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RESEARCHARTICLE

DETERMINANT FACTORS OF INFORMATION TECHNOLOGY USAGE IN MANAGERIAL
DECISION MAKING

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ABSTRACT

The study examined the determinant factors for the use of Information Technology in decision making. Questionnaires were prepared and administered in selected business Organizations. Data were interpreted and analysed using the appropriate statistical methods and application software. Descriptive statistics technique, logit model with support STATA 12 was used to analysis and interprets the survey data. The use of information technology in business organization affected by Age of manager, experiences of business organization, gender of manager, experiences, training, affordability, Organization size, education, sales volume determinant factors of Information Technology use. The results show that the organization under study use Information Technology in their Decision Making operation but not the modern one in terms of the use of decision support IS and Executive Information system..

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INTRODUCTION

Transition from industrial society to information and knowledge society has its impact on social, economic and cultural aspect of life. There are only few aspects of life nowadays which are unaffected by information technology. In recent years, information systems technology have become crucial and is playing a critical role in contemporary society and dramatically is changing economy and business. Business is conducted in a global environment and simply could not serve without computer based information systems. Furthermore, we are entering the information age because of information technology and information systems usage. The use of information systems especially is often understood to be changing the way business and organizations work as well as help managers reduce uncertainty in decision making. It is interesting to note that most authors (Lucey, 2005; Hicks, 1997; Gordon and Olson, 1985; Ward and Peppard, 2002) would agree that information systems are playing an increasingly important role in organizations of all types, regardless of their size. It is often stated that information systems is a tool to help improve management by using available information for decision making. According to Thompson and Beer (2000) in addition to more traditional systems which assist in the day-to-day business operations, information system is increasingly providing a competitive advantage for the organization.

Several studies have found and reported diverse findings regarding information systems usage in decision making (Davis and Olson, 1985; Hicks, 1997; Kumar and Mittal, Jawadekar etc.). We should emphasize that although decision making it is one of the areas that information systems have sought most of all to affect, there have been only a few existing studies that have dealt and examine the role of information systems in management decision making. To place this study in context, we turn to the papers by Lucey *et al.* (2005) and Haag and Cummings (2006). They noted that information systems support decision making in organisations and vary among managerial levels. Information systems usage to support managers in decision making falls into one of two general categories of systems that help users to analyze a situation and leave the decision up to him/ her and systems that actually make some sort of recommendation concerning what action to take (Lucey, 2005; Haag and Cummings, 2006).

Information Technology use in business organization is a manner within which each big business and small business enterprise will compete with one another on constant platform however there are variant factors and problems which impact the firms to achieve that level. According to Paulina *et al.* (2007), Business organization still falls short of their target, despite advancements in E-Business. Information Technologies like customer relationship management (CRM), enterprise resource planning (ERP), Intranet and extranet are considered important for creating competitive move. Despite their rapid

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use rates, only a few studies mainly from the information technology and engineering literature have been devoted in uncovering the factors that influence the distribution of new IT and their proper use within business organization. In the same way, empirical studies regarding the impact of IT flow and their proper use in organizations seems limited. According to Hofacker and Murphy (1998), within the past 10 years, business and government are using the internet; they need struggled to accommodate this new interactive medium in their integrated promoting Communications or marketing communication. Broadly use the medium as an on the spot response tool to promoting and additional notably as a relationship management (CRM) aid (Mulye *et al.*, 2001).

Seinfeld, Kraut *et al.*, 1995, 1995), mention that modern on-line business models have generated a good deal of reports media attention, tutorial attention on selling communication, business processes like exchanges, alliance interconnection, belief and commitment in on-line relationship management exist. Specific advantages are suggests for business use of the Information Technology. These could also be grouped as productivity based and revenue-growth based Business system and include international presence, establishing and maintaining a competitive edge, shortening or eradicating elements of provide disintermediation, pricing, storing and an analysis Advantage (Hanson, 2000).

This research was seeking answer for the following questions about the Business organization under investigation:

- What are the determinant factors of Information Technology usage in Business organization managerial Decision Making?

Conceptual frame work of analysis

Relevant literature was reviewed in order to develop a model and to propose various hypotheses based upon it. For this study the researcher developed to develop a one- stage model relating to various variables for this study. As more information is gained this model can be refined.

MATERIALS AND METHODS

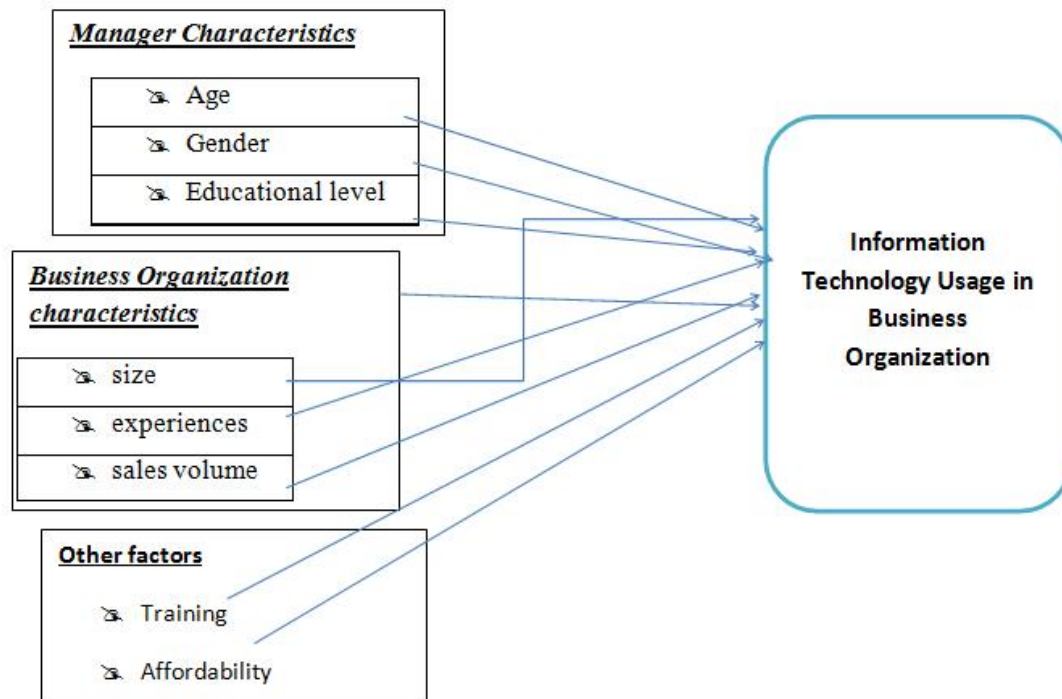
Study Design

The intended study was an explanatory research, creating yet another step to a more in-depth research in this area. It deals with a combination of qualitative and quantitative analysis with a study design of IT use in decision Making case study of selected Organizations in Mekelle city, Tigray, Ethiopia.

Data Source and Collection Methods

Data sources: Data was collected from various sources in order to get more information about the subject at hand. Both primary and secondary sources of information were used.

Primary data: The primary information to be used in this study was gathered through a survey instrument that is Questionnaires were developed and administered on Organizational managers the questionnaires had both open and close-ended questions. The questionnaire for managers probed types of IT used, factors influencing IT access, training, perceptions and attitudes towards IT and to address issues of Decision making. The data collection methods.



Showing Normative Model of Information Technology Use (adapted from Afzaal H. Seyal)

Secondary data: Data on IT use in Business Organization for decision making process was obtained from relevant sources of information, such as Publications, journals, relevant websites and books. A number of these sources have been consulted in the reviewing of literature. Different government sources were consulted for Information. These included handbooks, policy statements, published statistics, national government sources, planning documents, reports, historical and other official documents.

Population and sampling design

Population: The population was two hundred seventy nine organizations and composed of eight economic sectors perform their investment operation in Mekelle city. They may be involved in manufacturing products, construction system, agriculture, service and transportation. The organizational managers were included as respondents, because leaving manager would give inadequate information about the use of Information Technology in Decision making by the Business organization professionals. For successful Information Technology in Decision making, managers must be willing and able to use Information Technology Resource for Structural, Semi structural and unstructured decision making operations. Managers make decisions on the type of employees to employ and the appropriate IT resource suitable for their organization decision marketing. On the other hand, the managers are there to execute what the owner proposes.

Sampling Design

Sampling Techniques: In order to achieve the objectives of the study getting relevant data/information from sample respondents is quite crucial. To do this the researcher was used probability techniques. From the probability sampling techniques the researcher was employed stratified sampling because the economic sectors are heterogeneous in their nature. To make the economic sectors homogenous the researcher classified the sectors in eight strata which are agricultural, industry, construction, hotel and truism, trade, social services, real estate and transportation. From the various techniques disproportional stratified sampling was used. Since disproportional stratified sampling give consideration typically used to assure that smaller groups are adequately represented in the sample.

Sample Size Determination: According the government of the national state of Tigray bureau of urban development trade and industry in 2010 in Tigray region there are 2773 total number of economic business firms. Mekelle as a special zone has 1280 economic business entities at different statuses (pre-implementation, implementation and operation) of this number pre implementation, implementation and operation account 764,237 and 279 respectively. Since the focus of the study is to identify the determinant factors of IT use in decision making so that the study focuses on business organization under operation by excluding pre- implementation and implementation business entities. From the total number of business entities under operation agricultural (28), industrial (116), constrictio (70), hotel and truism (16), trade (2), social services (52), real estate (2) and transportation(1).

The total sample drawn from the population (accessible) was based on Cochran’s (1977) sample size determination formula which is stated below.

$$n = \frac{N(z)^2(s)^2}{N(e)^2 + (z)^2(s)^2}$$

Where:

- Z = value for selected confidential level
- e = margin of error.
- s = estimate of standard deviation

From the above information target population (279), Marginal error (5%), Confidence level (95% the Z table value is 1.96), and estimate of standard deviation (50%)

$$n = \frac{279(1.96)^2(0.5)^2}{279(0.05)^2 + (1.96)^2(0.5)^2} = 161$$

Giving the facts mentioned above, the econometrics model specification in to consideration and if the numbers sample size large the effectiveness of the research also increase. The study was used one hundred business organizations from the eight economic sectors. The sample selection procedure is illustrated in the Table below.

Table 1. Sample selection procedures

S.No	Sector Name	Target Population	Sample (n)
1	Agriculture	28	8
2	Industry	116	50
3	Hotel and Truism	16	6
4	Trade	2	2
5	Social services	52	15
6	Construction	70	23
7	Real state	2	2
8	Transportation	1	1

After selecting the organization by using disproportionate stratified sampling the researcher was prepared and distributed the questionnaires to the selected companies’ manger.

Data analysis techniques: For study the researcher employed Correlation analysis and regression analysis and STATA 12 soft ware were used in this study.

Econometric Model Specifications

$Y_i = f(\text{age, Edu, Gender, manager Exp, Training, Affordability, organizational Size, sales volume and Organizational experiences})$.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon_0$$

Where:

Y = IT suitability for Organization decision making process (A binary value of 1 if IT is likely to be used productively on an organization, 0 if otherwise)

β_0 = Constant

$\beta_1 - \beta_9$ = Coefficients of the predictor variables

ϵ_0 = Error term

Dependent variable: Y =current IT use in Decision making.

Independent /explanatory variables X_1 - X_{12} (age, Educational level, Gender, Experiences, Training, Affordability, Size, organization sales volume and organization experience)

Dependent Variable

Use is typically outlined in terms of a binary variable. During this case, Information Technology Use is that the dependent variable Y and is outlined as a binary variable with a worth of [1] and [0]. For organizational managers, Y encompasses a price of one if an organization manager is probably going to use IT for Decision making operation and zero if otherwise.

Assumptions of the Independent Variable

The following are the assumptions underlying the anticipated relationships between the independent variables and IT usage. Every independent variable and its assumed association with IT usage are discussed below:

Age: Young organization executive managers are additional seemingly to have an interest in learning and applying new data than older ones. Consequently, young workers are seemingly to be versatile and motivated to use Information Technology than older executive managers.

Education: organization managers who have attained higher levels of education are additional seemingly to have an interest in Information Technology use than those that don't have any or attained lower education level.

Experience: competent managers are additional seemingly to be entrusted with managerial duties which can need the additional use of Information Technology. As organization expertise of the corporate employee will increase, the likelihood of IT use conjointly will increase.

Gender: Contrary to the views of Sabuhoro and Wunsch (2005) additional managers are expected to use IT than girl's organization workers. Men are more likely than women to purchase and sale products and services through e-marketing.

IT Training: The trained executive manager is seemingly to use IT than the untrained ones.

IT affordability: Alvarez and Nuthall, (2006) is argue that it's negatively associated with use since it's an anticipated barrier to the employment of IT. The high value of IT is negatively associated with use. Costlier IT are less seemingly to be afforded by organization workers and thereby limiting their use.

Organizational size: As organization will increase in size, complexity and business transactions, the employment of IT

conjointly will increase. This is often as a result of because the organization size will increase, it becomes troublesome to manage efficiently, and use of IT can facilitate with record keeping, management, effective and potency measures (Batte, 2005).

RESULTS AND DISCUSSION

The determinant of Information Technology Usage in Decision making of Business Organizations.

Table 2. Logit result for determinants of IT usage

variables	coefficient	p-value	Marginal effect
Age	-.3810871***	0.003	-.0687508
Gender	1.31709*	0.090	.2683872*
Education level	2.440416***	0.000	.4402682
experiences	.1796605*	0.090	.032412
organization size	2.573243***	0.005	.4920437*
organization experiences	.1414179	0.168	.0255128
Training	3.8418***	0.000	.7407113*
Affordability	-2.942787***	0.007	-.3898831*
Sales volume	1.738906**	0.041	.3777494*
Constant	1.160085	0.698	
Number of observation = 100			
LR chi2(9) = 90.80			
Prob> chi2 = 0.0000			
Pseudo R2 = 0.5683			

Note: ***significant at 0.01, **significant at 0.05 and *significant at 0.10

(*)Marginal effect is for discrete change of dummy variable from 0 to 1

Source: Model output, 2014

In the output above, there are many variables the researcher describes in detail first seeing the iteration log, indicating how quickly the model converged (The log likelihood -34.482602). Secondly at the top of the output exist that all 120 observations data set were used in the analysis (fewer observations would have been used if any of our variables had missing values). The likelihood ratio chi-square of 90.80with a p-value of 0.000 tells the model as a whole fits significantly better than an empty model (i.e., a model with no predictors). In the table display coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable.

Taking IT use Y_i , to be $\text{LnP}(x)/(1-\text{P}(x))$ as the dependent variable in the logit model, the resulting logistic regression equation becomes; $Y_i = 1.16 - .38x_1 + 1.32x_2 + 2.44x_3 + .18x_4 + 2.57x_5 + .141x_6 + 3.84x_7 - 2.94x_8 + 1.74x_9$. Based on the definitions of the variables as indicated earlier, the equation is presented as: IT use(Y_i) = 1.16 - .38 Age + 1.32 gender + 2.44 education level + .18experiences + 2.57organization size + .141organization experiences + 3.84training - 2.94 affordable + 1.74salesvolume. The interpretation and discussion of each independent variable, as it relates to the dependent variable is explained here below:

Age of manager: There is a statistically significant difference in the case of IT use between the organization managers age groups ($0.002 < 0.05$). Comparing the ratios of organization managers using IT in different age groups, younger

organization managers responded positively to the use of IT than older ones. This variable took a negative sign (-.3810871) implying that IT use is negatively influenced by the age of the organization managers. The marginal effect depicts that when age of manager in manager's increases by 1 year their probability of IT use may be decreased by 6.8 percent. It was expected that the age group would negatively influence IT use and vice versa so that most young people are willing to learn and are flexible than older ones. Older people tend to have technophobia. The influence of age has been demonstrated in many technology usage studies (Venkatesh *et al.*, 2003; Knutsen, 2005). Study by Yi, Wu and Tung (2005) indicated that age may influence technology use negatively.

Gender: This variable took a positive sign (+1.31709) implying that male organization managers are better user of improved IT than female managers. The marginal effect depicts that when male head manager is increases by 1 their probability of IT use may be increased by 26 percent. This is reliable with the researcher theoretical expectations and conforms to the findings of other earlier researchers (Dholakia *et al.*, 2003). This positive correlation shows the influence of gender on IT use and the difference between male and female managers based on the chi2 value $P(m) = 0.008$ this result show male head manager significantly use IT. Male managers have exposure to new technologies and innovations, are more open to new ideas and are more willing to use, hence this supported by the positive correlation between gender and IT use. Statistics on technology access and use across companies also reveal gender as one of the most important factors influencing internet adoption and utilization (Dholakia and Kshetri, 2003). Dholakia *et al.* (2003) noted that 'men and women have different cultures, are specialized in different tasks, and have different preferences.

Such differences tend to interact with the features found in the Internet and other modern IT in ways that intensify their perceived usefulness and the perceived ease of use in favor of men rather than women'. Considering that internet and intranet utilizations are equivalent in many respects, it is therefore hypothesized that gender is positively related with IT utilization. In this study, the relationship between organization managers' IT use and gender is at 10% level but not significant at 5% and 1% level.

Education level: This variable took a positive sign (+2.440416) implying that highly educated organization managers are better user of improved (better) IT than less educated ones. The marginal effect depicts that when educational level of manager increases by 1 year their probability of IT use may be increased by 44 percent. This is reliable with the researcher theoretical expectations and conforms to the findings of other earlier researchers (Jones and Hubona, 2005) as observed when reviewing literature. This positive correlation shows the influence of education on IT use. Educated managers and employers have exposure to new technologies and innovations, are more open to new ideas and are more willing to use, hence this supported by the positive correlation between education and IT use. The education levels of the respondents ranged from secondary to university graduates. However even for the educated ones, some

technologies are product-specific or site-specific and the user may need to be provided with information on their usage.

Work experiences: This variable took a positive sign (+.1796605) indicating that highly experienced managers are better user of improved IT than less experienced managers. The marginal effect depicts that when experiences of manager increases by 1 year their probability of IT use may be increase by 3.2 percent. This is reliable with the researcher theoretical expectations and conforms to the findings of other earlier researchers (source). This positive correlation shows the influence of experiences of managers on IT use. Since the time factor has been included in the state of IT use seems reasonable that managers that have survived for the longest are the ones most likely to be the soundest and strongest in terms of optimizing the IT resources, managing change, taking risks in using new systems, and taking the best opportunities to explore the possibilities that Information communication Technology has to offer.

Organizational size: This variable was expected to positively influence IT usage. The basis of this expectation was that for a organization to grow and acquire a large amount of capital which is use to operate it might also be in a position to utilize new technology compared to smaller firms, perhaps on account of large-scale production and other Managerial functions like Decision making. This variable took a positive sign (+2.573243) implying that IT use is positively influenced by the size of the organization. The marginal effect depicts that when size of organization increases by 1 unit their probability of IT use may be increase by 49 percent. It was expected that the advantages of large-scale would positively influence IT use and vice versa so that smaller firms would find it difficult to use IT than large ones. It is clear that a large firm in terms of establishment and output levels is definitely better placed to acquire and use new IT than a smaller firm

Organization experiences (Age): This variable took a positive sign (+.1414179) indicating that the older the companies are the better use of improved IT than less experienced organization. The marginal effect depicts that when experiences of organization increases by 1 year their probability of IT use may be increase by 2.5 percent this is reliable with the researcher theoretical expectations and conforms to the findings of other earlier researchers (Freeman *et al.*, 1983). This positive correlation shows the influence of experiences of companies in operation on IT use. Since the time factor has been included in the state of IT use seems reasonable that businesses that have survived for the longest are the ones most likely to be the soundest and strongest in terms of optimizing resources, managing change, taking risks in using new systems, and taking the best opportunities to explore the possibilities that IT has to offer.

Training: This variable took a positive sign (+3.8418) the trained manger use IT than the untrained ones. The marginal effect depicts that when training of manager increases by 1 unit their probability of IT use may be increase by 74 percent. This is mainly because training is essential for the effective use of IT by the managers, especially the IT that need a user to be computer literate. Without IT training it is difficult for

organization and managers to be able to use the IT productively for decision making purpose.

Affordability: There is a significant relationship between organization managers' IT use and their perception on IT affordability (p -value <0.05). Perception on IT affordability negatively influences (-2.942787) the use of IT by organization managers. The marginal effect depicts that when cost IT tools increases by 1 birr their probability of IT use may be decrease by 38 percent. If they perceive that IT is expensive; they will not buy it and vice-versa. In this study, perception on IT affordability has a significant influence on IT use.

Sales volume: There is a significant relationship between organization managers' IT use and organization sales volume (p -value <0.05). Sales volume increment is positively (+1.738906) influences the use of IT by organization managers. The marginal effect depicts that when sales volume of organization increases by 1birr their probability of IT use may be increase by 37 percent. If they perceive that IT is necessary to increase sales volume of the organization, they buy it and vice-versa. In this study, perception on sales volume improvement has a significant influence on IT use

Correlation analysis results

IT use correlated with the independent variable age (0.1435), gender (0.2437), educational level (0.4634), experiences (0.1925), Organizational size (0.4408), organization experiences (0.4344), training (0.3365) and sales volume (0.3795) positively. In the case of IT affordability (0.2917) and IT use correlation exist negatively. Correlation exists between -1 and 1 and the value approach to 1 gets the chance the strongest correlation with the dependent variables. Accordingly, educational level (0.4634) strongly correlated with IT use dependent variable.

Conclusion and Recommendation

The general findings showed that IT training, age, educational level, work experiences organization size, affordability and sales volume influence the use of IT by the selected Industries. Gender and manager work experiences and organization operational experiences took positive influencing Organizations use IT but statistically in significant, although they are expected to be major IT use determinants in normal cases.

Identification of factors and variables that are related to and influence the use of IT by the selected organization was done and demonstrated by use of log it model and correlation analysis. However, it should be noted that the factors affecting IT use may differ depending on a number of factors including manager characteristics and organization characteristics. From the results of the study, it can be surmised that IT can have far-reaching development impact in providing decision making role players like manager access to knowledge, information and markets in the globalized world.

A number of limitations facing women hinder them from benefiting from IT services in Decision making as compared to men. Lack of gender focus in telecommunications and IT policy as a major barrier that a lot of women in developing countries are facing. To address these gender disparities, the

government should play a vital role by giving affirmative action's like (i) women should be enabled to use IT to improve their livelihood and share their views in local and national programs, (ii) development actors are supposed to use gender sensitive approaches in their programs especially in decision Making,(iii) change the attitude of family and males towards women's in IT using through attitudinal change training and,(iv) government should be setting affirmative policy towards using IT.

In order to alleviate the problem of non IT User organizations, managers should be trained; awareness should be created about the merits of using IT. IT services managerial decision making should be strengthened. Such educational institutions should serve the non users without affecting their sustainability. The modern technology found in the globe is not easily purchased with a minimum cost. This situation leads to technology in affordability and this problem exists in the sub-Saharan countries like Ethiopian business firms. Government and business Organizations should be playing a vital role by conducting the following activities: (i) importing latest technology through donation, (ii) give financial support for the business firms to purchase the modern technology, (iii) Business Organization should be ready for the risk that arise from the technology after purchasing because many organization fire the maintenances cost of the modern technology.

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