Intra-organizational Connectivity and Interactivity with Intranets:  
The case of a Pharmaceutical Company

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Intra-organizational Connectivity and Interactivity with Intranets:
The case of a Pharmaceutical Company

Niki Panteli¹, Ioanna Tsiourva and Soy Modelly

Abstract

The paper argues that connectivity and interactivity are key features of effective intranet systems which promote knowledge sharing and innovation within organizations. Yet these features have not been well-conceptualised in the literature. Using the case of a large pharmaceutical organization where we evaluate intranet use, we reconceptualise these two concepts and examine their inter-relationships. In this paper, we develop a model that presents the relationship between intranet connectivity and interactivity. In doing so, the concept of connectivity is broadened up to include both technological and organizational connectivity. It is found that the intranet connectivity to other communication media contributes to intranet interactivity when both organizational connectivity and technological connectivity are in place. Finally, the implications for research and practice are discussed.

Key words: intranet, connectivity, interactivity, case study

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**Introduction**

Intranets have generated considerable interest among business organizations in the recent years. They have been found to enhance productivity by enabling employees to share information and documentation in an efficient and cost effective way (Wachter and Gupta, 1997), whilst they are also being seen as an effective solution to problems related to intra-organizational communication, knowledge sharing and innovation (Edenious and Borgenson, 2003; Newell, et al, 2001; Scott, 1998). However, there has been an increasing realization among researchers and practitioners that an intranet in itself may not provide the expected benefits for effective intra-organizational communication (Damsgaard and Scheepers, 2000). In this paper, we aim to examine the connectivity and interactivity potentials of intranet systems and the inter-relationships between the two. We argue that these characteristics have an effect on intranet usage.

While connectivity refers to the spread and accessibility of intranet technology within an organization contributing to a single common user interface to many different kinds of applications (Carr, 1996), interactivity refers to the degree of collaborative use that leads to mutual influence and understanding (Rafaeli, 1988; Rafaeli and Sudweeks, 1997). The latter poses new challenges for organizations in terms of creating, sharing and managing knowledge and expertise (Newell, et al, 2001). Despite these, relatively little research has been devoted to understanding intranet as an interactive medium both conceptually and empirically as well as the relationship between its interactivity and connectivity capabilities.

Following from these, this study goes beyond any existing research by proposing a framework which takes a focus on both the level of connectivity and the level of interactivity that is linked to intranet use. It is argued that this approach provides a more informed explanation and a deeper understanding of the potentials of intranets and a richer analysis of the actual use of intranet systems and their role in business communication. This has implications not only for defining what constitutes successful intranet use but also for generating strategies for improving knowledge sharing and collaboration among different users (individuals, groups, departments) and among the same users over time.
The study addresses these issues by focusing upon the way intranets are designed, implemented and diffused within a pharmaceutical company. In the following sections, the benefits and importance of intranets in organizational communication and collaboration are discussed. The literature review contributes to the development of a model that taxonomises the potentials for interactivity and connectivity. The findings of the empirical study are presented and analysed. Finally, the implications of the study for both research and practice are discussed in the concluding section.

Intranet usage within Organizations

Intranets are prominent intra-organizational information systems. They are communication systems based on internet technologies that exist within the organizational network (Bernard, 1996) enabling the connectivity of disparate systems (Eder and Igbaria, 2001). They are collaborative tools that primarily include applications such as e-mail, discussion databases, video and audio. Moreover, an intranet system can integrate text, sound and video and user-organizations can include in multimedia features such as newsgroups, online meeting facilities, videoconferences and personal web pages. As a result it is characterized as an interactive and reflective medium (Markus, 1987). Access is restricted to employees and is protected from public visits by firewalls.

Intranet is a tool used to manage information and to promote interaction (Schachtman, 1998). However, as organizations increasingly expand globally their geographically dispersed and remote workforce may not have adequate opportunities for face to face communication; therefore, they have to rely on computer-mediated communication media. Intranet is one such medium that is used to support effective organizational communication (Brown, 1998) and innovation (Andersen, 2001). Its global connectivity potential helps employees to receive and disseminate their own information and knowledge. In addition, Intranet differs because it is a software system that has no well-defined boundaries or time-span and is not always designed by experts (Damsgaard & Scheepers, 1999). Users have the chance to become developers; they can use Intranet features to create home pages and publish information.
Accordingly, the introduction of Intranets could lead to significant implications on the way organizational communication is structured and information system services are organized and delivered (Lyytinen et al., 1998). Bansler et al (2000) found that the role of information technology departments may change during and after the intranet installation. It was found in their study that IT staff are no longer considered as technical staff responsible for the technical configurations of the systems. They should collaborate and communicate with other departments and users as a strategy to identify their needs and wants towards a successful Intranet implementation. Web based development requires new skills, methods and project management techniques (Bansler et al., 2000). In addition intranet users and information system developers are blurred and new organizational roles and skills emerge (Scheepers, 1999).

Furthermore, as the use of intranet has the potential to increase communication among employees and improve knowledge sharing, this may have implications on decision making processes; with some decision-making responsibilities being transferred to lower level employees. However, this shift will not necessarily happen, it depends on the opportunities provided to organizational actors at different levels to engage themselves in an ongoing process of experimentation and learning.

In relation to the above, Bansler et al. (2000) highlight that the power and control over intranet development are critical. They argue that if power is centralized then organizational control is often very tight and the planning is authoritarian. The absence of users during the development of the software system will increase the risk of creating an intranet that does not reflect employees’ needs. According to Bansler et al. (2000) when the power is distributed to local actors then this facilitates experimentation and adoption.

A taxonomy on the Interactivity and Connectivity Potentials of Intranets

In the social and organizational science literature, interactivity has been described as responsiveness (Rafaeli, 1988), an interplay (Goffman, 1983), a chain of interrelated messages (Schultz, 1999), and a by-product of dialogue (Ford, 1999) that leads to mutual influence (Lee, 1998). It is important noting, however, that even though interactivity emerges from communication, it is not an inherent characteristic of all communication.
types. According to Rafaeli (1988) and Rafaeli and Sudweeks (1997) there are three types of communication; declarative, reactive and interactive; these are shown diagrammatically in Figure 1: declarative communication is one-way, either from one-to-one or even one-to-few or many; reactive communication is a type of two-way communication where one side (P1) simply responds to another side (P2); interactive communication requires that later messages in any sequence take into account the messages that preceded them, and not just responding to the last message reactively (Rafaeli and Sudweeks, 1997).

Figure 1: Types of Communication (adopted from Rafaeli and Sudweeks, 1997)

Intranets have been described as multi-purpose and richly networked information technologies (Damsgaard and Scheepers, 1999). They therefore differ from other intra-organizational information systems, such as inventory systems, payroll systems, logistics systems, systems that perform simple input and output operations (p.335). "Intranet technology is the great unifier ...and it is often applied to build a seamless 'user-friendly' interface to (non-graphical) legacy systems" (p.335). In this way, the technology can interact with other systems to search for organizational information, to enable computer-based transactions and to record and update organizational memory. In doing so, intranets can support communication and decision making by proving rapid and easy access to data and database systems distributed throughout the organization (Sridha, 1998): "the data may reside on remote intranet servers or it may reside in remote databases which can be
accessed through the intranet” (p.21). For this reason intranets are often referred to as “middleware” or “glueware” (Lyytinen et al., 1998).

Recognizing that intranets have only recently been used in organizations, we argue that in order to effectively assess the level of intranet interactivity and its usage as an intra-organizational communication tool, other alternative communication media need to be taken into account. Lai (2001:99) recognises this when saying that intranet applications "compete directly with conventional groupware products, such as Lotus Notes". In the majority of the literature on intranets as an intra-organizational communication tool, there has been a neglect of other collaborative tools that may interfere with intranet use.

**Proposition 1**: The existence of alternative collaborative tools will influence Intranet's use and its potentials for interactivity.

Moreover, intranets are considered as being the ‘vehicle’ (Newell et al, 2001) that is implemented for encouraging knowledge sharing and communication among employees especially in big organizations. Lai (2001) identifies two main reasons for Intranet implementation. Firstly, Intranets have been used to unify geographically dispersed employees. In this way, employees enjoy the advantages of access to the company’s information and communication with partners and colleagues anytime, anywhere and from any place. Secondly, intranets are used to empower employees as these systems can support collaboration, interaction and real time sharing of corporate information across different organizational levels regardless of location. Because intranet can function to provide a multiplatform access to corporate data through their connectivity with other systems, we make another proposition:

**Proposition 2**: The higher the level of intranet's connectivity with other information systems the more the opportunities for intranet interactivity. This proposition is also depicted in figure 2 that shows the relationship between connectivity and interactivity following previous research on intranet use in organizations.
For the purpose of this study, we conducted an investigation into the use of intranet in a large pharmaceutical organization in the UK. This study is an exploratory one and will be used to provide a tentative support to the propositions developed above as well as to outline the approach to be adopted for further empirical research.

**Research Site**

The research was conducted in a UK-based pharmaceutical organization which we call FarmaCoUK (pseudonym). FarmaCoUK had a reported turnover in 2000 of more than £95m. It is a subsidiary of FarmaCo Global a global player in life sciences, focusing on three main business: Healthcare, Consumer Health and Agriculture. FarmaCoUK is closely affiliated to its parent company, and seeks its approval for each key strategy. FarmaCo Global has production facilities, research centres as well as sales and client service field offices throughout the world; it has more than 70,000 employees and operates in more than 140 countries. In the UK, FarmaCoUK employs approximately 1000 employees, three quarters of which are associates who work remotely.

For the Pharmaceutical companies, R&D is vital for developing innovative products and improving and sustaining competitiveness. Intranets therefore could be critical for an industry such as the pharmaceutical one because they can store and distribute information among employees, enrich their knowledge base and improved communication between them that is essential for the development of innovative products and services. They could

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2 “The pharmaceuticals Industry:2002 Market Overview”, Key Note
link the different sites of a pharmaceutical company and disseminate valuable information contributing in this way to improved collaboration and knowledge sharing among employees.

In addition, intranet implementation is valuable to the sales professionals within pharmaceutical companies who as remote workers, always on the move, face the challenge of being informed about all the company’s operations, processes and products while they are away. Employees can access their company’s intranet regardless of place, time and infrastructure and they can have the most accurate information about drugs, processes, and customers or even about social activities. For these, FarmaCoUK was a suitable organization to participate in a study on intranet use.

**Research Method**

For the purpose of this study, documentation, semi-structured and structured interviews were used for data collection. This methodological triangulation with the use of different types of data collection techniques is particularly important for case study research, such as the one pursued here in order to ensure accuracy and alternative explanations.

The study consisted of two phases. The first phase of the research project aimed to gather background information about the intranet system in FarmaCoUK and specifically on the development and implementation of the system. For this purpose, four people who have been directly involved in developing, implementing and maintaining the system were interviewed and documentation where available was studied. These interviews lasted between 40 to 90 minutes and were tape-recorded with the participants’ permission. At this early stage of the study, it became obvious that Lotus Notes, a groupware application (Vandenbosch and Ginzberg, 1996) was an alternative computer-mediated communication tool within this company. Therefore, we decided in phase two to set specific questions related to the use of Lotus Notes and to ask participants to compare the two systems.

During the second phase of the research, we studied the actual use of intranet by interviewing different people across different departments and levels. This phase involved both structured and semi-structured interviews and lasted between 30 to 40 minutes. The aim was to access and record closely the situations identified as eliciting interactive and
cooperative behaviour and gain access to participants’ personal opinions and experiences as intranet users. The data during the second phase of the study were obtained from 14 interviewees: 28.6% of the respondents were remote users of Farmaintranet and 71.4% were based in the Head Office.

The main issues explored during interviews included the following:
- Participants’ understanding of what constitutes successful intranet use in their organization/department.
- Participants’ understanding of what employees’ role should be for achieving effective intranet use.
- Participants’ actual use of the intranet system (e.g. publishing, accessing, exchanging information) and comparisons to the use of Lotus Notes.
- Participants’ own explanation of why they use the intranet the way they do.

**Results: Intranet in FarmaCoUK**

In this section, we present the reasons for the intranet development and implementation and identify its level and type of usage.

The intranet adoption process was initially set up for Global implementation; however it was then decided that each country would use templates and adapt to what information they would like to put on the intranet, and there would be a cooperate intranet where all countries can view. The time span was 12 months to implement. This included: demo, training, templates, translation and servers etc.

**Intranet development**

It was recognised by all participants in the study that communication is vital for their organization especially due to the high number of associates outside the company. Communication anytime, anywhere and from any place would make these remote associates feel that they are company’s employees. The internal communication manager justifies the above: “…so that is the kind of staff driving around, they may be halfway to a meeting so they can see what else is happening in the organization”.
Therefore the company wanted to find an efficient way to communicate with their geographically dispersed colleagues and with the company. Farmaintranet was launched in FarmaCoUK in October 2000. It was described as “a news media rather than information database in FarmaCoUK” by the Internal Communication Manager as it was a way to communicate news immediately anywhere, anytime to the employees. Lotus Notes was already in use when the Intranet was introduced in the company and employees were using it as database and to communicate internally.

Three departments have collaborated to manage the intranet implementation: internal Communication, E-Business and Information Technology Departments as shown in figure 3.

![Diagram of Intranet in FarmaCoUK](image)

Figure 3: Intranet in FarmaCoUK

The role of the internal communication department is to ensure effective communication among all the internal associates and to process the priorities of each year. In the monthly magazine that is published to inform employees about the major events of the company, the internal communication department advertises the 2 days Intranet training sessions
called ‘e-days’ and ‘i-days’. They also publish articles for the employees on how to exploit intranet further.

The e-Business department is also responsible for the Farmaintranet that has been described by the e-business director as “the communicational and educational tool”. The role of e-Business in Intranet Implementation is to identify and push within the organisation new ways of using the Intranet among employees. Another role of the e-Business Department is the collaboration with the IT Department for the design and the context of Farmaintranet.

Finally, the IT department also had a critical role to play in intranet implementation. IT “…. has a supportive role with regard to Farmaintranet... and has a supply-kind activity”; for example, the IT department is in charge of the technical infrastructure in terms of firewalls, network connections and desktop configurations.

Farmaintranet Content and Services

Farmaintranet primarily aims to disseminate news as they happen. The internal communications manager also reveals that :"whenever we open a new page we send an email with the link to that paper".

The internal communications department updates the system on a continuous basis on any product news, events, company performance information, awards, social events, training and developments schemes announcements that are related to the company and its members. User departments are also expected to publish their own news at the company's intranet. For this reason, each department has been encouraged to have an Intranet Champion. The intranet Champions are employees responsible for creating their department's web page and publishing their departmental news on Farmaintranet following approval from the internal communications department their web page can go online. Therefore champions undertake to communicate their news to other departments promoting in this way inter-departmental communication. Annual awards are given to the best champions of the year for their contribution to promoting Farmaintranet.

Moreover, Farmaintranet offers a question-answer function where any employee can send his or her questions to the CEO of FarmaCoUKor another senior member of staff via the
application “touch”. Replies to individual questions are then posted on the intranet within five days. Finally, Farmaintranet is linked to the Intranet of FarmaCo Global enabling UK employees to find information about the parent company and its activities worldwide. Therefore, this link gives a global picture of the company while the Farmaintranet is UK-based only.

The Intranet usage patterns among employees
The majority of responses given during the second phase of the study showed that employees use the Internet either once a day or more than twice a day. Despite this, the intranet usage varies among remote and head office employees. The majority of the head office participants (70%) access the intranet at least once a day. The frequency of intranet usage of remote users is clearly smaller, with half of them either using it only 'sometimes' or 'less than 5 days a week'.

Further, it was found that the time that remote and headquarters based employees spend logged on Farmaintranet was limited. Both head office and remote employees spend in most cases less than 15 minutes in Farmaintranet, 62.5% and 75% respectively; the rest of the remote employees spend up to 30 minutes in the case of headquarters based employees

A significant observation that can be made from the findings is that most employees are satisfied with the overall content of Farmaintranet. In particular, 71.4% of the participants in the study stated that they were satisfied with the content of the intranet. Moreover, according to the questionnaire data the percentage of employees that are “enforced” to access it through links that come with the every day e-mails is the same with the percentage of employees that take the initiative to access it.

Despite these however, several barriers were identified in intranet-use. Site maintenance was among the most popular comments of the employees with the majority of the respondents complaining about navigation in Farmaintranet. It was also mentioned that there are often broken links and information overload. Employees require better search facilities, more, accurate and well-managed information in the site. Some employees would be more satisfied if there were league tables, news about staff, e.g. new recruiters, and UK news.
Another barrier to the effective use of intranet is that the system is slow and people find that it takes a long time to download whilst the remote users have said that they do not have much time to access the intranet to find out what's going on elsewhere in the organization. As an interviewee put it: "employees would be more motivated to use Intranet “when computers and lines are not slow”.

In addition to the length of time that it takes to download an intranet page, there were also comments on the poor graphs of intranet. Also, the fact that intranet was not part of the company's start up menu has been another disincentive for members to access it as it means that members would need to make an extra effort to access the intranet. Therefore, when employees log into the company's system, the intranet site does not immediately appear on the screen. Instead, when an employee wants to visit the Farmaintranet site s/he should click on the browser and type the web address of the Farmaintranet site. In addition, employees receive company’s e-mails where they can use the hyperlinks to access Farmaintranet.

In sum, our study has found that even though there is a widely recognised view that Farmaintranet is an information and communication tool mainly used for disseminating company's news and departmental events whilst there has also been an acknowledgement that Farmaintranet is currently not used at its maximum capabilities.

**Analysis**

At the beginning of this paper, interactivity has been defined as not simply passively responding to others’ messages nor as a simple exchange of messages. Similarly, it is not just a two way monologue, where meaning exists before interaction takes place, but rather it should take the form of a dialogue in which participants constructively engage in a sustained, analytical and collaborative investigation (Ford, 1999) leading to mutual understanding. As Rafaeli and Sudweeks (1997: 12) vividly put it: “the presence of interactivity in the behaviour of groups is both evidence for their reality and a mechanism for their formation”. In doing so, interactivity does not only help improve commitment among organizational members to jointly develop action plans, but it also enables focussing attention on the tasks while playing a key role in knowledge creation.
Drawing on the above, our results show that the intranet system in FarmaCoUK has not promoted interactive communication among the organizational members. Rather, following Rafaeli and Sudweeks (1997) communication can be described in the case of FarmaCoUK as being declarative, one-way communication and mainly from one to many for the purpose of information dissemination; in the main, this involves the case where the internal communications department publishes information about the company and its departments, and company's members are encouraged to read it. This is prompted by an email to all members that provides a link to the intranet side with the relevant news. Indeed, it was found in our study that half of the employees log into the Farmaintranet because there is a link in the e-mails that they receive from the internal communications department.

In what follows, we explain why there has been a low level of interactivity in FarmaCoUK by referring to the connectivity aspect of the system.

Employees in FarmaCoUK have access to both Farmaintranet and Lotus Notes. Therefore, in this study it was interesting to investigate the relation between the two systems. In our study, all the remote users stated that they use Lotus Notes more than Farmaintranet. In addition, 78.6% of all the respondents answered that they use Lotus Notes more than Farmaintranet. In the interviews, participants were asked to explain the reasons for their preference. Lotus Notes was described by the participants as a database and a communication tool that is more user-friendly than Farmaintranet. Furthermore, some employees commented that that they prefer to send information through Lotus Notes because they can keep their anonymity.

It was found that though Lotus Notes and Farmaintranet should be complementary information systems they do have overlaps. Lotus Notes, a combination of document creator and indexer, calendar organizer, database generator and manager, and messaging platform (Vandenbosch and Ginzberg, 1996), allows information to be distributed between different users in a structured or semi-structured way (Brown, 2000). Lotus Notes can be used as a database whilst intranet as a medium for enhancing communication and knowledge sharing.
The two systems however within FarmaCoUK have some identical features. As a result, this overlap between the two systems creates confusion among employees and affects Intranet implementation and Lotus Notes usage. For example, when employees were asked to identify the level of use and the level of satisfaction using the Person Finder of Intranet application, they thought of the Person Finder feature that Lotus Notes provides them with. In this case when the same feature was provided twice there was confusion to the employees. Accordingly, managers in FarmaCoUK should differentiate the use of the two systems to employees in order to achieve successful Intranet Implementation.

In addition to the above, we identify that there is another factor that has contributed to the low usage of intranet in FarmaCoUK thus far; this being that Farmaintranet has not established its own distinct identity as an information system within this organization. This has been recognised by the IT manager during an interview who stated that the company's intranet needed to develop its own brand image, "a brand value that people internally could identify with", though he also clearly expressed his view that the Farmaintranet is a web-based technology for publishing information, and not a dialogue tool. The internal communication manager in the interview stated that Farmaintranet was implemented in order to facilitate and enhance communication within the company. However, she also specifically defined Farmaintranet as a “news media rather than an information database”. This role of the system was reinforced through the interviews as none of the participants had commented that the Intranet was implemented to enhance communication among employees; rather, they were all focused on the departmental communication and news spread. As Yates et al. (1999, p.100) put it “…users will most likely transfer existing norms and established habits from familiar media to a new medium…. the migration of existing communication patterns to new media may, however, lead users simply to apply ineffective habits of use from all technologies to new ones". The implementation of this new system therefore has reinforced the role of the traditional company newsletter; though not paper-based any more, Farmaintranet is used like one: people 'receive' it but never read it; or read the headlines and then throw it in the bin, thus delete it. Even though intranet has the potential to improve knowledge sharing and idea generation (Newell, et al, 2001) it has been recognised that in FarmaCoUK the remote members are not frequent users of the system whilst also limited use is made by the office-based employees.
Discussion

The importance of interactivity to the furtherance of human communication has long been recognised in social science research (Goffman, 1967; Habermas, 1984). In information systems, interactivity has received significant attention as a result of research on human-computer interactions and recently on computer-mediated communication. However, scholarly understanding on the level of human-to-human interactivity in computer-mediated, virtual environments has lagged. In this paper, we have examined the use of a particular-computer-mediated communication medium, intranets, in promoting intra-organizational interactivity. Following our findings, we argue that the level of interactivity related to intranet use needs to be explored in this area of research and understood in relation to other communication and collaborative technologies such as Lotus Notes in order to accommodate emerging practices in intra-organizational communication.

Based on existing literature, the paper has argued that intranets hold potentials in improving connectivity and interactivity promoting knowledge sharing and innovation across organizational members and especially those who are geographically dispersed. It further argues that connectivity and interactivity are key features of effective intranet systems. Using existing literature, we conceptualise the relationship between interactivity and connectivity and the case of a pharmaceutical company is used to explore the relationship between the two concepts in an empirical setting.

We identify that the way the company's intranet relates and is linked to other information systems had an impact on its own functionality and effectiveness. In particular, our study has found that the existence of Lotus Notes as a complementary communication medium in FarmaCoUK has had an influence on intranet use. This finding supports the first proposition of our study. In relation to this, however, it has been apparent that merely having a hyperlink between the intranet and Lotus Notes has not been enough to promote intranet use. Technological connectivity is not therefore a panacea for promoting interactivity, though as other researchers have argued it can provide opportunities for improved information sharing and communication across an organization.

It follows that even though Farmaintranet links to other applications such as Lotus Notes and FarmaCo Global Farmaintranet it cannot be described as a system that has achieved
high level of user connectivity due to its limited use. This as a result restricts the system from becoming a single interface for organizational members. We are therefore beginning to realise that the concept of connectivity needs to be broadened up to include both technological and organizational connectivity; the literature so-far has taken a focus only on the technological dimension of connectivity. We find with this study that additional factors need to be in place to support intranet use and subsequently to promote intranet as an interactive medium. In this way, organizational connectivity has been identified as important in promoting interactivity within an organization. If the organization is fragmented in terms of communicative practices then technology on its own cannot bridge the existing organizational disparities, despite the technological potentials for connectivity the fragmentation remains. Organizational connectivity therefore indicates the case when users across different departments and hierarchical levels share a willingness to communicate and engage with each other crossing in this way boundaries that have traditionally constrained communication and collaboration. Due to this, the second proposition of the study, that the higher the level of intranet connectivity to other media the more the opportunities for intranet interactivity, only holds true when organizational connectivity is also in place. Technological connectivity cannot on its own lead to interactivity.

Figure 4: Connectivity and Interactivity Relationship: Revised
Both connectivity and interactivity have been identified as key characteristics for intranet success in the literature, but the interrelationship between the two has remained unexplored. Figure 4 presents a model that shows that both technology and organizational connectivity are important in promoting intranet interactivity. The taxonomy depicted in figure 5 develops this inter-relationship further between the two types of connectivity. Each quadrant identifies the impact that the different types of connectivity would have on communication patterns within the organization where intranet has been implemented.

**Figure 5: A Connectivity Taxonomy for assessing intranet interactivity**

- **Low Technological Connectivity and Low Organizational Connectivity**: The intranet does not have sufficient links to other communication media and information systems; this therefore restricts its information reach capabilities whilst communication tends to be one-way.

- **High Technological Connectivity and Low Organizational Connectivity**: The intranet is linked to other systems providing opportunities for improved communication in dispersed organizational units, but communication is declarative, one-way. The Farmaintranet experience is located within this quadrant.

- **Low Technological Connectivity and High Organizational Connectivity**: The organization supports an interactive communication environment but this is restricted by limited
technological connectivity. When there is interactive communication this remains localised within a specific unit or location of the organization.

*High Technological Connectivity and High Organizational Connectivity:* The organization supports an interactive communication environment and this is enabled by intranet's connectivity to other systems that enrich information accessibility and the organization's knowledge base.

**Conclusion**

The paper argues that intranets hold potentials in improving connectivity and interactivity promoting in this way knowledge sharing and innovation across geographically-dispersed organizational members. Yet the literature has so-far taken an interest in connectivity neglecting the interactivity potential of intranet systems. Intranets are emergent in nature as they evolve and increase in sophistication over time and as more people make use of them for a variety of communication purposes (Damsgaard and Scheepers, 2000). However, even though interactivity is indeed a type of communication not all types of communication are interactive. In a similar vein, while interactive communication processes could be linked to intranet use, not all intranet uses are interactive.

Intranet is an application that provides solution to the communication problem that organizations face in their every day operations. Intranet adoption and usage depend on the relation of the system to other systems within the organization. This factor needs to be taken into consideration in future studies on IT adoption and usage to complement existing models in the field (e.g Karahanna et al, 1999). Intranets cannot instantly replace other forms of communication but can complement them by acting as an organizational information platform where members onsite and offsite can get access to corporate data. For example, they can do so by supporting the collection and categorisation of internal and external information, accessing stored knowledge by using flexible knowledge navigators and advanced search mechanisms that include keyword-based as well as concept-based searching, and supporting the collaboration via on-line workspaces that allow people to work together from different locations. With such functionalities, intranets will not only distinguish themselves from other systems, but also and most importantly they will be able to develop their own unique character and identity within an organization. In this way, awareness increases around the use and importance of an intranet system in the
organization and its use is more likely to increase as more people understand the role and contributions of intranets in their day to day activities.

The study has practical implications. It identifies several factors which will allow practitioners to overcome key obstacles in the effective organization and management of intra-organizational systems. The findings of this case study have shown that the co-existence of complementary information systems has a key effect on the effectiveness of intranets. It is therefore argued that IS managers should firstly define the role of intranet in relation to other complementary information systems at an early stage of intranet implementation, and secondly should make clear to the employees the relation between the complementary systems by differentiating the roles of the different systems building in this way different identities for each system.

With the emergence of virtual organizations, more and more organizations would need to be using intra organizational systems to improve knowledge sharing. For this however to happen there is a need to redefine the role of intranets from a declarative communication medium to an interactive medium that is embedded within the everyday organizational practices. Technologies such as intranets that have the potential to provide rich interfaces should be implemented in ways that promote enjoyment and experimentation and offer opportunities for cognitive absorption (Agarwal and Karahanna, 2000). The paper found that this would be achieved with both technological and organizational connectivity. The present study is exploratory and suffers from limited empirical data. Further research is therefore required to examine these issues in more detail and increase generalizability of the findings by examining issues of connectivity and interactivity in a variety of organizations within the same sector as well as organizations across sectors.

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