The Influence of Culture on Enterprise Portal Design in a Global Environment

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ABSTRACT
Enterprise portals collect and synthesize information from various systems to deliver personalized and highly relevant information to suppliers, customers and employees. While enterprise portal design and portal applications have been widely discussed in the literature, the implications that arise when the scope of such portals is global have not yet been explored. Thus, this paper aims to highlight the implications and the opportunities of enterprise portals for international, transnational and multinational businesses, paying special attention to the influence of culture on portal design. More specifically, we argue that culture has a significant influence on a number of important portal design considerations—including color, icons, symbols, language use and portal layout.

INTRODUCTION
Sifting through voluminous amounts of Internet and intranet information to find relevant material is a daily nuisance for people all over the world. General search engines provide quick results, but one is very dependant on finding just the right combination of keywords, and, even for the best search engine the coverage of its search index is no more than 16% of all the material available on the Internet (Lawrence & Giles 1999). A number of strategies have been employed to reduce this nuisance, including the use of categories, filter sites and the grouping of results according to content—e.g. sports, tourism, finances, news, culture, etc. Functionality has also been expanded to include membership in virtual communities, real time chats, personalized search engine interfaces like My Yahoo and My Excite, and access to specialized commercial content. This aggregation and bundling of information, distributed to various users by a single access point - be it through intranets, extranets, or the Internet – is commonly referred to as a portal (Tatnall 2004). Our definition of a portal is: an integrated and personalized web-based application that provides the end user with a single point of access to a wide variety of aggregated content anytime and anywhere using any web-enabled client device.

The evolution of portal applications has attracted the attention of the business world, because the same underlying technology can also be adopted to manage, structure, and facilitate access to enterprise information as well. Most contemporary organizations use portals to identify, capture, store, retrieve or distribute great amounts of information from multiple internal and external information sources. Portals are used to deliver information and applications to their employees (Counsell, 2004; Daniel & Ward, 2003); to provide staff with job- or task-related information and knowledge (Detlor, 2004; Terra & Gordon, 2003); and as a way to enable collaboration and interaction with external business partners (Detlor, 2000; Dias, 2001). Portals not only deliver information, but improve the usefulness of the information itself by tailoring it according to the role, location or interest of the individual user (Ben-Arieh & Pollatscheck, 2002).

With the continuing rapid development of internet technology, portals have emerged as one of the most promising opportunities in the management of enterprise information—including information dissemination, information access, information sharing, and information exchange (Collins, 2002; Terra and Gordon, 2003; Detlor, 2004). Numerous 'enterprise portals' have been developed, including employee portals, e-market portals, enterprise collaboration portals, enterprise knowledge portals, and others. Research on enterprise portals is also abundant, but most studies have concentrated either on enterprise portal design (Detlor, 2000; Bock, 2001; Ben-Arieh & Pollatscheck, 2002), enterprise portal applications (Dias, 2001; Collins, 2002; Terra and Gordon, 2003; Daniel and Ward, 2003, Detlor, 2004) or on content management and the customization or personalization according to portal-users' roles and information requirements. Whereas portals provide great opportunities to business, *global* portals provide even larger opportunities due to the larger scale, but also the larger diversity of the information represented. Thus, an important yet under-represented area in research to date is culture, and specifically the influence of culture on enterprise portal design. The purpose of this paper is therefore to fill this research gap and highlight the implications and the opportunities of enterprise portals for international, transnational and multinational businesses, paying special attention to the influence of culture on portal design in a global environment. We will show how culture influences several factors of the design, implementation and usage of portals in a global context. This study should be of benefit to managers, educators, and students involved in international business intelligence, information systems management, information resource management, and knowledge management. The structure of the paper is as follows: First, we draw attention to the opportunities enterprise portals provide for improving the daily information flows within an enterprise. Then, we discuss the influence of culture on global enterprise portal design by means of five elementary points. The final section then summarizes our key findings and highlights important implications for management and research.

BUSINESS OPPORTUNITIES FOR ENTERPRISE PORTALS
By serving the needs of large and diverse number of users, enterprise portals can be extremely helpful in the alignment of business and IT. This is not an easy task as the portal must integrate information from a large number of different functions, including purchasing, R&D, manufacturing and production, finance, sales and marketing, etc. The enterprise portal delineates and explicates the internal collaborations and interoperability requirements among these various functions and collaborating groups. Since an enterprise portal offers a single point of access and a single point of information interchange (Hazra, 2002), an enterprise portal could integrate business events across existing information systems and departmental boundaries thus facilitating the internal collaborations and promoting interoperability among the different departments within the enterprise.

Furthermore, the enterprise portal can help employee to be highly productive and competitive. Those capabilities of an enterprise portal give employees a resourceful and aspiring role in the organization because they could personalize information for business decision making. Meanwhile, the personalized information allows employees to find high quality information without having to spend copious amounts of time browsing. It also reduces massive quantities of information into the customized set. The effective information acquisition and utilization make employees more productive in doing their job and thus businesses more competitive.

In addition, the enterprise portal introduces business information management for enterprises with an extension to reach the customers, suppliers, and business partners in their network. In this way, the enterprise portal can support supply chain management and customer relationship management for both businesses and customers. In practice, business relationships evolve in multiple directions

in which buyers, sellers, and brokers of goods and services come together to exchange information, obtain specific knowledge, and conduct transactions. An enterprise portal could extend to potential customers worldwide as well as in the search for optimized suppliers by comparing supplier offerings and prices instantly in a real-time manner. Additionally, the collaboration relationship with suitable business partners is possible, such as collaboratively designing products, matching and responding to customer demands by the entire value chain players, etc. Accordingly, an enterprise portal can provide enterprises with a genuine capacity to enable real-time, interactive exchange of business transaction information and integration of business processes in a network; e.g. of trading partners, buyers, sellers, brokers or intermediaries, and e-business service providers.

The enterprise portal and its various applications shown above strongly suggest that an enterprise portal can contribute to both internal and external integration of enterprise businesses. The internal integration includes the back-end processes required for complete fulfillment of customer requests, which may involve the major customer-client interactions (such as registration, marketing, payment, and so on) and management of customer transactions (such as accommodating requests from the website for products and services, or integration of the vast amounts of customer information). The external integration combines services from multiple providers (such as partners of a supply chain) to support extended transaction management, information exchange, coordination, and collaboration along the entire business value chain. In addition, personalization can help in providing more relevant information, as opposed to more information.

CULTURAL INFLUENCES ON THE DESIGN OF ENTERPRISE PORTALS

From a technical point of view, extending an enterprise to global scale presents challenges, but none that cannot be overcome. But what of the users? Global scale also brings different languages, different life styles and different cultures, all of which affect the perceptions and expectations of users (Ruta, 2005). Two users may have completely different interpretations of a single message displayed on a portal. What are the portal design factors that are influenced by culture, and what are the possible differing perceptions, expectations and interpretations of international portal-users? We highlight five design factors that need to be considered. Next to language differences, important roles are also played by color, icons, symbols, and layout (e.g. Choong & Salvendy 1998; Del Galdo, 1990; Fang & Rau, 2003; Ossner, 1990; Rau, Choong & Salvendy, 2004; Spencer, 1988; Tractinsky 2000).

Language-differences between countries are one of the more obvious hurdles that global portals must overcome. The differences require more than just translation of text, but call for consideration of the meaning and implications attached to words and phrases and how those meanings and implications vary across borders (see for instance the UNESCO B@bel initiative). There are technical considerations as well, such as the difference between single- and double-byte characters for Western and Chinese text, respectively. But in addition to the more obvious language differences, we like to draw attention to numerous other, often overlooked yet important factors that also differ by country and must be considered when designing portals that are global in scope. The factors include color, the use of icons, symbols and portal layout. We consider each of these in turn.

Color is a useful and important consideration, as it both catch and hold the user's attention. It can also help to sustain, reinforce and enhance a positive experience during searching or browsing. However, in a global context, colors connote very different meanings. For instance, colors that are sacred differ between Judeo-Christian West (red blue, white, gold), Buddhist (saffron yellow) and Islamic (green) traditions. Subdued Finnish designs for background screen patterns might, or might not be suitable in Mediterranean climates (Marcus, 2003). Based on Russo and Boor **(1993) s**ome significations of colors related to several countries are adopted, and presented below in table 1.

As shown in table 1, a single color will have very different meanings from country to country; while similar meanings may be represented with completely different colors. For example, red means happiness, prosperity, and success in China, and is the most preferred color for celebrations, such as weddings. It is also often used to decorate festivals sites, important events, or to welcome very important persons. Nevertheless, red color represents danger for Anglo-American, anger for Japanese, and death for Arabs. A similar example is white color, which represent purity for Anglo-American and is commonly used for weddings, but represents death for Chinese and is normally used during funerals. Thus, in a global environment,

Table 1. Colors related to some countries--adapted based on Russo and Boor (1993)

Color / Country	Red	Green	Yellow	White
Anglo-American	Danger	Success; Safety	Coward	Purity
French	Aristocrat	Crime	Lucky; Temporary	Neutral
Chinese	Happy; Success	Life; Hope	Wealthy; Powerful	Death
Japanese	Anger; Danger	Young; Energetic	Grace; Nobility	Death
Arab	Death	Fertile; Strong	Happy; Wealthy	Joy
Indian	Life	Wealth; Fertile	Success	Death

differences in color go deeper than just appearance, and the selection of colors can be a difficult and sensitive decision for designers of global portals.

Similar to color, the meaning of *icons* also varies from one country to the next. Icons that represent everyday objects or functions in one country may be perceived as obstacles by users in another country. Nielsen (1999) suggested that, in general, hands or feet as icons should be avoided. Additionally, animal icons may have subtly different meanings by country. For instance, an owl represents wisdom in many western countries but implies something evil in some eastern countries. To most westerners, the dragon is a fearsome mythical animal, but to the Chinese, the dragon has a more positive and mythological connotation. Chinese people considered the dragon as a representative of wisdom and a source of blessings. Another example is that a dog can be a lovely image in some countries, but it is seen as the lowest form of life in some other countries. Some icons may convey meanings that are not only different, but contradictory. Sabre's Planet Sabre, one of the world's largest extranets, whose UI+IV was designed by the authors' firm, uses multiple variations of icons for an e-mail 'mailbox,' to account for national differences (Marcus, Armitage, Frank & Guttman, 1999).

Symbols are also commonly used for international communication, but similarly to colors and icons, the meanings of symbols are country and culturally specific. One example to consider is whether selecting symbols such as the "X" or check marks convey the correct distinctions as to 'selected' or 'de-selected. Looking again to China, an "X" is most commonly used to cross out what is not desired rather than indicating what is to be selected, which is precisely the opposite in many western countries.

Regarding the *layout of portals,* reading direction across the world can be generally divided into three types, the most popular being left-to-right, and row-by-row, from top to bottom. However, in some regions people read from *right-to-left*, and row-by-row, from top to bottom. Moreover, a third way to read is from right-to-left and *column-by-column*, such as in traditional Chinese layout that is still very popular in Taiwan, Hong Kong and certain locations in mainland China. Obviously, left-to-right sequencing may be inappropriate or confusing for use with right-to-left reading scripts or with icon layout. Studies have shown how pictorial information should be presented and organized for scanning on a display according the direction the script flows naturally in the user's first language (Badre, 2000). The early version of a website called Arabia.On.Line, for example, intended to be a place where western readers could learn about Arab countries, mistakenly laid out its contents as though the text were written in Arabic, for Arabic readers. The result was an arrangement of icons that was misleading for the (Western) viewer's eye, and led them in directions inconsistent with that intended by the designers (Marcus, Armitage, Frank & Guttman, 1999). As a final, somewhat humorous example, consider a billboard where a woman on the left is shown unhappy, next to a pile of dirty laundry, while the woman on the right of the billboard is shown smiling, next to clean laundry and holding a certain brand of washing powder. Now imagine how the message might change for viewers who are accustomed to reading from right to left!

CONCLUSION

In this paper we have focused on the business opportunities for enterprise portals and subsequently the influence of culture on enterprise portal design. Enterprise portals can help in integrating internal as well external information flows. Internally, to be effective, enterprise portals require seamless information flows across the organization. When enterprises are bold enough to provide their employees such broad access, cross-linking between all sorts of departments becomes possible. Employees are enabled to consider issues and opportunities—and potentially adding value—well beyond their own functional domain. Similarly, external integration can lead to the development of value networks which extend beyond enterprise boundaries, linking together the information systems of supplies and customers, to minimize order-to-cash, production, and other key cycle times. Furthermore, personalization can enhance the productivity of employees as information is filtered for relevance and the effectiveness of search results—and the work that depends on them—is improved. Capturing these benefits for global enterprise portals, however, requires careful consideration of the influence of culture. Not only language, but also color, icons, symbols and layout—these are examples of portal design considerations that are relatively simple, but that have a strong impact on the successful deployment of an enterprise portal in a global environment (Fang & Rau, 2003).

Managers and portal designers need to consider that enterprise portals will only be successful when a portal can provide most of the services, information, and links that users want (Tatnall, 2004). Nonetheless, portal design has been limited to portals providing user-customizable access to information and applications through a browser (White, 2000). In other words, user-customization does not yet include personalizing the cultural factors, e.g. color, icon, symbol, language, and layout, when portal-users are granted access to portals. To meet the requirements of international portal-users, portal designers should be sensitive to such user-customization in a global context. Next to improving portal design, this knowledge can also be used to improve portal utilization. When enterprise portals are used much less in certain regions than in other regions, perhaps the designers should look for possible conflicts in the meaning of colors, icons, symbols, language and layout.

Finally, we propose that future research be directed at studying various cases of portal design and use and verify how the influence of culture affects portal design and use in a global environment. It would be particularly meaningful if the study results could indicate specifically which factors most influence portal utilization across national borders. The findings of case studies would greatly contribute to the international portal design and development. To satisfy a wider range of users in different locations globally, future research efforts are needed for portal products that can be further customized or personalized. Although portals currently allow users to customize the applications and information they need, the customization should go further in a global environment to include personalization of appearance as well. For example, investigation of "reusable libraries" in which various optional and pre-configured packages or palettes of colors, images, icons, symbols, languages, templates, etc. may prove useful. These optional components are reusable and can be seen as building blocks, which could better fit specific national and/or cultural requirements. Only after consideration of these cultural influences can enterprise portal design become truly global.

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