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# CONTENTS

| Sr. No. | TITLE & NAME OF THE AUTHOR (S)   | Page No. |
|---------|--|----------|
| 1.      | PRICE EFFECT IN DHAKA STOCK EXCHANGE OF CROSS-LISTING IN CHITTAGONG STOCK EXCHANGE<br><i>MD. RAFIQUK MATIN &amp; DR. JAWAD R ZAHID</i>   | 1        |
| 2.      | STUDY OF SHOPPER'S ATTITUDE TOWARDS PRIVATE LABELS IN DUBAI<br><i>DR. TANMAY PANDA &amp; K. TEJA PRIYANKA YADAV</i>  | 8        |
| 3.      | FACTORS INFLUENCING INDIVIDUAL INTRANET USAGE: A LITERATURE REVIEW<br><i>MOHAMAD NOORMAN MASREK, DANG MERDUWATI HASHIM &amp; MOHD SHARIF MOHD SAAD</i>   | 15       |
| 4.      | THE BRANDING OF A COUNTRY AND THE NIGERIAN BRAND PROJECT<br><i>DR. ANTHONY .A. IJEWERE &amp; E.C. GBANDI</i>   | 21       |
| 5.      | THE RELATIONSHIP BETWEEN THE INTERNAL AUDIT FUNCTION AND CORPORATE GOVERNANCE: EVIDENCE FROM JORDAN<br><i>DR.YUSUF ALI KHALAF AL-HROOT</i>   | 27       |
| 6.      | PROPOSED FRAMEWORK FOR IMPROVING THE PAYMENT SYSTEM IN GHANA USING MOBILE MONEY<br><i>MENSAH KWABENA PATRICK, DAVID SANKA LAAR &amp; ALIRAH MICHAEL ADALIWEI</i>   | 33       |
| 7.      | A COMPARATIVE STUDY ON PUBLIC SECTOR BANKS (VS) PRIVATE SECTOR BANKS (A CASE STUDY ON STATE BANK OF INDIA, CANARA BANK VS CITY BANK, ICICI BANK)<br><i>V. SRI HARI, DR. B. G SATYA PRASAD, VIKAS JAIN &amp; DR. D. L. SREENIVAS.</i> | 40       |
| 8.      | DATA MINING APPLICATION IN TRANSPORT SECTOR WITH SPECIAL REFERENCE TO THE ROAD ACCIDENTS IN KERALA<br><i>DR. JOHN T. ABRAHAM &amp; SWAPNA K. CHERIAN</i>   | 48       |
| 9.      | RURAL MARKETS-A NEW FORCE FOR MODERN INDIA<br><i>RICHARD REMEDIOS</i>  | 51       |
| 10.     | ASSESSMENT OF TRAINING NEEDS AND EVALUATION OF TRAINING EFFECTIVENESS IN EMPLOYEES OF SELECT ITes COMPANIES AT BANGALORE<br><i>DR. ANITHA H. S. &amp; SOWMYA K. R.</i>   | 54       |
| 11.     | JOB HOPPING AND EMPLOYEE TURNOVER IN THE TELECOM INDUSTRY IN THE STATE OF TAMIL NADU<br><i>L.R.K. KRISHNAN &amp; DR. SETHURAMASUBBIAH</i>  | 59       |
| 12.     | GROWTH AND RESPONSE OF AGRICULTURE TO TECHNOLOGY AND INVESTMENT IN INDIA (A STUDY OF POST GLOBALIZATION PERIOD)<br><i>SONALI JAIN, H.S. YADAV &amp; TANIMA DUTTA</i>   | 80       |
| 13.     | DAY OF THE WEEK EFFECT IN INTERNATIONAL MARKET: A CASE STUDY OF AMERICAN STOCK MARKET<br><i>DR. BAL KRISHAN &amp; DR. REKHA GUPTA</i>  | 86       |
| 14.     | STOCHASTIC BEHAVIOR OF A TWO UNIT SYSTEM WITH PARTIAL FAILURE AND FAULT DETECTION<br><i>VIKAS SHARMA, J P SINGH JOOREL, ANKUSH BHARTI &amp; RAKESH CHIB</i>  | 90       |
| 15.     | SURVEY OF NEWRENO AND SACK TCP TECHNIQUES PERFORMANCE IN PRESENCE OF ERRORS FOR HIGH SPEED NETWORK<br><i>MARGAM K.SUTHAR &amp; ROHIT B. PATEL</i>  | 98       |
| 16.     | A STUDY OF INDIAN BANKS WITH REFERENCE TO SERVICE QUALITY ATTRIBUTES AND CUSTOMER SATISFACTION<br><i>DR. ASHWIN G. MODI &amp; KUNDAN M PATEL</i>   | 103      |
| 17.     | PREDICTING CONSUMER BUYING BEHAVIOR USING A DATA MINING TECHNIQUE<br><i>ARATHI CHITLA</i>  | 108      |
| 18.     | PERFORMANCE ANALYSIS OF VALUE STOCKS & EVIDENCE OF VALUE PREMIUM: A STUDY ON INDIAN EQUITY MARKET<br><i>RUBEENA BAJWA &amp; DR. RAMESH CHANDER DALAL</i>   | 113      |
| 19.     | STAR RATING FOR INDIAN BANKS WITH RESPECT TO CUSTOMER SERVICE<br><i>DR. M. S. JOHN XAVIER</i>  | 119      |
| 20.     | ROUTING OF VLSI CIRCUITS USING ANT COLONY OPTIMISATION<br><i>A.R.RAMAKRISHNAN &amp; V. RAJKUMAR</i>  | 123      |
| 21.     | A STUDY ON INVESTORS' CONSCIOUSNESS AND INVESTMENT HABITS TOWARD MUTUAL FUNDS: - AN EXPLORATORY STUDY OF MEHSANA DISTRICT<br><i>ATUL PATEL, H. D. PAWAR &amp; JAYSHRI DATTA</i>  | 127      |
| 22.     | THE JIGSAW CAPTCHA<br><i>BALJIT SINGH SAINI</i>  | 134      |
| 23.     | STUDY OF THE AWARENESS ABOUT THE SERVICES OFFERED BY THE DEPOSITORY PARTICIPANTS IN RAJASTHAN<br><i>DR. DHIRAJ JAIN &amp; PREKSHA MEHTA</i>  | 137      |
| 24.     | ATTACHMENT BETWEEN STOCK INDICES FII, NSE AND BSE<br><i>P. KRISHNAVENI</i>   | 142      |
| 25.     | UTILIZATION OF E-BANKING SERVICES BY THE CUSTOMERS OF ICICI BANK LIMITED<br><i>M. S. ANANTHI &amp; DR. L. P. RAMALINGAM</i>  | 146      |
| 26.     | A SYSTEM FOR EMBEDDING FIVE TYPES OF EMOTIONS IN SPEECH: USING TIME DOMAIN PITCH SYNCHRONIZATION OVERLAP AND ADD (TPSOLA)<br><i>MAMTA SHARMA &amp; MADHU BALA</i>  | 153      |
| 27.     | PERFORMANCE OF INDIAN SCHEDULED COMMERCIAL BANKS IN PRE AND POST GLOBAL CRISIS<br><i>PRABINA KUMAR PADHI &amp; MADHUSMITA MISHRA</i>   | 159      |
| 28.     | FOOD PROCESSING INDUSTRY: INDIA NEED FOR DOMINATING GLOBAL MARKETS<br><i>ALI LAGZI &amp; R.THIMMARAYAPPA</i>   | 162      |
| 29.     | ROLE OF BALANCED SCORECARD AS A COMMUNICATION TOOL<br><i>ANSHU</i>   | 167      |
| 30.     | PERFORMANCE APPRAISAL OF INDIAN BANKING SECTOR: A COMPARATIVE STUDY OF SELECTED PRIVATE AND FOREIGN BANKS<br><i>SAHILA CHAUDHRY</i>  | 171      |
|         | REQUEST FOR FEEDBACK   | 181      |

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**FACTORS INFLUENCING INDIVIDUAL INTRANET USAGE: A LITERATURE REVIEW**

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**ABSTRACT**

*While the intranet has been significantly matured since its first inception in the mid 90s, studies addressing on the determinants of usage at the individual perspective has been very scarce. To this effect, this paper presents a review of the extant literature on factors that influence individual usage of intranet. Four groups of determinants were found to be influential are organization factors, technological factors, individual factors and environmental factors. The findings of this review should be useful for researchers intending to investigate the topic. The variables identified in the study can be empirically tested in diverse intranet implementation setting using either quantitative, qualitative or mixed method approach.*

**KEYWORDS**

intranet, determinants, organizational factors, technological factors, individual factors.

**INTRODUCTION**

Since its first inception in the mid 1990s, the intranet has achieved major advancement and sophistication. Today, intranet technologies have significantly matured more sophisticated terms like intranet portal, enterprise portal, enterprise information portal or EIP have been used to replace intranet. Unlike any other application systems, the intranet is usually implemented for company-wide usage. In other words, almost everyone in the organization has access and rights in using the intranet. In a typical intranet computing environment, individual usage can be divided into mode of usage or purpose of usage. Damsgaard and Scheepers (2001) identified the mode of intranet usage as being publishing, transacting, interacting, searching and recording. On the other hand, the literature indicates that the purposes of usage are mainly centered upon decision support (Ba, Lang and Whinston, 1997; Sridhar, 1998; Denton, 2005) and knowledge sharing (Ruppel and Harrington, 2001; Stoddart, 2001; Lichtenstein, Hunter and Mustard, 2004; Panteli, Tsiourva and Modelly, 2005; Stenmark, 2005c).

In publishing mode, intranet is used to publish information such as home pages, newsletter, employee directories or organizational information. In transacting mode, intranet can be used for transacting the functions of the intranet pages and other computer-based information systems such as Human Resources Information Systems, Customer-Relationship Information Systems etc. In interacting mode, intranet is used to interact with other individuals and groups in the companies via discussion groups or collaborative applications. In searching mode, intranet is used for searching organizational information via the search engines, indexes or search agents. In recording mode, intranet is used for recording the computer-based organizational memory such as best practices, business processes or frequently asked questions. Decision support in intranet computing environment relates to the users' usage of the intranet for decision making and problem-solving purposes. On the other hand, knowledge sharing denotes users' usage of the intranet as a medium for sharing their knowledge with colleagues and peers.

Stenmark (2004) noted that despite the growth of corporate organizations embracing intranets, research in this topic is still very scarce and limited. To this effect, this paper presents a review of the extant literature on factors that influence individual usage of intranet.

**INTRANET CHARACTERISTICS**

Many IS researchers have adopted the Zachman's Information Architecture framework (Zachman, 1987) to explain the characteristics of information systems architecture (see Scheepers, 1999; Lyytinen et al., 1998). The framework employs the typical English interrogatives of *what, how, where, who, when* and *why* to describe the different aspects of information systems architecture. Question on 'what' focuses on the content or data entities of the architecture. Question regarding 'how' enquires about possible applications and functionalities of the intranet. Questions about 'where' describes the scope or location of the intranet architecture. Questions on 'who' refers to the people involved with the intranet. Questions on 'when' refer to time-related matters, i.e., the appropriate timing for the adoption of the intranet. Finally, questions on 'why' examine reasons for adopting the intranet. Table-1 presents the intranet characteristics based on Zachman's Information Architecture framework.

TABLE-1: INTRANET CHARACTERISTICS

| Characteristics                             | Description  |
|---|--|
| What? (i.e., intranet content?)             | Contents are company-specific and may encompass information on corporate policies, employee benefits, internal job openings, sales information, newsletters, event schedules, press releases (Butler et al., 1997). Contents can appear in many forms (e.g. text, audio, video) and format (e.g. MSWord, Adobe Acrobat)  |
| How? (i.e., intranet applications?)         | All intranet applications fall into three main categories (i) publishing applications or applications that allow one person or group to talk to many (ii) discussion applications which allow many people to talk to many people and (iii) interactive applications or applications that interact with a program or other document (Casselberry et al., 1996). The three described application possibilities can be used in any combination or simultaneously (Scheepers, 1999)  |
| Where? (i.e., intranet architecture?)       | The scope of intranet coverage depends upon the implementation model being adopted. Stanek (1997); Zimmerman and Evans (1996) identified three possible models for intranet implementation being (i) centralized model with a single web server administered by a specific organization in the company, and a formal process for developing and installing new services (ii) decentralized model with anyone free to set up a web server and place resources of their choice on it (iii) mixed model with elements of both the centralized and decentralized models. |
| Who? (i.e., intranet users)                 | Intranet users are both consumers and developers of intranet. As consumers, users surf the intranet for information seeking and retrieval but as developers, users themselves involve in the development of intranet pages and even functionalities such as pages with embedded scripts and applications (Scheepers, 1999)   |
| When? (i.e., timing of intranet adoption?)  | The rational and approach to determine whether a company / department needs intranet is similar to that used to determine whether any new IS should be implemented. However, the implementation does not start at a definite point in time, but emerges through a series of implementation initiatives that combine existing initiatives with novel one. Likewise, the implementation never seems to end because new functionalities and possibilities evolve over time (Karlsbjerg and Damsgaard, 2001)   |
| Why? (i.e., reasons for intranet adoption?) | Reasons for intranet adoption include for internal communication and trainings (Bottazzo, 2005), knowledge management initiatives (Sarkar and Bandyopadhyay, 2002; Dingsoyr and Conradi, 2003); strategic weapons for competitive advantage (Curry and Stanchich, 2000); decision support tool (Sridhar, 1998; Denton, 2005); enabler for Business Process Reengineering (Golden and Hughes, 2001)   |

## INTRANET USAGE

Organizational adoption of IS generally experiences two stages, namely, (i) primary adoption by a firm, division, or department, and (ii) secondary adoption by individual employees (Hsieh and Zmud, 2006). To describe the process of IS implementation processes, Kwon and Zmud (1987) developed a six-stage model which consists of initiation, adoption, adaptation, acceptance, routinization, and infusion. According to (Hsieh and Zmud, 2006), the last three stages of the model refer to different levels of implementation activities where individual IS usage behaviours may take place. Acceptance denotes users' commitment to use the system. Routinization relates to the state where the system use is no longer perceived as out-of-ordinary but actually becomes part of an individual's behavioural routine. Infusion describes the process of embedding an IT application deeply and comprehensively within an individual's or an organization's work systems (Cooper and Zmud 1990). It is evident that through direct experiences with an IS and associated learning processes and activities, individuals develop abilities to utilize the IS to its fullest potential at the infusion stage (Cooper and Zmud 1990; Saga and Zmud 1994; Jaspersen et al., 2005). Saga and Zmud (1994) asserted that the stage model should not be seen as a strict sequential process, but rather should be thought of as activities, some of which may occur in parallel. The present study defined intranet usage is an individual intranet usage behaviour that embraces the threefold stages, i.e., acceptance, routinization and infusion of the six-stage model developed by Kwon and Zmud (1987).

## DETERMINANTS OF INTRANET USAGE

Every individual is subject to his own personal traits and to the environment or surrounding that he belongs to or is attached with. The Theory of Reasoned Action (TRA) and The Theory of Planned Behaviour (TPB) posited that individual beliefs such as object-based belief of a particular technology are influential in shaping individual behaviours. Diffusion of Innovation (DOI) posited that besides individual beliefs of the innovation characteristics (i.e. the object or technology being studied) other factors such as individual characteristics, organizational characteristics and external characteristics are also influential in molding one's behaviour associated with individual adoption behaviour. Models such as Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology or UTAUT (Venkatesh et al., 2003) which are mainly derived from TRA and TPB have been consistently showed by researchers that individual characteristics, organizational characteristics and technology characteristics are predictors or antecedents of technology adoption (Jeyaraj et al., 2006).

The term 'predictors' or 'antecedents' which are sometimes used interchangeably with determinants in the IS literature, refers to "a determining or causal element or factors". Depending on the number of articles reviewed and the theories being referred to, various authors have identified scores of determinants to technology adoption and usage. In their review, Trice and Treacy (1988) synthesized that four main determinants of IS usage are design and implementation process characteristics, information systems characteristics, individual characteristics and task characteristics. Building upon the TRA and TPB, and supported by previous researches on individual IT adoption, Agarwal (2000) conceptualized that the determinants to IS adoption are managerial interventions, social influences, beliefs and attitudes, situational influences and individual characteristics. Larsen (2001) examined 5000 articles from five highly ranked journals and identified the determinants of IS usage as being inter-organizational, environment, structure, task, process, technology and individual. Recent review by Jeyaraj et al., (2006) of 99 empirical studies on IT adoption that was published between 1992 and 2003 categorized four major determinants to IT adoption i.e. individual, organizational, and technological and environment.

A large number of studies on the intranet have attempted to investigate the effects of the aforementioned determinants on intranet adoption. However, these studies either done at the firm-level perspective (Al-Gharbi and Atturki, 2001; Eder and Igbaria, 2001) or user-level perspective (Horton et al., 2001; Weitzel and Hallahan, 2003; Chang, 2004) were meant to determine use or non-use. Furthermore, the purposes of the studies conducted by Horton et al., (2001) and Chang (2004) was to validate the TAM model in the context of intranet. While TAM is recognized as parsimonious, its constructs only embraced two aspect of the technology characteristics i.e. perceived ease of use and perceived usefulness. Clearly, in explaining the phenomenon of intranet usage especially effective usage, there are still many other contributing factors that have varying effects. Studies have shown that individual whose backgrounds or characteristics are not in favor on technology disposal, are somehow affected by factors such as social influence or organizational factors. Likewise, individual whose traits are inclined towards technology adoption could be inhibited from embracing the technology when the characteristics of the technology itself does not fit or match his needs and requirements. Against this argument, it is imperative to investigate how determining factors effects individual usage behaviour on the intranet. Depending on the unit of analysis, either individual or organizational, studies on intranet adoptions and acceptance have investigated numerous determinant or antecedent factors. Following the categorization by Jeyaraj et al., (2006), these determinants are grouped as individual, organizational, technology (innovation) and environmental characteristics.

## ORGANIZATIONAL FACTORS

Diverse studies have shown that various organizational characteristics are influential in determining both organizational and individual IT adoption and acceptance (Jeyaraj et al., 2006). Organizational characteristics relate to organizational attributes or features such as top management support, user support, user training, and IT facilities. Table-2 exhibits various organizational characteristics that were found to be significant predictors or determinants of intranet



adoption and acceptance. These characteristics comprise of top management support, user participation (involvement), IT infrastructure, champion presence, culture, functional integration, slack resources, knowledge building, knowledge deployment, subsidy, mobilization, standard setting, innovative directive, user training, user technical support, IT manager ability, organizational size and earliness in adoption.

TABLE-2: ORGANIZATIONAL FACTORS RELATED TO INTRANET ADOPTION AND ACCEPTANCE

| Characteristics                                  | Description   | Studies   |
|--|---|---|
| Top management support                           | Relates to the top management support for and favorable attitude toward intranet manifested by sufficient allocation of resources (fund, human resources etc) and willingness to accept risk, while encouraging and promoting the intranet implementation effort.   | Zolla (1998); Phelps and Mok (1999); Young (2000); Tang (2000); Al-Gharbi and Atturki (2001); Eder and Igbaria (2001); Bajwa and Ross (2002); Wilkinson et al., (2002); Fong (2003); Masrek et al. (2008) |
| User participation and involvement               | Relates to users taking part in some intranet development and implementation activities which can be direct or indirect, formal or informal, performed alone or in a group  | Zolla (1998); Phelps and Mok (1999); Young (2000); Tang (2000); Al-Gharbi and Atturki (2001); Bajwa and Ross (2002); Wilkinson et al., (2002)   |
| IT infrastructure (flexibility)                  | Defined as a set of IT resources and organizational capabilities that are shared across the organization and that provide the foundation on which IT applications are developed and business processes are supported  | Zolla (1998); Lai and Mahapatra (1998); Eder and Igbaria (2001); Bajwa and Ross (2002);   |
| User technical Support / Facilitating conditions | Denotes the degree to which an individual feels there is organizational and technical infrastructure in place to support using the intranet   | Lai and Mahapatra (1998); Young (2000); Duane and Finnegan (2000); Chang (2003); Chang (2004); Masrek et al (2008)  |
| Champion Presence                                | Managers to actively and rigorously promote the intranet, building support, overcoming resistance, and ensuring that the intranet is successfully implemented   | Zolla (1998); Bajwa and Ross (2002)   |
| Social Norms                                     | Relates to customary rules of behaviour that coordinate interactions among people.  | Chang (2003); Chang (2004); Baptista et al., (2006); Masrek et al (2008)  |
| Culture  | Describes the pattern of basic assumptions - invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and integral integration - that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (Schein, 1985) | Zolla (1998); Ruppel and Harrington (2001); Wilkinson et al., (2002)  |
| Functional Integration                           | Denotes the degree of interdependence among the various business units and functions and the extent of cooperation and coordination among business units and functions that are required for developing new product or services   | Tang (2000); Bajwa and Ross (2002); Windrum and Berranger (2003); Masrek et al. (2008)  |
| Slack Resources                                  | Refers to the degree to which a pool of resources involving funds and human is perceived to be in excess.   | Tang (2000); Al-Gharbi and Atturki (2001); Bajwa and Ross (2002);   |
| Knowledge building                               | Signifies the availability of knowledge necessary to develop and sustain the intranet and the application of the intranet   | Damsgaard and Scheepers (1999); Butler (2003)   |
| Knowledge deployment                             | Interprets adoption purposes i.e. the purposes of intranet adoption   | Damsgaard and Scheepers (1999); Butler (2003)   |
| Subsidy  | Relates to subsidizing critical activities essential for the diffusion and innovation of the intranet   | Damsgaard and Scheepers (1999); Butler (2003)   |
| Mobilization                                     | Describes the encouraging and decentralized actors and organizations to think about the intranet in the right way in order to facilitate increased usage  | Damsgaard and Scheepers (1999); Butler (2003)   |
| Standard setting                                 | Relates to making the intranet practice official and defines the scope of options for the actors involved   | Damsgaard and Scheepers (1999); Butler (2003)   |
| Innovative directive                             | Addresses the guidelines that are meant to control both the production and use of the intranet  | Damsgaard and Scheepers (1999); Butler (2003)   |
| User training                                    | Providing users with sufficient education and exposure on how to use and operate the intranet   | Tang (2000)   |
| IT manager ability                               | Refers to the IT manager skills and competencies especially on their IT background and experiences  | Tang (2000)   |
| Organizational Size                              | Defined as the number of equivalent full-time salaried employees in the organization  | Eder and Igbaria (2001)   |
| Earliness in adoption                            | Indicates the relative earliness of adoption within a population of potential intranet adopters.  | Eder and Igbaria (2001)   |

Since the present study evaluated intranet usage at the user-level perspective, the appropriate and relevant characteristics (variables) from the aforementioned list are top management support, grassroot support (user participation / involvement), user technical support, champion presence, social norms, culture, functional integration, slack resources, user training and IT manager ability. Organizational size and earliness in adoption are not relevant as they are more appropriate for the firm-level perspective. The remaining characteristics, knowledge building, knowledge deployment, subsidy, mobilization, standard setting and innovative directive which are actually extracted from King's et al., (1994) taxonomy of institutional factors in information technology innovation are also not appropriate as they are more relevant for institutional or organizational perspectives.

## TECHNOLOGICAL FACTORS

Various theories provide different innovation characteristics that are influential in determining IT adoption. The connotation of these innovation characteristics is based on individual belief on a particular technology (i.e., object of the innovation). The Theory of Reasoned Action or TRA (Fishbein and Ajzen, 1975) describes beliefs as the individual's cognitive evaluation of the consequences of a particular behaviour. According to Agarwal (2000), beliefs recur as an important construct in each of the major theoretical paradigms that have been used to understand acceptance behaviour. Technology Acceptance Model or TAM (Davis, 1989) categorizes two object-based beliefs being perceived ease of use and perceived usefulness. Diffusion of Innovation or DOI (Rogers, 1983; 1995) outlines five object-based beliefs, namely, relative advantage, compatibility, complexity, trialability and observability. Others such as the Kwon and Zmud (1987) framework suggest three: compatibility, relative advantage and complexity, while IS Success Model (DeLone and McLean, 1992) delineates two: perceived information quality and perceived systems quality. Building upon these theories and models, various studies have demonstrated that technology (i.e., intranet) characteristics that were found to be significant predictors include perceived usefulness, perceived ease of use, information quality, systems quality, service quality, relative advantage, compatibility, complexities, results demonstrability, trialability and task-technology fit. Table-3 depicts various intranet characteristics that were found to be influential in determining intranet adoption and acceptance.

TABLE-3: INTRANET CHARACTERISTICS RELATED TO ADOPTION AND ACCEPTANCE

| Characteristics         | Description   | Studies   |
|-------------------------|---|---|
| Perceived usefulness    | The individual's perception concerning the degree to which using the intranet will improve his / her job performance  | Phelps and Mok (1999); Horton <i>et al.</i> (2001); Weitzel and Hallahan (2003); Chang (2004); Lee and Kang (2005); Baptista <i>et al.</i> , (2006)   |
| Perceived ease of use   | The individual's perception concerning the amount of effort required to use the intranet  | Phelps and Mok (1999); Horton <i>et al.</i> , (2001); Weitzel and Hallahan (2003); Chang (2004)   |
| Information quality     | Refers to measure of information and data for desired characteristics such as accuracy, precision, currency, reliability, completeness, conciseness, relevance, understandability, meaningfulness, timeliness, comparability and format                           | Myerscough (1998); Phelps and Mok (1999); Young (2000); Tang, (2000) CIBA Solutions (2002); Fong (2003); Welch and Pandey (2005); Deltour (2005), Sugianto and Tojib (2007) ; Masrek <i>et al.</i> (2009) |
| Systems Quality         | Refers to measures of the information processing systems itself which include convenience of access, flexibility of system, integration of system, response time, realization of user expectation, reliability, ease of use, ease of learning and usefulness      | Myerscough (1998); Phelps and Mok (1999); Young (2000); Deltour (2005); Sugianto and Tojib (2007); Masrek <i>et al.</i> (2009);   |
| Service Quality         | The extent to which the intranet service meets users' needs or expectations. The SERVQUAL (Parasuraman <i>et al.</i> , 1988, 1991) instrument measures service quality in terms of tangibles, reliability, responsiveness, assurance and empathy of the intranet. | Phelps and Mok (1999); Cody and Hope (1999) and Miller (2004); Sugianto and Tojib (2007); Masrek <i>et al.</i> (2009)   |
| Relative advantage      | Signifies the degree to which the intranet is perceived as being better than the idea it supersedes   | Weitzel and Hallahan (2003)   |
| Compatibility           | Refers to the ability in which the intranet works within the existing environment (economic, social, and convenience).  | Weitzel and Hallahan (2003)   |
| Complexity              | Relates to the degree to which the intranet is perceived as relatively difficult to understand or use   | Weitzel and Hallahan (2003)   |
| Results Demonstrability | Concentrates on the tangibility of using the intranet including their observability and communicability.  | Weitzel and Hallahan (2003)   |
| Trialability            | Refers to the ability of the user to experience the intranet without having to fully adopt  | Weitzel and Hallahan (2003)   |
| Task-technology fit     | Relates on how well the intranet functionalities fits the needs and requirements of the users.  | Wilkie (2005); Masrek <i>et al.</i> (2009)  |

## INDIVIDUAL CHARACTERISTICS

Numerous studies have demonstrated that when IT adoption, diffusion or implementation is assessed at the individual-level perspective, individual characteristics such as demographics, self-efficacy, attitude, personal IT innovativeness etc are also significant predictors (see Jeyaraj *et al.*, 2006). Within the domain of intranet studies, individual characteristics that had been investigated by previous researchers include age, experience, computer attitude, computer anxiety, self efficacy and personal IT innovativeness (Table- 4). Weitzel and Hallahan (2003) discovered that other than computer attitude, individual traits comprising computer anxiety, computer self-efficacy and personal IT innovativeness appeared to have little predicting power towards intranet adoption. The authors argued that this could be due to the professional and educated nature of the staffs plus the fact that many of them have long experiences in using computers. Young (2000) however found that computer self efficacy was a significant predictor of intranet adoption. Chang (2004) showed that both age and experience were also significant in determining intranet adoption by students in a university environment.

TABLE-4: INDIVIDUAL CHARACTERISTICS RELATED TO INTRANET ADOPTION AND ACCEPTANCE

| Characteristics            | Description   | Studies                                   |
|----------------------------|---|---|
| Age                        | Refers to demographic information that shows how long user has existed  | Chang (2004)                              |
| Experience                 | Denotes the duration or level of an individual's prior use of computers and information systems   | Chang (2004)                              |
| Computer Attitude          | Indicates the user's affect, or liking, for information systems and for using information systems   | Weitzel and Hallahan (2003)               |
| Computer Anxiety           | Defined as the tendency of individuals to be uneasy, apprehensive, or fearful about current or future use of computers  | Weitzel and Hallahan (2003)               |
| Computer Self-efficacy     | Refers to individuals' judgments of their capabilities to use computers (intranet) in diverse situations such as in problem solving and decision making or accomplishing one job task | Young (2000); Weitzel and Hallahan (2003) |
| Personal IT Innovativeness | Indicates the individual willingness to try out any new information technology  | Weitzel and Hallahan (2003)               |

## ENVIRONMENTAL FACTORS

When the purpose of the study is to investigate the IS adoption and acceptance at the firm-level perspectives, environmental characteristics would be definitely embraced as predictors or determinants. Technology adoption model such as Technological-Organizational-Environmental or TOE model (Tornatzky and Fiescher, 1990) which is widely adopted in IS studies have explicitly included environmental characteristics as important determinants to adoption. The literature on intranet suggests that environmental characteristics that have bearing upon intranet adoption and acceptance are environmental uncertainty, customer's pressure, supplier's pressure and vendor availability (Table-5).

TABLE-5: ENVIRONMENTAL CHARACTERISTICS RELATED TO INTRANET ADOPTION AND ACCEPTANCE

| Characteristics           | Description   | Studies   |
|---------------------------|---|---|
| Environmental Uncertainty | Indicates the degree of uncertainty in the environment which arise from heterogeneity of products and services, dynamism of the environment, and perceived environmental competitiveness in the environment | Bajwa and Ross (2002); Windrum and Berranger (2003) |
| Customer pressure         | Signifies the influence on the firm from the imposition by customers  | Bajwa and Ross (2002); Windrum and Berranger (2003) |
| Supplier pressure         | Relates to the influence on the firm from the imposition by supplier and business alliances   | Bajwa and Ross (2002)                               |
| Vendor availability       | The availability of vendor in providing and supplying intranet technologies   | Bajwa and Ross (2002)                               |

**CONCLUSION**

This conduct of this study has been to investigate from the extant literature factors that influence individual usage of the intranet. Based on our reviews, it was found that four groups of factors were found to be influential in determining individual intranet usage. The findings of this review should be useful for researchers intending to investigate the topic. The variables identified in the study can be empirically tested in diverse intranet implementation setting using either quantitative, qualitative or mixed method approach.

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