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Abstract

No business or organisation can remain in ignorance of, or unresponsive to, what is going on its environment and hope to remain successful for very long. This is especially true with regard to the business planning process (Cooke and Slack 1991). Even though a significant amount of decision-making takes place across the boundaries of the organisation concern with the environment within which companies operate is a relatively new phenomenon. Without understanding this environment it is very difficult to be effective at gleaning business intelligence. For this reason, this paper examines the way that organizations manage intelligence from the environment.

Keywords: Intelligence, Management, Environment

1.0 Introduction

This paper looks at the way that organizations manage intelligence from the environment. Increasing numbers of firms are at the mercy of turbulent business environments (Koh and Maguire, 2009; Cheng et al., 2009). Their survival can often be reliant on a good source of business intelligence. This can range from data about their existing customers to intelligence about their competitors. It is worth noting that even customer data will be viewed as being of a strategic nature. For over 40 years organisations have laboured to try and get their internal systems in shape. Even well publicized developments such as enterprise resource planning (ERP) have mainly

concentrated on getting internal systems and processes in order. Data and information and their properties have been well documented. More recently knowledge has had a lot of coverage. The authors believe that intelligence should be given more credence for a number of reasons.

With the growth of extranets, inter-agency cooperation, strategic alliances, and virtual organisations there is greater scope for sharing intelligence. This is especially true for small and medium-sized enterprises (SMEs). An increase in the number of takeovers and mergers adds to the complexity surrounding access to business intelligence. A recent focus on the concept of ERP 2 (Moeller, 2005) has increased the need for intelligence to be viewed as a business necessity. It is even suggested that the fundamental wealth of an organization is reflected in their ability to utilize information, knowledge, and intelligence (Ghazanfari et al., 2011). The fact that business environments appear to be even more complex and dynamic means that many firms are planning with less certainty than before. How can firms undertake business planning if they do not know what their competitors are doing? (Maguire and Suluo, 2008; Maguire et al., 2009). Some firms are working in environments that are so turbulent the traditional planning process is almost redundant. The dynamic nature of world economies in the last 3 years has put this in even sharper focus. However, we feel that the literature has not kept pace with these changes. The paper will firstly address how intelligence is being covered in the current literature. It will then go on to look at one of the areas that requires further research – environmental scanning. It will then explore areas of research that will be required to make firms more effective in gleaning intelligence to make them more effective in dynamic business environments.

A dictionary definition of intelligence may concentrate on the operation of gathering information about an enemy. Business intelligence has been referred to as *the art of knowing your customers better than they do themselves.* Recent research on customer listening tools has shown this definition to be quite close to the truth (Maguire et al., 2007). Firms can no longer develop business plans in isolation. The business planning and strategic planning process cannot be undertaken within a closed system.

Intelligent and intelligence are not new words in the information systems field. In 1950 Alan Turing stated that a computer could be described as intelligent when the day arrives that a human being communicating with it does not know whether they are

interacting with a human or a machine. Recently we have accepted that no system, automated or otherwise, can process information in the same intuitive conscious manner as undertaken by human beings (Cleary, 1998; Maguire et al., 2010). We can make computers appear intelligent in certain domains (IBM Deep Blue managed to beat the world chess champion in 1997).

When artificial intelligence (AI) is applied in a business context it can be aligned to knowledge-based systems where human knowledge is used to solve problems. It can be argued that it is close to expert systems where computer programmes represent the knowledge of human experts in the form of heuristics. Intelligence is an essential asset for organisations, whether it is human or artificial. However, human intelligence is still viewed as the most important and sophisticated form of intelligence in the environment (Elliott, 2004). It may be the scanning activity that is the most important element. For over 25 years writers have seen the biggest strategic concern of business intelligence as how to convert the mass of data from the external environment into reliable and useful information for decision-making (Gilad and Gilad, 1985). Alternatively, business intelligence can be viewed as that range of tools and techniques that provide organisations with the capability of undertaking effective decision-making (Mikroyannidis and Theodoulidis, 2010).

The decision-maker should be continually on the lookout for information and knowledge and this might be continuous or periodic in nature (Marakas, 2003). It may be argued that the internal information that helps managers review and improve the performance of an organisation can be viewed as business intelligence (Chaffey and Wood, 2005). However, external information can support the process by monitoring trends in relation to market share and competitor activity. It may even be possible to use the information and intelligence to develop a vision and strategy for the organisation. Business intelligence can even be used to underpin decision-making at a strategic level for a particular initiative (Petrini and Pozzebon, 2009).

Recently more has been written about intelligent agents – autonomous, goal-directed computerised processes that can be launched into a computer system or network to perform background work while other foreground processes are continuing – than the interaction between intelligence and the decision-making process. An e-mail agent can interrupt an employee when necessary to deliver important information: a data-mining agent can sort and filter data in a database to identify trends; and a news agent can compile relevant, personalised news bulletins for

individuals. Identifying actionable signals from the environment and communicating these to decision-makers is often easier said than done (Rouibah and Ould-adi, 2002).

However, to be effective at extracting intelligence from the business environment it may be necessary for a group of staff to have a well-defined set of key competencies. Ability for visioning may be very important. Expertise in strategic planning may be useful but this may be dependent on the amount of turbulence in the environment. There will certainly be a requirement for flexibility, a need to be proactive. Being skilled in managing change may be crucial as business plans may require change on a regular basis. Environmental scanning will be required as this process takes place as part of an open system. It is proposed that the role of *intelligence analyst* will become more and more important to organisations. It is not within the scope of this paper to cover this range of competencies. However, an attempt will be made to give an overview of previous work undertaken in the area of environmental scanning.

Increasing environmental turbulence in the 1950's led practicing managers and theoreticians to the realisation that organisations could no longer be regarded as closed systems. Organisations had to be regarded as open systems that necessarily led to the inclusion of environmental considerations in the planning process. The mere fact that environmental considerations had to be included in the planning process necessitated the development of a process whereby information about the environment could be collected, analysed and acted upon. The necessity for environmental scanning came into being (Mendelow, 1982).

Business environments are constantly changing and they do not conform to traditional perspectives regarding the storage and use of management information. Mintzberg (1974), contrasted formal with informal information systems in order to explain why managers often favour the latter. He highlighted four basic weaknesses of the traditional Management Information System (MIS) concept: the formal information system is too limited; formal information systems tend to aggregate data as a result much of the information produced is too general for the manager; much formal information is too late; and some formal information is unreliable. Each of these issues highlights a lack of flexibility in the information system. There are even more pressures on organisations in dynamic business environments.

Organisations require adaptability, flexibility and the ability to create variety in order to survive in changing, complex environments. In contrast to this flexibility,

the organisation may require a technology for maintaining some consistency and intelligent behaviour (Cooper et al., 1981). In a general sense organisations need to be in balance with their environments. This can often take time that the firm doesn't have. Once an organisation has gone out of balance, getting this balance back again is inevitably a very difficult and sensitive process. In an ideal world, adaptation to the environment would be a gradual incremental process in which the dynamic balance of the organisation was not put at risk. In practice, however, competitive environments can change very quickly, and companies very often do not change with them (Hendry, 1995).

2.0 Information Systems and the Environment

Research suggests that organisations implementing information systems find it difficult to draw the correct boundary round the system they are considering, and they are often found wanting when the environment in which the system is being developed changes. This has had a major effect on the success, or otherwise, of system implementations. Environmental scanning requires an analysis of sub-systems, the system, wider system and environment. Many systems projects would be successful if the environment for which they had been developed had not changed over time, but virtually all organisations find themselves in competitive, changing environments. This problem is often accentuated when the organisation is unable to react quickly to changes in the environment. A basic problem with model-based approaches to defining information requirements is that they tend to result in conceptions of the organization as being in a static equilibrium, interacting with an environment which is effectively knowable, objectively verifiable and affected by the action of managers. The objective of the organisation is to adapt to its environment in an optimum sense, and to periodically reassess its strategy of adaptation as the environment changes (Boland, 1979). This is certainly the case with regard to competitor intelligence (CI).

To achieve a competitive advantage requires companies to quickly identify market opportunities and to take advantage of them in a fast and effective manner. However, it would be difficult to have any certainty in business planning without a modicum of knowledge about our competitors' situation (Maguire et al., 2010). CI can make this a reality. The primary goal of CI is to help in making decisions that improve a company's performance and promote its competitive advantage – making

consistently better decisions sooner will provide a competitive advantage (Maguire et al. 2009). It supports a given decision making process placing strategic information in the hands of decision makers empowering them to make better decisions leading to greater competitive advantage (Turban et al., 2004), and the outcome of CI is better decisions that improve and optimise business processes (Maguire et al., 2009).

If information requirements have been defined once and for all, it is debatable whether the organisation is flexible enough to react to changes in the environment that would change the original requirements. What the organisation should aim for is some sort of strategic flexibility (Hayes and Pisano, 1994). However, many organisations find it difficult to build in enough flexibility into their systems to allow for changes in the environment. However, a contract may have been signed for the delivery of a particular system. Changes to systems are expensive. It can only be hoped that flexibility can be built into the system during its original specification.   Organisations operating in changing environments actually need information systems that allow them to detect change (Hedberg and Jonsson, 1981). The only way an organisation can develop information systems that remain effective in turbulent environments is to make them as flexible as possible. However, when specifications are agreed between purchaser and supplier and the system is not scheduled to go live for another five years it is very difficult to change these agreements without substantial financial penalties.

Organisations that *can* predict potential changes in the environment will be better able to be proactive in the development of new information systems to take advantage of these changes. It is not enough, however, to be aware of changes in information technology. There is a requirement to be aware of potential 'business-winning' opportunities. One very good reason for updating the business, information and IT strategies on a regular basis, as outlined in the previous section, is that it may highlight not only changes in the environment, but possible business opportunities. All companies can benefit from continuously re-evaluating the environment and how their organisation interacts with it.   The introduction of new information systems/technology into organisations may challenge existing cultures. They may affect existing power structures, reporting mechanisms, and working practices. It has been suggested that turbulent environments make it easier for organisations to change existing cultures.

With totally integrated systems such as enterprise resource planning (ERP) extra reliance is put on their successful operation. If they cannot reflect the changing information requirements of the organisation the situation can arise where the output from the system does not match reality. The system may continue to be used by staff even when it is apparent that its output is incorrect. The situation may deteriorate and the output from the system will be gradually ignored by staff. It is difficult to break out of this downward spiral. A brave decision has to be made that the system is having a negative effect on the organisation and should be replaced.

A systems development approach clearly needs to be able to react to major changes in the environment. An argument could be put forward that because of the dynamic changes in information technology it is futile to have a strategy in this area. It is certainly of paramount importance that the applicability of the technology and existing systems is reviewed on a regular basis. Many organisations have been saddled with systems that do not respond to changes in the environment in which they are working.

It is very difficult to have a vision in terms of the future needs of the organisation in relation to information technology. Technology is changing at such a dramatic rate that it would be very difficult to have any confidence in a strategy that had a time horizon longer than twelve months. Suppliers of information technology are not usually prepared to change the technology of their clients in mid-project. If they do they will expect to be paid the full cost. The responsibility for identifying changes in the environment would rest firmly with the organisation. In changing environments a greater onus is placed on information systems to be able to cater for this change. It is, however not easy to build flexibility into information systems. However, if possible designers should try and build flexibility into their systems so that some of the consequences of changes in the environment can be addressed. This is especially true when one is considering the gleaning of business intelligence from an organisation's customers. The following case study refers to research in the area of customer listening tools (Maguire et al., 2006, 2007).

3.0 Case Study

Observing best practice and current experiences from four large organisations interested in improving their knowledge and understanding of the complex issues surrounding the management of customer satisfaction has produced a number of

interesting results. Measuring customer satisfaction identifies ways of improving product/service quality, which in turn leads to increased competitive advantage. World-class companies use a variety of different customer listening tools to collect customer information for fully understanding customers' needs, preferences, and perceptions. In total, ten listening tools were included in this study. All the companies emphasised that a deep understanding of their customer is a source of competitive advantage. Thus, the world-class companies go beyond surveys. They engage in a dialogue with customers at every opportunity and ensure that the insights that are captured are used in decision making at all levels of the organisation.

Confirmation from different customer listening tools could provide managers with more confidence and provide a better understanding of customer perception and decision-making. Yet we claimed that listening to customers must be considered from a holistic perspective in order to realise its full potential. However, the onus is on the individual companies to assess their customers, their business environment, and identify which customer listening tools are appropriate. They cannot do this without extracting crucial intelligence from the environment.

This study also pointed out several factors that could have a significant impact on the successful use of listening tools and the enhancement of customer relationship management. In summation, world-class companies constantly use multiple customer listening tools to glean feedback from customers; they use a deep understanding of customers to build products and services that meet customers' needs and expectations; and they track competition and innovation to improve operations and customer satisfaction management. Through the use of these tools a company's overall performance should improves and it is likely that it will increase its share of business with existing customers as well as attracting new customers. It is hoped that the benchmarking data will prove useful in creating possibilities for sharing experiences and also shed some light on aspects of customer satisfaction management for all organisations.

4.0 Conclusions

To ensure long-term survival organizations must focus on ensuring they are able to generate enough intelligence on their customers, competitors and the business environment in which they are working. If information systems are used to analyse this intelligence extra resources may be required at the design stage to ensure critical

elements are able to be retrieved from the database or data warehouse. There is substantial likelihood that the business intelligence gleaned from the environment will be used alongside the existing data from formal information systems. It is the ability to get the most from both sources that may differentiate organizations in the future. It may be a case of less is more in terms of what today's business decision-maker is able to process given time constraints.

The system designer will need to know the individual idiosyncrasies of the various decision-makers within the firm to ensure the most effective set of intelligence sources are utilized for a particular situation. Modes of decision-making must be carefully studied. It is important that the designer and the decision-maker work closely together to ensure that the channels of communication are clearly understood. This should enable the design process to be more effective and be more proficient for a longer length of time. Lastly, it should be taken for granted that any intelligence that is stored should be able to be retrieved in a very short space of time. The technical competence of the decision-maker should not interfere with the organisation's ability to react to changing business situations.

Generating intelligence on the business environment is particularly challenging when considering the reality of today's business environment. With increased competitive pressures in much of Western Europe, organisations are now seeking to expand their business operations in emerging markets. However, as has been shown in research (Ojiako et al., 2012; Marshall et al., 2012), with globalization, organisations are now facing different forms of competition which in some cases brings about an intense demand to balance ethical considerations when faced with *'unconventional'and asymmetric competition'*. Under different conditions, firms are also increasingly faced with more indigenous customers (Ojiako and Aleke 2011). Both different sets of competition have considerable different demands on intelligence

With the increasing adoption of enterprise resource planning (ERP) by small and medium sized enterprises across the world there may be a necessity to identify their value to organizations. This is especially true in relation to the aforementioned concept of ERPII (Moeller 2005). Would it be possible to measure the worth of the business intelligence within systems such as customer relationship management (CRM) and supply chain management (SCM) (Ghazanfari et al., 2011).

To generate real competitive advantage companies have to develop their own systems and ways of working rather than copying others. Increasing customer

satisfaction and Customer Relationship Management (CRM) have become the main focus of many firms to boost repeat business and benefit from positive word-of-mouth, thus increasing long-term profitability. As a result, increasing customer satisfaction is an important goal in business practice today, measurement of satisfaction is becoming increasingly common, and customer satisfaction and relationships research are by far the most popular means of gathering customer feedback. Since customer tastes and requirements are always changing, a major part of the quality effort must be devoted to market research.

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