Global Comparison of Stages of Growth Based on Critical Success Factors

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With increasing globalization of business, the management of IT in international organizations is faced with the complex task of dealing with the difference between local and international IT needs. This study evaluates, and compares, the level of IT maturity and the Critical Success Factors (CSFs) in selected geographic regions, namely, Norway, Australia/New Zealand, North America, Europe, Asia/Pacific, and India. The results show that significant differences in the IT management needs in these geographic regions exist, and that the IT management operating in these regions must balance the multiple Critical Success Factors for achieving optimal local-global mix for business success.

INTRODUCTION

The chief information officer (CIO) of Kongsberg Simrad was recently asked by the chief executive officer (CEO) to develop a global information technology (IT) strategy for the organization. Kongsberg Simrad is one of the world’s largest manufacturers of marine electronics based in Norway. Kongsberg Simrad’s globalization has so far led to locations in the UK, US, Italy, Canada, Brazil and Singapore. For the CIO it was essential to understand the differences in the level of IT maturity in these regions before an effective global IT strategy for Kongsberg Simrad could be developed.

For global organizations the difference between local and international IT needs has been shown to be a matter of concern (Jarvenpaa and Ives, 1991). As organisations, such as, Kongsberg Simrad expand their operations to cover increasing number of countries and geographic regions they need to understand the considerable differences that exist in the levels of IT maturity in these regions, and the factors that are critical for the success of the deployment of IT if these organizations have to achieve success.

IT has long been recognised as integral to an organisation’s success as it expands its business from local to global marketplace (Doz and Prahalad, 1981). However, despite ongoing concerns regarding differences in international versus local IT requirements, there is a lack of empirical research which clarifies how the companies that are operating globally should manage their IT capabilities in the complex and different global business environment (Broadbent, 1997). This paper attempts to fill this gap by evaluating and comparing the IT maturity and Critical Success Factors (CSFs) of organizations in various geographic regions. This is based on the data from a field study carried out to determine IT management CSFs in organizations in Norway, and similar data from earlier studies covering organizations in Australia/New Zealand, North America, Europe, Asia/Pacific, and India. Because of the temporal nature of CSFs, information systems executives report different CSFs over time (Munro, 1983). These changes may reflect organizational evolution and maturity along the stages of IT growth (Nolan, 1979). By mapping the CSFs onto the stages of growth of IT, this paper presents a technique for identifying the stage of evolution or the maturity of IT in organizations.

The comparison between IT maturity in organizations in Norway and Australia/New Zealand presented in this paper can be of significant benefit to those Norwegian organizations that plan to expand their business in the Australia/New Zealand region, or vice versa. Comparison of maturity and growth of organizations in the other regions can benefit the organizations that plan to expand their business globally in the regions investigated.

The paper begins with a brief description of the updated model of IT stages of growth, and the Critical Success Factors. It then describes the methodology used for the current field study, including the CSF constructs, the survey instrument, the survey approach, and the technique used for comparing the IT maturity of different geographic regions. This is followed by the detailed results of the survey of IT managers carried out in Norway. These results are compared with those of an earlier survey in Australia/New Zealand (Khandelwal and Ferguson, 1999).
Further based on other surveys (CSC, 1998; Khandelwal and Iyer, 1996) the comparison is extended to include North America, Europe, Asia/Pacific and India.

**STAGES OF GROWTH**

Nolan’s (1973, 1979) stages theory is perhaps the best-known and most widely cited model of evolution of IT in organizations (King and Kraemer, 1984). The stages theory provides an insight into the way IT evolves in organizations, and offers IT management the possibility of managing this complex phenomenon (Khandelwal and Ferguson, 1999). The model describing the Stages Theory does not appear in the literature as a single model, but rather as a number of versions of the same model which have evolved over time.

Mulares et al. (1997) expanded the model in the form of three S-curves, each curve describing an era, with a discontinuity between the preceding and the following eras. The three eras are identified as data processing (DP) era, information technology (IT) era, and network (NW) era. These eras are themselves subdivided into three stages each as shown in Table 1. The curves represent both the growth of the information technology and the organization’s learning experience as it progresses through these eras. Each era is characterized by a period of evolution, followed by a period of stability, ending with a period of discontinuity before the start of the next era. The discontinuity is more a revolution rather than an evolutionary transition. For example, the transition from DP era to IT era is characterized by technological discontinuities in the form of personal computers, data communication networks, and robotics, while the transition from IT era to NW era is characterized by business discontinuities in the form of strategic alliances with customers and suppliers, access to external data, and outsourcing.

While a number of studies on the nature of growth of organizations (for example, Greiner 1972; 1998) strongly support the stages theory, Nolan’s stages of growth model has been criticized by academics. An analysis of the model’s logical and empirical structure has raised concerns in its formulation that help to account for the fact that its principal tenets have not been independently validated (King and Kraemer, 1984). Benbasat et al. (1984) using data from a number of empirical studies cast doubts on the validity of the stages theory, but conceded that “… while the evidence to date is not very encouraging, it does not definitely reject the stage hypothesis” (p. 485). It is with these limitations in mind that the Stages Theory is applied in this research.

**CRITICAL SUCCESS FACTORS**

Information systems (IS) departments face many challenges in today’s rapidly changing environment. One approach to understand these challenges is to survey IT managers to elicit what they consider as their CSFs. The concept of CSFs was first introduced by Rockart (1979) as a mechanism to identify the information needs of chief executive officers. He had based the concept of CSF on the idea of success factors first discussed in the management literature by Daniel (1961). CSFs are defined as those few key areas where things must go right for the business to flourish. If management does not pay attention to these areas, the organizational performance would suffer. The emphasis here is on “few” and “must go right”.

Because of this limited number, management is able to provide a constant focus on the CSFs until they are successfully achieved.

Although introduced initially to determine the information needs of managers, the current use of CSFs has grown to cover all legitimate areas of management. Examples of these are the use of CSFs for management of the Year 2000 project (University of Texas System, 1998), CSFs for management of small business (Gadenne, 1998), and CSFs in the alignment of IS plans with business plans (Teo and Ang, 1999). The CSF technique has been assessed for reliability and consistency by comparing the results of management studies carried out for identifying the key concerns of IT managers. The results published (Murdo, 1983) have confirmed its reliability.

Although the CSFs aim at organizational objectives, each individual manager of an organization can have a different set of CSFs. In a company for example, the marketing manager may have a different set of CSFs to the personnel manager. The CSFs for the marketing manager may include market success, profit margin, and the performance of the sales staff, while those of the personnel manager may be human resource planning, occupational health and safety, and staff rewards.

Studies have shown that CSFs can be synthesized, i.e., while each manager in an organization may have different, individual CSFs, the whole organization may have its own aggregated set of CSFs. This argument has been extended to include CSFs for a group of organizations belonging to an industry, or CSFs for a group of managers in a particular function belonging to different organizations, giving rise to the concept of group CSFs. Thus there could be CSFs for manufacturing managers, CSFs for the retail industry. This concept is further broadened to incorporate geographic regions of the world. We can thus, for example, have IT management CSFs for Norway which will define those few factors that are required by Norwegian IT management for their success.

**Table 1: Eras and stages of IT growth**

<table>
<thead>
<tr>
<th>Era</th>
<th>Characteristic</th>
<th>Stage</th>
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<tbody>
<tr>
<td>DP</td>
<td>Initiation</td>
<td>1</td>
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<td>Contagion</td>
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<td>IT</td>
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<td></td>
<td>Architecture</td>
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<td>Demassing</td>
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<tr>
<td>NW</td>
<td>Functional infrastructure</td>
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<tr>
<td></td>
<td>Tailored growth</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Rapid reaction</td>
<td>9</td>
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