes. The results indicate that production and operation managers have been active (fourth highest) in the presentation of new ideas to meet consumer demands.

TABLE 6
Introduction of New Ideas for Change
Over the Past Five Years

Functional Unit	Average rating
Top Management	1.75
Finance and Accounting	2.04
Human Resource	1.25
Purchasing	1.15
Information Systems	2.96
Marketing	1.91
Distribution	1.56
Production/Operation	1.77
Technical Staff	1.25

Justification of Information Technology Acquisition

Traditional cost-justification techniques associated with technology acquisition are useful when such tangible factors as labor savings, increased profit, and

hardware and software costs are evaluated. However, these methods, in general, fail to consider the benefits of the new information technologies that are intangible and long term. In order to assess some of the variables used in the adoption of the new technologies, the surveyed firms were asked to rate five variables (cost, user satisfaction, competition, service to customers, and advances in technology) on a scale between zero and four.

Although acquisition cost is an important factor in the adoption of new technology (average rating of 2.69), other variables such as user satisfaction, service to customers, and meeting competition ranked higher than cost. This indicates that Swedish managers have realized the potential benefits of the new technology in strengthening the organization's competitive position, as well as increasing individual productivity and functional efficiency. The results also indicate that there is a strong relationship between user satisfaction and user involvement in both strategic planning and implementation of the new technology. Advances in technology ranked last and this is due to the fact that many firms do not need to remain at the leading edge of technologies to maintain their competitive advantage.

Conclusions

Proliferation of information technology throughout the organizations has created a unique role for information technology in strategy development and strategy implementation. Top information systems professionals should be involved in developing corporate strategic planning. User managers should also be involved in information technology planning,

implementation, and to ensure the success of its applications.

The CIO plays an important role in the merger of information strategy and corporate strategy. Participation of the CIO and other managers in strategic planning will provide the organization with an opportunity to explore ways to use information technology as a strategic weapon.

Managements of Swedish firms which participated in the survey seems to have recognized the value of information technology as a corporate resource that can be used to improve their strategic positions and to remain competitive.

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