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Determinants of accounting information systems adoption in Ethiopia: Empirical evidence from large and medium manufacturing enterprises in Addis Ababa

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ABSTRACT

This paper aims to examine determinants of accounting information systems (AISs) adoption among large and medium manufacturing enterprises in Ethiopia using Diffusion of innovation (DOI) and Technology-Organization-Environment (TOE) models as a theoretical background. To achieve this objective, the researcher distributed 212 self-administered structured questionnaires to mangers/accountants of the manufacturing enterprises located in Addis Ababa city administration using simple random sampling. The study applied quantitative research approach to address hypotheses of the study. The method of analysis for determinant variables was binary logistic regression with the aid of SPSS software version 20.The study established that extent of AISs adoption among large and medium manufacturing enterprises in Ethiopia was extremely low. Both descriptive statistics and binary logistic regression results revealed that relative advantage of AISs, top management support, organizational readiness, employees' IT competence, competitive pressure, and government support were the significant factors that influence AISs usage among manufacturing enterprises in Ethiopia. However, complexity and compatibility factors were found to be not significantly related to the decision to adopt AIS technologies. Based on the findings of the study, recommendations were forwarded to stakeholders of the manufacturing sector so that the sector's accounting system would be modernized and automated.

Introduction

The current Ethiopian government has set a long term goals of bringing sustainable and rapid economic growth, poverty alleviation, transform the country from the predominantly hand to mouth economy to one of lower middle income countries in the world; and making the country a leading manufacturing hub in Africa and among the leading countries in the globe by 2025 (GTP II, 2016). In order to achieve the above long term visions of the country, the government has currently identified a range of priority sectors in the economy that can maintain and foster the rapid double-digit economic growth that the country so far registered.

The contribution of manufacturing industries in terms of employment creation and sustainable economic development is well acknowledged worldwide, including Ethiopia. According to AACCSA (2014) the manufacturing sector in Ethiopia had contributed 4.8% to the bank of the country's GDP, employed about 173 thousand labor force and had a gross production value of about 113 billion Birr (Equivalent with 5.9 billion USD) in the year 2012/13. As a result, the manufacturing sector in Ethiopia is identified as the key productive sector of the economy in the upcoming years with the expectation that the sector can stimulate economic growth with its immense potentials of foreign currency generation, import substitution, poverty reduction, technology transfer, employment absorption, and wealth creation (GTP II, 2016). However, due to inadequate technical proficiency and low technological adoption, the manufacturing sector in Ethiopia is still in infant stage which is neither transformed to high tech processing unit nor is highly competitive in the global market.

Alamin et al. (2015) define accounting information systems (AISs) as a software package that is operated on a computer system and used to accomplish all accounting tasks, including recording, storing, retrieving, sorting, analyzing, presenting and transferring accounting information to different stakeholder groups. In the same fashion, Salehi & Abdipour (2013) define AISs as a tool which is incorporated into the field of information and technology (IT) systems that are designed to assist mangers to control firm's economic-financial areas.

Our current era is the age of information and every business organization needs to obtain and provide quality information which can assist managers and external stakeholders to assess the business's performance. The emerge of globalized markets, cross border transactions, digital business environment, fierce market competition, and the advancement and availability of information and communication technologies (ICTs) put immense pressure on business entities to acquire and utilize up-to-date accounting software packages. As a result, currently most business organizations, from large corporations to small enterprises that operate in both developed and emerging economies are utilizing AISs in their business operations aiming to succeed in highly competitive global market (Lim, 2013).

It is well established that the adoption and utilization of AISs provide a number of benefits to the business organizations: It increases organizational performance and helps businesses to achieve strategic objectives (Naranjo-Gil, 2004; Patel, 2015); it increases the profitability and growth of business firms (Muhindo,

2014; Ahmad, 2013); it helps to facilitate the decision making process via providing highly qualified financial reports (Swalhah, 2014); it helps businesses to comply with the given tax systems of a nation (Abdallah, 2013); it provides sustainable competitive advantage in the market (Porter & Millar, 1985); it favors international financial reporting standards (IFRSs) adoption (Akanbi & Aruwaji, 2016) and it helps to implement adequate internal control systems that could protect the organization's assets from fraud (Romney & Steinbart, 2012).

However, business organizations in Ethiopia including the manufacturing sector are characterized by low technological adoption, inefficient accounting system largely due to poor accounting records, and non-compliance of their financial reports with International Accounting Standards (Talegeta, 2014; Wegen, 2014; ROSCE, 2007). These scenarios could create multiple fold of problems for business entities such as tax incompliance with the existing tax system and poor access to finance due to poor financial statement preparation and presentation (Abdallah, 2013; Sambasivam & Assefa, 2013); difficulty of measuring the actual performance of business operations; poor investment management and evaluation and hence wrong strategic decisions due to lack of quality accounting reports (Chakraborty, 2015); poor internal control systems and hence increases susceptibility of business's assets for fraud; and poor accounting records may lead to bankruptcy of business organizations in the long run (Ismail & Ali, 2012).

Therefore, examining determinant factors that affect the adoption of AIS technologies is of great importance to automate and modernize the accounting systems of the manufacturing sector in Ethiopia which in turn could increase the competitiveness of the sector in the face of information based international market.

Research design and Methodology

For this study, cross sectional survey design was found to be appropriate to gather information about the extent of AISs adoption and its determinant variables among manufacturing enterprises in Ethiopia. According to Saunders et al. (2009) survey research method allows the collection of quantitative data from large population which in turn can be used to suggest the possible reasons about a specific relationship between variables of interest. This study also applied quantitative research approach. Creswell (2014) asserted that quantitative research approach is used for testing objective theories by examining the relationship between variables. The aim of quantitative research is to answer pre-determined hypotheses/research questions and produce general results about a given population.

Data source and method of data collection

For this study, primary data was collected through surveying of large and medium manufacturing enterprises located in and around Addis Ababa city administration. In this regard, the researcher used self-administered structured questionnaires. The questionnaire was divided into three sections: The first section contained questions pertaining to capture respondents' demographic information. The second section comprised close ended questions related to extent of AISs adoption among manufacturing enterprises. The third section consisted of questions regarding the perception of respondent on factors influencing the adoption of AISs. With regard to independent variables of this study, respondents were asked to indicate their level of agreement on five point likert rating scale items with the following ratings: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree. The data collection instrument was prepared in both Amharic and English languages.

Target population

The target population considered in this study was large and medium manufacturing enterprises found in and around Addis Ababa city administration. According to FMSEDA (2011) large and medium manufacturing enterprises are those enterprises that have employed more than 30 employees and have a total asset of more than 1.5 million Birr.

Sample design and sample size

According to Addis Ababa Trade and Industry Bureau Annual Report (2017), there are 450 large and medium manufacturing establishments, as of February, 2017, actively operating in and around the city administration. To determine the sample size in this study, the famous Yamane (1967) formula was used. The formula to calculate the sample size is:

$n = \frac{N}{1+N(e)^2}$ Where, n = sample size, N = total population size, e = level of precision.

Hence, the sample size is equal to: $n = \frac{450}{1+450(.05)^2}$

$= 211.764 \approx 212$

Therefore, for this study, 212 large and medium manufacturing enterprises were selected. The questionnaire respondent was mangers/accountants of the manufacturing industry. In selecting respondents, simple random sampling technique was used.

Methods of data analysis

In this study, both descriptive and inferential statistics were used to analyze the survey data. Even though there is a huge debate in literature on the issue of whether likert scale data should be analyzed as an interval or ordinal measurement scales, the author of this research convinced that likert-scale should be analyzed as interval measurement scale. Similar descriptive analysis method was utilized by Rosli et al. (2013) and Alamin et al. (2015). Besides, so as to find if there exist direct relationships between the determinant factors proposed as independent variables and the likelihood of AISs adoption, binary logistic regression model was used. The dependent variable (i.e. the likelihood of AISs adoption) is a dummy variable which is coded as 1 = Adopters, 0 = non-adopters. Further, all independent variables were measured on a "scale" (Numerical value) bases. According to Harry & Deborah (2012) and Creswell (2014), Likert scale data are analyzed at the interval measurement scale within which

likert scale items are created by calculating a composite score (Sum or mean) from four or more likert-type items. In due process, statistical package for social science (SPSS) version 20 was used to analyze the quantitative data.

Model specification

Logistic regression is appropriate when the nature of the dependent variable is categorical and when the independent variables are either continuous or categorical in nature. Since accounting information systems (AISs) adoption is a discrete choice (i.e. enterprises either invest on AIS technologies or do not invest on the technology), the ordinary least square (OLS) method of estimation is biased and inefficient to predict the likelihood of AISs adoption (Gujarati, 2003). As a result, binary logistic regression model was developed and utilized to explore factors that influence the likelihood of adopting AIS technologies.

Hence, with binomial logistic regression, this study estimates the probability of a dichotomous response (Adopt/not adopt of AISs) for various values of explanatory variables. Accordingly, the logistic regression function is given by:

$P(Y) = \log\frac{P}{1-P} = \beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots \beta_nX_n + \varepsilon_i$ and this results in:

$$P(Y) = \frac{e^{\beta 0 + \beta 1X1 + \beta 2X2 + \ldots \beta nXn + \varepsilon i}}{1 + e^{\beta 0 + \beta 1X1 + \beta 2X2 + \ldots \beta nXn + \varepsilon i}}$$

Where: P = the probability of the occurrence of success, Y = binary response dependent variable, X_i = Explanatory/independent variables that influence the probabilities of the outcome of the dependent variable, e = Natural logarithm base, β_0 = Interception at Y – axis, β_i = coefficients of the explanatory variables, ε_i = stochastic disturbance or error term.

In the above logistic function, the relationship between P(Y) and X is non-linear. According to Field (2009) when the outcome (dependent) variable is categorical, the linearity assumption is violated; both Gujarati (2003) and Field (2009) recommended that one way of solving the linearity problem in logistic regression is to transform the data using the logarithmic transformation. Therefore, for this study, the binomial logistic regression is written as follows:

$$P(Y) = \ln\left(\frac{P}{1-P}\right) = \beta 0 + \beta 1RAD + \beta 2CLX + \beta 3COMP + \beta 4TMGS + \beta 5OR + \beta 6EITC + \beta 7CP + \beta 8GOVS + \varepsilon i$$

Where: P = the probability of adopting AIS technologies, Y = Accounting information systems adoption (1 if adopt AISs, 0 otherwise), B_0 = Constant of the binary logistic regression equation, RAD = Relative advantage of AISs, CLX = Complexity of AISs, COMP = Compatibility of AISs, TMGS = Top management support, OR = Organizational readiness, EITC = Employees' IT competence, CP = Competitive pressure, GOVS = Government support, εi = Random error term

Reliability of the questionnaire items

In this research, Cronbach's alpha has been used to test the reliability of the items included in the questionnaire. Hair et al. (2010) suggested that the coefficients of Cronbach's alpha greater 0.70 are considered as a reliable indicator of the constructs under study. Therefore, using SPSS version 20, the reliability test of all items used to measure the independent variables in this study were above the minimum threshold of 0.70 limits (Table 1).

Table 1. Cronbach's alpha coefficient of the research items

Cronbach's alpha value	No of items	Degree of reliability
0.842	35	High reliability

Source: Survey questionnaire (2017)

Validity of the questionnaire scales

In order to check validity of the questionnaire being used in this study, a pilot test was conducted in 5 manufacturing enterprises found outside of Addis Ababa city administration. Besides, the questionnaire was also assessed for content validity by two accounting and finance lecturers who are currently teaching at Addis Ababa University.

Results and Discussion

Out of 212 questionnaires distributed to manufacturing industries, only 143 of them were collected and prepared for analysis, which is accounted for a response rate of 67.5%.

Demographic information of respondents

Male respondents took the lion share with the frequency of 91 (63.6%) out of the total of 143 respondents in this study (Table 2). With regard to female respondents, their share is relatively small with a frequency of 52 (36.4%). With regard to age of respondents, majority of participants (49.7%) lie between 21–30 years old which implies that most of respondents were youngsters. The other respondents were between 31-40 years old that form about 31.5% of the total respondents, followed by those with the age group of 41-50 years which took about 17.5% of the total respondents and the rest (1.4%) were above 50 years old. The distribution of respondents by their level of education showed that most respondents (58%) were Bachelor degree holders. Master's degree holders accounted about 13.3% of the total respondents. Only 21% of respondents were diploma holders, followed certificate (5.6%) and PhD (i.e. Doctor of philosophy) holders which accounted about 2.1%. This indicated that majority of respondents in this study were fairly educated to fill the questionnaires. The job experience of participants was incorporated in the questionnaire with the intention of understanding how familiar they are with their work operation and how experienced they are with their professions. In this regard, more than half (55.9%) of respondents had between 6 – 10 years' work experience in their current position. 23.8% of respondents had a work experience between 0 – 5 years. The rest of the respondents had

11 – 15 years and more than 15 years' work experience with a percentage share of 18.2 and 2.1 respectively. This implies that most of participants in this study were experienced employees with exposure to know AISs adoption issues in their organizations. Finally, the respondents of this study were also asked about their information technology (IT) experience, based on the number of years they had used IT either for personal or organizational purposes. The above table demonstrated that 41.3% of participants had been using information technologies like computers from 6 to 10 years, while 46.9% of respondents had between 11 – 15 years of IT experience. 5.6% of respondents had IT experience of more than 15 years, and only 9participants (6.2%) had an experience of less than 5 years IT usage. This result shows that majority of respondents most employees of the manufacturing sector have adequate IT experience.

Extent of AIS technology adoption among manufacturing enterprises in Ethiopia

Results indicate that majority (64.3%) of large and medium manufacturing enterprises were non-adaptors of AIS technologies (Table 3). Only 51 enterprises (35.7%) had adopted AIS technologies. This finding indicates that the adoption of AIS technologies is low in the manufacturing sector, which further clearly shows that the manual accounting system is dominating the manufacturing sector in Ethiopia. Besides, among adopters of AIS technologies, only 15.7% of the manufacturing enterprises were using fully automated AIS to accomplish their accounting tasks, while majority of AISs adopters (66.6%) were using both manual and computerized accounting systems concurrently. The rest (17.7%) of enterprises were partially automated their accounting systems. This result clearly demonstrates that the level of computerized accounting system adoption is extremely low among manufacturing enterprises. Regarding accounting data processing method, majority of manufacturing enterprises (74.8%) were processing their accounting transactions and financial reports using batch processing method (i.e. a method of processing business transactions and financial reports periodically such as annually, semi-annually and quarterly), while 18.9% enterprises used real time data processing method (i.e. a method of capturing and processing business transactions and financial reports immediately and continuously as requested). The rest (6.3%) of them are used real time processing method integrating with online data connection. This result indicates that due to low level of AISs adoption, the manual accounting system is dominating the manufacturing sector. As can be observed from the above table more than two third (79.0%) of manufacturing enterprise had stand-alone desktop computers in their premises, while enterprises that had been using multi-user system using wide area network (i.e. a computer network that extends over a large geographical area aimed to share business information to different stakeholders) were only 12 (8.4%). The rest (12.6%) of manufacturing enterprises used multi-user system using local area network (i.e. a private computer network which is limited to a single office and owned by a single organization) to process and communicate accounting information to concerned bodies. This result demonstrates that majority of manufacturing enterprise's accounting system is not connected to either local area network or wide area network to process and share information related to business activities. This could be due to poor information and communication technology (ICT) infrastructures across the country and the lags of Ethiopian manufacturing sector in terms of AISs adoption.

Table 2. Demographic information of the respondents

Characteristics	Type	Frequency	Percentage
Gender	Male	91	63.6
	Female	52	36.4
Total		143	100
Age	21 – 30	71	49.7
	31 – 40	45	31.5
	41 – 50	25	17.5
	Over 50	2	1.4
Total		143	100
Academic qualification	Certificate	8	5.6
	Diploma	30	21.0
	Bachelor	83	58.0
	Masters	19	13.3
	PhD	3	2.1
Total		143	100
Experience in current position (in years)	0 – 5	34	23.8
	6 – 10	80	55.9
	11 – 15	26	18.2
	More than 15	3	2.1
Total		143	100
IT Experience (in years)	0 – 5	9	6.2
	6 – 10	59	41.3
	11 – 15	67	46.9
	More than 15	8	5.6
Total		143	100
Types of manufacturing enterprises	Agro processing	84	58.7
	Chemical & Pharmaceuticals	12	8.4
	Textile and garment	13	9.1
	Metal & engineering	12	8.4
	Leather & leather products	6	4.2
	Other	16	11.2
Total		143	100

Source: Survey questionnaire (2017)

Table 3. Extent of AIS technology adoption among manufacturing enterprises

Variables	Types	Frequency	Percentage
Frequencies of adoption of AIS technologies among manufacturing enterprises	Adopter of AISs	51	35.7
	Non-adopter of AISs	92	64.3
Total		143	100
Types of AIS adopted by manufacturing enterprises	Partly automated	12	17.7
	Manual & computerized	21	66.6
	Fully automated	18	15.7
Total		51	100
Types of accounting data processing and reporting method	Batch processing	107	74.8
	Real time only	27	18.9
	Online and real time	9	6.3
Total		143	100
Enterprises' accounting systems integration with the network	Stand-alone system	107	74.8
	Multi-user system using wide area network	27	18.9
	Multi-user system using local area network	9	6.3
Total		143	100

Source: Survey questionnaire (2017)

Descriptive analysis of factors affecting AISs adoption in manufacturing sector

The overall mean for the relative advantage of AISs was 3.74, indicating that most respondents were agreed on the benefit of adopting AIS technologies against its installation, functioning and subsequent maintenance cost (Table 4). The average standard deviation was high (>1.0), indicating while some respondents perceived that the cost of AISs was greater than the benefit derived from it, others (especially AISs adaptors) believed that using AISs has relative advantage over the manual accounting system. This result is in line with the findings of Edison et al. (2012).

The total mean for complexity of AISs was 3.31, which reveals that majority of respondents were unsure about the impact of complexity on adoption of AISs (Table 5). The deviation of responses (Std. deviation >1) among respondents could be due to the inclusion of both AISs adaptors who already experienced the complexity of AISs and non-adaptors who did not experience the complexity of AISs in the study.

The mean and standard deviation about the perceived compatibility of AIS technologies with the existing work procedures and organizational values (Table 6). The total mean for the factor compatibility of AISs was 3.67, which implied that most respondents tended to agreed that compatibility of AISs has huge impact on their decision to adopt AIS technologies.

The four top management support attributes have a total mean of 3.62, indicating the support of top management had a great impact on the decision to adopt and utilize AISs among manufacturing enterprises (Table 7). On average, respondent's response deviates from the mean value by 1.41, which indicated that while some respondent's enterprises were supported by their top managers to use AIS technologies, others found out they were not supported by their top managers to use AISs.

Responses captured shows that the total mean and standard deviation was 3.61 and 1.45 respectively (Table 8). This finding revealed that majority of the study participants were moderately agreed that organizational readiness affects the adoption of AIS technologies among manufacturing enterprises. On average, respondent's response deviates from the mean value by 1.45, indicating that while some enterprises were equipped with financial and technological resources to adopt AIS technologies, others found that they were not.

It was found that total mean of Employees IT competence factor was 3.61 implying 'Employee's IT competency' is extremely influential factor for the successful adoption of AIS technologies (Table 9). On average, respondent's response deviates from the mean value by 1.40, indicating that while some enterprise's employees good in dealing with information system (IS) technologies, others found that their employees were lack of IT competence.

Responses showed that the means of the items to measure competitive pressure factor ranged from 3.76 to 4.00 (Table 10). The total mean for competitive pressure factor was 3.9, which lies between agree and strongly agree measurement ratings. This finding indicated that the decision to adopt AIS technologies is extremely influenced by the competitive pressure that the manufacturing enterprise faces in both local and international markets.

It can be observed that the majority of respondents were either strongly disagreed or disagree regarding the presence of government support that favor the process of AISs adoption in the manufacturing sector (Table 11). The total mean for the factor government support was 2.08, revealing that there is lack of government support in terms of subsidy, capacity building trainings and access to finance for manufacturing enterprises to adopt AIS technologies in Ethiopia.

Table 4. Relative advantage

Item	Attributes	Mean	Std. dev.
1	Adoption of AIS technologies will allow us to better communicate with our business partners	3.80	1.35
2	Adoption of AISs will enable us to accomplish our accounting tasks more quickly and accurately	3.72	1.34
3	Adoption of AISs will allow us to cut costs in our business operation	3.68	1.38
4	Adoption of AISs will increase the profitability of our business	3.79	1.37
5	Adoption of AISs will provide timely and accurate information for decision making	3.73	1.36
	Total Mean and standard deviation	3.74	1.36

Source: Survey questionnaire (2017)

Table 5. Complexity

Item	Attributes	Mean	Std. Dev.
1	AIS technologies are difficult to understand and use	3.36	1.42
2	It is difficult for employees to use AISs in accounting	3.32	1.25
3	AISs are technically complex accounting tools	3.30	1.26
4	Learning to operate AISs is hard for our employee	3.35	1.32
5	Using AISs requires a lot of mental effort	3.20	1.31
	Total mean and standard deviation	3.31	1.31

Source: Survey questionnaire (2017)

Table 6. Compatibility

Item	Attributes	Mean	Std. dev.
1	I think using AISs fits well with the way we would like to accomplish our accounting tasks	3.57	1.43
2	I think AISs are compatible with our firm's work procedures	3.76	1.41
3	I think AISs will be compatible with all aspects of our accounting practices	3.78	1.35
4	I think using AISs fits with our organizational beliefs and values	3.53	1.44
	Total Mean and standard deviation	3.67	1.40

Source: Survey questionnaire (2017)

Table 7. Top management support

Item	Attributes	Mean	Std. dev.
1	Top management enthusiastically supports the adoption of AIS technologies	3.62	1.47
2	Top management has allocated adequate financial and human resources to the adoption of AIS technologies	3.70	1.41
3	Top management actively encourages employees to use AIS technologies in their daily tasks	3.57	1.39
4	Top management is willing to take the risks involved in the adoption of AISs	3.58	1.40
	Total Mean and standard deviation	3.62	1.41

Source: Survey questionnaire (2017)

Table 8. Organizational readiness

Item	Attributes	Mean	Std. dev.
1	Our firm has financial resources to support AISs usage	3.78	1.46
2	Our firm has information technology resources to support AISs usage	3.55	1.45
3	Our firm is willing to provide trainings on AIS for employees	3.53	1.47
4	Our firm has information technology facilities needed to implement AISs	3.64	1.45
	Total Mean and standard deviation	3.61	1.45

Source: Survey questionnaire (2017)

Table 9. Employees' IT competence

Item	Attributes	Mean	Std. dev.
1	Our employees are IT literate	3.62	1.42
2	Our employees' understanding of AISs are very good	3.63	1.41
3	Our firm has at least one employee who is AISs expert	3.43	1.36
4	Our employees have sufficient knowledge to use the result produced by AISs	3.72	1.39
5	Our employees have experience regarding how to operate AISs	3.64	1.44
	Total mean and standard deviation	3.61	1.40

Source: Survey questionnaire (2017)

Table 10. Competitive pressure

Item	Attributes	Mean	Std. dev
1	Our firm experienced competitive pressure to implement AISs	4.00	1.32
2	Our firm would have experienced a competitive disadvantage if AISs had not been adopted	3.95	1.22
3	Our firm's decision to implement AISs is affected by competitors in our manufacturing industry	3.89	1.20
4	Our main competitors that have adopted AISs have benefitted greatly	3.76	1.26
	Total mean and standard deviation	3.9	1.25

Source: Survey questionnaire (2017)

Table 11. Government support

Item	Attributes	Mean	Std. dev.
1	The government offers grants and loans for the adoption of AIS technologies	2.04	1.11
2	The government provides knowledge building capacity for our enterprises to help us to adopt AIS technologies	2.24	1.00
3	The government provides information and communication infrastructures for the adoption of AIS technologies	2.11	1.03
4	The current government has regulations related to information technology that favor the adoption of AIS technologies	1.94	0.99
	Total mean and standard deviation	2.08	1.03

Source: Survey questionnaire (2017)

Binary logistic regression results and discussion

Goodness-of-fit test of the binary logistic regression model

Regarding goodness of fit of the overall model, this study applied omnibus test of model coefficients (Table 12). Omnibus test of model coefficients shows a Chi-Square of 153.889, which is also significant (P-value < 0.0005). Since the omnibus test is significant, it can be concluded that adding predictor variables to the model has significantly increased our ability to predict AISs adoption among manufacturing firms in Ethiopia.

The most common assessment of overall goodness-of-fit of the binary logistic regression model is the likelihood ratio test, which is simply the chi-square difference between the null model (i.e. with the constant only) and the model containing predictors. The -2 log likelihood statistics is 32.429 (Table 13). Even though SPSS does not give us the statistics for the model that had only the intercept, we know it to be 186.318 (32.429 + 153.889). This implies that adding of predictor variables in this study improved the predictive power of the model. Further, the result of Nagelkerke R^2 in the above table is 0.905, which implies that 90.5% of the variance in the dependent variable (i.e. the likelihood AISs adoption) is explained by the predictor variables in this study.

In Table 14, the significant values is greater than 0.05 (0.218 > 0.05). Hair et al. (2010) argued that if the significant value in Hosmer-Lemeshow test is greater than 0.05, then model we used is feasible to be used for further analysis.

Table 12. Omnibus tests of model coefficients

		Chi-square	Df	Significant level
Step 1	Step	153.889	8	0.000 [a]
	Block	153.889	8	0.000
	Model	153.889	8	0.000

[a]significant at 5% level

Table 13. Model summery of the binary logistic regression model

Step	-2 Log Likelihood	Cox & Snell R Square	Negelkerke R Square
1	32.429[a]	0.659	0.905

[a]Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Table 14. Hosmer-Lemeshow test of goodness of fit of the logistic regression model

Step	Chi-square value	Df	Significance level
1	10.719	8	0.218

Source: Survey questionnaire (2017)

The Wald statistics test was also used to evaluate the statistical significance of each predictor in explaining the dependent variable. A Wald test indicates whether β - coefficient for predictor is significantly different from zero.

As far as the relative importance of the eight independent variables is concerned, the binary logistic regression result shows that relative advantage of AISs (β = 1.215, P-value <0.05), top management support (β = 1.855, P < 0.05), organizational readiness (β = 2.199, P < 0.05), employees' IT competency (β = 2.203, P < 0.05), competitive pressure (β = 1.440, P < 0.05), and government support (β = 1.526, P < 0.05) were found to be significantly associated with the adoption decision of AIS technologies among large and medium manufacturing firms in Ethiopia (Table 15). However, complexity (β = -0.720, P > 0.05) and compatibility (β = 0.562, P > 0.05) factors were not found to be influential determinants. From the above findings we can infer that hypothesis H1, H4, H5, H6, H7, H8 were supported as an important determinants that affect AISs adoption among large and medium manufacturing firms in Ethiopia.

Table 15. Logistic regression results of determinants affecting AISs adoption

Step[a] Variables	B	S.E	Wald	Df	Sig.	EXP (B)	95% C.I for EXP (B)	
							Lower	Upper
Relative advantage	1.215	0.535	5.157	1	0.023	3.370	1.181	9.615
Complexity	-0.720	0.576	1.561	1	0.211	0.487	0.157	1.506
Compatibility	0.562	0.446	1.590	1	0.207	1.755	0.732	4.205
Top management support	1.855	0.648	8.193	1	0.004	6.392	1.795	22.766
Organizational readiness	2.199	0.637	11.911	1	0.001	9.017	2.586	31.435
Employees' IT competence	2.203	0.702	9.845	1	0.002	9.050	2.286	35.827
Competitive pressure	1.440	0.571	6.353	1	0.012	4.220	1.377	12.928
Government support	1.526	0.737	4.283	1	0.038	4.599	1.084	19.506
Constant	-39.067	.283	17.709	1	.000	.000		

[a]Variable (s) entered on step 1: Relative advantage, Complexity, Compatibility, Top management support, Organizational readiness, Employees' IT competence, Competitive pressure, Government support.

Conclusion and recommendation

To answer the research hypotheses set out in chapter two, two technology adoption models namely, Technology-Organization-Environment (TOE) and Diffusion of innovation (DOI) frameworks were integrated and utilized in this study. Despite the extensive application of TOE and DOI framework in the study of factors affecting information and communication technology (ICT) adoption, little has been specifically applied in the stream of AISs adoption at organizational level globally. The result of this study revealed that extent of AISs adoption among large and medium manufacturing enterprises in Ethiopia was extremely low. Both descriptive statistics and the binary logistic regression results showed that related advantage of AISs, top management support, organizational readiness, employees' IT competency, competitive pressure, and government support were the determinants of AIS technology adoption among manufacturing enterprises in Ethiopia. Organizational decision makers in manufacturing sector should come up with appropriate actions and strategies regarding human resource recruitment, financial and technological utilization, and financial and non-financial support of top management for the adoption of AIS technologies. IT developers and suppliers should aggressively engage in advertising their business information system (IS) products using either electronic or print media. Further, in collaboration with the ministry of industry and accounting software training institutions, they should organize trainings and workshops for manufacturing enterprises in order to raise awareness about the benefits of adopting AIS technologies for manufacturing businesses so that the usage trend of AISs among business organizations in Ethiopia would be promoted.

Given low level of AISs adoption among manufacturing enterprises in Ethiopia, the government, through minister of industry, should support manufacturing enterprises in terms of allowing access to finance, capacity building trainings, provision of ICT infrastructures, and provide incentives for the adoption of AIS technologies. In addition, since skilled manpower in the area of AISs in Ethiopia is still a challenge for manufacturing enterprises, the government, through its higher educational institutions, should set up and organize business informatics departments, which is uncommon in Ethiopia. In taking the above measurements, the government could increase the competitiveness of the manufacturing sector in the global market and thereby achieve its long term visions of making Ethiopia the leading manufacturing center in Africa and among the leading countries in the globe by 2025.

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