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Impact of corporate orientation of information technology adoption in the United States forest products industry

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IMPACT OF CORPORATE ORIENTATION ON INFORMATION TECHNOLOGY
ADOPTION IN THE UNITED STATES FOREST PRODUCTS INDUSTRY

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Renewable Natural Resources

by

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DEDICATION

I dedicate this dissertation to my daughters, Akosua and Afia, for their forbearance throughout my long period of absence in their lives while I pursued further studies.

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My gratitude and sincere thanks are due, firstly to my major advisor, Dr. Richard Vlosky for his immense help, valuable advice, foresight and, coupled with his incessant challenge of my thoughts right up to the last day. This kept me on my toes and encouraged me to be focused on the research. His support for me to reach greater heights can never be over-emphasized. His personal friendship extended to me ensured that my stay at Louisiana State University was a profitable one. I consider him greatly responsible for having kept me motivated, focused, and providing the enabling environment for the completion of my dissertation, even under extenuating circumstances that could have removed me from completing the program. Thanks so very much, Rich.

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ABSTRACT

This study aims to contribute to addressing the gap that exists in determining the role an organization's internal operations play in information technology (IT) adoption in organizations. In particular, this research stems from investigating the relationship between company success at adopting information technology systems (the Internet) in the United States forest products industry (specifically, the lumber sector) and the extent to which organizational orientation within the industry supports the development.

Following an extensive literature review, a conceptual model that represents the synthesis of information technology adoption-marketing orientation influences is developed. (This study does not infer that a company can acquire only one orientation at any one time). The United States forest products industry has traditionally been perceived as being production-oriented by many researchers. Marketing orientation, however, is a relatively new phenomenon that is gradually seeping into the way the industry does business as a result of competition, technology advancement, and the changing needs of consumers.

Consequently, a number of propositions are tested and managerial and research recommendations are put forward. Overall, this research finds that email and the World Wide Web are the two most popular internet-based applications used by companies in the lumber industry. A positive relationship exists between factors of Internet adoption (extent of Internet application, user participation, perceived ease of use by user, perceived usefulness by user, and adoption diffusion by company) and "perceived company effectiveness of Internet adoption" under high and low marketing orientation, with a higher rate of increase in high marketing orientation than low marketing orientation.

1. PROBLEM STATEMENT AND JUSTIFICATION

1.1 Problem Statement

Traditionally, the Forest Products Industry (FPI) has often been characterized as being reactive rather than proactive, and slow to change when it comes to implementing inter-organizational technologies (Vlosky 2002, Vlosky and Westbrook 2002). These attitudes have been attributed to a number of reasons including the industry's history of complacency, some of which emanate from the concept of timber primacy (Bennett 1965), poor profitability performance as a result of the fragmented nature of the industry (PWC 2000), a production orientation (Sinclair 1992), slower efforts in research and development (Spelter 1996), lack of understanding about the concept of eBusiness, perceived lack of adequately trained information technology staff within the industry, and inadequate application tools (Vlosky 2000a, Juslin and Hansen 2002).

Even though the industry is moving more and more towards sophistication as a result of advancements in technologies, integrations and consolidations, there is also keen competition from other industries for substitute products such as steel, plastics, concrete and other composite products, to meet the changing needs of consumers. This has changed the dynamics of the marketplace and requires market intelligence to fill the market information gap, which hitherto, has not been necessary.

In order for the FPI to successfully compete in the dynamic marketplace it has to, among other things, adopt information technology (IT) to capture the necessary market information to be able to channel products that will meet the needs of the consumer. How effective this will be will depend, to a large extent, on the organizational orientation and

how the organization can leverage this orientation for competitive advantage (Harper and Utley 2001).

1.2 Justification

Information technology (IT) is a tool used to manage business strategies and internal corporate processes (Vlosky 1999). Gates (1997) considered IT as the nervous system of a company that determines the company's competitiveness. Companies using IT are able to learn about the market, the competition, the internal and external customers, and leverage the knowledge it for competitive advantage in order to increase market share and profits (Mahmood and Soon 1991). Information technology speeds communication between trading partners, shortens product life cycle, establishes better relationships with customers, suppliers and partners, and reduces expenditures as shown in business-to-business (B2B) and business-to-consumer (B2C) transactions (Franklin 1997). Research indicates that the incorporation of computerization (as a form of IT) in production processes brings improvement in productivity and allows for improved manufacturing flexibility (Dewan et al. 2000, Boone and Ganeshan 2001).

Often there is the initial fear of using technology and incorporating it into the workplace because of such factors as the length of time it takes to learn how to use the technology, ignorance, cost, fear of change and complacency (McCoy-Pinderhughes 2001). However, though some of these factors may be genuine concerns, they are usually overcome after the initial steep learning curve, which is usually accompanied by an initial drop in productivity as companies attempt to initiate and employ new IT initiatives (Harper and Utley 2001).

Nevertheless, maximizing the opportunities that IT brings is beneficial in the long run and can compensate for the initial loss in productivity as a result of the adoption. However, it requires an understanding of the nuances involved in value exchange and how well people are managed and not just the apparent success of the technology (Lorenzi and Riley 1995). Over the years, the study of IT's impact on firms has increased tremendously but with little knowledge of the role of the firms' internal operations play on the impact. Among the many factors that could make IT play an influential role in increased performance and productivity include human relationships, policies, strategic controls and internal/external organizational relationships with widely held shared values being the common thread that underlie and define the orientation of the organization (Harper and Utley 2001). In addition to realizing the full impact of the adoption of IT in the FPI, there is the need to understand how organizational (corporate) orientation influences the IT adoption process in the industry.

The overarching objective of this study is to investigate the relationship between company success at adopting information technology systems and the extent to which the organizational orientation supports the development.

2. INFORMATION TECHNOLOGY (IT)

2.1 Introduction

Information technology (IT) is defined as “all forms of technology used to create, store, exchange and use information in its various forms (business data, voice conversations, still images, motion pictures, multimedia presentations and other forms, including those not yet conceived)”. It is a convenient term for a rapidly expanding range of equipment, applications services and basic technologies that process information. The elements of IT fall into three principal categories: computers, telecommunications and multimedia data, and many combinations of the building blocks that may be used to create the IT resource across an organization (Keen 1995).

One of the forces behind making the world a “global village”, collapsing time and space and creating a sense of global intimacy through telecommunication, has been attributed to information technology (Waldera 2000).

2.2 Value of Information Technology

Information technology, in and of itself, is not the limiting factor in business. It is a facilitator that enhances effective decision-making. Information technology that is integrated into business processes, serving as the primary management tool, provides value by providing capabilities for companies to improve business processes and workflows through information processing, managing the process of sharing and transfer of knowledge from one project to another over time, and fostering synergy and learning (Bowen 2001, West and Berman 2001). During the last decade, many managers and scientists alike have strived to explore the concept of the transformation power of information technology on the nature of organizations, and many chief executive officers

(CEOs) express great faith in IT's effectiveness as an engine of change, growth and learning in an organization (Mullin 2002).

Some examples of IT applications are internal and external computer communication networks such as Intranet, Extranet, Internet/World Wide Web, Enterprise Resource Planning (ERP), Network Information System, EBusiness, Electronic data Interchange (EDI) and Customer Relationship Management (CRM) (Corso and Paolucci 2001).

Opportunities for sustainable advantage lie in the recognition of the importance of using information technology to improve service in all phases of the customer's participation with the firm's product or service (Piccoli et al. 2001). When IT employees in primary functions have a better understanding of business processes, they tend to add more value in design and implementation approaches rather than merely taking a passive role. That impact can be so dramatic that Leon (2001) reports that IT, other than manufacturing and sales, can contribute most directly to profitability provided it is strategically managed. Lee (2001) has shown that there exists a causal relationship between IT and profit. According to Verton (2001), "IT is the cornerstone of the Department of Defense's plan to achieve 'information and decision superiority', i.e., getting the right information to the right people at the right time and in the right format". This could come about through integrating the Pentagon's databases, acquiring geospatial data sets with more detail and higher resolution, and developing a conceptual data model that can facilitate the creation of interoperable databases. Information technology has become a major influence on many major business decisions made in today's highly competitive business world. It is no longer a luxury, but rather, an integral part of successful business.

2.3 Adoption of Information Technology

There are many technologies adopted by companies (i.e., approved and purchased), with little or no actual implementation, even years later. Such an assimilation gap between adoption and implementation is especially common for technologies with high implementation complexity (Fichman and Kemerer 1997, Leonard-Barton 1988a, Agarwal et al.1977). However, for the purpose of this study, information technology adoption is examined in the context of Zaltman et al. (1973) two-step adoption or two-stage implementation where the innovation adoption process within organizations includes a decision to adopt the innovation and actual implementation. Hence, adoption and implementation will be used interchangeably in this report.

Effective IT adoption requires a good deal of planning and strategy based on the business case, preparation, and openness to change since information technology also tends to generate increasingly complex internal and external demands on the information management capabilities of organizations (Rivera and Casias 2001, Rogers 2001).

2.4 Theories of Information Technology Adoption

2.4.1 Foundation Theories

Innovation in organizations does not always occur top-down. It may emerge as a grass roots or bottom-up initiative. Top management adoption decisions do not guarantee that the innovation will actually be implemented or used by the targeted users (Fichman and Kemerer 1997). Several theories have been developed to explain individual adoption and acceptance of IT. Among these are Diffusion of Innovation Theory (Rogers 1983, 1995), the Theory of Reasoned Action (Ajzen and Fishbein 1980), the Technology

Acceptance Model (Davis 1989, Davis et al. 1989, Szajna 1996), the Theory of Planned Behavior (Ajzen 1985) and Social Cognitive Theory (Compeau and Higgins 1995).

The two that have received a great deal of attention in the Information Science literature are Rogers' (1983) Diffusion of Innovation (DOI) theory and Davis' (1989) Technology Acceptance Model (TAM). These two theories have well-grounded frameworks that have proven their value for explaining individual's behavioral intentions to adopt a technology, and also provide managers with guidelines for designing intervention strategies to encourage IT adoption (Davis et al. 1989). Both models identify the perceived attributes of an innovation as key predictors that explain adoption. Their dependent variable is users' intentions to adopt a technology (or their actual adoption/use). The models apply most readily to situations where the individual user can voluntarily choose whether to adopt the innovation or not and provide reasons for adoption. Diffusion of innovation (DOI) identifies five perceived attributes of an innovation to influence adoption behavior: relative advantage, complexity, compatibility, trialability and observability. Whereas Technology Acceptance Model (TAM) posits that IT adoption has just two perceived attributes that influence adoption: "Usefulness and ease-of-use". In TAM, it is assumed that the intention to use a technology is affected by the attitude of the user, and his or her feelings toward the technology. Due to many similarities between these models, and also owing to the fact that many Information Science researchers have combined elements of both models in their studies on information technology adoptions (Agarwal and Prasad 1997, Thompson et al. 1991), they were selected as the foundation upon which modified models were built for this study. They were however adapted to focus on the objectives of the study.

2.4.2 Limitation of Foundation Theories

Predictions of the foundation adoption frameworks have not been well supported for IT adoption at the organizational level. This is because of the high level of complexities in terms of the technology itself (Attewell, 1992), and high implementation complexity (Leonard- Barton 1998a) across many adopters who may be distributed across multiple departments or geographic locations.

Fichman (1992) argues that researchers should consider substituting the “foundation” models or integrating them with new metaphors and theories such as critical mass (Markus 1987), absorptive capacity (Cohen and Levinthal 1990) or organizational learning (Attewell 1992), to build theoretical frameworks that fit these complex scenarios. Thus, a research model which assumes that people's innovative behavior changes over time depending on interactions among the persons, the technology, and the organization, should capture longitudinal data on all three dimensions (Gallivan 2001, Orlikowski and Robey 1991, Leonard-Barton 1988b).

2.5 Relative Success of Information Technology Adoption

In organizational-level process and stage research models, the extent of the use of the innovation and how deeply the firm 's use of the technology alters processes, structures and organizational orientation produce more important outcomes of interest than technology use or user adoption per se (Fichman and Kemerer 1997). Thus, the successful adoption of technology in an organization will depend on the number of adopters within the organization, the extent of use of the innovation, and the level of impact within the firm (Cooper and Zmud 1990). It also depends on the interaction of people, organizational

issues and the technology applications within the company (Lorenzi and Riley 1995, Lorenzi et al. 1995).

2.6 Information Technology Applications

One of the most important driving forces behind business success in this information age is the network's seamless connection to companies and people around the world. The central and overarching network is the Internet, an example of information technology (IT), which has many applications including the Intranet, Extranet, eBusiness, etc. This study uses the Internet as the principal IT application to investigate the impact of corporate orientation in its adoption.

2.6.1 The Internet

The Internet is a global mesh of computer networks that share a common software standard called TCP/IP (Transmission Control Protocol/Internet Protocol), and serves as a platform for other IT applications. It serves as a content-delivery vehicle, which uses the World Wide Web as a tool for the delivery. Companies anywhere, at any point in time, are able to create competitive advantages through acquisitions, research, and sale of their products or service with the opportunity of reaching a global market (Piccoli et al. 2001, Vizard 2001). The Internet is open to the public and supports services such as email, the World Wide Web, file transfer, Internet Relay Chat, and many others (Metcalf 1996) across the globe. Application extensions of the Internet also include intra-company networks (Intranets) and Internet linkages with customers or suppliers (Extranets).

The forest products industry uses the Internet to communicate with current and potential customers via e-mail, for promotion via the Web and for other business applications (Vlosky 1999).

Results from previous studies on factors affecting adoption of the use of the Internet and the World Wide Web show that the intention to use a technology is equally important, not only for promoting the technology but also for encouraging its voluntary continued use (Chang and Cheung 2001). Although the World Wide Web has become one of the most widely used information technologies, research indicates that there are many firms that have still not established a Web presence. The reasons behind such decisions are diverse. Firms that decide to be early adopters of Web technology place more emphasis on perceived benefits and compatibility of the Web with existing technology and organizational norms than do later adopters (Beatty et al. 2001).

It is believed that the Internet will continue to play an increasingly important role in relationship building between manufacturers and retailers. The question of how to get from a stage in which awareness is high but usage is low to one in which usage is commonplace will depend, to a large extent, on the need for B2B technology companies to hear manufacturers' and retailers' frustrations and disappointments with B2B Internet systems and aggressively work to solve them (Evans 2001).

According to Thomas (1998), a majority of the programming content of the Internet originated from the United States. It is therefore believed that the Internet will enhance the diffusion of Western (and specifically the United States) culture and influence around the globe. In addition, the Internet promises to build a vast new distribution system for intangible products, to serve as a new worldwide advertising medium and an exciting new catalog for direct marketers and to provide a pervasive new data collection tool for marketing researchers everywhere.

2.6.2 Intranets

The technical performance, versatility, user-friendliness and business contribution of Intranet applications have proved to many organizations worldwide that Intranet technology is a cost-effective and efficient approach to supporting corporate-distributed computing strategies. The intranet is a private network used exclusively within a company or organization (Anonymous 1996). Increasingly, all kinds of organizations are taking advantage of the Intranet to disseminate corporate documents, forms, news, policies, phone directories, product specifications and pricing information. In addition to using the intranet technology to integrate individual, group, departmental and corporate communications, business managers are exploring Intranets to enhance their organizations' business strategies (Lai 2001).

A typical intranet is developed, at least in its first stages, on the existing Local Area Network (LAN) within the organization. Further expansion can be achieved by using a Wide Area Network (WANs). The intranet is based on the client-server networking model where the client refers to the program or process that submits a request to a server, and the server refers to the program that receives the request from the client, processes it, and returns it to the client (Stern and Rasmussen 1997). For cost and time efficiencies, the technologies that underlie the Internet's functionality is usually applied to the Intranet (Moore and Luoma 1997). As a result, people in the organization are able to use the Web browser as a client application for all intranet services such as the Web, e-mail, File Transfer protocol (FTP) and news. Additionally, the Web browser can interact with other applications to allow employees to access company data that is not necessarily in Hyper Text Mark-up language (HTML) format, such as order/invoices databases or human resources records. Hence, according to Hills (1998), the use of the intranet provides

opportunities for companies to achieve significant cost and time savings, better customer support, better use of resources, increased operating effectiveness and an overall improved competitive position.

2.6.3 Extranets

The extranet is a network that uses the Internet to link company intranets. This linkage is usually accomplished through agreements between business partners to allow access to selective company information (Anderson and McKeever 1998, Greengard 1997). Through the construction of firewalls, a company extranet on the Internet is shielded from unauthorized public access (Radosevich 1997). Companies use Extranets to share information in order to keep up with the competition, strengthen relationships with customers, suppliers and partners, reduce operating costs, save time and resources, improve customer service, and generally improve business-to-business relationships (Franklin 1997, Anderson 1998). The use of this technology, however, does not go without problems. Some of the concerns include: the question of which corporate function should monitor the extranet systems, liability issues if other user-companies should lose business as a result of an extranet crash (Nash 1997), vulnerability to encroachment (Anderson 1998), confidentiality and availability of information when needed (Bort and Felix 1997).

2.6.4 EBusiness

According to a study on eBusiness adoption in 27 countries by IDC, an analyst firm, companies all over the world are implementing eBusiness with zeal. It was predicted that companies around the world were going to spend more than \$300 billion on IT to support eBusiness by the end of the year 2001, and this is more than they did in five years

of preparation for Y2K (Gantz 2001). Common priorities for eBusiness oriented Web sites include security, privacy and performance. Generally, business unit managers develop eBusiness initiatives, while IT personnel specify technical solutions. However, there seems to be no master blueprint behind the general migration to eBusiness. Talent, outsourcing and prioritization are some of the reasons in deploying eBusiness applications (Gantz 2001).

A number of unique advantages afforded to companies in the forefront of eBusiness applications are the use of technology to anticipate the needs of customers, attracting and recruiting new customers, retaining profitable customers and reinforcing the loyalty of customers. To realize the full potential of eBusiness, a cost-effective, comprehensible solution should be developed to enable that trust in electronic business relationships to flourish. Trust is an elusive quality, not easily translated into the definition of a service or an information technology system. Thus, Martin (2001) reports that “the three most visible motivations for businesses to adopt eBusiness are: opening up new markets, responsiveness and straight-through processing”. Trust will allow customers to deal with new trading partners, whom they have only met electronically, with the same confidence and with as little risk as those they have been trading with for years.

3. THE UNITED STATES FOREST PRODUCTS INDUSTRY (FPI)

3.1 Introduction

The United States forest products industry (FPI), dating back to the sixteenth century, primarily provided wood for construction and fuel¹. Today, the FPI provides a wide range of products, ranging from construction lumber to packaging paper. A uniform numbering system, the Standard Industrial Classification System (SIC), is used to classify industries and their products. The first two digits of the SIC code signify an industry classification such as 01, 02, 07, 08, and 09 which represent agriculture, forestry and fishing; 10-14 represent mining, 15-17 represent construction, and 20-39 represent manufacturing (Sinclair 1992).

Within this classification, the FPI is categorized as follows: SIC 24 – Lumber and Wood Products, SIC 25 – Furniture and Fixtures, SIC 26 – Paper and Allied Products, SIC 50 – Wholesale Trade Durable Goods and SIC 52 – Building Materials, hardware, Garden Supply and Mobile Home Dealers. Industry segment under SIC codes 24 falls under primary products which are made up of logs, cants and commodity grades of lumber and commodity grades of plywood, wafer board, oriented strand board and similar building panels. Similarly, industry segments under SIC code 25 are considered secondary products which are intermediate components or finished products with a minimum 50 percent solid or reconstituted wood based on value, but not including primary wood products. Secondary wood products result from the physical alteration of the wood input by a change in the dimension or shape, the chemical composition, the physical appearance or other physical properties of the wood input (Anonymous 1997).

¹ Vlosky, Richard P. 1998. "Forest Products Marketing", Personal communication.

Changes in the US economy's composition have led to the introduction of the North American Industrial Classification Systems (NAICS) which is also used by others alongside the older SIC. The NAICS was developed using a production-oriented conceptual framework, with groups established into industries based on the activity in which they primarily engaged. It uses a six digit hierarchical coding system to classify all economic activity into twenty industry sectors. NAICS allows for the identification of 1,170 industries compared to the 1,004 found in the SIC system (Anonymous 2001a).

3.2 Industry Structure

Historically, the FPI has had a production-oriented business philosophy based on increasing productivity while minimizing costs (Juslin and Hansen 2002). As a result, wood products have been mainly commodity products with differentiation based on price (Kotler et al. 1997). A drive towards the marketing approach of identifying and fulfilling customer needs and wants at a profit is evolving, taking the place of the traditional production-oriented approach in many companies (Juslin and Hansen 2002). As a result, differentiation in wood products can be made based on criteria other than price, including service level, quality of product and service, distribution methods or credit (Sinclair 1992).

Another change is the fact that diminishing log diameter has compelled the wood industry to develop alternative products that make better use of available resources while still meeting customer needs (Tyrell 1994). This requires more sophisticated manufacturing technology and research and development. Examples of such alternative products include oriented strand board (OSB), a mat-formed structural panel that is made of narrow strands of fiber sliced from logs. It is gradually replacing plywood in many applications. Also, laminated veneer lumber (LVL), which is made up of thin sheets of

wood veneer oriented with grain parallel to the beam lengths and bonded together by adhesives to form laminated billets which can be re-sawn to required dimension is also replacing the increasingly scarce high quality solid wood lumber (Youngquist 1999).

Many wood commodity dealers use price-lists published in industry-wide publications such as Random Lengths (Anonymous 2001b) for softwood lumber and panels, or the Hardwood Market Report (Anonymous 2002) for hardwood lumber in order to establish a starting base in calculating price.

In the area of distribution, the FPI has been impacted by a desire to increase efficiency, reduce delivery times, and reduce or eliminate inventories and on the resource side, by a convenient location of wood resources. This requires a substantial investment in information technology such as bar coding, EDI, and just-in-time (JIT) systems, often with the consequence of buyers having fewer, but stronger relationships with their suppliers to bring value to their businesses (Vlosky and Wilson 1994, Fontenot and Vlosky 1998a, 1998b, 1997). The increasing use of IT in distribution channels in the FPI, although mainly among large firms, helps in managing information with direct positive effects on cost and overall efficiency (Vlosky and Westbrook 2002, Vlosky and Wilson 1994, Vlosky and Fontenot 1997). However, when it comes to the use of the Internet in conducting business in the FPI, research shows that facsimile is used more even though more and more companies are embracing the use of the Internet tools such as the World Wide Web, email, Usenet, Gopher, website development, Intranet, Extranet and search engines (Sage 1996, Panches 1998).

Because the wood products market is primarily a business-to-business market, companies have historically relied heavily on personal selling and sales promotions as the

main means of advertising (Duerr 1998). The industry also promotes itself through trade associations that play a major role in promoting specific wood products. Examples of such associations are American Hardboard Association, American Fiberboard Association, Hardwood Plywood, Veneer Association, and Southern Forest Products Association (SFPA). Others include National Hardwood Lumber Association (NHLA), APA – The Engineered Wood Association, Composite Panel Association (CPA), Composite Wood Council (CWC), American Wood Preservers Association (AWPA), and Western Wood Products Association (WWPA).

A trend that is common in the FPI is acquisitions, mergers and consolidation. These mergers and acquisitions are occurring both in manufacturing facilities and timberland resources as a result of economies of scale brought about by environmental regulations, global competition, new manufacturing technologies and forest production practices (Diamond et al. 1999).

3.3 The Forest Products Industry and Information Technology Adoption

The need for firms in the FPI to better understand the dynamics across the supply-chain has become more urgent as a result of manufacturing firms' increasing reliance on suppliers (Tanner and Laine 2002).

Most forest products firms are currently at the beginning stages in adopting most IT applications, even though most of them have been consistently building the required infrastructure to accelerate their development in the near future (Juslin and Hansen 2002). The adoption of the Enterprise Resource Planning (ERP) system, for example, has in many ways been similar to other global industries. The first installation dates back to the 1980s, when forest and paper companies typically launched their ERP to cover financials,

controlling materials management and plant maintenance. This has been followed by the inclusion of sales processes such as customer data, prices of products, and required transactions. A stand-alone system has usually been developed alongside or following the initial expansion of ERP to support human resources. Generally, production, planning and logistics have been integrated at later stages. Due to the varying specific needs of different companies in areas such as process and discrete manufacturing, and logistical requirements by region and by product, SAP (the world's largest inter-enterprise software company) has developed "industry solutions" which take the standard ERP package one step further to address these needs (Tanner and Laine 2002).

With regard to eBusiness, companies such as Forest Express, Inc., and TALPX, Inc., provide eBusiness solutions to clients in the FPI. They are independent business-to-business solution providers for buying and selling forest products. They utilize a technology platform and approach that facilitates eCommerce initiatives and accelerates the adoption of electronic commerce across the forest products industry. For example, Forest Express supports brand differentiation in the forest products industry, allowing companies to choose their participants for transactions and to determine their unique level of integration with existing systems. Currently Georgia Pacific, International Paper, Weyerhaeuser, Mead Corporation, Boise Cascade and Willamette Industries are members of Forest Express (Juslin and Hansen 2002).

As a result of industry consolidation and globalization, there is an increasing need to harmonize business processes, revisit business strategies, and make changes in corporate structure, supply chains, markets and marketing. This will require systems that have the

capability to cross boundaries between enterprises in order to achieve collaborative communities (Räisänen 2000).

A review of literature reveals that the United States forest products industry is increasingly interested in the benefits of the Internet, with many companies establishing or desiring to establish a web presence (Anonymous 1998, Vlosky and Fontenot 1997). However, the level of adoption of other IT applications in the operations of the day-to-day business trails behind many industries. This study examined why the FPI lags in IT adoption and how corporate orientation plays a role in the adoption.

4. CORPORATE CULTURE AS AN INDICATION OF ORIENTATION

4.1 An Overview of Corporate Culture

For many years, scholars in organizational behavior have attempted to demonstrate the link between an organization's culture and its performance. It has been argued that the success of an organization's strategy depends, to a significant extent, on the culture of the organization (Yip 1995).

One common thread that greatly affects many of the organizational aspects that enhance performance and increase productivity is the widely shared and strongly held values that underlie and define an organization's culture. Desphandé and Webster (1989) reviewed several studies and defined organizational (or corporate) culture as "the pattern of shared values and beliefs that help individuals understand organizational functioning and thus provide them with the norms for behavior in the organization". Schneider and Rentsch (1988) describe culture as "why things happen the way they do", and organizational climate as "what happens around here". Cultures can be determined by the values, assumptions and interpretations of organization members (Hales 1998). These factors can be organized by a common set of dimensions on both psychological and organizational levels to derive a model of culture types to describe organizations (Cameron and Freeman 1991). Corporate culture is an important predictor of organizational capabilities and outcomes such as customer orientation (Desphandé et al. 1993) and new product development (Moorman 1995). According to the "competing values" model of organizational effectiveness (Quinn and Rohrbaugh 1983), there are four cultural types – adhocracy, clan, market and hierarchy - based on Jungian framework where shared beliefs are considered in the context of dominant organizational attributes (Desphandé and

Webster 1989), leadership styles (Erickson 2000), organizational bonding mechanisms and overall strategic emphases, even though elements of these cultures may overlap one another within the same strategic business units and between product groups in an organization (Gregory 1983, Desphandé et al. 1993).

Harrison (1975) reported four types of cultural orientations of employees as derived from organizational ideologies. These include power orientation where there is the intention of complete dominance of the environment, elementary competition and, in most cases, with ruthless disregard for employee welfare. Others are role orientation, which tends to have a preoccupation with legitimacy, legality and responsibility. Task oriented culture places the highest priority on task achievement whereas Person (self) oriented culture serves the needs of employees through organizational learning as a result of individual influence on one another.

Other cultures include marketing orientation and production orientation. In marketing orientation, organizations develop and maintain a viable fit between the organizations' objectives, skills and resources to the changing market opportunities (Jaworski and Kohli 1993). In effect, marketing-oriented organizations design their products and service offerings to meet customer needs with a profit. Business success depends on effective analysis of marketing opportunities, researching and selecting target markets, designing marketing strategies, planning marketing programs and organizing, implementing and controlling the marketing effort (Kotler 2000). Production orientation, on the other hand, concentrates on achieving high production efficiency, low costs and mass distribution (Kotler 1988). Under such culture, organizations operate on the

assumption that consumers prefer products that are widely available and inexpensive. Success is based on technological efficiency through cost cutting.

According to Jaworski and Kohli (1993), depending on the theoretical approach taken, organizational culture could be viewed as a property of the group or the organization itself, or as something that resides within each individual as a function of the cognitive and learning process (Krefting and Frost 1985), or as both a process and outcome because it shapes human interactions and is also an outcome of the interactions (Jelinek et al. 1983). In considering culture in the light of a strategic management paradigm, Barney (1986) argued that, “ for an organization’s culture to provide sustained competitive advantages, it must add value. It must be rare or unique and be difficult to imitate by competitors”. This could be sustained through the formulation of strategies that encourage a non-passive employee socialization in the form of formal indoctrination into organizational activities and processes, remedial training in areas related to enhancing personal productivity within a group context, and formally sanctioned encouragement to interact with socially oriented as well as production oriented work groups (Hopkins and Hopkins 1991).

In determining the influence of corporate culture on organizations’ IT adoption successes in this study, the adopted cultural type that is distinguished and compared is the marketing-oriented culture. According to Sinclair (1992), a major portion of the forest products industry for years operated under the culture of production orientation, whereas over the years, the changing needs of the customer, competition and other changes in marketplace dynamics, have caused many businesses to migrate from production orientation culture to marketing orientation (Blois 1983), even though some may argue that the marketing concept is not always the best strategic planning philosophy for business,

especially in product innovation and as a guide to choosing business strategy (Bennett and Cooper 1979). A technology or production orientation has been suggested to be more beneficial because, in most cases, marketing-oriented companies tend to base their strategic planning on defining their markets and forget about the product dimension which is also very important. Thus, where a company relies heavily on technology or production, Bennett and Cooper (1979) recommends that the business strategy must also consider the product's use, its production, its customers, and technology.

There has been a growing appreciation that for firms with a substantial investment in manufacturing capabilities, profitability and competitive advantage could be better achieved through satisfactory integration of manufacturing and marketing activities (Blois 1980). However, the need to develop such an orientation becomes clearly evident only when certain types of information are available in order to enhance effective and prompt response. It is with this background that an investigation into how marketing orientation influences IT adoption in the forest products industry within the United States has been necessitated.

4.2 Importance of Corporate Culture

In the modern day dynamic and technology-driven market place, agile and adoptive companies with the ability to evolve become market leaders, while the sluggish unfocused companies lose. In such an environment, corporate culture provides the operating instructions that drive organizational behavior. It is no wonder that Waldera (2000) credits corporate culture as “the single most important determinant of a company’s ability to adapt to market forces”. Corporate culture within an organization will answer questions concerning the markers of a new economy leader, the attributes that enable an organization

to extract economic value from its human capital and the building blocks that allow companies to compete successfully in a knowledge-based technology-powered economy. Given that 25 percent to 50 percent of an employee's behavior on the job is culturally determined (Gannon 1994), it is important to understand the cultural values driving this employee. There is, therefore, the need for the development and articulation of specific cultural characteristics to maximize performance in an organization.

4.3 Corporate Culture and IT Adoption

The development of an information network is a project of prime importance for many organizations. In managing technological change, there is the need for many forms of expertise. However, the behavior of managers as well as how users form perceptions of innovations are important factors to the success of the adoption of the innovation (Chiasson and Lovato 2001, Png et al. 2001).

Advances in new information technology and changes in the global environment have made it increasingly difficult for organizations to make decisions regarding information technology adoption. Many researchers have demonstrated that there are significant differences between cultures in the implementation and use of IT (Ronen and Shenkar 1985, Cartwright and Cooper 1989, Kettinger and Lee 1995). Therefore, the knowledge of the cultural orientation of an organization's employees can facilitate the adoption and implementation of IT and provide for a coherent approach to the strategy for the organization (Merchant 2001).

4.4 The Model of IT Adoption

Figure 1 provides an overall illustration of how an organization adopts information technology and the numerous factors that influence the adoption process (Vlosky 2001).

A whole range of economic, social, political and technological factors that influence decision-making and performance surrounds an organization. Other factors in the external environment constitute the organization's customers, distributors, suppliers and the competition. These forces constitute the external macro-environment, as well as microenvironment forces, respectively. They need to be scanned to determine opportunities and threats for the business (Kotler 2000).

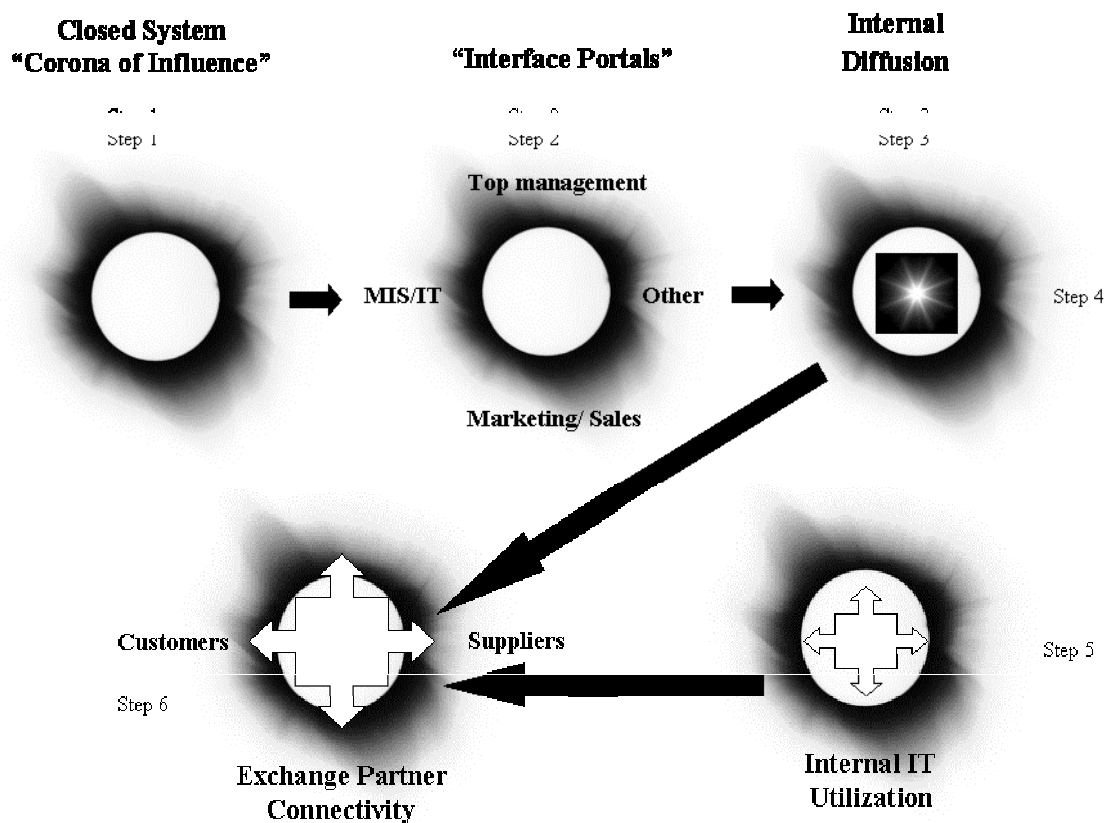


Figure 1. Schematic of Information Technology Adoption (Vlosky 2001)

The Internal environment of the organization could be made up of tangible factors such as the physical plant and equipment and the intangible such as the skills of the

employees within the organization. To be able to survive in the highly competitive business world, a business must identify its strengths and weaknesses, hone in on its core competencies, and leverage them for competitive advantage (Grant 1991). The important role IT plays in business has been emphasized in literature (Rockart and Short 1989, Benjamin et al. 1984). Thus, the current information technology system of an organization constitutes the corona of IT influences. Such influences could be made up of old legacy systems, integrated systems, semi-integrated systems or stand alone IT systems.

Depending on the organizational size, the market nature and type of products being produced, and the perceived benefits of IT, certain portals are able to penetrate the organization to varying degrees in order to influence adoption. Top management, organizational orientation, management information systems, or the information technology itself, as alluded to in earlier sections of this report typically facilitates penetration and adoption. Once these factors have successfully penetrated the organization to influence the adoption of IT, internal diffusion occurs (step 3). The diffusion is tremendously affected by the cultural orientation of the organization to create strong or weak relationships of the factors that lead to the penetration, adoption and diffusion (step 4). Based on the corporate orientation with respect to IT adoption, the organization may utilize IT for internal consumption (Intranet), external consumption (Extranet), a network of computer networks for global application (Internet), database management, enterprise resource planning and many other IT applications (step 5). In the highest order application of IT, eBusiness takes place with inter-organizational connectivity (step 6). This can be done with its exchange partners such as its customers, which includes order taking, order

process, order payment, dispatch, order tracking and after-sales customer support. Others include suppliers for procurement processes and overall supply chain management.

4.5 Conceptual Foundations of the Study

4.5.1 Overview

Figure 2 provides a model for the measurement of constructs related to Internet adoption and corporate orientation. In this model, corporate orientation plays a moderating role in systematically modifying either the form and/or strength of the relationship between the predictor variables (“perceived company effectiveness of Internet adoption”) and the criterion variables that influence Internet adoption (such as “extent of Internet application”, “user participation”, “perceived ease of use by user”, “perceived usefulness by user” and “adoption diffusion by company”) (Sharma et al. 1981).

There are various orientations that organizations can adopt. However, for the purpose of this study, organizational orientation is defined in terms of marketing orientation. Nevertheless, this study does not infer that a company can acquire only one orientation at any one time. Instead, companies could have a blend of other orientations including production orientation, technology orientation, research and development orientation, etc. The United States forest products industry has traditionally been production oriented. Marketing orientation is a relatively new phenomenon that is gradually seeping into the way the industry does business as a result of competition, technology, and the changing needs of customers and it is worthwhile investigating how this new phenomenon impacts Internet adoption.

The items to measure marketing orientation in this research have been adapted from McCarthy and Perreault (1987) and other marketing and management literature such as

Kotler et al. (1997), Kotler (2000), Keegan et al. (1992), and Elliot (1990). Since IT adoption constructs could be perceived to be rather broad, a modified version of a similar instrument developed by the Computer Science and Telecommunications Board of the National Research Council in 1991 (Anonymous 1994) was adapted for Internet adoption (as an example of IT application) as well as other items from the Technology Acceptance Model (TAM) by Davis (1989) and Davis et al. 1989).

Factors Influencing IT Adoption

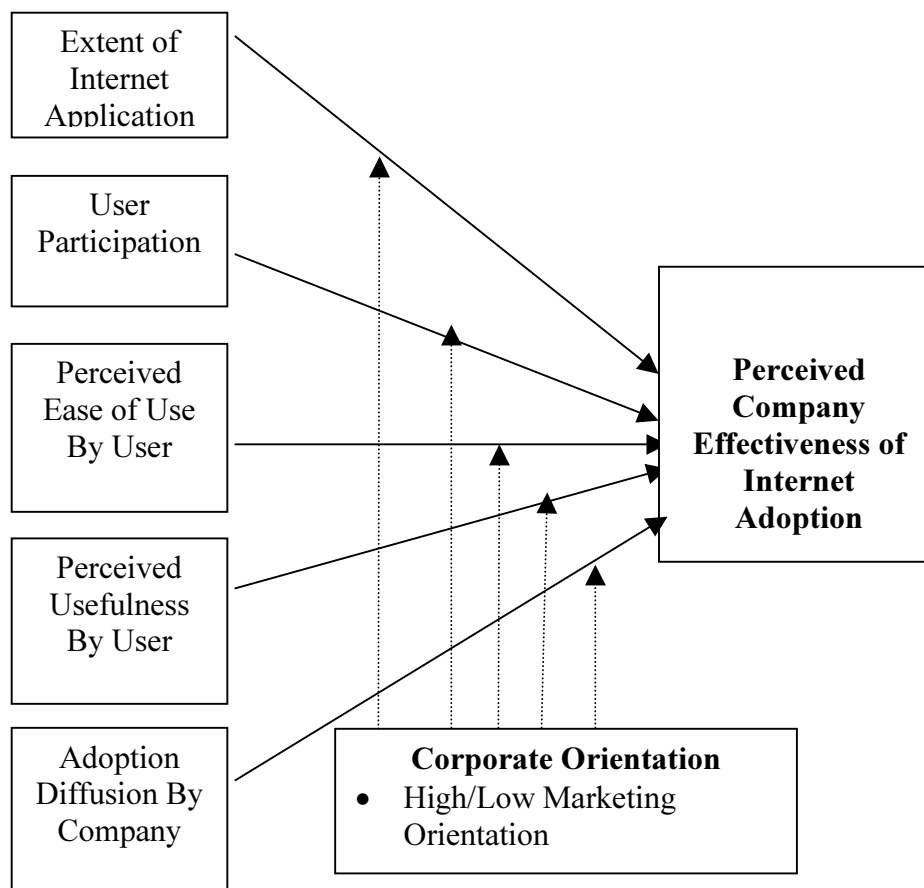


Figure 2. Model of Internet Adoption/Corporate Marketing Orientation Interaction

4.6 Model Constructs

4.6.1 Extent of Internet Application

The “extent of Internet application” construct describes the extent to which an organization applies the Internet to making, implementing and evaluating organizational decisions. Its benefits are commonly based on enhanced decision-making or improved business performance. The use of information in decision-making involves integrating information sources and selecting among alternative strategies (Bettman 1990), whereas information use in decision implementation concerns how decisions should be carried out (Nutt 1986). Information use in evaluation, on the other hand, refers to the determination of positive and negative performance outcomes and the reasons for the outcomes (Zaltman and Moorman 1989).

The development of IT comes with a significant risk of whether the end-users will actually use it or not. To ensure continued use, external variables (such as technical features and organizational environment), internal psychological variables (such as past education and attitude to system use) and past usage (prior experience) must be considered (Bajaj and Nidumoli 1998, Taylor and Todd 1995).

Past research has found inconsistent associations between usage and other measures of system success. There still remains a significant gap in establishing the relevance of the way of measuring usage to the task or study (Szajna1993). According to the theory of reasoned action, the perceived usefulness of the system and its impacts on valued skills affect attitudes toward use of IT (Liker and Sindi 1997). This means that for users of IT to realize the full potential of the technology, they must be willing to use the

technology and become effective users. Unfortunately, many IT applications are misused, underutilized or abandoned (Martinsons and Chong 1999, McDermott 1987).

4.6.2 User Participation

The relationship between user participation and information system (IS) has drawn attention from researchers for some time because of its potential impact on the success of systems. Yet, empirical results have drawn a lot of controversy as a result of conflicting findings, weak measures and methodological and theoretical differences. Hence, over two decades of research has still not convincingly demonstrated the benefits of user participation (Ives and Olson 1984, Torkzadeh and Doll 1994, Saleem 1996). User participation has been reported to be situation dependent and not equally effective in all situations (McKeen and Guimaraes 1997).

There is much controversy surrounding the definition of user participation in organizational behavior literature (Locke and Schweiger 1979, Vroom and Jago 1988). User participation could be considered as “taking part” in some activity. Such participation may be direct or indirect, formal or informal, performed alone or in a group, covering varying scopes of activities during systems development and implementation (Vroom and Jago, 1988). Ives and Olson (1984) suggested that assessing a wide variety of specific behaviors, activities, and assignments is more accurate, reliable and valid than measures assessing general opinions during user participation evaluation (Cote and Buckley 1987, Barki and Hartwick 1994)).

Systems development, as a result of being marked by cost overruns, late deliveries, poor reliability and user dissatisfaction, in many cases, does not achieve the expected strategic benefits. It has been suggested that the participation of users in the design and

implementation of IT promotes greater user acceptance, IT usage, system quality, organizational impact and increased user satisfaction, which could lead to increased IT implementation success (Hwang and Thorn 1999, Lin and Shao 2000, Amoako-Gyampah and White 1997). Orientations that are high in trust and mutual supportiveness foster higher levels of communication, shared identity and commitment (Mohr and Nevin 1990). This in turn enhances user participation (Moorman et al. 1992). Literature from social exchange and organizational behavior suggests that the greater the user participation in the project, the greater will be the establishment of trust in the success of the project (Moorman et al. 1993) because the users will be able to identify loopholes in the project before final implementation and will also feel committed to make it work (Moorman et al. 1992). This also generates confidence in the users that the IT system is reliable (Rotter 1971) and encourages users to take risks (Ring and Van De Ven 1992).

According to Foster and Franz (1999), analysts and users have different perceptions of the user's participation and acceptability of the system to the user. From the point of view of users, the level of user participation has a direct, positive and significant impact on user satisfaction, whereas analysts' perceptions portray otherwise (Amoako-Gyampah and White 1993). This is because it is believed that the successful implementation of IT projects depends, to a large extent, on the learning processes and the accumulation of knowledge at the firm level (Panopoulou 2001).

User participation facilitates organizational learning by bringing together all dispersed knowledge from the various units within the organization to one spot where employees can access information, learn from one another, and benefit from new knowledge developed by other units (Becker 2001). This provides opportunities for

mutual learning and interunit cooperation that stimulate the creation of new knowledge and, at the same time, contribute to organizational units' abilities to innovate (Kogut and Zander 1993, Tsai and Ghoshal 1998, Huber 1991).

4.6.3 Perceived Ease of Use by User

Perceived ease of use has been established from previous research to be an important factor influencing user acceptance and usage behavior of information technologies (Igbaria et al. 1995). It describes the individual's perception of how easy the innovation is to learn and use. This includes support, complexity and change. The Technology Acceptance Model (TAM) by Davis et al. (1989) which places emphasis on the roles played by perceived ease of use and perceived usefulness in influencing technology adoption decisions, has been widely used to predict user acceptance in much of the possible literature (Plouffe et al. 2001, Karahanna and Straub 1999, Thompson et al. 1991, Venkatesh and Davis 1996). Venkatesh (2000) reported that six variables significantly contribute to how users perceive the ease of use of specific IT systems over time in an actual corporate setting. These variables include computer self-efficacy, facilitating conditions, intrinsic motivation/computer playfulness, emotion/level associated with computer anxiety, objective usability and perceived enjoyment (Wexler 2001). Self-efficacy has a strong direct effect on perceived ease of use, but only an indirect effect on perceived usefulness through perceived ease of use (Igbaria and Iivari 1995). Another factor, past usage (prior experience) also apparently influences the ease of use of the system and this is a key factor in determining future usage (Bajaj and Nidumoli 1998).

4.6.4 Perceived Usefulness by User

The Technology Acceptance Model (TAM) is one of the most influential research models in studies of the determinants of information systems/information technology (IS/IT) acceptance (Igbaria and Iivari 1995, Davis et al. 1989). Sets of antecedent constructs drawn from both TAM and the perceived characteristics of innovating (PCI) inventory show that the PCI set of antecedents explains substantially more variance than does TAM while also providing managers with more detailed information regarding the antecedents driving technology innovation adoption. Technology Acceptance Model (TAM) provides a poor fit for the model until the introduction of an additional construct, computer self-efficacy (Fenech 1998). Furthermore, a review of the IS and psychology literature suggests that perceived usefulness can be of two distinct types: near-term usefulness and long-term usefulness (Chau 1996).

The Social Exchange Theory posits that IT managers are able to influence both the perceived usefulness and the perceived ease of use of an IT application through a constructive social exchange with the user such as developer responsiveness (Gefen and Keil 1998).

Perceived usefulness describes the perceptions of the individual to the innovation and has been found to influence an individual's adoption behaviors. Davis (1989) defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her performance". It is an example of extrinsic motivation which is found to play a greater role in an individuals' behavior (Igbaria et al. 1995). According to Liao and Cheung (2002) the most important consumer attitudes underlying perceived usefulness of and willingness to use IT are expectations of accuracy, security,

network speed, user-friendliness, user participation and convenience. Expectation-confirmation theory adapted from the consumer behavior literature and integrated with theoretical and empirical findings from prior IT usage research suggest that users' continued intention is determined by their satisfaction with IT use and perceived usefulness of continued use. User satisfaction, in turn, is also influenced by the user's confirmation of expectation from prior IT use and perceived usefulness and this is influenced by the user's confirmation level (Bhattacharjee 2001). According to Igbaria et al. (1996) perceived usefulness (rather than perceived fun or social pressure) is the principal motivator of increased use of microcomputers by professionals and managers.

4.6.5 Adoption Diffusion by Company

The process of information technology adoption and use is critical to deriving the benefits of information technology. Understanding how users form perceptions of an IT innovation would help designers, implementers and users in their evaluation, selection, implementation and on-going use of IT. The diffusion of IT, however, is a complex process that is influenced by numerous factors such as perceived characteristics of the innovation, subjective norms, stages of adoption, user competence, implementation processes, and organizational factors (Chiasson and Lovato 2001). Each factor has a direct effect on IT diffusion. Other findings suggest that migration costs (Chau and Tam 2000), earliness of adoption, top management support and organizational size are positively associated with diffusion (Eder and Igbaria 2001, Knol and Stroeken 2001). However, advocacy by middle management is seen not to have a positive effect on the success of implementation (Carter et al. 2001), but rather having the right organizational and individual incentives could cause a widespread adoption (Wong et al. 2000).

The most commonly found model to explain the s-curve pathway of new technology use (Geroski 2000) is the so-called epidemic model, which builds on the premise that what limits the speed of usage is the lack of information available about the new technology, how to use it and what it does. The leading alternate model is often called the probit model, which follows from the premise that different firms, with different goals and abilities, are likely to want to adopt the new technology at different times. In this model, diffusion occurs as firms of different types gradually adopt it.

Rogers' (1995) work on diffusion theory has provided an important set of theoretical constructs, called "perceived characteristics of an innovation", which is important in influencing adoption and diffusion. These constructs include relative advantage, compatibility, complexity, trialability and observability.

Explanation of adopter attitudes on innovation adoption and diffusion has long converged on a core set of theoretical frameworks that stem from Diffusion of Innovations (Rogers 1983) and Technology Acceptance Model (Davis et al. 1989) which have been explained in an earlier section of this report. Other theories include the Theory of Reasoned Action (Ajzen and Fishbein 1980) which posits that personal attitudes and subjective norms play major roles in determining intentions to use; the Theory of Planned Behavior (Ajzen 1985, Taylor and Todd 1995) which suggests that a behavior is a direct function of behavioral intention, which in turn, is formed by attitude, which reflects feelings of favor or disfavor toward a behavior; and Social Cognitive Theory (Compeau and Higgins 1995) which proposes that contextual supports and barriers play key roles in behavior formation. Specifically, Social Cognitive Theory suggests that behavior is affected by both outcome expectations and self-efficacy, while outcome expectations and

self-efficacy are in turn influenced by prior behavior. However, these frameworks have been reported to neglect the realities of implementing technology innovations within organizations when adoption decisions are not made at the individual level but at organizational, division or workgroup levels (Orlikowski 1993, Fichman and Kemerer 1997) where decisions are made top-down. Here authorities make the initial decision to adopt and implement a selected information technology application, and targeted users have few alternatives, but to adopt the innovation and make the necessary adjustments for using it to perform their jobs (Zaltman et al. 1993).

4.7 Corporate Orientation

Aligning corporate orientation with new strategic decisions is a complex phenomenon that requires management's attention because corporate orientation may result from day-to-day operations of the organization because of patterns of shared beliefs, behaviors and assumptions, acquired over time by the members of the organization (Conner et al. 1987).

However, if the introduction of planned change and management initiatives with significant organizational implications are to have full impact, corporate orientation, in conjunction with IT intensity, must be given serious consideration (Smith 1998, Weber and Pliskin 1998).

There is a wide spectrum of orientations that organizations could adopt, some of which include technology orientation, research and development orientation, marketing orientation, and production orientation. However, for the purpose of this study, organizational orientation is defined in terms of marketing orientation. An organization may have high marketing orientation together with other orientations at any point in time.

4.7.1 Marketing Orientation

The dynamic nature of the marketplace needs requires a continuous tracking and responsiveness of these needs with superior value in a consistent manner at a profit. A marketing-oriented organization generates market intelligence, disseminates the intelligence across departments and provides the appropriate response to the needs of the market at a profit (Kohli and Jaworski 1990). The strategy is to survey markets to identify unfilled needs and then to produce products that satisfy those unmet needs. It is believed that if a product or service sufficiently satisfies consumers, the product or service will basically sell itself, as people with the need will seek it for fulfillment. To be effective, more resources are required to focus on what potential consumers want, and then translate to product traits, packaging characteristics, price levels or availability of products to the consumers. Though marketing orientation has been posited to lead to greater customer satisfaction and organizational commitment of employees (Narver and Slater 1990), arguments have been advanced in literature to the effect that a marketing orientation may have a strong or weak effect on business performance. This depends on the environmental conditions such as market turbulence and competitive intensity (Houston 1986). Narver and Slater (1990) reported that for an organization to be considered market oriented, it must possess three behavioral components - customer orientation, competitor orientation and interfunctional coordination- and two decision criteria: long-term focus and a profit objective.

4.8 Perceived Company Effectiveness of Internet Adoption

Perceived effectiveness of Internet adoption is the extent to which individuals believe that the adoption of the Internet has been successful. Despite remarkable advances

in information technology, many IT projects still fall short of performance expectations. A growing share of these implementation failures arises from non-technical factors. Griffith et al. (1999) believe that technology implementation success could be improved with active top management support, clear implementation goals and user participation and training. Other success factors include a good understanding of the intended end-users, their tasks, and the interdependencies between the two, together with the appropriate business strategy (Martinsons and Chong 1999). This should lead to adding value to the firm and bringing some positive influence on user behavior.

Unfortunately, IT success can sometimes be elusive (Davis (1991). An effective IT application is expected to improve performance, but if poorly planned, developed or implemented without due recognition to increase human resource effectiveness, it can breed disaster and retard individual and/or group performance (Templer 1989).

The literature in social psychology and marketing suggests through the cognitive dissonance theory that individuals' expectations on a task are influenced by performance expectations (Aronson and Carlsmith 1962, Brock, et al. 1965, McLeod and Fuerst 1982). Thus, before considering the products and the technology to be offered, the IT department must develop an understanding of its customers and their expectations (Panko 1987).

While utilization of an information system is widely regarded as an indicator of its success, effectiveness or acceptance (Szajna1993), the realization of user expectation has been suggested as one possible means of assessing the eventual success or failure of an IT (Van De Ven 1976).

Miller and Doyle (1987) reported that IT success correlates with the perceived performance and importance of these factors in each firm. Though different firms have

different levels of appreciation of importance of performance factors, their overall attitude toward IT is strongly influenced by how well those factors are handled. The firms that concentrate their resources in the most important areas will achieve greater success than those that spread their resources too thinly. Performance factors include: 1. Functioning of existing transaction/reporting systems, 2. Linkage to strategic processes of the firm, 3. Amount and quality of user participation, 4. Responsiveness to new systems needs, 5. Ability to respond to end-user computing needs, 6. IT staff quality and 7. Reliability of services. Other factors include identity, significance, autonomy and feedback (Ryker and Nath 1995).

Other research findings further suggest that the payoffs from end-user computing have a significant relationship with performance. This provides more opportunities for organizations to work to improve performance (Guimaraes and Igarria 1994).

Saarinen (1996), by studying the IT development projects in major Finnish companies, also provides measurement scales for four dimensions of success - the development process, use process, IT product quality and impact of the IT on the organization.

5. OBJECTIVES AND METHODOLOGY

5.1 Research Objectives

The specific objectives of the study were to:

1. Examine overall adoption of the Internet in the United States lumber industry.
2. Investigate the influence of corporate orientation (marketing orientation) on Internet adoption effectiveness.

5.2 The Sample

Literature on IT adoption indicates that within the forest products industry, there is a direct correlation between company size and IT adoption (Vlosky 2000a, Vlosky 2000b, Vlosky et al. 2000, Vlosky and Fontenot 1997, Vlosky and Westbrook 2002). For the purposes of the study, 1,250 sawmills of varying sizes were randomly selected from the four geographic regions of the United States.

5.3 Data Collection

Data for the study were collected through a mail survey using questionnaires as the research instrument. Mail questionnaire procedures including pre-survey notification of initial mailing, a post-survey reminder, and two additional survey mailings were done. Companies were surveyed at the corporate headquarter level only to capture corporate information. The key informants were the CEOs and chairpersons or appropriate persons or designated senior-level managers in a sample of top sawmills in the industry that were identified through the use of the industry database which indicated the CEO and chairperson of each company by name, mailing address, and phone numbers.

5.4 Questionnaire Design

Since IT is a broad term for equipment, applications services and basic technologies that process information, the researcher selected the Internet as one example of IT application for the study. A questionnaire was therefore developed using the Internet as the technology upon which to test the model in Figure 2.

Based on the literature, the researcher developed an extensive list of topics and questions. The questionnaire instrument tested constructs using measures developed by the researcher as well as measures adapted from other sources, which had been tested in previous studies. The process of questionnaire design followed guidelines and recommendations by Dillman (1978), Churchill (1979), Mangione (1995), and Burns and Bush (1998). The type of questions included open-ended, dichotomous, multiple category closed-ended and labeled scale response questions.

The final version of the questionnaire was divided into the following sections:

(1) Business Profile, (2) Your Company, (3) Internet Adoption.

Below is a brief summary of each section of the questionnaire:

Section I. Business Profile

Business type

- Location
- Size (i.e., 2001 sales revenue and number of employees)
- Specialty (major products manufactured).

Section II. Your Company

- Value creation focus – Customer / production
- Attitude toward customers
- Product offering
- Role of market research in the organization
- Interest in innovation

- Role of customer credit
- Role of packaging
- Inventory levels
- Focus on advertising
- Flexibility and continual adopting to change

Section III. Internet Adoption

- Adoption of the Internet and the time of adoption
- Internet-based applications
- Extent of IT Application
- Training
- Employee initiatives
- Employee participation
- Importance of the Internet
- Ease of use of the Internet
- Valuableness of the Internet
- Management support
- Stage of Adoption
- Usefulness of the Internet
- Skill level in the use of the Internet
- Sufficiency of the Internet in meeting job needs
- Implementation process factors
- Reasoning behind Internet adoption
- Funding level of adoption
- Personality influence on the adoption process
- Trial opportunity of Internet use
- Management's understanding of employee tasks
- Clarity of Implementation goals
- Role of employee acceptance
- Adoption performance factors.

5.5 Data Analysis

Questionnaire data were coded and input into Microsoft Excel and transferred to Statistical Package for Social Sciences (SPSS) software, version 10, for Windows. Using SPSS software, factor, regression, and univariate statistical analytical techniques were employed to analyze the quantitative aspect of the data. Univariate inferential summary statistics were employed to characterize the qualitative data and the differences and

similarities of ordinal and interval measured constructs such as industry type, products produced and Internet business applications were examined. Graphical representations of the data such as tables, charts, and other figures were extensively used. In addition, descriptive analyses were conducted to highlight on the qualitative side of the research.

6. PROPOSITIONS AND HYPOTHESES

6.1 Introduction

In the context of the forest products industry, relationships between Internet adoption factors (independent variables) and “perceived company effectiveness of Internet adoption” (dependent variable) were studied from the point of view of the user. Marketing orientation can co-exist with other orientations such as production orientation in an organization. The dominant orientation of the organization is usually what determines the organizational orientation (Desphandé and Webster 1989). Thus, when the dominant marketing orientation is high, the organization will be said to have high marketing orientation and vice versa.

6.2 Influences of Corporate Orientation

The relationship between the factors of Internet adoption and perceived effectiveness of Internet adoption in the company may be moderated by the dominant orientation (marketing orientation) of the organization.

A high marketing-oriented organization relies heavily on the knowledge about the customer and the marketplace in order for the organization to engage in activities that will reach out to meet the needs of customers at a profit (McCarthy and Perreault 1987). The following hypotheses were thus formulated:

6.2.1 Relationship between Extent of Internet Application and Perceived Company Effectiveness of Internet Adoption

Proposition 1: In order for an organization to target its products towards the needs of the customer (high marketing orientation), it needs to know what the needs of the customer are. This will require a more extensive use of the Internet for information gathering about the market.

Hypothesis 1: Marketing orientation will moderate the relationship between “extent of Internet application” and “perceived company effectiveness of Internet

adoption” such that the relationship between “extent of Internet application” and “perceived company effectiveness of Internet adoption” will be positive for high marketing orientation and negative for low marketing orientation.

6.2.2 Relationship between User Participation and Perceived Company Effectiveness of Internet Adoption

Proposition 2: The opportunity to involve users in the adoption of the Internet will enhance the perception of users on how effective the Internet has been adopted in the company because users will have the opportunity to understand the technology and its effectiveness in meeting their needs at job delivery. A high marketing-oriented organization will create the environment that enhances employee participation.

Hypothesis 2: Marketing orientation will moderate the relationship between “user participation” and “perceived company effectiveness of Internet adoption” such that the relationship between “user participation” and “perceived company effectiveness of Internet adoption” will be positive for high marketing orientation and negative for low marketing orientation.

6.2.3 Relationship between Perceived Ease of Use by User and Perceived Company Effectiveness of Internet Adoption

Proposition 3: An organization with a high marketing orientation thrives on information sharing about the market and the needs of the customer in order to be able to produce to meet the specific needs of the customer. This sharing process enhances organizational learning and provides greater opportunities for users to understand the Internet applications in order to perceive its ease of use in performing their jobs. The more users of information technology perceive the Internet use to be easy, the more they will be able to appreciate the effectiveness of the adopted Internet in the company.

Hypothesis 3. Marketing orientation will moderate the relationship between “perceived ease of use by user” and “perceived company effectiveness of Internet adoption” such that the relationship between “perceived ease of use by user” and “perceived company effectiveness of Internet adoption” will be positive for high marketing orientation and negative for low marketing orientation.

6.2.4 Relationship between Perceived Usefulness by User and Perceived Company Effectiveness of Internet Adoption

Proposition 4: As users are given the opportunity to use an Internet application in an organization where participation is encouraged (high marketing-orientation), they are able to better ascertain the extent of usefulness of the Internet application in meeting their needs and hence, can determine the effectiveness of its adoption within the company.

Hypothesis 4: Marketing orientation will moderate the relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet adoption” such that

the relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet adoption” will be positive for high marketing orientation and negative for low marketing orientation.

6.2.5 Relationship between Adoption Diffusion by Company and Perceived Company Effectiveness of Internet Adoption

Proposition 5: Because a high marketing oriented organization provides the environment for information sharing and interaction among users’ employees and external customers, there is a quicker diffusion of the adoption of information technology within the organization. Hence, the faster the adoption diffusion of Internet adoption in the organization, the greater the opportunities for users to perceive the adoption effectiveness within the organization.

Hypothesis 5: Marketing orientation will moderate the relationship between “adoption diffusion by company” and “perceived company effectiveness of Internet adoption” such that the relationship between “adoption diffusion by company” and “perceived company effectiveness of Internet adoption” will be positive for high marketing orientation and negative for low marketing orientation.

7. RESULTS AND ANALYSIS

7.1 Demographics

7.1.1 Response Rate

Table 1 shows the respondents that were initially sampled, the adjusted sample size after accounting for non-deliverable surveys as a result of company closures, change of address or deceased, and adjusted response rates. All industry survey respondents were surveyed at the corporate headquarters level. Given that typical response rates for industrial studies range from 15-30 percent, a response rate of 34 percent in this study is considered to be exceptional (Vlosky et al. 2002).

Table 1. Response Rate

Initial Sample Size	Undeliverable, Out of Business, inappropriate or duplicate	Adjusted Sample Size	Number of Total Respondent Companies	Adjusted Response Rate
1,250	89	1161	394	34%

7.1.2 Business Description

Of the 387 respondent companies that indicated company type, 293 respondents (76 percent) were manufacturers, 17 (4 percent) were distributors or wholesalers, while 77 (20 percent) were both manufacturers and distributors or wholesalers. As seen in Table 2, the majority of the businesses were located in the South where respondents had 139 (47 percent) of the 293 respondents who were manufacturers. Nine (53 percent) of the 17 respondents were distributors or wholesalers, and 34 (44 percent) of the 77 respondents were both manufacturers and distributors or wholesalers.

Table 2. Distribution of Business Categories across Geographic Regions (n = 387)

Geographic Region	Business Category			
	Manufacturer	Distributor or Wholesaler	Both	Total
North/Central	51	3	18	72
Northeast	52	2	16	70
South	139	9	34	182
West	51	3	9	63
Total	293	17	77	387

7.1.3 Geographic Distribution of Study Respondents

Figure 3 shows the geographic distribution of respondent corporate locations by the four major U.S. regions – North/Central, Northeast, South and West. All the regions were well represented in the study. However, the majority of the respondents (47 percent) were located in the South, followed by 19 percent located in North/Central and 18 percent in Northeast, with the West having the least representation (16 percent).

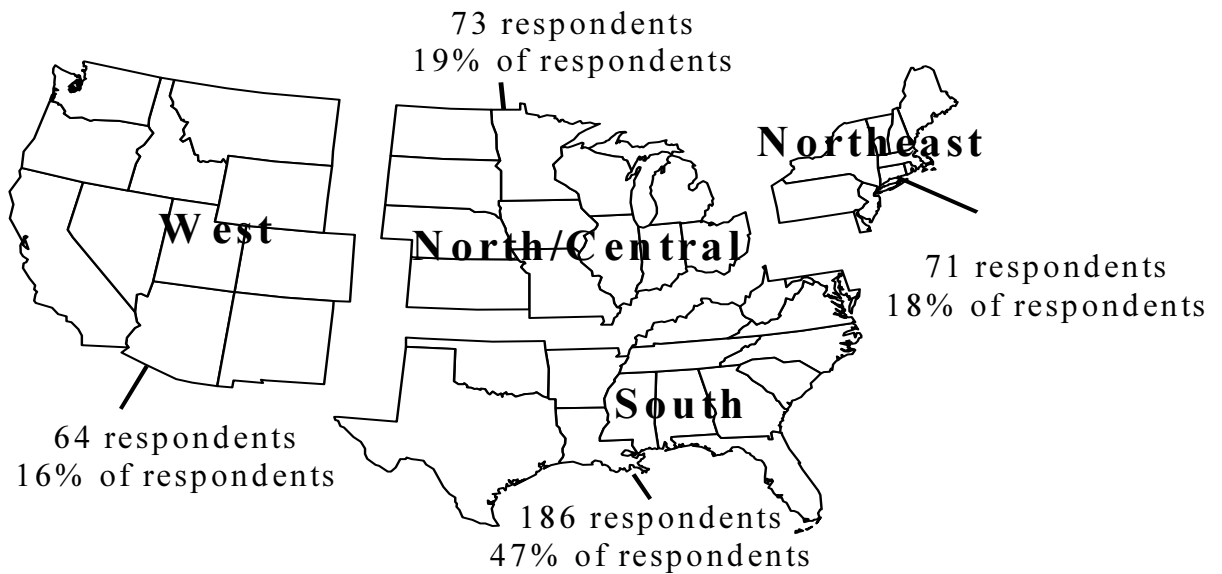


Figure 3. Respondent Corporate Headquarters Regional Locations (n = 394)

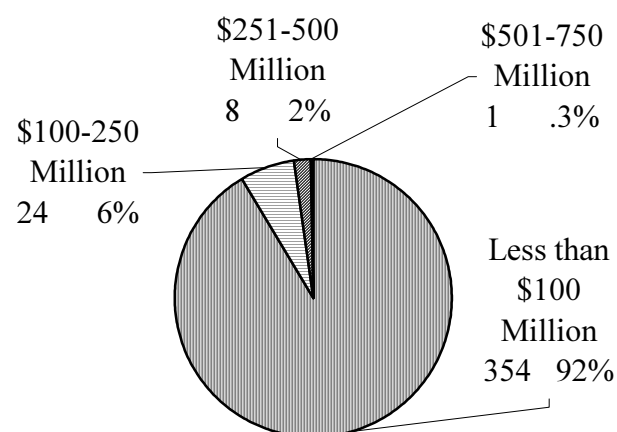
7.1.4 Company Size Distribution

The majority of respondents were small size firms with 92 percent having revenues of less than \$100 million in 2001. Only 8 percent had revenue between \$100-500 million (Figure 4).

Examining company size with respect to number of employees, Figure 5 shows that 70 percent of respondents had less than 50 employees each. Thus, between company revenue and number of employees, the study suggests a direct relationship in the sawmill industry.

7.1.5 Products Sold

Rough-cut green lumber was the top ranked wood product sold by most respondents (76 percent of respondents) (Figure 6). The next ranked product was wood chips with 30 percent of respondents, closely followed by by-products such as bark mulch with 27 percent of respondents and sawdust with 22 percent of respondents. Pallets and logs were also both sold by 16 percent of respondents. Table 3 indicates a myriad of other products that respondents sell.



**Figure 4. Company Size by 2001 Revenue
(n = 387)**

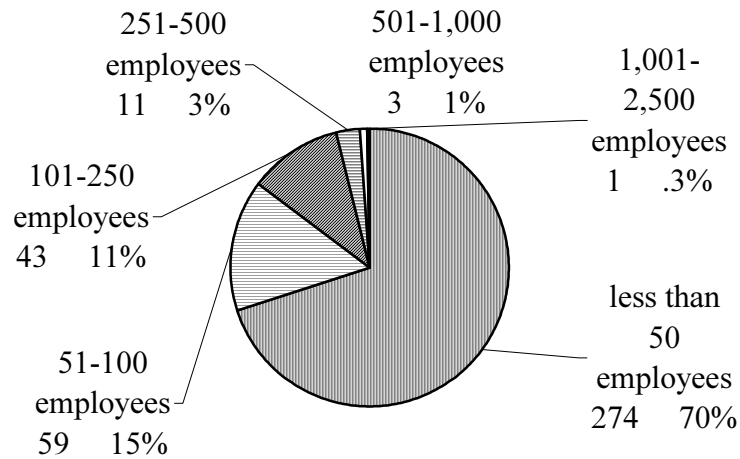


Figure 5. Company Size by Employee Class
(n = 391)

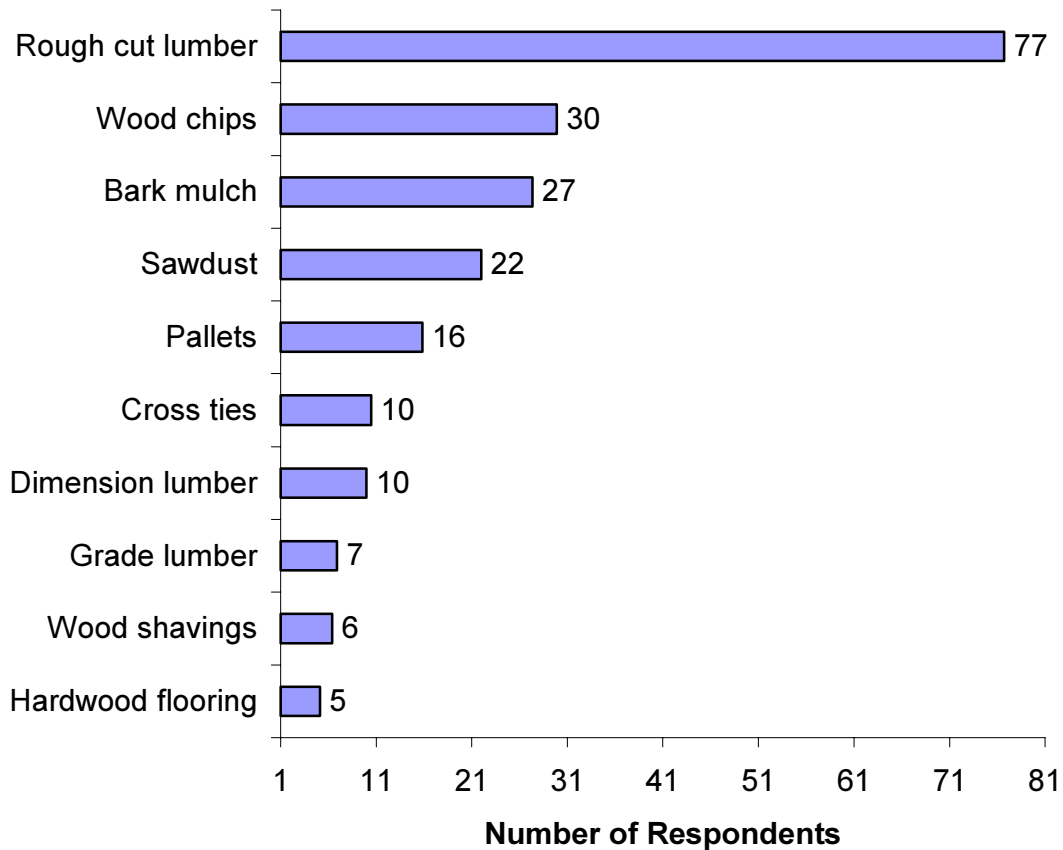


Figure 6. Wood Products Sold
(n=394; multiple responses possible)

Table 3. Other Products Sold

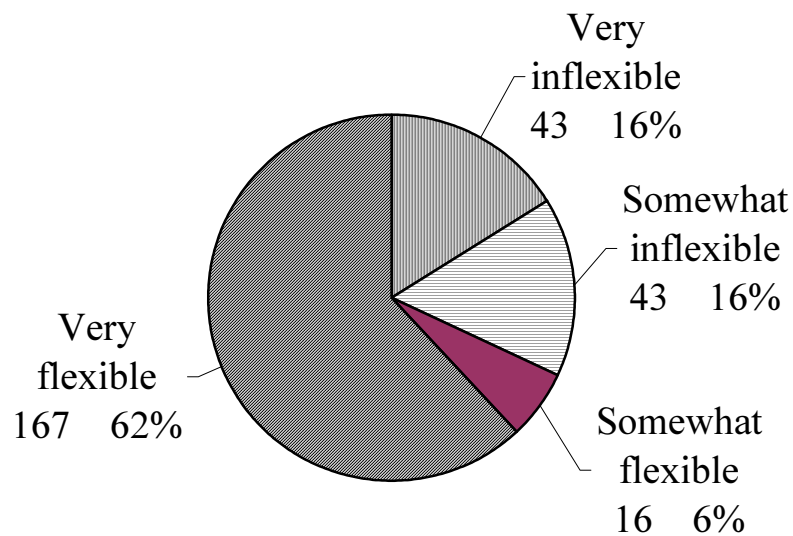
- | | | |
|--------------------------------|-----------------------------|--------------------------|
| • 2 x 4 studs | • Fire starter | • Structural timber |
| • Antique (reclaimed) lumber | • Fencing | • Slicing veneer |
| • Barbecue pellets | • Finger jointed studs | • Squares |
| • Barrel stairs | • Fuel | • Standing timber |
| • Beams | • Hardwood plywood | • Smoker trays |
| • Bedroom furniture | • Hardwood siding | • T & G panels |
| • Bevel siding | • Horse bedding | • Trim |
| • Cabinet stock | • I-joist | • Utility poles |
| • Ceramic tiles | • Laminated materials | • Vinyl covered products |
| • Chair rails | • MDF | • V-groove panels |
| • CNC routed wood products | • Melamine covered products | • Window frames |
| • Crane and trucking materials | • Moldings | • Wood lath |
| • Crates | • Particle board | • Wooden barrels |
| • Custom sawing | • Pet litter | |
| • Decking material | • Plugs | |
| • Doors | • Pressure treated lumber | |
| • Door core | • Posts | |
| • Door frames and jamb | • Pulpwood | |
| • Dowels | • S4S lumber | |
| • Entertainment center | • Shoe horns | |
| • Furniture component | | |

7.2 Company Orientation (Market/ Production)

Out of the 390 respondents, 78 percent indicated that they produce to meet customer needs (marketing orientation), while 22 percent said they produced at low cost to serve the market (production orientation). However, further probing into how respondents were in agreement with certain attributes of marketing orientation and production orientation as stated by McCarthy and Perreault (1987), and Sinclair (1992), revealed that 53 percent of respondents were production-oriented, while 47 percent showed marketing orientation. Of these, only 15 percent indicated that their company conducted marketing research. This confirms a report by Sinclair (1992) that the forest products industry is traditionally production-oriented.

7.3 Flexibility

Flexibility is the ability to be open to change and supportive of continuous improvements, which is a hallmark of a market oriented company (McCarthy and Perreault 1987). Respondents' consideration of their companies' level of flexibility indicated that 68 percent considered themselves to be flexible while 32 percent were inflexible to change (Figure 7). This suggests that the forest products industry is currently becoming more accommodating to change in the face of competition and changing consumer needs.

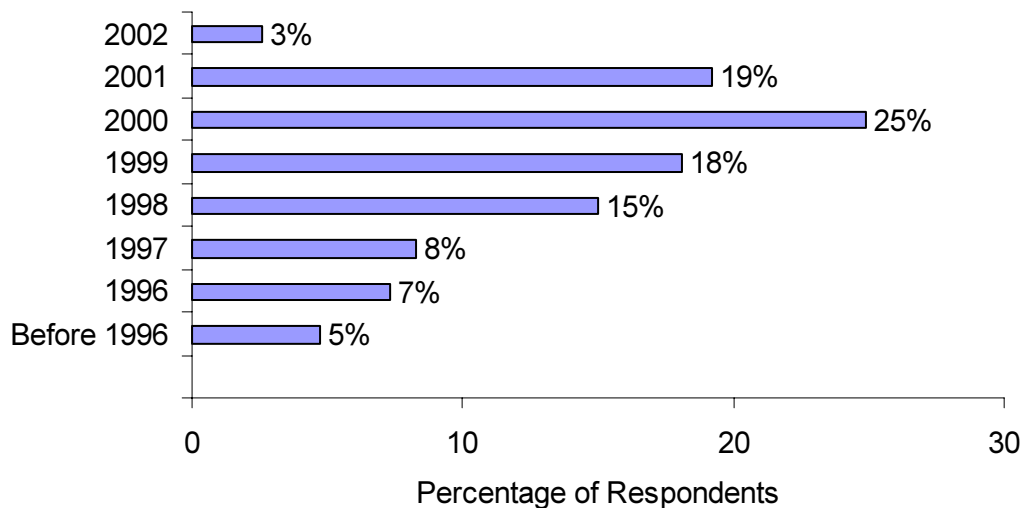


**Figure 7. Consideration of Company Level of Flexibility
(n = 269)**

7.4 Internet Adoption

Fifty-two percent of respondents indicated that they had adopted Internet-based technologies, and about 50 percent of the adoption took place between 2000 and 2002.

This confirms reports that the FPI is a late adopter of information technology (Figure 8). The 48 percent of respondents who had not adopted Internet-based technologies had various reasons for not doing so. Table 4 lists the reasons. Although the responses were quite varied, many centered around the fact that respondents had not found the need for the Internet in doing business yet.



**Figure 8. Year of First Internet Adoption
(n = 195)**

Table 4. Reasons for Not Adopting Internet-Based Technologies

- | | |
|--|---|
| • No decision has been made. | • Our consumers do not see the need. |
| • We have only one computer. | • No need. Our customers are within 100 m radius and we have frequent personal contact. |
| • Not interested. | • Comfortable with fax, telephone, and email inquiry and communication. |
| • Work strictly for Internet Service Providers. | • All lumber products are sold either by contracts or over the phone. |
| • So far no need. | • Fear of credit loss. |
| • We sell all we can produce without the Internet. | • Not necessary with the present marketing systems. |
| • Have not found the need at the present time. | |
| • We are a small company. | |
| • Have computer, but no Internet hookup. | |
| • We are not ready for this kind of technology, due to lack of experience. | |

(table cont'd.)

- Our customers and buyers have been with us for 20-30 years. All production is sold.
- We just wholesale to a log home.
- We don't need more customers.
- With the Internet, you get a lot of junk inquiries.
- Still developing.
- Not interested.
- No expertise.
- Antiquated phone system. Customers are more receptive direct interaction.
- Boss has little interest in conducting business on the Internet.
- All sales handled through a lumber broker. No changes in production since early 90s.
- Not widely used in our industry.
- No time to use it.
- We do not do business on the Internet.
- Our web page will be operational in the summer 2002.
- We try to do business locally with established vendors & customers.
- We don't have a computer.
- We are looking into designing a web page and going online.
- Our company uses a salesman. We prefer one-on-one.
- Do not have time for all the different functions you have to go through to use the Internet.
- Our market is already bigger than we can serve.
- We do not feel it is needed.
- We manufacture lumber as a subcontractor for a large corporation which markets our products.
- Customers are not using the Internet to conduct business.
- We never used it and do not know how
- Our products are sold to wholesale companies within the local area.
- Our business market area is local, we do not use the Internet as a business tool.
- We don't use Internet.
- Quality & improvement of products sell themselves.
- Have not gotten to that point.
- Not applicable to our type production at this time.
- Do not use computers.
- We do not see its benefit.
- We have done business the same way for over fifty years.
- We are a wholesale company with established customer base.
- Very few people browsing the Internet are familiar with lumber grades, species, or terminology.
- We feel advertising in the Hardwood market Report gives more return for our money.
- We do not completely understand its potential, if any.
- Have no idea how to use it to my advantage
- It is not necessary in the continual supply of our customer-base.
- We operate in a very select market due to frugal and ownership decision.
- Lumber industry is very much people oriented.
- We have good sales without the Internet.
- Lack of Internet expertise.
- Hardwood industry has not been conducive to the Internet.
- I don't think that at present the cost justifies the benefits.
- Too impersonal.
- Our local Internet service is not very good at times.
- I think the use of the computer has gone beyond its usefulness.
- I can't afford it.
- We do what we can to stay alive.
- We are able to market our product at current production levels.
- We are not that hi tech yet.

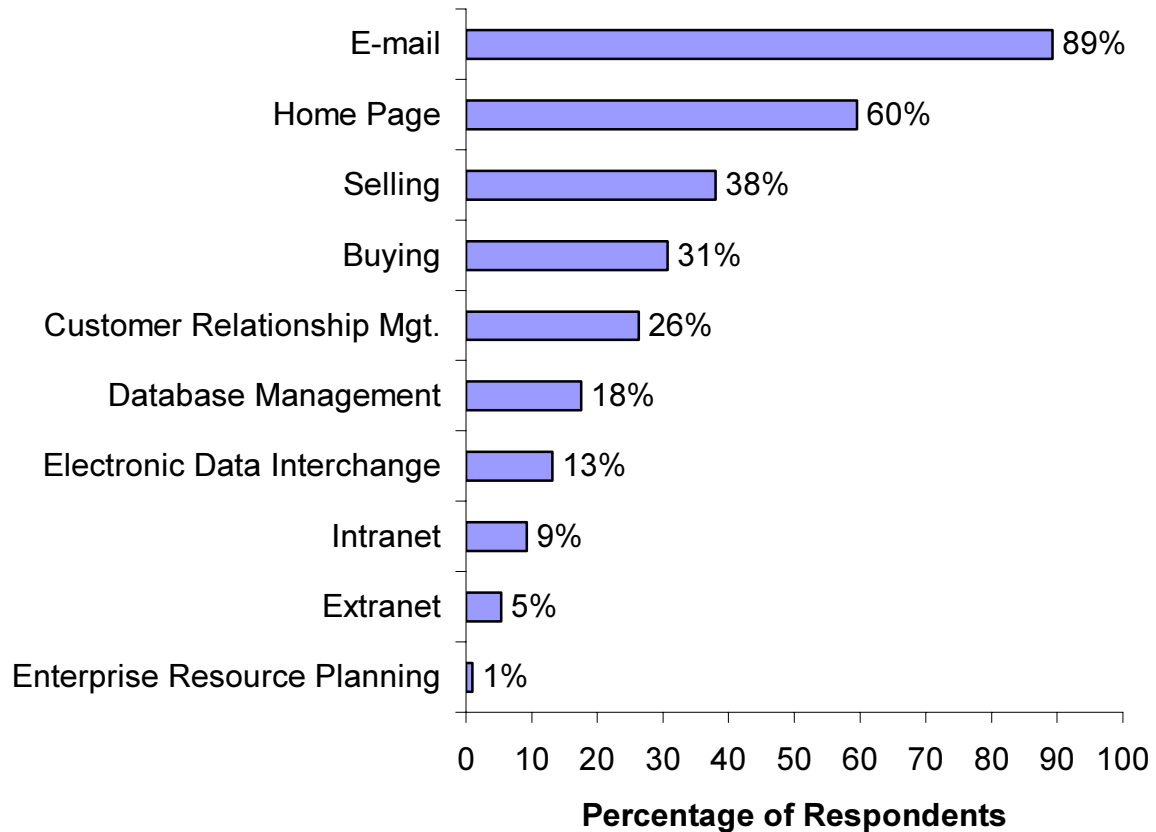
(table cont'd.)

- Our industry is small, fragmented, and intensely relationship-oriented.
- We are in the process.
- Too small to justify cost.
- We do not have enough people to speculate, and we are not government-funded.
- We barely keep up with customer demand.
- The Internet will not help us with the things we do.
- Customer base does not utilize the Internet enough.
- We do all our business by word of mouth through brokers.
- Demand for our products exceeds supply.
- The Internet has made no inroads into the lumber market as of this time.
- Don't have time or person capable.
- We're not Internet savvy.
- We will adopt Internet-based technologies as we move forward.
- See no advantage of using the Internet in our business.

7.5 Internet-Based Applications

A majority (89 percent) of the respondents who claimed to have adopted Internet-based technologies indicated e-mail as the leading application adopted (Figure 9). This was closely followed by the World Wide Web, which was adopted by 60 percent of respondents. The use of the Internet for buying products was adopted by 31 percent of respondents and for selling products by 38 percent of respondents. The email was generally the medium by which respondents used bought and sold products.

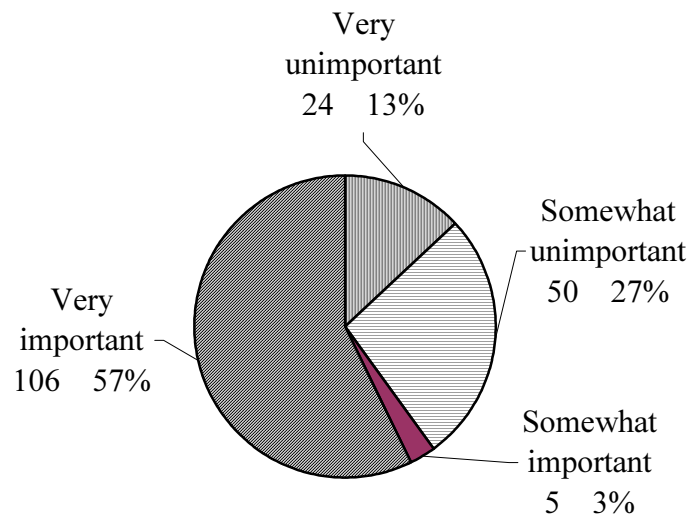
Fewer respondents adopted the more sophisticated Internet-based applications which require the use of more resources and higher level of information technology skills to implement. Such Internet-based application were Customer Relationship Management, Database Management, Electronic Data Interchange, Intranet, Extranet, and Enterprise Resource Planning. This confirms reports by Vlosky (2000a) and Juslin and Hansen (2002) that the forest products industry lacks understanding about the concept of eBusiness, and also lacks adequately trained information technology staff and application tools to adopt inter-organizational systems.



**Figure 9. Companies Adopting Internet-Based Applications
(n = 205; multiple responses possible)**

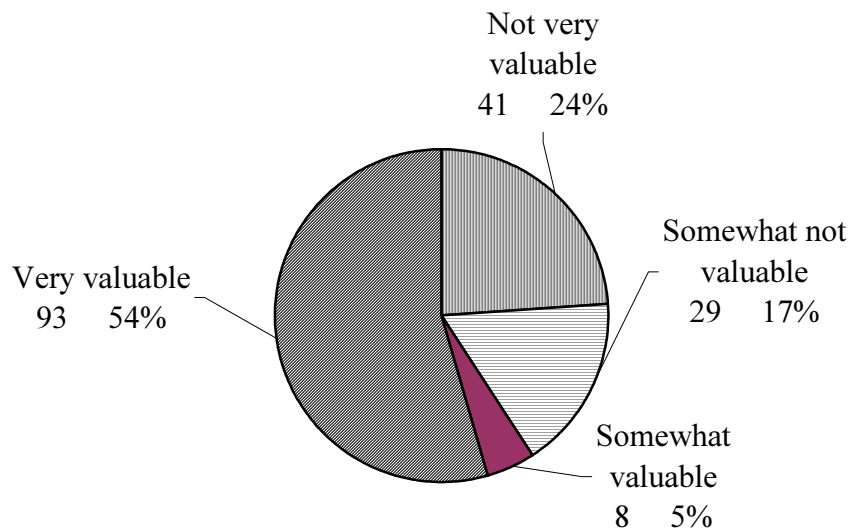
7.6 Importance of the Internet

Respondents were asked to rank the level of importance of the Internet in conducting business, taking everything into account. A greater proportion (60 percent) of respondents found the Internet to be important in conducting business (Figure 10). This supports why a similar proportion of respondents had adopted the Internet as has been indicated earlier. This also suggests that users who adopted the Internet found it to be important in conducting business. Similarly, most of the respondents felt comfortable in using the Internet and also found it to be sufficient in meeting their job performance needs. This alludes to the report by Waldera (2000) that the Internet is a useful tool in job performance.



**Figure 10. Overall Consideration of Importance of the Internet
(n = 185)**

When respondents were asked how valuable Internet use was in increasing their job performance, 54 percent thought Internet use was very valuable to them (Figure 11).

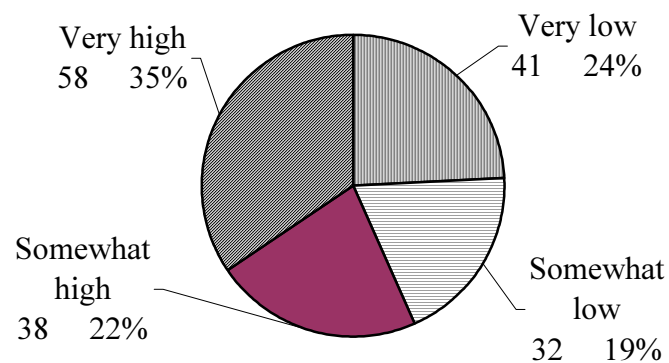


**Figure 11. How valuable is Internet use in increasing your job performance?
(n = 171)**

7.7 Employee Contribution to Internet Adoption

7.7.1 Co-worker Cooperation

It is believed that a high level of cooperation among workers enhances learning (Kogut and Zander 1993), which in turn could lead to easy adoption. Fifty-seven percent of respondents considered the level of cooperation among co-workers in solving problems that arose from the use of the Internet as being high, while 43 percent of respondents thought otherwise (Figure 12). This provides yet another reason why more companies in the forest products industry are adopting Internet technologies.



**Figure 12. Level of Cooperation among Co-Workers in Solving Problems Concerning Internet Use
(n = 169)**

7.7.2 Employee Involvement and Initiative

On the subject of extent of employee (user) involvement, respondents were split in their responses. Forty-nine percent believed that there was a high level of employee involvement in the process of Internet adoption, while 51 percent believed otherwise (Figure 13). However, a majority of respondents (82 percent) were satisfied with employee initiative in the adoption process (Figure 14).

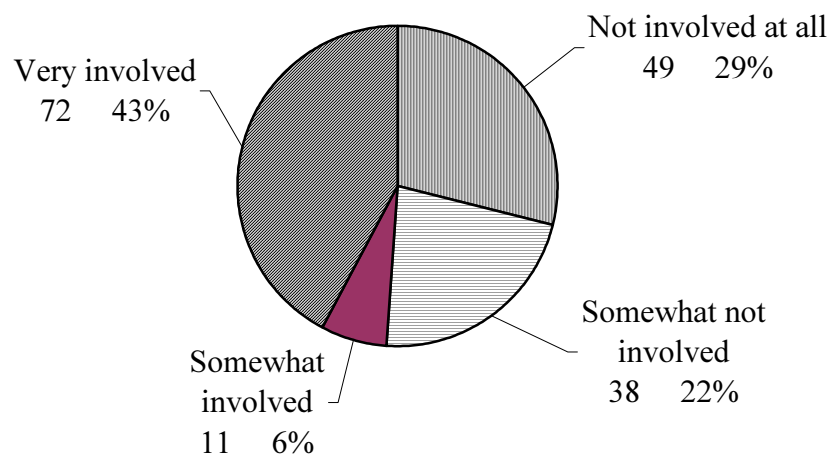


Figure 13. Perception of Employee Involvement in Internet Adoption (n = 203)

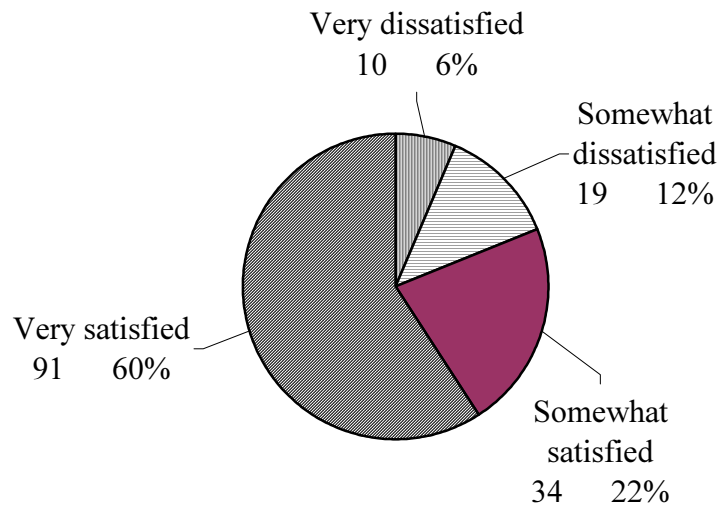
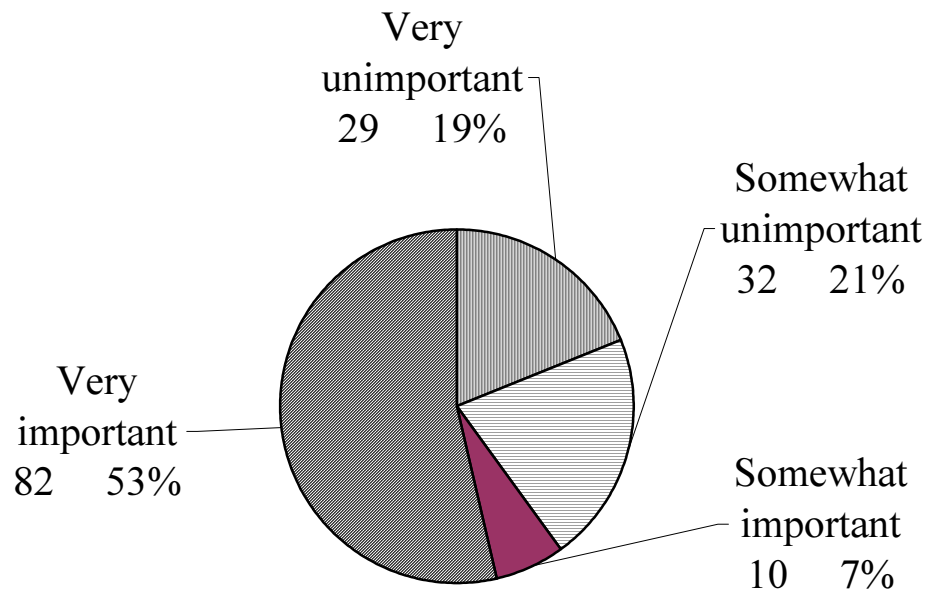


Figure 14. Level of Satisfaction with Employee Initiative towards Internet Adoption (n = 154)

7.7.3 Employee Acceptance

The ability of employees to participate in the IT adoption process enhances user buy-in, which in turn determines the success level of the adoption (Van De Ven (1976) and Szajna (1993). This was confirmed in the study when respondents were asked to rank the level of importance of employee acceptance in the successful adoption of the Internet in their company. Sixty percent of respondents believed that employee acceptance was important in the successful adoption of the Internet (Figure 15).



**Figure 15. Level of Importance of Employee Acceptance
(n = 197)**

7.8 Training

The frequency of users attending training/information sessions on Internet use greatly helps in the adoption process, since users gain the opportunity to ask questions and interact with experts, as well as with other colleagues. However, when respondents were

asked how often they attended any of such training sessions, the majority (62 percent) responded in the negative (Figure 16).

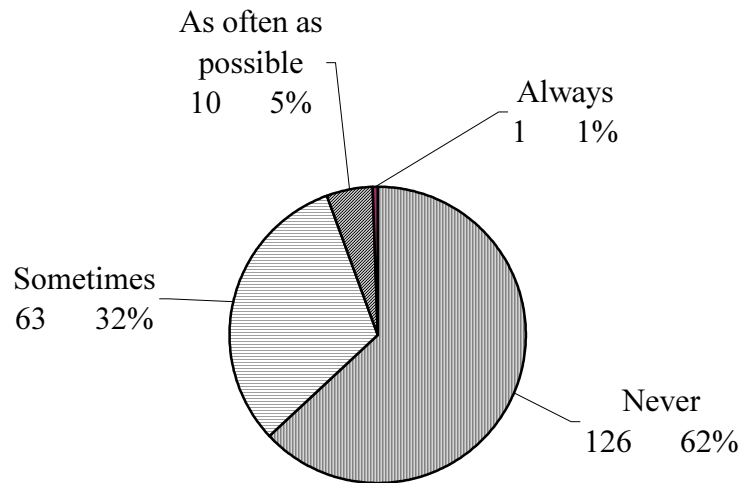
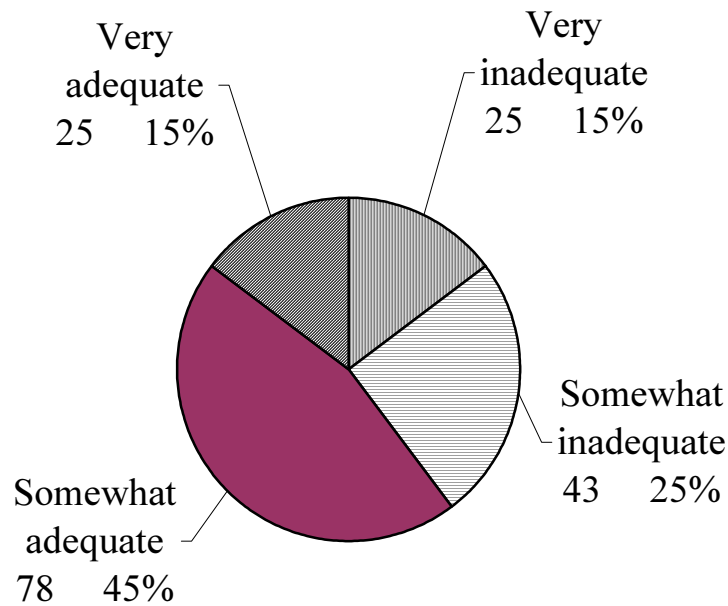


Figure 16. Frequency of User Attendance to Company-Sanctioned Training/Information Sessions (n=200)

Further investigation about Internet training revealed that most companies (81 percent) did not provide formal in-house training for Internet use. This suggests that companies did not give priority to providing Internet training on a formal basis in-house, hence, providing little incentive to users to attend any training session. Nevertheless, since a majority of the respondents who had adopted the Internet considered the general level of training towards Internet adoption to be adequate (Figure 17), it stands to reason that the non-formal form of training being provided by companies in the form of user involvement, user initiative, co-worker cooperation, etc., is working for the FPI in the adoption of the Internet.



**Figure 17. Level of Training towards Internet Adoption
(n = 171)**

By the same token, of the few companies (19 percent of respondents) that provided formal Internet training, 77 percent felt that the training was adequate in improving their job performance (Figure 18). Thus, Internet training, be it formal or non-formal, is found to be an important ingredient in the adoption process. However, the non-formal training appears to be more accepted in the forest products industry because majority of the respondents who had adopted the Internet considered the general level of training towards

Internet adoption to be adequate even though they did not obtain formalized in-house training.

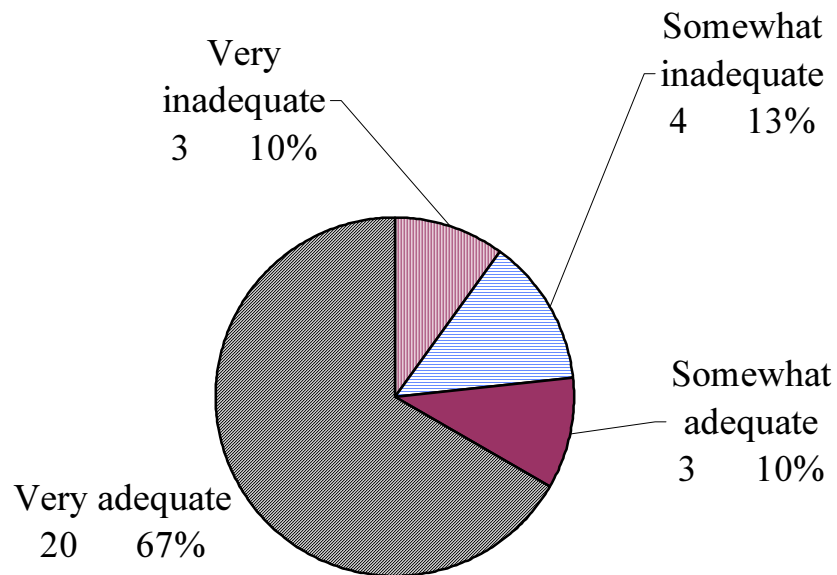


Figure 18. Adequacy of Formal Company-Sanctioned Training (n = 30)

7.9 Management Support

7.9.1 Level of Management Support

Management plays a very important role in decision-making in most organizations. Thus, their support of adoption of the Internet in an organization cannot be over-emphasized. This was confirmed in the study by an overwhelming majority (83 percent) of respondents who found management support to be necessary. Respondents were also

asked to classify management's support of employees in using the Internet. As illustrated in Figure 19, sixty-one percent of them believed that management had been supportive of employees in using the Internet.

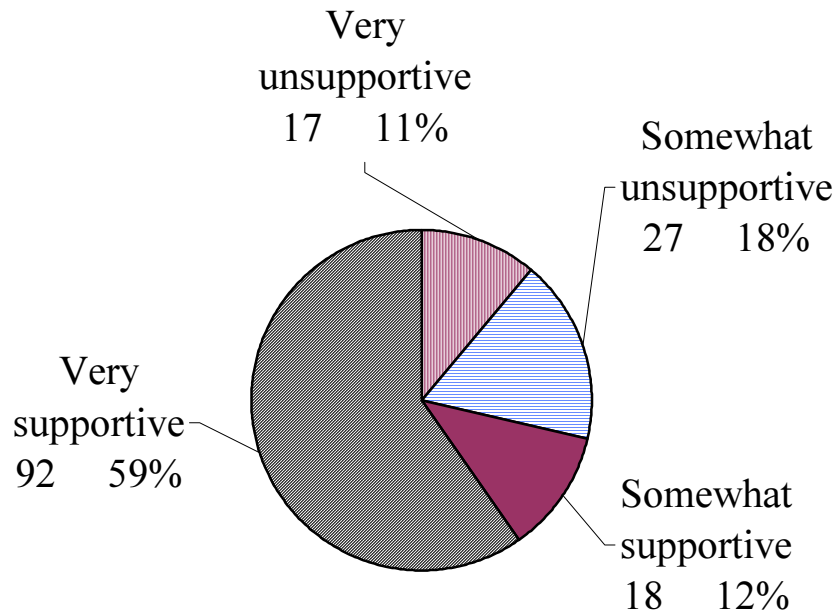
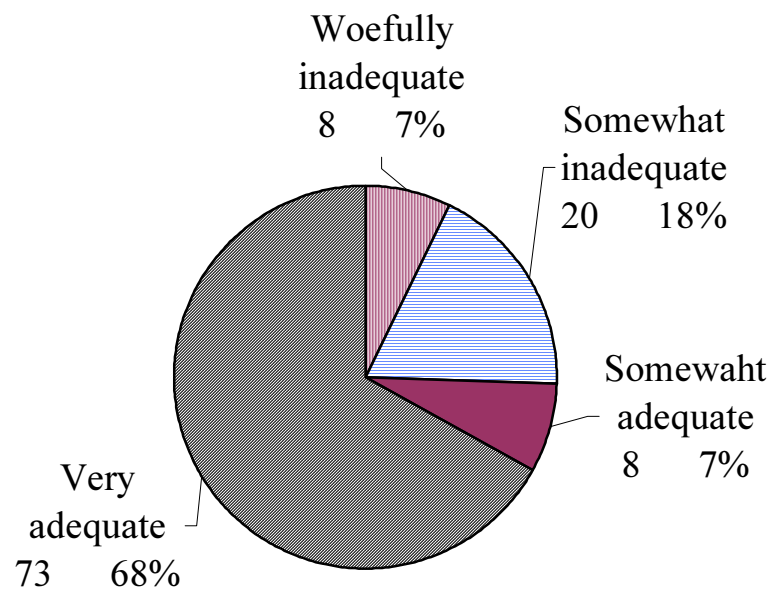


Figure 19. Classification of Management Support of Employees in Internet Use (n = 205)

7.9.2 Management Understanding of Employee Tasks

Management's understanding of the tasks performed by employees will be of tremendous help in adopting appropriate Internet-based applications to meet the needs of users. The study showed that the majority of respondents (seventy-five percent) considered

management's understanding of employees' tasks as being adequate (Figure 20). This could be a reflection of why management is so supportive of employees in Internet use as shown in Figure 17.

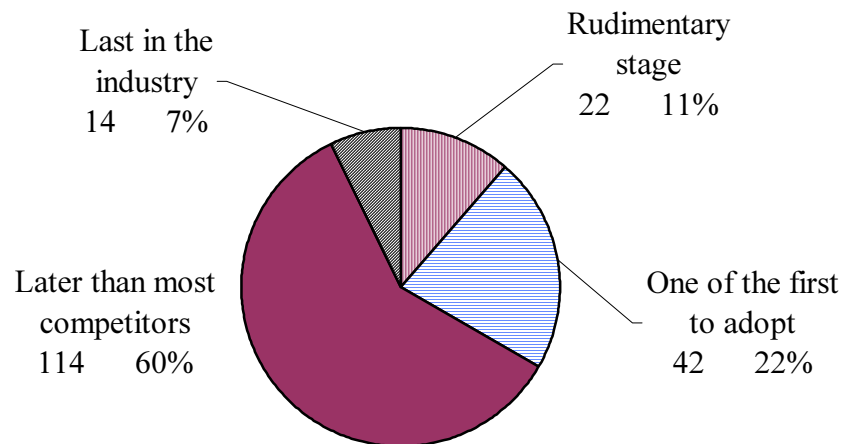


**Figure 20. Level of Management's Understanding of Employee Tasks
(n = 203)**

7.10 Stage of Adoption

Most of the respondents (60 percent) believed that their companies were latecomers in the adoption of the Internet, compared with other competitors (Figure 21). This corroborates reports by Vlosky (2002), and Vlosky and Westbrook (2002) that the forest

products industry lags in adopting information technologies. Some of the reasons for this position have been enumerated earlier in this report.

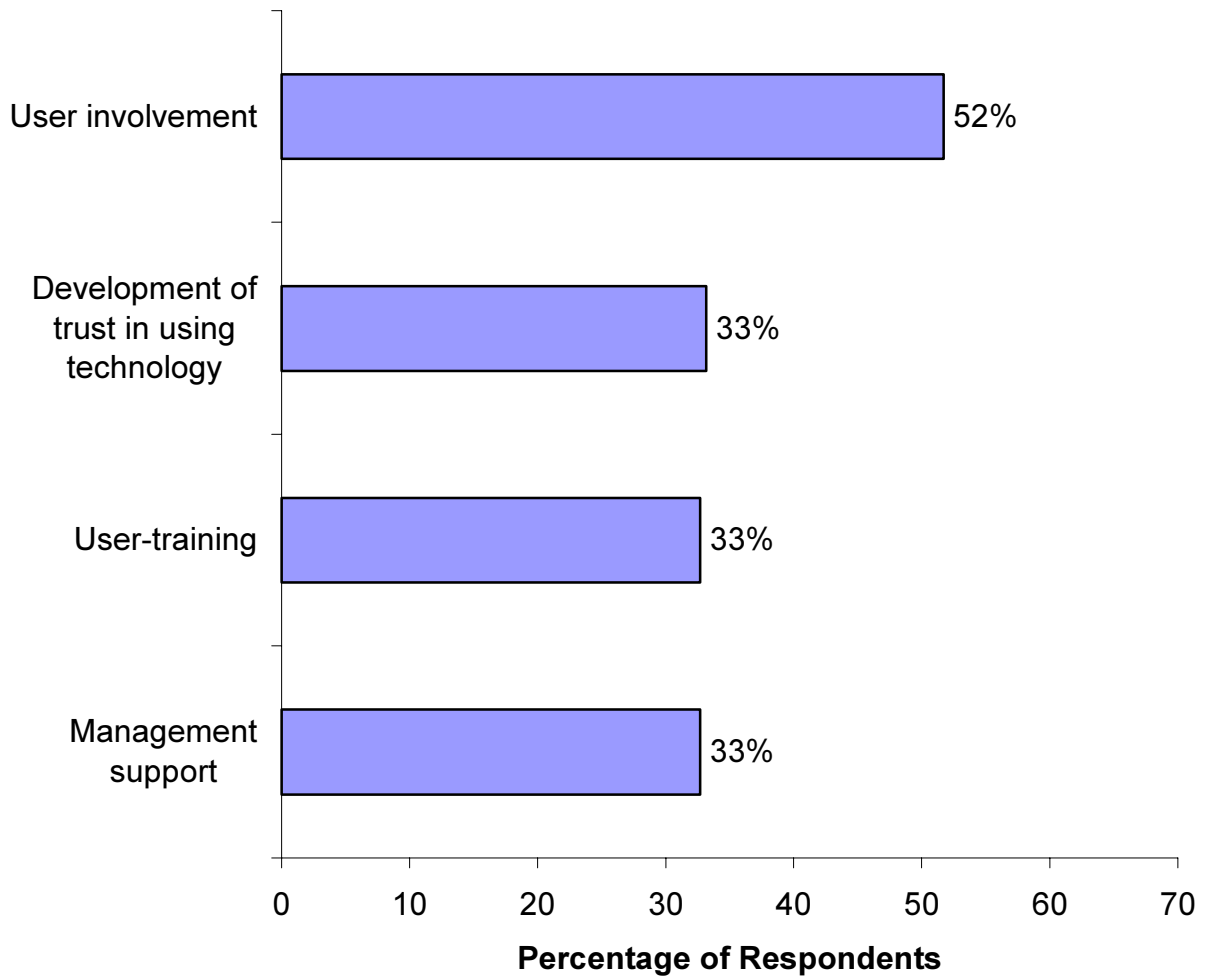


**Figure 21. Stage of Adoption of the Internet
(n = 205)**

7.11 Implementation Process Factors

Respondents considered “User involvement” as the most influential factor contributing to successful Internet implementation (Figure 22). It is therefore important for decision makers in information technology adoption to invest in activities that would encourage the users of the technology to get involved in the front end of the adoption process as well as the

implementation proper of the technology. This will enhance user buy-in of the adopted technology provide the opportunity for their concerns to be addressed before full-scale implementation.



**Figure 22. Factors Contributing to Successful Internet Implementation
(n = 205; multiple responses possible)**

7.12 Background Knowledge about Adoption

Adequate background knowledge of Internet adoption process could enhance user buy-in, user confidence, and hence, promote effective adoption. Eighty-eight percent of respondents

acknowledged that they had adequate knowledge about the reasons behind the adoption of the Internet in their companies. This adds to the list of reasons that made the majority of respondents adopt Internet technology.

7.13 Clarity of Business Goals and Strategies

Some of the essential background information for any new business are implementation goals and business strategies (Grant 1991). Clarity of such information to users before IT adoption could help capture user acceptance and enhance the adoption process. Prior to Internet adoption, 59 percent of respondents indicated that they had clear understanding of the implementation goals of the adoption of the Internet in their company. However, only 40 percent of respondents believed that their company had a clear-cut business strategy towards Internet adoption. This suggests that communication of implementation goals to users is vital in the effective adoption of the Internet. However, the lack of clarity of business strategy may be due to the difficulty of effectively communicating how to achieve set goals in a dynamic environment with all the added uncertainties.

7.14 Performance Factors

When respondents were asked to rank the level of importance of factors that they thought contributed to successful Internet performance after its adoption (post implementation success factors), the quality of IT staff and the responsiveness to new systems needs emerged leading factors (Figure 23). These were followed by linkage to company strategies and user participation with mean responses of 4.2 and 4.0, respectively. On the other hand, functions of exiting transaction procedures, responsiveness to end-user

needs and reliability of Internet as a post-implementation success factor were considered to be less important post implementation success factors.

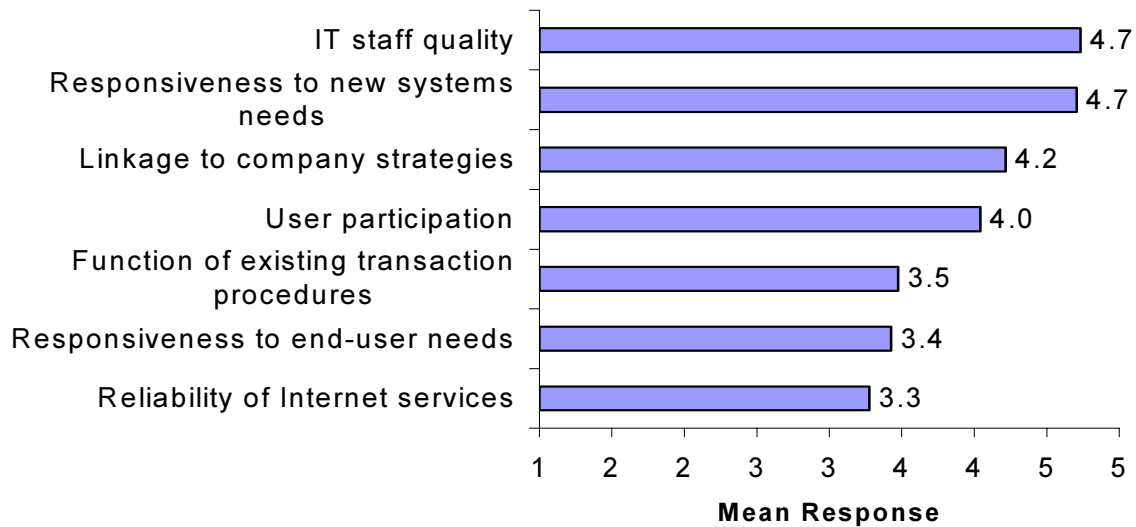


Figure 23. Factors Contributing to Successful Internet Post-Implementation Performance

**Scale: 1 = Very unimportant, 3 = Somewhat important, to 5 = Very important
(n = 197; multiple responses possible)**

8. TEST OF CONCEPTUAL MODEL

8.1 Internet Adoption Factors

A principal axis factor analysis with communalities in the primary diagonal and a varimax rotation on the summated scale of each of the variables in the study was conducted to determine the relevant items for each variable in the study. The internal consistency (Cronbach's α) for the dependent variable, "perceived company effectiveness of IT adoption" was .73, and that for the predictor variables ranged from .69 for "adoption diffusion by company" and .91 for "perceived usefulness by user". These were all within the customary range for the internality dimension of the Levenson measure (Presson et al. 1997).

An iterative process resulted in a reduction of items under each factor. Using factor loadings greater than 0.50 as the practically significant separation criterion led to a reduction from ten items to six for "extent of IT application", from seven items to five for "user participation", from seven items to six for "Perceived ease of use", from nine items to six for "Perceived usefulness", and from six items to three for "adoption diffusion" as shown in Table 5 from the questionnaire (Appendix). Items for "perceived company effectiveness of IT adoption" were reduced from eleven to six. The factor loadings for corporate orientation, however, resulted in two factors with six items loading on one factor and one item ("my company sells what we can produce") loading on another factor. Using the communalities in the primary diagonal, the item "my company sells what we can produce" was eliminated for lack of sufficient explanation. Thus, the factor with significant loadings was labeled "marketing orientation" with six items. The validity, "the extent to which the set of measures accurately represents the concept of interest" (Hair et

al. 1998) of the factor, “marketing orientation” was confirmed by McCarthy and Perreault (1987) and Sinclair (1992) who listed similar items to differentiate marketing orientation from production/sales orientation when management attitude to these organizational orientations were considered, since marketing is considered “a set of a dynamic system of integrated activities by which a firm/organization reaches out to customers and by which customers reach in to the firm”. Thus, corporate orientation was measured in terms of marketing orientation in this study.

Tolerance statistics for the predictors placed in a complete equation with “perceived company effectiveness of IT adoption” as the dependent variable ranged from .37 for “perceived ease of use by user” to .82 for “marketing-orientation” with mean of .60, indicating that multicollinearity among the predictors was not a concern (Hair et al. 1998).

Table 5. Factor Analysis of IT Adoption Factors

Factor	Items	Factor Loading	Cronbach's Alpha
Extent of Internet application	Internet use saves my company money	.63	.81
	Internet use in my company is important for market research	.66	
	Internet use in my company is important for decision making	.63	
	Internet use in my company has changed the nature of competition among companies	.58	
	Internet has been easy to adopt because of high technical skills of IT personnel in my company	.62	
	Internet has been easy to adopt because of the compatibility with existing systems in my company	.53	
User participation	Employees play active part in making decisions about Internet adoption	.70	.79
	Clear, planned goals and objectives about Internet adoption	.57	
	Constructive suggestions about improvement Internet adoption	.79	
	Employees strong interest in Internet adoption	.82	
	Co-workers promotion of Internet adoption	.68	

(table cont'd.)

Perceived ease of use by user	It is easy to find ways to perform my job using the Internet	.83	.84
	The Internet has made my job easier	.89	
	Technical support by my company	.67	
	Technical support from outside company	.59	
	Clear understanding of the Internet to perform job better	.50	
	I enjoy using the Internet in performing my job	.81	
Perceived usefulness by user	Technical support from outside company	.52	.91
	Provides powerful information	.77	
	Increases productivity	.88	
	Increases working relationship	.58	
	Job quality is increased	.85	
	Gain greater work control	.77	
Adoption diffusion by company	Top management	.57	.69
	Desirable supervisor	.87	
	Co-workers	.65	
Perceived company effectiveness of Internet adoption	Importance of the Internet, all things considered	.78	.73
	Importance of the Internet for you to perform job	.61	
	Valuableness of Internet use in performing job	.82	
	Management support	.50	
	Usefulness of the Internet in doing business	.66	
	Level of training	.55	
Marketing orientation	Use of marketing research to determine customer needs	.76	.80
	Use of marketing research to determine customer satisfaction	.74	
	Engagement in innovation focusing on new market opportunities	.63	
	Consideration of packaging as a selling tool	.50	
	Focuses advertisements on the benefits of products and services	.56	
	Focuses advertisements on product features and quality	.62	

Extraction method: Principal axis factor analysis. Rotation Method: Varimax Kaiser Normalization

Intercorrelations, standard deviations and the means of all the study variables, including factors influencing Internet adoption, “Perceived company effectiveness of Internet

adoption”, and the moderating variable (marketing orientation), are presented in Table 6.

The correlations were all significant from .18 correlation coefficient and above at .05 alpha level for different sample sizes of the variables.

Table 6. Means, Standard Deviations and Intercorrelations for All Study Variables

Variables		n	M	SD	1	2	3	4	5	6
Dependent variable	1. Perceived company effectiveness of Internet adoption	209	3.01	.75						
Independent variable	2. Extent of Internet application	208	2.63	.79	.45					
	3. User participation	206	2.56	.96	.33	.52				
	4. Perceived ease of use by user	206	2.83	.92	.42	.61	.42			
	5. Perceived usefulness by user	200	2.49	.93	.40	.62	.38	.77		
	6. Adoption diffusion by company	201	2.97	.99	.23	.38	.36	.23	.27	
Moderator variable	7. Marketing orientation	386	2.65	.92	.18	.40	.33	.22	.29	.22

8.2 Moderating Influence of Corporate Orientation on Internet Adoption

The stated hypotheses were tested by use of moderated multiple regression. The question of how many antecedent variables to examine in each regression analysis was a choice to be made during the analysis of the interactions. The choice requires the option of

sacrificing statistical power by putting all antecedents into a single analysis or tolerating some amount of Type I inflation error by executing separate models. The lower power alternative is to regress “perceived company effectiveness of IT adoption” simultaneously on all five antecedents, corporate orientation (marketing orientation), and all five interaction terms (i.e., each antecedent X corporate orientation). This test will consume 12 degrees of freedom as against an analysis that considers each antecedent separately along with corporate orientation that will yield greater statistical power as well as more Type I error inflation. In such a case, each of the regressions will consume only 4 degrees, but with the five antecedents, five different regressions must be computed. The many factors that contribute to diminish the opportunity of detecting moderator effects influenced the choice of separate regression analyses for this study. Some of the factors include limited sample size, which impact statistical power, unavoidable multicollinearity among interaction.

Results of these analyses for corporate orientation are shown in Table 7. The nature and direction of their significant interactions were examined graphically as shown in Figures 24 – 28. Separate regression lines were computed and subsequently plotted based on a mean which is +/- 1 standard deviation split for marketing orientation, using the guideline suggested by Cohen and Cohen (1983). Hence, M_H (high marketing orientation) and M_L (low marketing orientation) correspond to one standard deviation above and below the mean market orientation, respectively. The line Y_H represents the regression line when marketing orientation is one standard deviation above the mean, whereas the line Y_L represents the regression line when marketing orientation is one standard deviation below

the mean. From Table 6, the mean marketing orientation was found to be 2.65, and the corresponding standard deviation was .92.

Table 7. Results of Hierarchical Regression Analyses for Perceived Company Effectiveness of Internet Adoption

	Extent of Internet Adoption				User Participation				Perceived Ease of Use by User				Perceived Usefulness by User				Adoption Diffusion by Company			
	<u>β</u>	<u>p</u>	<u>R</u>	<u>ΔR^2</u>	<u>β</u>	<u>p</u>	<u>R</u>	<u>ΔR^2</u>	<u>β</u>	<u>p</u>	<u>R</u>	<u>ΔR^2</u>	<u>β</u>	<u>p</u>	<u>R</u>	<u>ΔR^2</u>	<u>β</u>	<u>p</u>	<u>R</u>	<u>ΔR^2</u>
Step 1	.42	.00	.45	.20	.25	.00	.33	.11	.34	.00	.42	.18	.32	.00	.40	.16	.17	.00	.23	.05
Step 2	.42	.00	.46	.01	.22	.00	.34	.01	.31	.00	.43	.00	.28	.00	.40	.00	.15	.00	.26	.02
	.01	.91			.08	.17			.09	.12			.10	.11			.10	.10		
Step 3	1.16	.00	.53	.07	.86	.00	.43	.07	.80	.00	.48	.05	.83	.00	.47	.06	.51	.00	.30	.02
	.68	.00			.64	.00			.60	.00			.58	.00			.48	.01		
	-.26	.00			-.22	.00			-.18	.00			-.20	.00			-.13	.03		

Note. Step 1 represents the regression of “perceived company effectiveness of Internet adoption” on the antecedent. Step 2 represents the simultaneous regression of “perceived company effectiveness of Internet adoption” on both the antecedent and the moderator variable (marketing orientation). Step 3 represents the simultaneous regression of “perceived company effectiveness of Internet adoption” on the antecedent, the moderator variable, and the interaction term. $n = 195 - 207$.

Hypothesis 1 suggested that marketing orientation would moderate the relationship between “extent of Internet application” and “Perceived company effectiveness of Internet adoption” such that the relationship between “extent of Internet application” and “Perceived company effectiveness of Internet adoption” would be positive for high marketing orientation and negative for low marketing orientation. As shown in Table 7, the interaction of “extent of Internet application” and marketing orientation is significant ($\beta = -.26$; $P < .05$), supporting corporate orientation as a moderator of “extent of Internet application”— “perceived company effectiveness of Internet adoption”. Because the

interaction is significant, it was plotted and interpreted in Figure 24 using the guidelines suggested by Aiken and West 1991.

The line Y_H represents the regression line when marketing orientation is one standard deviation above the mean, whereas the line Y_L represents the regression line when marketing orientation is one standard deviation below the mean.

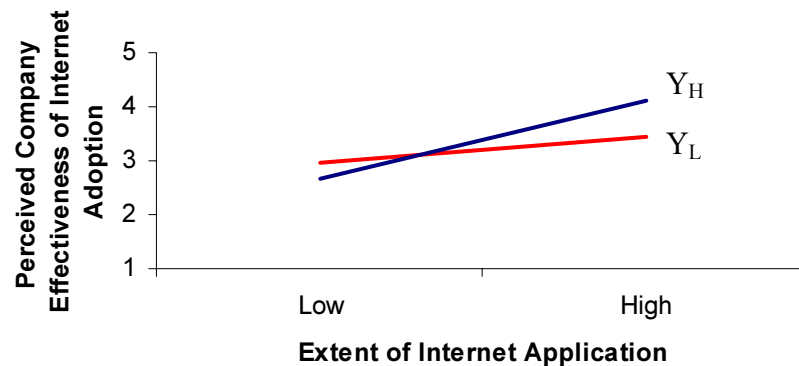


Figure 24. Interaction of Corporate Orientation and Extent of Internet Application

Both graphs are positively sloped, however, under high marketing orientation, Figure 24 shows that an increase in extent of Internet application corresponds to a higher increase in “Perceived company effectiveness of Internet adoption” than under low marketing orientation. Therefore Hypothesis 1 was not fully supported.

Hypothesis 2 stated that marketing orientation would moderate the relationship between “user participation” and “perceived company effectiveness of Internet adoption” such that the relationship between “user participation” and “perceived company effectiveness of Internet adoption” would be positive for high marketing orientation and negative for low marketing orientation. As shown in Table 7, the interaction of “user participation and corporate orientation is significant ($\beta = -.22$; $p < .05$), thus, supporting

corporate orientation as a moderator of “user participation” — “perceived company effectiveness of adoption relationship” in Hypothesis 2. Probing the interaction by plotting, it is shown in Figure 25 that there is a positive relationship between “user participation” and “perceived company adoption effectiveness relationship” under both high and low marketing orientations. However, the high marketing orientation graph had a steeper slope than that of production orientation. Thus, with increasing “user participation”, Figure 25 shows that “perceived company effectiveness of Internet adoption” increases faster under high moderating marketing orientation than low marketing orientation. Though a relationship between “user participation” and “perceived company effectiveness of Internet adoption” was established under the moderation of corporate orientation, the direction of the relationships with respect to high and low marketing orientations was not supported. Therefore, Hypothesis 2 was not fully supported.

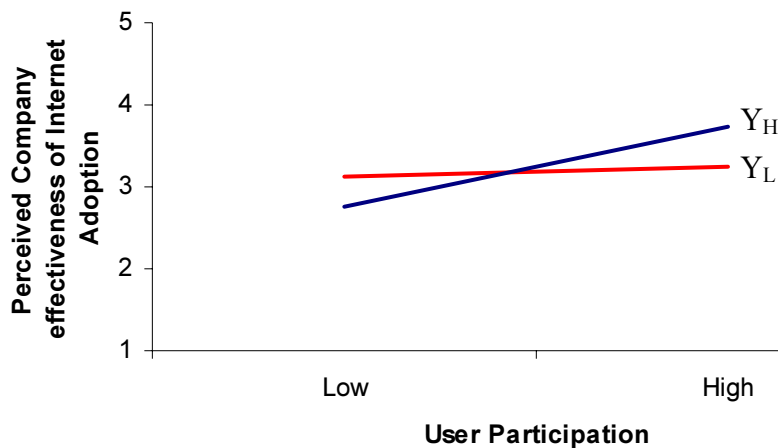


Figure 25. Interaction of Corporate Orientation and User Participation

Hypothesis 3 predicted that corporate orientation would moderate the relationship between “perceived ease of use by user” and “perceived company effectiveness of Internet adoption” such that the relationship between “perceived ease of use by user” and

“perceived company effectiveness of Internet adoption” would be positive for high marketing orientation and negative for low marketing orientation. Regression results in Table 7 shows the interaction of “perceived ease of use by user” and corporate orientation is significant ($\beta = -.18$; $p < .05$), thus, supporting corporate orientation as a moderator of “perceived ease of use by user” — “perceived company effectiveness of adoption relationship” in Hypothesis 3. As shown in Figure 26, in organizations with high marketing orientation, increase in “perceived company effectiveness of adoption” is accompanied by a higher rate of increase in “perceived company effectiveness of adoption relationship” than in organizations with low marketing orientation. The relationship between “perceived ease of use by user” and “perceived company effectiveness of Internet adoption” relationship was positive under both high and low marketing orientations. Thus, Hypothesis 3 is not fully supported.

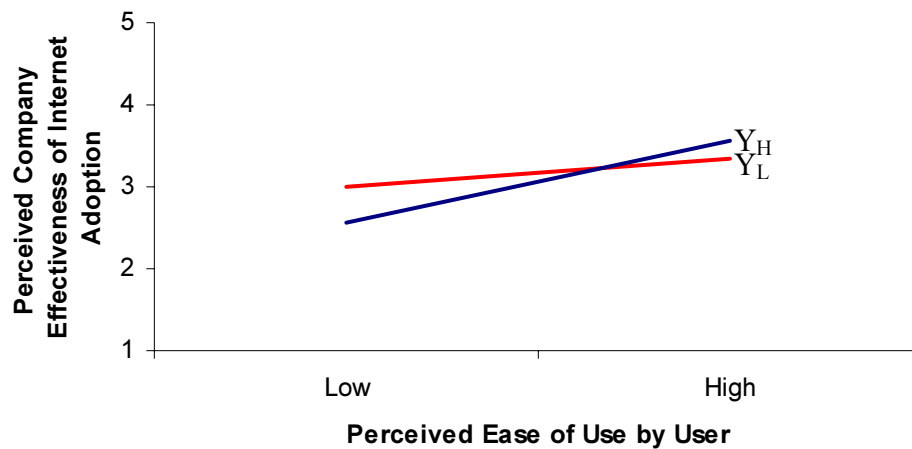


Figure 26. Interaction of Corporate Orientation and Perceived Ease of Use by User

Hypothesis 4 predicted that marketing orientation would moderate the relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet

adoption” such that the relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet adoption” would be positive for high marketing orientation and negative for low marketing orientation. Table 7 shows that Hypothesis 4 received support from the interaction of “perceived usefulness by user” with marketing-orientation ($\beta = -.20$; $p < .05$). As shown in Figure 27, the relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet adoption” follows a similar pattern as in the earlier hypotheses. There is a positive relationship between “perceived usefulness by user” and “perceived company effectiveness of Internet adoption” under both high and low marketing-oriented corporate orientation, with a higher rate of increase for high marketing orientation than for low marketing orientation. Hypothesis 4 was not fully supported.

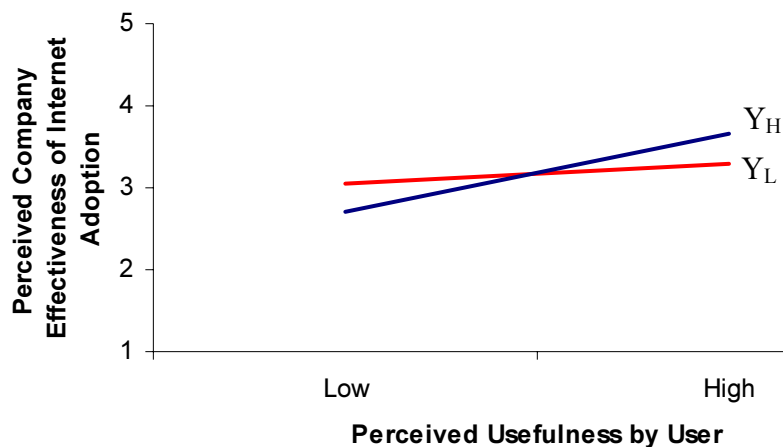


Figure 27. Interaction of Corporate Orientation and Perceived Usefulness by User

Hypothesis 5 predicted that corporate orientation would moderate the relationship between “adoption diffusion by company” and “perceived company effectiveness of Internet adoption” such that the relationship between “adoption diffusion by company” and

“perceived company effectiveness of Internet adoption” would be positive for high marketing orientation and negative for low marketing orientation. Hypothesis 5 received support for the moderating action of corporate orientation on “adoption diffusion by company”–“perceived company effectiveness of Internet adoption” relationship in that the interaction of “adoption diffusion by company” with market orientation is significant ($\beta = .74$; $p < .05$). Figure 28 shows the relationship between “adoption diffusion by company” and “perceived company effectiveness of Internet adoption” when marketing orientation is high and low. There is a positive relationship between “adoption diffusion” and “perceived company effectiveness of Internet adoption” under both high and low marketing orientation. An increase in “adoption diffusion by company” is accompanied by a higher rate of increase in “Perceived company effectiveness of Internet adoption” for high marketing orientation than for low marketing orientation. Hence, Hypothesis 5 was not fully supported.

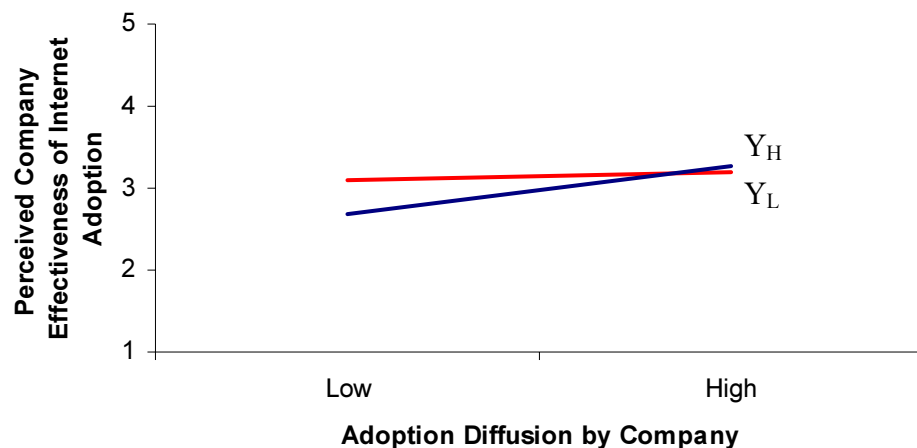


Figure 28. Interaction of Corporate Orientation and Adoption Diffusion by Company

9. DISCUSSION AND CONCLUSION

Results from the study showed that a majority of respondents in the United States lumber industry have adopted Internet-technologies because they find it an important tool in conducting business and in meeting their needs. Even though the companies are considered latecomers in the technology adoption stage, 52 percent of the respondents indicated to have adopted the Internet with a high percentage (77 percent of the adopters) having adopted for the Internet for the first time between 1998 and 2001. This period also falls in the technology boom era in the United States where many “dot com” companies were established. The other companies, who did not adopt Internet technologies, had chosen such a position for various reasons. Predominant among the reasons was the lack of use for the Internet in doing business.

The leading Internet-based applications that were adopted are the email and home page establishment. Also, according to the study, the leading post-implementation performance factors that determine adoption success depend on the quality of the skill level of information technology (IT) staff as well as responsiveness to new systems needs. It could be argued that with a high quality IT staff, the right choice of IT application could be made at the onset and major technical problems could be envisaged and rectified ahead of time and in real time. Additionally, a high confidence level among users could be created knowing that IT staff would be on hand to solve IT-related problems that would arise during adoption and implementation.

A majority of respondents in the lumber industry did not provide formal training for Internet use. The non-formal means of training such as co-worker cooperation, user initiative, and user involvement in the adoption process, all culminated to make Internet

adoption a success because they enhanced employee acceptance which is an important part of Internet adoption effectiveness. Through such means, a less stressful learning environment could be created to allow for peer-peer consultation.

The role of management cannot be ignored in decision-making in organizations. This role has been identified in the study as an important component in the successful adoption of the Internet. Such roles include clear communication to the user about the reason behind the adoption, clear implementation goals and business strategies, and understanding the tasks performed by users.

Though most of respondents claimed to produce to meet customer needs, the study revealed that 53 percent were production-oriented, while 47 percent were market oriented; thus, confirming Sinclair (1992) that the United States forest products industry is predominantly production-oriented. However, the responses suggested a willingness and a drive towards marketing orientation in the face of keen competition from producers of other substitute products and the changing market demand of consumers (Juslin and Hansen 2002).

9.1 Conceptual Model

The expectation that “extent of Internet application” would interact with corporate orientation to significantly influence “perceived company effectiveness of Internet adoption” was confirmed. Organizations with high marketing orientation showed a positive relationship between “extent of Internet application” and “perceived company effectiveness of Internet adoption” as previously suggested, because of the greater need for information about the customer and the marketplace which would require a more extensive use of the Internet. However, organizations with low marketing orientation also showed a

positive relationship between “extent of Internet application” and “perceived company effectiveness of Internet adoption”. This suggests that “extent of Internet application” is a necessary adoption factor for organizations with both high and low marketing orientation and that a low marketing-oriented organization may require a lesser use of IT to gather information about the customer and the marketplace. Hence, the need for the “extent of Internet application” to determine the effectiveness of the adopted Internet application in the company may not be as critical in organizations with low marketing orientation as there would be in high marketing-oriented organizations. Other sources of information for low marketing-oriented organizations for production efficiencies could come from learning on the job to improve the existing production process, information about the production equipment from operation manuals, the skill level of the production operators, etc. Hence, the study showed that organizations with low marketing-orientation have a lower rate of increase in “perceived company effectiveness of Internet adoption” with an increase in “extent of Internet application” than for high marketing-oriented organizations.

User participation also interacted with corporate orientation to significantly influence “perceived company effectiveness of IT adoption”. As “user participation” increased, high marketing-oriented organizations had an increase in their perception of how effective the Internet application was adopted. This finding corresponds with the notion that a high marketing-oriented organization will create the environment that enhances employee participation because of the need for information sharing about the market and the internal and external customer. Organizations with low marketing orientation, on the other hand, showed a slower increase in “perceived company effectiveness of Internet adoption” with increasing “user participation. Thus, alluding to

the notion that though low marketing-oriented organizations may produce a user participatory environment, the impact on “perceived company effectiveness of Internet adoption” is not felt as fast as that of high marketing-oriented organization.

Similar patterns were observed in the relationships between “perceived ease of use by user” and “perceived company effectiveness of Internet adoption”, “perceived usefulness by user” and “perceived company effectiveness of Internet adoption”, and “adoption diffusion by company” and “perceived company effectiveness of Internet adoption”. This suggests that corporate orientation plays a significant moderating role in the adoption of Internet in organizations such that organizations with high and low marketing orientation positively influence the relationship between Internet adoption factors and “perceived company effectiveness of Internet adoption”. However, the rate of increase is greater for high marketing orientation than for low marketing orientation, because organizations with high marketing orientation have a greater need for market intelligence to disseminate across departments within the organization in order to respond to the needs of customers (Kohli and Jaworski 1990). This requires a greater need for the use of Internet, and hence, the influence of marketing orientation on the relationship between Internet adoption factors and the perceived adoption effectiveness in the organization.

10. RESEARCH LIMITATIONS AND IMPLICATIONS

The contributions of the study should be considered in light of its limitations. Nevertheless, these limitations, coupled with the findings of the study provide opportunities for future research.

The respondents of the study were top managers of organizations in the forest products industry who provided their perspective of the activities of users of Internet and other activities within their organizations. Future research should be directed to users (employees) within the organizations to capture their perception as well. Also only one sector of the forest products industry was investigated. There is the opportunity to investigate IT adoption in other sectors of the industry such as furniture, pulp and paper, building materials, etc. This study did not compare the impact of marketing orientation vs. production orientation on Internet adoption per se.

Within the confines of the forgoing limitations, the study showed that majority of the respondents have adopted Internet technologies because they found it to be an important and valuable tool in conducting business. This provides a wide range of opportunities for research into which Internet technologies work for which type of organization within the forest products industry (FPI) for value maximization.

The email and the World Wide Web are the two most popular Internet-based applications used by companies in the forest products industry. Further investigation into what the companies use these applications for and what opportunities there are in using these applications and other Internet applications will be of value to the FPI.

The study showed that the majority of companies in the FPI do not provide formal training to their employees on Internet use. The non-formal method such as “user

participation”, user initiatives in the adoption process, and co-operation among co-workers should be embraced and researched into to enhance adoption effectiveness, since they generate user acceptance, which is an important component for adoption success of the Internet.

According to the study, management has a unique role to play in the successful adoption of the Internet in the FPI. Management support by understanding the tasks performed by users and providing clear implementation goals and business strategies would generate a high level of user buy-in towards the successful adoption of the Internet.

The majority of respondents in the study were found to be production-oriented even though most of them claimed to produce to meet customer needs which is a quality of marketing orientation. It appears that respondents have the desire to be high in marketing-oriented, given the dynamic market environment. However, they are still set in their traditional ways of production orientation. This provides research opportunities to investigate how the forest products industry can successfully migrate from its traditional production orientation into marketing orientation in the face of keen competition and changing market dynamics.

The study has taken a step toward addressing the gap that exists in determining the role an organization’s internal operations (corporate orientation) play in impacting IT adoption within the organization, an area which has hitherto not been widely explored (Harper and Utley 2001). An opportunity is opened for the study of how other orientation types could influence Internet adoption.

From the study, there is a positive relationship between the factors of Internet adoption, “extent of Internet application”, “user participation”, “perceived ease of use by

user”, “perceived usefulness by user”, “adoption diffusion by company” and “perceived company effectiveness of Internet adoption” under high and low marketing-oriented organizations, but with a higher rate of increase for high marketing-orientation. Future research may explore the necessary conditions under which such relationships could prevail over time.

The study will help top managers of organizations in the US forest products industry to identify what to do in order to effectively adopt Internet in their organizations in the context of their corporate orientation.

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HOW THE FOREST PRODUCTS INDUSTRY USES THE INTERNET

Kofi Poku, Doctoral Candidate
Forest Products Marketing
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1. Less than \$100 Million
2. \$100-250 Million
3. \$251-500 Million
4. \$501-750 Million
5. \$751 million-\$1 Billion
6. Greater than \$1 Billion

4. Please indicate the total number of people that are currently employed in your company. (Circle only one option).

- | | | |
|---------------------------|------------------------|--------------------------|
| 1. Less than 50 employees | 4. 251-500 employees | 6. 1,001-2,500 employees |
| 2. 51-100 employees | 5. 501-1,000 employees | 7. Over 2,500 employees |
| 3. 101-250 employees | | |

5. What are the top 5 products your company sold (by revenue) in 2001?

Section II. Your Company

1. Companies often serve the market by either producing to meet customer needs or by producing at low cost to serve the market. If you had to choose, of the two choices below which best characterizes your company. (Choose one).

1. Produces to meet customer needs
2. Produces at low cost to serve the market

2. On a scale from 1 to 5 (1-strongly disagree, 5-strongly agree), please rate your level of agreement with the following propositions of about your company focus in conducting business.

My Company:

	Strongly disagree		Somewhat agree		Strongly agree
	1	2	3	4	5
Produces what our customers need	1	2	3	4	5
Sells to customers what our company can produce	1	2	3	4	5
Uses marketing research to determine customer needs	1	2	3	4	5
Uses marketing research to determine customer satisfaction	1	2	3	4	5
Engages in innovation with a focus on locating new market opportunities	1	2	3	4	5
Engages in innovation with a focus on cost cutting	1	2	3	4	5
Considers customer credit as a necessary service	1	2	3	4	5
Considers packaging only as protection for the product	1	2	3	4	5
Considers packaging as a selling tool	1	2	3	4	5
Sets inventory levels primarily based on customer Requirements	1	2	3	4	5
Sets inventory levels primarily based on production requirements	1	2	3	4	5
Focuses advertisements on the benefits of production and services	1	2	3	4	5
Focuses advertisements on product features and quality	1	2	3	4	5

3. Does your company conduct marketing research?

1. Yes
2. No

4. Flexibility is the ability to be open to change and supportive of continuous improvements. How do you consider the level of flexibility of your company?

- | | |
|------------------------|------------------|
| 1. Very inflexible | 4. Very flexible |
| 2. Somewhat inflexible | 5. I don't know |
| 3. Somewhat flexible | |

Section III. Internet Adoption

1. Internet is defined as a network of computer networks. Has your company adopted **any** Internet -based technologies? (Please circle one option).

- 1 Yes (continue to question #2).
2. No →

↓
If NO, please give reasons and put questionnaire in **postage paid envelope** and mail it back.

2. If your answer is yes from question #1 above, when did your company first adopt the use of the Internet?

- | | | | |
|---------|---------|---------|----------------|
| 1. 2002 | 3. 2000 | 5. 1998 | 7. 1996 |
| 2. 2001 | 4. 1999 | 6. 1997 | 8. Before 1996 |

3. What types of Internet-based applications has your company adopted? (Please circle all that apply).

- | | |
|-------------------------------------|---------------------------------------|
| 1. Buying | 7. Home page |
| 2. Selling | 8. Electronic Data Interchange (EDI) |
| 3. Database management | 9. Enterprise Resource Planning (ERP) |
| 4. E-mail | 10. Intranet |
| 5. Customer relationship management | 13. Extranet |
| 6. Other, please list: _____ | |

4. Taking everything into account, how important is the Internet in conducting business in your company?

- | | |
|-------------------------|-------------------|
| 1. Very unimportant | 4. Very important |
| 2. Somewhat unimportant | 5. I don't know |
| 3. Somewhat important | |

5. What is the level of cooperation among co-workers to solve problems that arise from the use of the Internet in your company?

- | | | |
|-----------------|------------------|-----------------|
| 1. Very Low | 3. Somewhat high | 5. I don't know |
| 2. Somewhat low | 4. Very high | |

6. The use of the Internet offers a range of benefits. On a scale from 1 to 5 (1-strongly disagree, 5-strongly agree), please rate your level of agreement with the following benefits from the **use** of the Internet.

The use of the Internet in my company:

	Strongly disagree		Somewhat agree		Strongly agree
Saves my company money	1	2	3	4	5
Is important for market research	1	2	3	4	5
Is important for decision making	1	2	3	4	5
Is helpful in coordinating efforts among several departments	1	2	3	4	5
Has increased interaction among departments	1	2	3	4	5
Has changed the nature of the competition between companies	1	2	3	4	5
Has been easy to adopt because of the high level of Technical skills of the IT personnel within my company	1	2	3	4	5
Has been easy to adopt because of the compatibility it has with existing computer systems	1	2	3	4	5
Has met our expectations	1	2	3	4	5
was adopted as a result of management pressure	1	2	3	4	5

7. How often do employees in your company attend company-sanctioned training/information sessions that help in the adoption of the use of the Internet in your company?

1. Never
2. Sometimes
3. As often as possible
4. Always

8. How satisfied are you with the initiative shown by employees in helping with the adoption process of the Internet in your company?

- | | |
|--------------------------|-------------------|
| 1. Very dissatisfied | 4. Very satisfied |
| 2. Somewhat dissatisfied | 5. I don't know |
| 3. Somewhat satisfied | |

9. On a scale from 1 to 5 (1-strongly disagree, 5-strongly agree), please indicate your level of agreement concerning **employee participation** in the adoption of the use of the Internet in your company.

	Strongly Disagree		Somewhat agree		Strongly agree
Employees play active part in decisions made concerning the adoption of the Internet	1	2	3	4	5
There were clear, planned, goals and objectives for employees about the adoption of the Internet	1	2	3	4	5
Employees make constructive suggestions about how to improve the adoption of the use of the Internet	1	2	3	4	5
There is a definite lack of leadership support in the adopt of the Internet	1	2	3	4	5
Employees have generally, very little loyalty to the company's Internet initiatives	1	2	3	4	5
In general, employees have strong interest in the adoption of the use of the Internet	1	2	3	4	5
Co-workers put in a lot of effort to promote Internet adoption	1	2	3	4	5

10. How important is it **for you** to use the Internet in performing your job? (Please circle one).

- | | |
|-------------------------|-----------------|
| 1. Very unimportant | 4. Important |
| 2. Somewhat unimportant | 5. I don't know |
| 3. Somewhat important | |

11. Are you generally comfortable using the Internet? (Please circle one).

1. Yes
2. No

12. On a scale from 1 to 5 (1-strongly disagree, 5-strongly agree), please indicate your level of agreement concerning the **ease of use** of the Internet in conducting business in your company.

	Strongly Disagree		Somewhat agree		Strongly agree
It is easy for me to find ways to perform my job using the Internet	1	2	3	4	5
The Internet has made my job easier	1	2	3	4	5
Technical support provided by my company makes it easy for me to use the Internet in performing my job	1	2	3	4	5
Technical support provided from outside my company makes the use of the Internet easy for me in performing my job	1	2	3	4	5
I have a clear understanding of how the Internet can help me to perform my job better	1	2	3	4	5
I enjoy using the Internet in performing my job	1	2	3	4	5
Internet use for job performance is required in my company	1	2	3	4	5

13. Does your company provide Internet training?

1. Yes (Continue to question # 14)
2. No (Continue to question # 16)

14. If your answer is "Yes" in question #13 above, who provided the training?

1. My company
2. Training was outsourced
3. I don't know

15. If your answer is "Yes" in question #13 above, how adequate has the training improved your job performance?

- | | |
|------------------------|------------------|
| 1. Very inadequate | 4. Very adequate |
| 2. Somewhat inadequate | 5. I don't know |
| 3. Somewhat adequate | |

16. How valuable is the use of the Internet to you in increasing your job performance. (Circle one option).

- | | |
|--------------------------|------------------|
| 1. Not very valuable | 4. Very valuable |
| 2. Somewhat not valuable | 5. I don't know |
| 3. Somewhat valuable | |

17. How would you classify management support of employees using the Internet in your company? (Please circle one option).

- | | | |
|--------------------------|------------------------|-----------------|
| 1. Very unsupportive | 3. Somewhat supportive | 5. I don't know |
| 2. Somewhat unsupportive | 4. Very supportive | |

18. Relative to your competitors, what stage is your company in with regard to its adoption of the Internet for doing business? (Please circle one).

- | | |
|-----------------------------------|--------------------------------|
| 1. Potential (i.e., yet to adopt) | 3. Later than most competitors |
| 2. We were one of the first | 4. Last in the industry |

19. On a scale from 1 to 5 (1-strongly disagree, 5-strongly agree), please indicate your level of agreement concerning the **usefulness** of the Internet in your company.

	Strongly disagree		Somewhat agree		Strongly agree
My company's Internet technologies are superior to that of our competitors	1	2	3	4	5
The use of the Internet conforms to the beliefs and practices of doing business in our company	1	2	3	4	5
Technical support provided by my company makes the Internet valuable for me in performing my job	1	2	3	4	5
Technical support provided from outside my company makes the Internet valuable for me in performing my job	1	2	3	4	5
The information I obtain from the use of the Internet is powerful (persuasive, useful, and helpful) for me in getting my job done	1	2	3	4	5
My productivity is increased by using the Internet in performing my job	1	2	3	4	5
Using the Internet in performing my job increases my working relationship with co-workers	1	2	3	4	5
My job quality is increased by using the Internet	1	2	3	4	5
I gain greater control over my work when I use the Internet to perform my job	1	2	3	4	5

20. How do you find the usefulness of the Internet in doing business in your company? (Please circle one).

- | | |
|---------------------|-----------------|
| 1. Totally useless | 4. Very useful |
| 2. Somewhat useless | 5. I don't know |
| 3. Somewhat useful | |

21. How adequately skilled are you in using the Internet in performing your job? (Please circle one).

- | | |
|------------------------|------------------|
| 1. Very inadequate | 4. Very adequate |
| 2. Somewhat inadequate | 5. I don't know |
| 3. Somewhat adequate | |

22. Do you consider the adoption of the Internet to be sufficient in meeting your needs in performing your job? (Please circle one).

1. Yes
2. No
3. I don't know
4. Not applicable

23. Which of the following implementation process factors do you consider to positively influence the successful adoption of the Internet in your company? (Please circle all that apply).

- | | |
|-----------------------|---|
| 1. User involvement | 4. Development of trust in using technology |
| 2. User-training | |
| 3. Management support | |

24. Do you consider yourself to have adequate knowledge about the reason(s) behind the adoption of the Internet in your company? (Please circle one).

1. Yes 2. No 3. Not applicable

25. How do you consider the level of funding for Internet technologies in your company? (Please circle one).

1. Severely inadequately funded 4. Very adequately funded
2. Somewhat inadequately funded 5. I don't know
3. Somewhat adequately funded

26. On a scale from 1 to 5 (1-does not influence at all, 5-influence greatly), please indicate the level of influence of the following personalities on Internet adoption in your company.

	Does not Influence at all		Influences moderately	Influences greatly	
Top management	1	2	3	4	5
Desirable Supervisor	1	2	3	4	5
Co-workers	1	2	3	4	5

27. Did you get the opportunity to use the Internet on a trial basis in your company, long enough to see what it could do before full-scale implementation?

1. Yes
2. No
3. Not applicable

28. Do you think the support of management is necessary for the successful adoption of the Internet in your company?

1. Yes
2. No
3. I don't know

29. Were the implementation goals for adopting the Internet in your company clear to you prior to adoption?

1. Yes
2. No
3. I don't know

30. To what extent do you think employees of your company have been involved in the adoption process of the Internet in your company?

1. Not involved at all 4. Very involved
2. Somewhat not Involved 5. I don't know
3. Somewhat involved

31. How would you consider the level of training in your company towards adoption of the Internet? (Please circle one).

1. Very inadequate 4. Very adequate
2. Somewhat inadequate 5. I don't know
3. Somewhat adequate

32. In general, how would you consider the level of management's understanding of the tasks performed by employees in your company?

- | | |
|------------------------|------------------|
| 1. Woefully inadequate | 4. Very adequate |
| 2. Somewhat inadequate | 5. I don't know |
| 3. Somewhat adequate | |

33. Would you consider your company to have a clear-cut business strategy towards the adoption of the Internet?

1. Yes
2. No
3. I don't know

34. What importance will employee acceptance play in the successful adoption of the Internet in your company.

- | | |
|-------------------------|-------------------|
| 1. Very unimportant | 4. Very important |
| 2. Somewhat unimportant | 5. I don't know |
| 3. Somewhat important | |

35. The following are post-implementation performance factors relevant to the successful adoption of the Internet.

Please rank them in order of importance (1-most important, 7-least important).
How you think they would impact the adoption of the Internet in your company.

- ___ Functioning with existing transaction procedures
- ___ Linkage to company strategies
- ___ User participation
- ___ Responsiveness to new technology requirements
- ___ IT staff quality
- ___ Reliability of Internet services
- ___ Responsiveness to end-user needs

Please use the following space below for any additional comments you have about corporate culture and Internet adoption.

Thank you for your time!!

If you have any further question about this survey, please contact:

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Please return this survey by placing it in the postage paid envelope and dropping it in the nearest mailbox. Your response has ensured that this study will be a success. Thank you for your cooperation and your time in completing this survey

VITA

The author was born on May 5, 1964, in Ghana. He received a degree of Bachelor of Science in natural resources management from Kwame Nkrumah University of Science and Technology in 1989, and pursued a graduate diploma in industrial management from the same university in 1992. He started graduate school at Lakehead University in Thunder Bay, Canada, in 1996, and continued in the United States in 1998 at Louisiana State University and Agricultural and Mechanical College (LSU). He earned a degree of Master of Science in forestry in 1999 with a concentration in forest products marketing. He also earned a degree of Master of Business Administration in 2002, with a concentration in management and internal auditing from LSU. He will be earning the degree of Doctor of Philosophy in forestry in 2003 with a concentration in forest products marketing and industry development from LSU.