Information Management for the Competitiveness and Competence of the Small and Medium-sized Enterprises

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Abstract - The literature contains contrasting positions regarding the relationship between information technology and competitiveness in enterprises. Some studies argue that information technology is not a source of competitiveness. However, there are also a considerable number of studies that show how technology has helped organizations improve areas such as innovation, productivity, efficiency, decision-making, customer satisfaction, etc. Such improvement is then translated into a gain in the organizations' levels of competitiveness, which in turn helps them face competition. This research analyzes the degree of influence that the use of information management has on the competitiveness and competence of small and medium-sized enterprises. The empirical study was carried out in Tamaulipas (Mexico) through regression analysis. The results show that the efficient use of information has an effect on the two dependent variables, but, with a higher level of influence on competence (leadership in innovation, and in monitoring competitors).

Keywords: information, competitiveness, competence, SMEs, IT

1 Introduction

Technology and information have become important tools that have been used by organizations not only to succeed but also to survive in a globalized world. The argument that enterprises that use Information Management (IM) effectively are more likely to attain higher levels of organizational performance and competitiveness is certainly not new. As a result of this, many enterprises worldwide have started to allocate a great deal of resources for the generation and application of information and knowledge aiming at improving their performance and competitiveness. However, little empirical work has been done which contributes to our understanding of the extent to which Mexican enterprises make use of this valuable tool.

The purpose of this research is to analyze the relationship between IM and the performance of an organization. In particular, the research looks at the relationship between IM and levels of competitiveness and competence in small and medium-sized enterprises (SMEs) in the central part of Tamaulipas, Mexico. We believe that knowing about information management practices within organizations is crucial to the development of institutional policies aimed not only to survive, but also to obtain higher levels of competitiveness and competence at the regional, national and international levels.

2 Literature Review

2.1 Information Management

Most, if not all, enterprises depend on information technology (IT) for the accurate and prompt management of information. IM can be defined as the economic and efficient production, control, storage, retrieval, and dissemination of information, in order to improve the performance of the organization [1]. However, there is a challenge that many organizations face today. Once big amounts of data have been collected from the entire organization a question is raised: Now what do we do with them? In the efforts of contributing to the organizational effectiveness, the impact of the information remains hidden until it is removed or lost [19]. That is to say, information makes sense only if someone uses it for something; therefore, the critical areas of information transfer and storage must be closely and accurately defined for each system used in the firm [1].

The quality principles advocated by Deming, Ishikawa, Juran, Crosby, etc. for products quality are also used in the improvement of the information, applied to the problems of production of quality data output, where each information product has an intrinsic value for the user. Information quality is defined as the measurement of information technology data output in terms of accuracy, opportunity, completeness, reliability, and relevance. However, according to Lillrank [13] the most widely used definition of information quality is given by the American Society for Quality and ISO 9000-2000; such definition is based on customer satisfaction and places a strong emphasis on the idea that the requirements should not only be met for their own sake.

The emergence of information as a productive factor and development engine is now becoming evident in the wider society. The IT potential for the improvement of information performance in the organization has been widely recognized, since the availability of reliable information sources is a key
component in the decision-making processes of the executives as users [12]. These sources are selected as they are thought to be useful and therefore will offer the highest quality of information; there is also evidence that they help in the improvement of performance indicators such as data accuracy, speed in decision-making processes, effectiveness and ability of data analysis. Therefore, there is a need to take into account the following ideas about IM:

- The conception of IM should consider a transition from the focus on the information process and storage to that centered on its use and share [4].
- IM should be focused on people as the essential aim and consider IT as an enabling factor, perhaps necessary in the effective and satisfactory use of information [15].

Undoubtedly information is an intrinsic component in almost all the activities in every organization to the degree of becoming transparent. This is because it is the means through which people express, represent, communicate and share their knowledge. Marchand et al. [15] highlight that it is the use of information which has an influence in the creation of the business value through four strategic priorities: (i) minimizing financial, commercial and operational risks, (ii) reducing the costs of transactions and processes, (iii) adding value to customers and markets, and (iv) creating new realities through innovation.

2.2 Competence

For the purposes of this study, competence refers to that situation in which two economic entities (enterprises) engage in a constant struggle to sell their products and services in the market. That is why organizations view IT as a tool for the gain of competitive advantage that can serve to thwart the competitors’ force.

The impact of the IT investments on their performance in business and on IM has been researched [14]. However, it seems that firms have not taken full advantage of such research findings, at least in Mexico and in the region where this study took place. That is why the amounts of money spent by firms in technology continue to grow excessively. Unfortunately, such expenditures continue to result in little or no benefit for them. On the other hand and as an example, in the financial sector, Hauswald and Marquez [7] have argued that the information process points to the need for investments made in technology to be productive. Although, it is important to highlight the fact that the more accurate the information is the more costly it becomes [3]; IT, though, can help make more opportune decisions and maintain rapid communication in the competitive environment in which we are now immersed.

IT appears to be changing the competition structure, helping large organizations make their administration job easier [8]. These authors claim that IT helps manage large volumes of structured and unstructured transactions, and helps collect and share information beyond a country’s boundaries. Similarly, technological processes have affected the production and availability of information. According to Dell’Aricca and Marquez [5], this has served to change the competition nature in the markets, as an enterprise which possesses rich data related to users is more likely to focus its efforts on increasing the levels of competition in the market, lowering prices, as well as thwarting the competitor’s forces.

Diverse studies focus on aspects related to competition and their competitors [2008]. However, it is important to analyze such aspects from other perspectives such as Michael Porter's theory or Classic, Neoclassic and Austrian theories. Likewise, due to the market’s flaws and the delay in information processing at some enterprises, it is thought that those enterprises which take information seriously can turn it into a highly profitable opportunity advantage [6], considering that competition increases the intensity of the demand for information, especially accounting information [9]. For example, banks acquire information in order to soften the competition’s loans and expand their markets [7]. Therefore, a good IT infrastructure can become a greater competitive advantage for enterprises. According to Dewan and Mendelson [6], IT is costly, but it becomes twice as much costly for competitors if they are to continue to compete against those organizations with a good technological base already in place.

We now proceed to present the hypothesis of our work for this construct:

H1: Information Management plays an influential role in helping the SMEs to face and thwart competition.

2.3 Competitiveness

Enterprise competitiveness means to achieve an equal or higher profit than that of the competitors in the market. According to Lavon and Todd [10] competitive advantage is a phenomenon that occurs when a firm experiences returns that are superior to those of its competition (rents). So, it is known that information and knowledge are two factors which have a remarkable impact on the conception and sustainability of the competitive advantages for the organizations. IM provides organizations with the opportunity to either activate their new competitive strategies or to detect their competitors’ response as a way to restructure the industry. Nevertheless, the enterprise does not obtain any competitive advantage by merely having more computers at their disposal, but by being able to use them. More specifically, enterprises obtain competitive advantages by strategically applying the information generated or contained in them.

However, investments in IT may not have an immediate impact or add value to a firm and are, therefore, more likely to be reflected in future profit streams [11]. Mendelson [16] developed a metric which quantifies the ability of an organization to process information and make fast and
effective decisions in a highly dynamic environment. He coined it as "organizations’ intelligence quotient" which is based on the principles of an organizational architecture focused on the effective information flow, the speed in decision-making processes and the utilization of the knowledge resources when the environment generates big amounts of data whose effective process is key to success.

Both organizational performance and competitiveness need to take into account both financial measures as well as operational performance measures (non-financial) such as market share, introduction of new products and services, product quality, marketing effectiveness, reputation improvement, flexibility, and operations promptness and productivity [15]. We need to place a strong emphasis on the organizational design that facilitates the vertical and horizontal information flows that aim to achieve the organization’s objectives. In a similar vein, Melville et al. [17] define the term "Business Value of the IS/ICT" (Information Systems / Information Communications Technology) as the impact of the IT on organizational performance observed at the level of intermediate processes and overall organizational level, including an impact on efficiency and competitiveness.

The hypothesis for this construct:

H2. Information Management plays an influential role in helping the SMEs achieve higher levels of competitiveness.

3 Method

Both technology and information now play a crucial role in the performance of organizations, and some scholars have adopted a hermeneutics-critical approach to examine their uses and implementation. Thus, SMEs that make use of the notion of IM were selected for this study. In particular, the relationship between IM and the enterprises’ performance in terms of gaining competitiveness and facing competition was analyzed in this research.

The process followed to attain the aim started with a review of the state of the art on IM, competitiveness and competence. The operationalization of the variables was carried out as follows:

- **Dependant variables:** Competitiveness (financial performance, market share, innovation levels in products/services, customer satisfaction) and Competence (leadership in innovation, keeping track of competitors, competition information).
- **Independent variable:** Information Management (strategic use of information, participation of key staff members in information management, continuous acknowledgement of information processes).

The empirical work was carried out in the central region of the state of Tamaulipas, Mexico. To do so, a 5 point Likert scale questionnaire was designed and piloted with 12 enterprises. This pilot stage served to identify those items which did not have the minimum recommended statistical load. The composition of the final version of the instrument was as follows: Four items related to Competitiveness; three to Competence; and five to Information Management, in addition to the general data items.

According to the Mexican Entrepreneurship Information System’s Website (http://www.siem.gob.mx), as of January 2012, there are 1224 SMEs in Tamaulipas (excluding enterprises with fewer than 10 employees). Of them, 161 belong to the geographical zone under investigation. Unfortunately, due to the poor research culture in this zone, the final sample was made up of 46 enterprises (two questionnaires were administered to each enterprise: 92 valid for their analysis). The respondents of the questionnaires were (1) either the general manager or the owner, as they both make use of information on a daily basis, and (2) the head of the informatics department. The respondents were given one week to answer the questionnaire so that they could complete it freely and with plenty of time. The analyzed businesses represent all types of enterprises in a transversal study. The data were analyzed through descriptive statistics and a regression analysis technique using SPSS software 18th version (PASW Statistics).

Results

The size of the participating enterprises is distributed as follows: 14% have between 11 and 20 employees; 22% of them have 21 to 30; 28% between 31 and 50; and 36% between 51 and 100 employees. Regarding the type of activities that the enterprises do, those that belong to the trade (commerce) sector dominate, accounting for 44% of them.

Table 1 shows the reliability degrees of each of the variables measured with the Cronbach’s Alpha. In order for a variable to be considered acceptable, its value needs to be greater than 0.7 [18]. If so, it indicates that the questionnaire is valid; and therefore, its results can be interpreted as reflecting the current reality. The whole set obtained a value of 0.802.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitiveness</td>
<td>0.701</td>
</tr>
<tr>
<td>Competence</td>
<td>0.752</td>
</tr>
<tr>
<td>Information Management</td>
<td>0.865</td>
</tr>
</tbody>
</table>

After the descriptive analysis, it is important to indicate that according to Chin [2]: R (Relation) represents the path coefficients, which should obtain a value of 0.2 if they are to be considered significant, with above 0.3 being an ideal value. R² on the other hand, indicates the variance explained by the variable within the model. This should be equal or greater than 0.1, as lower values provide little information even if they are significant.

After that, the regression analysis was conducted with the aim of showing the inferential data. Table 2 indicates the results...
of the two proposed hypotheses. It shows the existing level of relation, the explained variance, as well as the obtained significance level, whose minimum value to accept a hypothesis needs to be equal or lower than 0.05 (at least 95% reliability).

**Table 2. Hypotheses Assessment**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>R</th>
<th>R²</th>
<th>Sig.</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₁, IM → Competitiveness</td>
<td>.320 *</td>
<td>.102</td>
<td>.034</td>
<td>Accepted</td>
</tr>
<tr>
<td>H₂, IM → Competence</td>
<td>.645 **</td>
<td>.416</td>
<td>.002</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

Figure 1 shows the assessed research model, which includes a graphical representation of the data as stated on tables above. It also includes the levels of relation between the independent and dependent variables with their respective hypothesis.

**Figure 2. Assessed Research Model**

![Assessed Research Model](image)

The figure shows that the two proposed hypotheses were accepted. The analysis reveals a strong relation between Information Management and Competence, as they obtained a high level of relation (.645), a high level of explained variance (41.6%), with a reliability degree of 99%. This means that the efficient information management has served to outpass or thwart competence in terms of keeping a detailed record of internal and external data, especially data about the competitors’ activities. Such a record of information has allowed the enterprises to develop more alternatives for their decision-making processes. In particular, their efficient information management process has enabled them to develop appropriate courses of action for their own benefit, as well as to defend their market position, which has been earned on the basis of hard work.

A similar issue seems to apply to Competitiveness. The obtained data out pass the minimum values as recommended by scholars. This seems to suggest that the appropriate use of information has assisted the SMEs in keeping an appropriate financial performance, in keeping or gaining a market niche, and in maintaining their customers’ satisfaction.

### 4 Conclusions

The goal of this work is to determine the degree of influence that Information Management has on the competitiveness and competence of the SMEs. The proposed hypotheses have been tested; however, it is necessary to state that even though some of the studied enterprises have achieved an advanced stage in the management and use of information, none of them has validated empirically these ideas or designed an effectiveness measurement to determine if an enterprise is appropriately managing and using information.

Three main contributions to knowledge can be derived from the results obtained in this research: i) the SMEs make use of information without a methodology or in a systemic way; they seem to be simply reacting to changes in the market or in the competitors’ strategies, ii) IM is basically the fact of having precise information for decision-making purposes. They seem to view quality information as an asset which has enabled them to use it moderately; and in a way they have managed to reduce costs. This has been reflected in their leadership in products/services and in monitoring competitors; and iii) regarding competitiveness, with their strategic use of information, these SMEs have been able to obtain financial stability, to generate innovations in products/services, and in processes. More importantly, however, is the fact that with their strategic use of information, the SMEs have been able to maintain their customers’ satisfaction, which allows them to generate a virtuous circle in their best interest.

However, the dynamic nature of technology continues to raise questions that can be good subjects for future research projects. In addition, it is strongly recommended that the SMEs continue investing in technology and staff training and development so as to improve their professional performance. Furthermore, the findings of this research suggest that little progress has been made in terms of information management, especially in competitiveness. Therefore, more knowledge in this respect still needs to be generated that can be useful for the different stakeholders in the knowledge society.

These findings give us an outlook of the current situation in Mexico. While they cannot be generalized to the whole country, they certainly enable us to realize that the concept of knowledge management is still not taken seriously at least in the region in which this study took place. The evidence presented here suggests that the Mexican SMEs are still not able to use the information generated within them properly. Therefore, we suggest that this is topic that needs more attention, and certainly more research.

### 5 References


