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Executive Summary

The growth of Internet / WWW use in business has been accompanied by a whole host of new challenges both technological and managerial for organizations. Despite considerable attention in trade magazines (e.g., Java, Internet as an application platform, Intranet versus groupware products like Lotus Notes, etc.), there has been no organized and formal research on the Internet from the perspective of technology management and organizational implications, with technology being one of the issues for study. Key questions are what could be the underlying motivations for businesses to adopt and make use of the Internet, how could they effectively manage this technology and its use, and what are likely to be the major organizational consequences from such use.. If the Internet / WWW is indeed a new way of doing business, then the implications it has on an organization need to be understood from a variety of perspectives.

This study attempts to provide a theoretical framework for analyzing the use of Internet in business. We intend the framework to be an overarching model, and identify a need for further detailed research on each component of the framework. We posit the Internet / WWW as a form of technological innovation, with two key attributes:

- The social context: characterized by the new forms of interaction between organizations and individuals that are spawned by Internet / WWW and it's wide ranging availability.
- The technological context: characterized by a continuously changing technology (technology morphogenesis) with a lack of ownership by entities (individuals or organizations) that use the Internet / WWW.

In studying the impact of Internet / WWW on organizations, we identify three key organizational attributes:

- Organizational boundaries: both internal and external, that an organization strives to manage,
- Transaction costs: that an organization strives to minimize, and
- Cognition: at an organizational level, which enables organizational sense making and consequently impacts their decision making.

The interaction between innovation (Internet) specific characteristics and organization specific characteristics is proposed to be a key determinant of business use of the Internet. A model and a set of propositions that are theoretically well grounded are suggested to spur empirical research in this increasingly important area.

The unprecedented interest evinced in and the exponential growth of the use of the Internet and the World Wide Web (WWW) in the past 2 to 3 years by individuals and real-world organizations alike is astounding. The Internet is supposed to have doubled in size in 1993 and again in 1994 growing to over 5 million host computer networks and over 20 million users by early 1995, continuing to grow at monthly rates of about 10 percent, and reaching over 100 countries (Laudon and Laudon 1996; O'Brien 1996). In fact from almost zero, the use of the Internet by businesses has grown very rapidly; in fact by 1995 over 30% (i.e., 1.5 million) of the host computer networks belonged to companies or their research labs (Booker 1995).

However, there are a number of serious unresolved issues with use of the Internet such as security, interface capability to existing infrastructure and legal issues (e.g., legality of e-mail contracts including the role of electronic signatures, and the copyright laws to electronically copied documents). Furthermore, there are a number of technology problems such as the lack of standards, overloaded communication lines resulting in inaccessibility of sites and sources of information and poor response times, lack of tools to keep track of various sites/ information, and possible psychological burnout due to an inability to absorb/use the Internet resources effectively (Laudon and Laudon 1996).

The objective of this paper is to try to describe the Internet within an innovation framework and model its attributes within a technological as well as social context that are likely to influence the use of Internet for business. The paper is structured as follows: Section 2 identifies a definition for the Internet within an innovation context, and develops the appropriate theoretical perspectives for its investigation; Section 3 proposes the research model with a set of five propositions, examining the innovation (Internet) and the organizational level attributes that interact to impact the business use of Internet; followed by our concluding remarks in the final section.

1. Background

How does one describe the Internet?
The evolution of the Internet from it's roots in the ArpaNet to a literal world wide web today, presents one of the most intriguing developments of a "mass" technology. The evolution of graphical browsing tools spawned the development of the World Wide Web (WWW), driving electronic commerce and "organization to organization" and "organization to individual" linkages, facilitated by a more user friendly way of browsing the Internet. It is this development which has sparked off organizational interest in the Internet, as a business tool.

We attempt to establish a research agenda by setting a context within which the Internet can be defined. To classify the Internet as a technology would not be wrong, but it may not be complete. As the WWW evolves into an organizational tool, newer technologies and technical challenges emerge (e.g., security, encryption, database support, compound document support - especially hypertext formats, image and graphical content, multi platform and protocol support, development environments, etc.). Each of these technological issues is spawned by a new and innovative approach to communicating and doing business via the Internet. The Internet, can thus be defined as an innovative process, supported or made feasible by technology, by which organizations and individuals communicate, network and do business.

Innovation has been variously defined in previous literature as the generation, development and implementation of new ideas and behavior (Damanpour 1991); as implementation of generated or borrowed ideas, whether pertaining to a product, device, system, process, policy, program or service, that is new to the organization at the time of adoption (Damanpour and Evan 1984); and as adoption of means or ends that are new to the organization (Downs and Mohr 1976). Our proposed definition of the Internet fits within the overall framework of an innovation as described in previous research. This leads

to the research question that we address in this paper: Recognizing Internet to be an innovative tool available to organizations, what factors determine organizational approach to using the Internet for business purposes?

A theoretical framework for the above question is developed based on the extensive body of research on innovation adoption. Studies in the adoption and implementation of innovation have identified a number of causal or antecedent variables. These can be classified into two main categories of variables: organization level (cf., Meyer & Goes 1988, Schwenk 1988, Saunders and Jones 1990, Cohen and Levinthal 1990, Damanpour 1991, Pennings and Harianto 1992, Ettlie and Reza 1992, etc.); and innovation level (cf., Dickson 1976, Daft 1978, Rogers 1983, Collins, Hage and Hull 1988, Meyer and Goes 1988, Fichman and Kemerer 1993, etc.). The interaction between organization level processes and innovation specific characteristics determine organizational approach to any innovation.

2. Research Model And Propositions

Figure 1 represents the research model for this paper. In the model we identify two types of innovation characteristics - The social context and the technological context, followed by three organizational characteristics - organizational boundaries, transaction cost economics, and organizational cognition The model proposes that the interaction between the innovation (Internet) and organization characteristics determine how an organization approaches the usage of Internet for business use. We discuss each of these characteristics below.
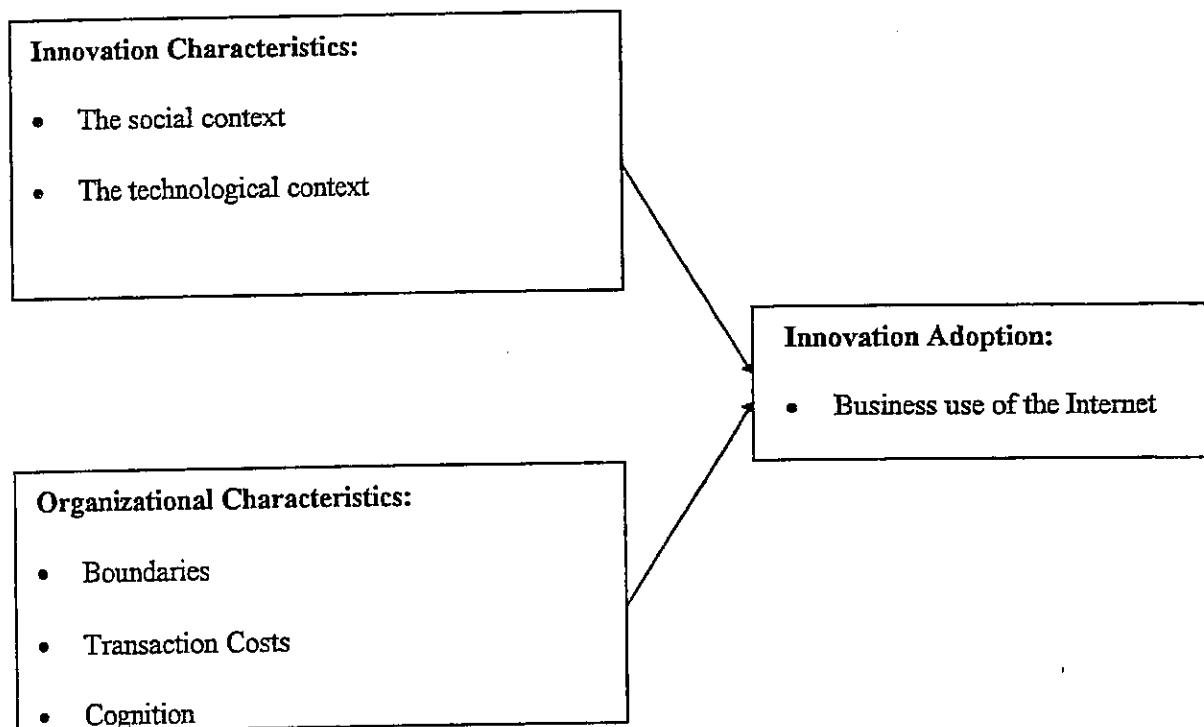

**Figure 1: Research Model - Innovation and Organizational Attributes
Impacting Business Use of the Internet**

Innovation (Internet) Characteristics

We identify four attributes of the Internet, classified across two categories: the social context and technological context.

We visualize the social context as one wherein:

- The Internet is available equally for individuals as it is for organizations. with size or availability of resources not being an entry barrier for a presence on the Internet. Thus, the Internet encourages the creation of new social form within an information society.

- The Internet supports interaction between individuals and organizations on an equal footing, thus laying the basis for a new social context within an information society.

We suggest the technological context to be one wherein:

- The Internet, as a technology, is owned by no one group or individual; thus representing a true non-proprietary and public technology platform.

- The Internet represents a continuously changing technology platform, with the Internet supporting multiple applications which in turn impact the direction of Internet technology; thus representing a continuum of technological change.

The Social Context: How technology interacts with social institutions has been the subject of considerable prior research. Approaches include a description of how social entities maintain their forms, and the pseudo-dynamic formulation of how social entities change to produce new forms, and an amalgamation of these two approaches (Fried and Molnar 1978). The role of information (technology) in society is also posited to be determined by how questions concerning the production of information, distribution of information, and the technological infrastructure for information storage, retrieval and transmission are addressed (Parker 1987). The Internet provides one set of answers to these very same questions, leading to a very unique definition of its role in society and its impact on social forms. The social impact of information can be categorized into three features: first, activities that are knowledge based, knowledge generating, or knowledge intensive; second the communication net by which information about social invariants is circulated, stored and used; and third how the information (technologies) are used to manage conflicts between what is invariant and what is planned adaptive change (Kochen 1987). In fact, researchers have long emphasized information society to be a social construct in itself, providing a useful instrument for social observation (Martin 1988).

With the Internet having established itself as a mass platform or forum to communicate and share ideas over the past twenty five years, organizations are now attempting to become part of a large mass of individual actors. This appears to be becoming a new mechanism of social involvement / interaction for an organization as it learns to co-exist on an equal footing as an individual. It can therefore be noted that the Internet provides a mechanism for social interaction between organizations and individuals on a many-to-many basis and satisfying requirements at various levels. The Internet, in its current form and given its direction of growth, is thus establishing a new social form and a new social context. The new social form is typically categorized by increased visibility and participation of organizations and individuals in the electronic or information society (as demonstrated by the presence of "home-pages" for participants ranging from middle school students to multinational corporations). The new social context is typically categorized by a more equal and open relationship between actors of dramatically different scales (e.g., organizations and individuals), enabled primarily by free information exchange (as demonstrated by the ability of individuals to perform a variety of activities from online investing to ordering and paying for airline tickets without the need for intermediaries or without having to leave the convenience of their home). This leads to the first proposition:

- *Proposition 1:* The ability of the Internet to impact participation by and relationships between organizations and individuals will increase business use of the Internet by organizations.

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The Technological Context: From being just a platform to share ideas and information, the Internet is now used for product and service marketing, conducting financial transactions, serving as a groupware platform and establishing inter-organizational networks. As organizations increasingly get onto the Internet platform, newer applications and uses of the Internet will be devised. For example, in the area of travel the demand for increased capabilities can be assessed by the path of growth - starting with information on travel sites, to the ability to make check airline schedules, finally evolving to the ability to manage secure credit card transactions to pay for airline tickets and having them delivered at home.

The Internet can also be viewed as a continuously evolving technological organism, with its boundaries being redefined by continuously increasing user groups. Any (active) user of the Internet has the potential to make significant technological contributions and hence impact the underlying technological structure. For example, the dramatic growth of Netscape (as an organization and as the most popular Internet browsing tool) can be traced back to college level work done by one of its co-founders. This individual level effort can be contrasted with the tremendous impact that Java, from Sun Systems, as a programming tool is having on Internet development. These two examples symbolize an inherently different and unique nature of the Internet; that is, the Internet is capable of dramatic change, be it as a result of individual or organizational efforts, representing a continuously evolving technology.

To support this notion of a continuously evolving technology base, we introduce the concept of *technology morphogenesis.* Morphogenesis has been defined as the evolutionary development of a structure or organism (American Heritage Dictionary 1985). This concept is not new to the social sciences, and has been used as a theoretical construct for describing how social entities change, in which complex subsystems, each with their unique substantive attributes, interrelate to produce new forms (Fried and Molnar 1978).

Running parallel to technology morphogenesis is the added complexity of lack of ownership of the technology. Compared with other fields within Information Technology, where one can clearly see dominant owners / players (e.g., Microsoft in the desktop operating systems and office automation, Intel in chips, IBM in mainframe technologies, etc.), the Internet presents a totally flexible and public environment. Thus, apart from the fact that organizations no longer have the luxury of one dominant vendor to fall back upon, the perspective also changes from owning or buying a technology to one of owning a window to the technology. Thus, traditional IT challenges like issues of database and access technologies which handle rich and multiple data types, interface to legacy systems, performance and system management, etc., take a new meaning in the Internet context, when part of this environment is beyond the control of an individual organization. This substantially increases the technological complexity of managing an interface to the Internet. This discussion leads to the second set of propositions:

- *Proposition 2A:* Technology morphogenesis demonstrated by the Internet will increase the usage complexity of Internet, both in terms of what organizations use the Internet for and how they achieve that use.

- *Proposition 2B:* The need to manage an interface to the Internet rather than Internet technology in itself increases the complexity of using Internet for business purposes by organizations.

Organizational Characteristics

Organizational Boundaries: It may be noted that this is a direct follow through from the social context of the Internet. Theories on business or organizational anthropology and the concept of open systems provide the basis for considering this factor. The anthropological perspective on organizations brings forth a variety of views about an organization and its environment. These include dividing organizations into formal systems, informal systems and the environment, or the metaphor of organization as an organism, or even just emphasizing on the continuous process of organizing (Wright 1994). The anthropological perspective assumes relevance given the social context of the Internet and, consequently, how organizations are forced to review their social contracts with other entities in the environment.

The theme of boundaries is inherent to the open systems approach. Boundaries are deemed to be necessary for open systems, failing which relatedness and relationships are impossible as we get lost in one large societal mass (Lawrence 1979). Two propositions from the open systems model are relevant in the current research context. One, that a change in the relatedness of a system to its environment requires internal changes within the system; two, that significant internal changes cannot be sustained unless consistent changes occur in the relatedness of the system to its environment (Miller 1979).

This lays the basis for changes in organizational boundaries with respect to three distinct entities in its environment: the individual customer (symbolizing the dis-aggregation of a market to an individual level), the internal groups which together constitute the organization, and the external groups with which the organization shares boundaries (business linkages or inter-organizational networks). Thus, the social context of the Internet substantially impacts the boundaries an organization shares with each of these other entities which are part of the organizations social system. This leads to the third proposition:

- *Proposition 3:* The criticality of organizational boundaries with both internal and external environments and the ability of Internet in managing these boundaries impacts the business use of Internet by organizations.

Transaction cost economics and rational decision making: The preceding discussion presents a view of the organization that is inherently similar with the population ecology stream of organization research, where an organization is selected out if it does not adapt. A competing model is one where an organization is viewed as making rational decisions, being purposeful, foresightful, and in control (Pfeffer 1982). A powerful theoretical construct to explain organizational level rational behavior is the market failure or transaction cost approach (Williamson and Ouchi 1981) where the focus is on the transaction cost efficiencies an organization achieves as being the main driving force behind organizational actions. Thus from a transaction cost perspective, an organization seeks to minimize its cost of interacting (transacting) with each of the three entities identified above - individual customers, business partners, and internal groups. From an Information Systems (IS) standpoint, the cost of interacting has various elements including processing hardware, software, data, system design, data storage, communication hardware, communication channels and IS overhead (West 1994). The characteristics of the Internet (identified earlier) provide substantial benefits on most of these elements of cost as compared to traditional modes of electronic communications and transactions. The Internet also supports the notion of transaction value (Zajac and Olsen 1993) which is a framework addressing joint value maximization and the process by which exchange partners create and claim value. This leads to the fourth proposition:

- *Proposition 4:* As an organization strives to maximize joint value in its transactions with both the internal and external environment, the role of Internet in aiding this process impacts the business use of Internet by organizations.

Cognition: The previous discussion on Internet and organization characteristics leads to a few interesting observations including questions relating to privacy, conflicting with the issue of freedom of information and free access to it, and the associated dangers of computer crime, infringement on intellectual property, and ultimately the vulnerability emerging from technology breakdown (Martin 1988). These are compounded by the technological challenges elaborated earlier in the paper.

The ability of an organization to handle these issues is largely a function of its absorptive and cognitive capabilities. The role of organizational learning as represented by absorptive capacity (Cohen and Levinthal 1990), theories of individual and organizational cognition (e.g. Cohen and Levinthal 1990, Schwenk 1988, 1986, 1985) have been used to explain the innovation adoption process of an organization. This is substantially true in the case of Internet technology management process, where the ability of an organization to manage the technological complexities of the Internet are dependent on its understanding of what it can do with the Internet. For example, organizations have over the past few years invested substantially in groupware products and technologies (e.g. Lotus Notes). The development of Intranets and internal Web Servers has made the WWW a competitor to groupware and messaging. Depending on interpretation of these technologies, organizations are treating the WWW and Groupware as either competing technologies or complementary technologies which could be leveraged

jointly. Each approach has substantially different results for organizations. Another example would be the use of Internet / WWW to communicate with customers, potential or existing. A common use of the WWW is to provide information via the concept of Home Pages. However, a few organizations are extending this to actually conduct transactions with customers. Federal Express is an excellent example, where it encourages customers to use its Internet site to track package deliveries rather than make phone calls to their customer service centers (in the process enjoying cost savings). Thus, usage of the Internet is likely to be strongly governed by how an organization perceives the Internet, and its capability to leverage it for business use. This leads to fifth and final proposition:

- *Proposition 5:* The ability of organizations to frame an approach to the business use of Internet is governed by their cognitive ability to recognize, understand and act upon the opportuniuies and threats presented by the Internet.

3. Conclusions

This paper attempted to provide a theoretical framework for analyzing the use of Internet for business. The choice of research variables at the level of innovation characteristics was important in distinguishing the Internet from other Information Technologies. We posit that these key differentiators (both at the social and technological level) contribute to the unique nature of the Internet. In identifying the research variables at an organizational level, we addressed those specific organizational attributes that are impacted by the unique characteristics of the Internet. The choice of organizational boundaries and an anthropological perspective as a variable was driven by the social context of the Internet. At the same time, we need to recognize the rational decision making model, thus leading to identification of transaction costs as a key research variable. Organizational cognition emerged as a key factor in the sense-making ability of an organization with respect to the unique attributes of the Internet. The propositions attempted to provide a framework for further empirical research in this area.

Future research can be suggested in two distinct streams: at a technology level, to attempt to address solutions to the various technical issues e.g., security, interfaces, etc., and at an organizational level to identify the role and direction of impact of the Internet on organizational boundaries and transaction costs.

A key aspect that was not considered in this paper is innovation adoption at the individual level. It must be recognized that there is also a substantial stream of research on innovation adoption at the individual level, the thrust of classical innovation theory; a number of factors such as age, aptitude, cosmopolitanism, experience, attitude toward new ideas, learning style, and risk propensity among others have been observed or posited to be important to adoption of personal-use innovations (cf., Rogers 1983 and Fichman 1992 for an excellent treatment of this area). These constructs become important in the actual adoption, diffusion and usage of the Internet for business purposes by individual stakeholders within an organization. Active and effective use at individual level will indeed be a major determinant of the final benefits that an organization achieves from Internet use. Role theory, expectancy theory, and political theory may be a few of the many theories that could be used as a framework to investigate the adoption and use of the Internet at an individual level within the organizations. Focused research in each of these areas would be key to providing insight and answers to the issues identified in this study.

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