

4 Portal technologies and Executive Information Systems implementation

This chapter appears in Encyclopedia of Portal Technology and Applications edited by A. Tatnell.
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4.1 Introduction

Portals may be seen as World Wide Web ('the Web') sites which provide the gateway to corporate information from a single point of access. The potential of the Web portal market and its technology has inspired the mutation of search engines (for example Yahoo!) and the establishment of new vendors (for example, Hummingbird and Brio Technology). Leveraging knowledge – both internal and external – is the key to using a portal as a centralised database of best practices that can be applied across all departments and all lines of business within an organisation (Zimmerman, 2003). A portal is simply a single, distilled view of information from various sources. Portal technologies integrate information, content and enterprise applications. However, the term portal has been applied to systems that differ widely in capabilities and complexity (Smith, 2004). Portals “aim to serve particular communities, including various business groups” (Deise *et al.*, 2000). A portal aims to establish a community of users with a common interest or need.

Portals include horizontal applications such as search, classification, content management, business intelligence (BI), Executive Information Systems (EIS) and a myriad of other technologies. Portals not only pull these together but are also absorbing much of the functionality from these complementary technologies (Drakos, 2003). When paired with other technologies such as content management, collaboration and BI, portals can improve business processes and boost efficiency within and across organisations (Zimmerman, 2003). Given the overlap between portal technologies and EIS, this article investigates the level of impact (if any) between them.

4.2 Background

Gartner defines a portal as “access to and interaction with relevant information assets (information/content, applications and business processes), knowledge assets and human assets, by select target audiences, delivered in a highly personalized manner” (Drakos, 2003). Drakos (2003) suggests that a significant convergence is occurring with portals in the centre. Most organisations are being forced to revisit their enterprise-wide Web integration strategies (Hazra, 2002). A single view of enterprise-wide information is respected and treasured (Norwood-Young, 2003). Enterprise Information Portals are becoming the primary way in which organisations organise and disseminate knowledge (PricewaterhouseCoopers, 2001).

Spoornet is southern Africa’s largest railroad operator and heavy hauler with 3,500 locomotives moving approximately 180 million tons of freight annually. Securing a “comprehensive view of its [Spoornet’s] own complex logistics environment has long been a dream for management” (Norwood-Young, 2003). During October 2002, vendor Sybase implemented the first stage of a project providing an executive portal to Spoornet management. Norwood-Young (2003) reports that executive management “had a single view of Spoornet’s resources and applications – “digital dashboard”” ... “Our executives waited for decades to be taken to such a high level of business functionality”. The portal is a technology in search of a business problem (Drakos, 2003). With EIS established in organisations in South Africa and the presence of portal technologies, there is thus a need to investigate the link (if any) between EIS and portal technologies.

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EIS grew out of the development of information systems (IS) to be used directly by executives and used to augment the supply of information by subordinates (Srivihok, 1998). For the purposes of this paper, EIS is defined as “a computerized system that provides executives with easy access to internal and external information that is relevant to their critical success factors” (Watson *et al.*, 1997). EIS are an important element of the information architecture of an organisation. Different EIS software tools and/or Enterprise Resource Planning (ERP) software with EIS features exist. EIS is a technology that is continually emerging in response to managers’ specific decision-making needs (Turban *et al.*, 1999). Turban (2001) suggests that EIS capabilities are being “embedded in BI”. All major EIS and information product vendors now offer Web versions of the tools designed to function with Web servers and browsers (PricewaterhouseCoopers, 2002).

Web-based technologies are causing a revisit to existing IT implementation models, including EIS (Averweg *et al.*, 2003). Web-based tools “are very much suited” to executives key activities of communicating and informing (Pijpers, 2001). With the emergence of global IT, existing paradigms are being altered which are spawning new considerations for successful IT implementation (Averweg and Erwin, 2000). Challenges exist in building enterprise portals as a new principle of software engineering (Hazra, 2002). Yahoo! is an example of a general portal. Yahoo! enables the user to maintain a measure of mastery over a vast amount of information (PricewaterhouseCoopers, 2001). Portals are an evolutionary offshoot of the Web (Norwood-Young, 2003). The Web is “a perfect medium” for deploying decision support and EIS capabilities on a global basis (Turban *et al.*, 1999).

4.3 Survey of Web-based technologies’ impact on EIS

Computer or IS usage has been identified as the key indicator of the adoption of IT by organisations (Suradi, 2001). As the usage of IT increases, Web-enabled information technologies can provide the means for greater access to information from disparate computer applications and other information resources (Eder, 2000). Some Web-based technologies include: Intranet, Internet, Extranet, e-Commerce Business-to-Business (B2B), e-Commerce Business-to-Consumer (B2C), Wireless Application Protocol (WAP) and other mobile technologies and portal technologies. The portal has become the most-desired user interface in Global 2000 enterprises (Drakos, 2003).

The technology for EIS is evolving rapidly and future systems are likely to be different (Sprague and Watson, 1996). EIS is now clearly in a state of flux. As Turban (2001) notes, "EIS is going through a major change". There is therefore both scope and need for research in the particular area of EIS being impacted by portal technologies as executives need systems that provide access to diverse types of information. As with any other IT investment, the use for a portal must be well-understood (Drakos, 2003). Emerging (Web-based) technologies can redefine the utility, desirability and economic viability of EIS technology (Volonino *et al.*, 1995). There exists a high degree of similarity between the characteristics of a "good EIS" and Web-based technologies (Tang *et al.*, 1997). With the absence of research efforts on the impact of portal technologies on EIS implementations in South Africa, this research begins to fill the gap with a study of thirty-one selected organisations in KwaZulu-Natal, South Africa which have implemented EIS.

A validated survey instrument was developed and contained seven-point Likert scale statements (anchored with (1) Not at all and (7) Extensively) dealing with how an interviewee perceives specific Web-based technologies impacted his organisation's EIS implementation. The Web-based technologies are (1) Intranet; (2) Internet; (3) Extranet; (4) e-Commerce: Business-to-Business (B2B); (5) e-Commerce: Business-to-Consumer (B2C); (6) Wireless Application Protocol (WAP) and other mobile technologies; and (7) Any other Web-based technologies (for example portal technologies). The questionnaire was administered during a semi-structured interview process. A similar approach was adopted by Roldán and Leal (2003) in their EIS survey in Spain. Pooling data across different technologies is consistent with prior research in user acceptance (see, for example, Davis, 1989, Venkatesh and Morris, 2000).

The sample was selected using the unbiased "snowball" sampling technique. This technique was also used by Roldán and Leal (2003). The sample selected included organisations with actual EIS experience with representatives from the following three constituencies: (1) EIS executives/users; (2) EIS team; and (3) EIS vendors or consultants. These three constituencies were identified and used in EIS research by Rainer and Watson (1995). A formal extensive interview schedule was compiled and used for the semi-structured interviews. Interviews were conducted during May-June 2002 at the interviewee's organisation in the eThekweni Municipal Area (EMA) in South Africa. EMA is the most populous municipality in South Africa (SA2002–2003, 2002) with a geographic area size of 2,300 km² and a population of 3,09 million citizens (Statistics South Africa, 2001). The survey of organisations in KwaZulu-Natal which implemented EIS is confined to organisations in the EMA.

From the author's survey instrument, a wide range of different available commercially purchased EIS software tools and/or ERP software with EIS features used by the respondents in the organisations surveyed was reported. These included Cognos®, JDEdwards BI®, Oracle®, Hyperion®, Lotus Notes®, Business Objects® and Pilot®. Cognos® was the most popular EIS software tool comprising 60,0% of the sample surveyed. In the USA, Cognos®, Business Objects® and Oracle® have the highest top-of-mind awareness (Gartner, 2002). Gartner (2002) reports that in Europe, SAP®, MicroStrategy®, Business Objects® and IBM® have highest top-of mind awareness. Furthermore Europe seems to focus more on full-solution vendors (for example IBM®, SAP®) than strictly EIS product-focused vendors. Drakos (2003) suggests that the portalisation of vertical applications such as ERP, customer relationship management (CRM) and supply chain management (SCM) is driving multiple vertical portals into single enterprises.

From the survey instrument, a summary of data obtained of the degree to which specific Web-based technologies impacted the respondent's EIS implementation in the organisations surveyed, is reflected in Table 1.



Web-based technology	The degree to which Web-based technologies impacted respondent's EIS implementation (N=31)						
	Not at all	Very little	Somewhat little	Uncertain	Somewhat much	Very much	Extensively
Intranet	17 (54,8%)	2 (6,5%)	2 (6,5%)	0 (0,0%)	3 (9,7%)	4 (12,9%)	3 (9,6%)
Internet	21 (67,7%)	1 (3,2%)	1 (3,2%)	0 (0,0%)	2 (6,5%)	3 (9,7%)	3 (9,7%)
Extranet	24 (77,4%)	1 (3,2%)	2 (6,5%)	1 (3,2%)	1 (3,2%)	2 (6,5%)	0 (0,0%)
e-Commerce: (B2B)	28 (90,4%)	1 (3,2%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	1 (3,2%)	1 (3,2%)
e-Commerce: (B2C)	26 (83,9%)	1 (3,2%)	1 (3,2%)	0 (0,0%)	2 (6,5%)	0 (0,0%)	1 (3,2%)
WAP and other mobile technologies	29 (93,6%)	1 (3,2%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	1 (3,2%)
Portal technologies	26 (83,8%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	2 (6,5%)	2 (6,5%)	1 (3,2%)

Table 1: Tally and associated percentage of the degree to which specific Web-based technologies impacted respondent's EIS implementation

Table 1 shows that only seven (22,5%) of organisations surveyed report that the Intranet significantly impacted their EIS implementation. Intranets are usually combined with and accessed via a corporate portal (Turban *et al.*, 2005). The level of impact by the Internet on EIS implementation is slightly lower with six (19,4%) of organisations surveyed reporting that the Internet has significantly impacted their EIS implementation. While 24 (77,4%) of organisations surveyed report that the Extranet had no impact on their organisation's EIS implementation, the balance of the data sample (22,6%) report different degrees of impact. The results show that the vast majority (90,4%) of respondents report that e-Commerce: (B2B) has not impacted EIS implementation in organisations surveyed. A slightly lower result (83,9%) was reported for e-Commerce: (B2C). One possible explanation for the e-Commerce (B2B) and (B2C) low impact levels is that the software development tools are still evolving and changing rapidly.

WAP and other mobile technologies have no (93,6%) or very little (3,2%) impact on EIS implementations. Of the seven Web-based technologies given in Table 1, WAP and other mobile technologies have the *least* impact (combining "Somewhat much", "Very much" and "Extensively") on EIS implementation in organisations surveyed. Only one respondent (3,2%) reported that WAP and other technologies had extensively impacted the EIS implementation in her organisation. A possible explanation for this result is that the EIS consultant was technically proficient in WAP technologies. The potential benefit of mobile access to portals are numerous and self-evident. PricewaterhouseCoopers (2002) note that organisations must first establish the benefits of mobile access to its portal and assess the value of providing those benefits via mobile access to the organisation. However, portals and related technologies promise that applications will be more operable, integrative and adaptive to user needs (Drakos, 2003).

From Table 1, three interviewees reported that their organisation's EIS implementations were significantly impacted ("Very much" and "Extensively") by portal technologies. At first this may appear to be noteworthy as the portal technology impact on EIS implementations (9,7%) is higher than the Extranet (6,5%), e-Commerce: (B2B) (6,4%), e-Commerce: (B2C) (6,4%) and WAP and other technologies (3,2%) impacts. However, it should be noted that the impact levels of all the Web-based technologies assessed are fairly low. This still means that after the Intranet and Internet, portal technologies have the third highest impact on EIS implementations in organisations surveyed. Combining the results ("Somewhat much", "Very much" and "Extensively") for each of the seven Web-based technologies, Table 2 gives a descending ranking order of the levels of impact of Web-based technologies on EIS implementations. This information is particularly useful for IT practitioners in planning future EIS implementations.

Rank	Web-based technology	Tally and level of impact on EIS implementations
1	Intranet	10 (32,2%)
2	Internet	8 (25,9%)
3	Portal technologies	5 (16,2%)
4	Extranet	3 (9,7%)
4	e-Commerce: (B2C)	3 (9,7%)
6	e-Commerce: (B2B)	2 (6,4%)
7	WAP and other mobile technologies	1 (3,2%)

Table 2: Descending rank order of impact levels of Web-based technologies on EIS implementation

4.4 Future trends

Meta Group expects B2B usage (encompassing partner and supplier portals) to expand by 50% by 2006 (Meta Group, 2003). The need for a portal usually becomes evident when an Intranet (or sometimes an Extranet or Internet site) accumulates more information than can be presented in a static manner. An Enterprise portal (also known as Enterprise Information Portal or corporate portal) is an approach in Intranet-based applications. Bajgoric (2000) notes that it goes a step further in the 'webification' of applications and integration of corporate data. The function of corporate portals may be described as "corecasting" since they support decisions central to particular goals of an organisation (Turban *et al.*, 2005).

Several "portal-based" products particularly from the BI area exist. The Hummingbird Enterprise Information Portal® (see Internet URL <http://www.hummingbird.com>) is an example of an integrated enterprise-wide portal solution. It provides organisations with a Web-based interface to unstructured and structured data sources and applications. Access to applications is a critical feature that distinguishes the current generation of enterprise portals from their predecessors (PricewaterhouseCoopers, 2002). The market for portal products will continue to coalesce during the next several years (Meta Group, 2003).

BI portal is a software product based on the Web concept of a portal site that lets organisations deliver information from a variety of sources to end-users (Bajgoric, 2000). Bajgoric (2000) reports that an Enterprise Information Portal describes a system that can be used to combine an organisation's internal data with external information which provides a powerful decision support capability. WebIntelligence® from Business Objects (see Internet URL <http://www.businessobjects.com>) includes a BI portal that gives users a single Web entry point for both WebIntelligence® and BusinessObjects®, the organisation's client-server reporting and OLAP system. Brio.Portal® from Brio Technology is another example of integrated BI software capable of retrieving, analysing and reporting information over the Internet. The role of portals is to ferry information to the users. Developers must be aware of emerging trends in the portal market to create systems that will be able to incorporate the latest technological developments and new methods of information delivery and presentation (Meta Group, 2003). This will serve to reduce costs, free busy executive's and manager's time and improve an organisation's profitability. Personalised technologies are becoming part of the portal environment (Zimmerman, 2003). Corporate portals help to personalise information for employees and customers (Turban *et al.*, 2005).

4.5 Conclusion

The findings of this survey show that while EIS have a significant role in organisations in the EMA, their technological base is not affected considerably by the latest innovations of Web-based technologies. This requires further investigation as to whether it is a signal for the fact that IT in South Africa is not transforming fast enough to adopt portal technologies.



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The author contends that portal technologies will become part of the organisational structure fabric and change the way infrastructure is viewed by the IT organisation. As evidenced in the case of Spoornet, “a simple portal has changed the company intrinsically” (Norwood-Young, 2003). Two trends will drive organisations to accept portals as business-critical: the ability to (1) deliver the availability and security required to support mission-critical functions; and (2) meet the needs of users outside the organisation’s employees. Organisations will need to take the database knowledge in their organisations, open them to business partners and suppliers in an effort to try and build a community. There must be a desire to make these commitments worthwhile and draw users back to the portals.

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