Implementation of Accounting Information Systems in Large and Medium Scale Manufacturing Enterprises; Case study on Metropolitan Cities of Amhara Region, Ethiopia

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Abstract

This study conducted with the aim of examining the implementation of AISs in large and medium scale manufacturing enterprises of metropolitan cities of Amhara region by postulating seven hypothesis of accounting information system (organizational structure, financial capacity, employee’s attitude, environmental factors, compatibility, complexity and relative advantage of AISs). To find out the research conclusion census was employed. In order to collect data, self-administered questionnaire were used and an in-depth unstructured interview was conducted about the subject of the study with key informants. The statistical society includes all large and medium scale manufacturing enterprises of Gondar and Bahirdar cities. Collected data is analyzed using SPSS software version 20 tool and regression and correlations are made to find answers for specific objectives on the basis of the result obtained from the software. Given the dichotomous response to the dependent variable (AISs implementation), binary logistic regression model was used to identify the influencing factors of AISs implementation in study area. According to the study, implementation of AISs is at its lowest level among manufacturing enterprises of Amhara region and factors such as organizational structure, financial capacity, environmental factors and relative advantage of AISs are found positively significantly influencing factors while complexity of AISs is found negatively influencing factor for AISs implementation. The study therefore recommends that these factors should be taken into account by those enterprises at the time when they decide to implement AISs.

Key words: Accounting information systems (AISs), Attributes of AISs, Implementation of AISs, Manufacturing, Large and Medium enterprises, Binary logistic regression.

1. Introduction.

Now a day the world becomes highly globalized, due to this countries are forced to modernize and sophisticate their industries and technology in respect to world’s economic trend. So, in today’s global economy government actions play a critical role in shaping the competitiveness of companies that operate within their respective boundary. Government actions can have an impact on a number of competitiveness drivers including trade, financial, legal systems, infrastructure, education, science and technology (WEF, 2013). The FDRE government sets a policy towards the attainment of global competitiveness by being the manufacturing hub of Africa through focus on the development of the manufacturing sector via the use of industrial parks to attract foreign direct investment and support SMEs in 2025 (GTP II, 2016).

As in past national plans, GTP II of Ethiopia sets a growth targets underpinned by envisaged rapid structural transformation and investments in energy generation, transportation, and infrastructure to boost productivity and competitiveness (IMF, 2016). For the attainment of the above country level
objective, remain competitive in the world market and build an export oriented manufacturing sector, the manufacturing sector must be supported by ICT infrastructure. Taking this into consideration, large and medium manufacturing companies has given priority in transforming a predominantly agrarian economy to a modern and industrialized economy and alleviating poverty in the second GTP by FDRE government.

The results of Deloitte (2016) study clearly show the ongoing influence of manufacturing has on driving global economies; from its influence on infrastructure development, job creation, and contribution to the gross domestic product on both an overall and per capita basis, a strong manufacturing sector creates a clear path toward economic prosperity. Failure to implement well AISs will have adverse effects on organization success (Salehi and Abdipour, 2011). According to Nicoloau (2000) AISs is a computer system that increases the control and enhances the cooperation in the organization and act as a mechanism that enables organizational strategy successful (Gerdin, 2004). Although developing countries are eager to implement new ISs technologies, the implementation of AISs in developing countries is at its lowest level in comparison with developed one. Currently it is highly reduced in many developing nations including sub-Saharan countries, but in Ethiopia it is in an infant stage of increment in AISs adoption, implementation and use (Wegen, 2014). As to the knowledge of the researcher, there was no any research that was conducted on the implementation of AISs in the study area even though there are some partially related studies like Wegen (2014). So, this study is designed to examine the implementation of AISs in large and medium scale manufacturing companies found in metropolitan cities of Amhara region.

2. Statement of the problem

The manufacturing sector has long been considered to be the main engine of regional, national and continental economies, and thus has received the most attention from economists, management researchers, and governments (Raymond et al., 2011). Nowadays, more and more digital and on-line information is utilized in the AISs. Business organizations are needed to take an action, which put such Information Systems at the forefront, and consider both the system and the human related factors while managing their AISs (Assefa et al., 2013).

Ethiopia like other developing countries has weak accounting information systems which hamper investment decisions, policy issues and leads to financial crisis and corporate failures together with their associated negative economic impacts that have been witnessed in many industrialized and developing countries (ROSC, 2007). The study was focused on the implementation of AISs in Ethiopia by giving particular emphasis to large and medium scale manufacturing firms found in selected metropolitan cities of Amhara region and aims to get a deeper understanding of the factors influencing the implementation of AISs by Ethiopian large and medium scale manufacturing firms. The focus of this study was to provide manufacturers, IT experts, and policymakers with the relevance of AISs that could assist in the understanding of factors that affect the implementation of AISs in Ethiopia and tries to fill the theoretical gap of implementation of AIS in manufacturing companies in Ethiopia that was not researched well previously by scholars.

3. Objectives of the study

The objectives of the study is :
1. To examine the extent of AISs Implementation
2. To identify the driving factors that leads to AISs Implementation
3. To identify the major impeding factors for AISs Implementation among large and medium scale manufacturing enterprises of Amhara national regional state.

4. The theoretical framework and previous studies

According to Alamin et al. (2015) accounting information systems (AISs) defined as a software package that is installed and 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.

Nowadays it is well acknowledged that implementation of AIS plays an indispensable role for the efficient and effective operation of businesses and sustain in the competitive environment. It increases organizational performance and helps businesses to achieve strategic objectives (Naranjo-Gil, 2004; Patel, 2015; Olamide & Adeyemi, 2016); it increases the profitability and growth of business firms (Ahmad, 2013; Muhindo, 2014); it helps to facilitate the decisionmaking process via providing highly qualified financial reports (Swalhah, 2014; Amanamah et al., 2016); it helps businesses to comply with the existing tax systems of a nation (Abdallah, 2014); it provides sustainable competitive advantage in the market (Porter & Millar, 1985); it favors international financial reporting standards (IFRS) adoption (Akanbi & Aruwaji, 2016); and it helps to implement adequate internal control systems that could protect the organization's assets from fraud (Romney & Steinbart, 2015).

According to Harry et al (2005) "Implementation follows the decision to adopt an innovation, and can be conceptualized as the phase where a positive decision is made operational: the decision on the part of an organization to use an ICT application is translated into a number of activities aimed at establishing the actual use of the application in the organization. Different researchers have listed many factors that have influenced IS implementation. Most of the literature regarding implementation of AISs shows that AIS implementation is influenced mainly by organizational factors like organization structure, attributes of technology, environmental factors, owner commitment, IT sophistication, IT strategy, top management support, organizational readiness, financial resources or capacity, trading partners, perceived benefit, external pressure (Hussin et al., 2002; Brynjolfsson et al. (2002); Ismail & King 2006; Ismail, 2009; Juris ulmanis (2011); Budiarto et al. (2015); Dr. Yuvaraj & Kibret, 2013; Ismail & Ali, 2013; Mahdi Salehi et al. (2013); Muhrtala & Ogundeji, 2013; Ngadiman et al., 2014; Awosejo et al., 2014; Kumilachew (2015); Ndekwa, 2015; Nyang’au et al., 2015; Amanamah et al. (2016)."

What distinguished this study is that it aims at examining the extent of implementation of AISs and identifying the driving and impeding factors for AISs implementation; where no one of previous studies have discuss Ethiopian cases before.

5. Hypothesis of the study

The following alternative hypotheses are formulated for this study:

H1: Organizational structure has a significant influence on the implementation of AIS in large and medium scale manufacturing firms.

H2: Financial capacity has a significant influence on the implementation of AIS in large and medium scale manufacturing firms.

H3: Employees attitude towards AIS have a significant influence on the implementation of AIS in large and medium scale manufacturing firms.

H4: Environmental factors significantly influence the implementation of AIS in large and medium scale manufacturing firms.

H5: Compatibility of AISs has a significant influence on the implementation of AIS in large and medium scale manufacturing firms.

H6: Complexity of AISs has a significant influence on the implementation of AIS in large and medium manufacturing firms.

H7: Relative advantage of AISs has a significant influence on the implementation of AIS in large and medium manufacturing firms.

6. Research methods

For addressing the objective of the study, the descriptive and econometric analysis especially binary logistic regression was used to test the hypothesis and for presenting and analysis of the data. For the purpose of the study secondary data were collected from different references, studies, reports, etc. and primary data were collected by using structured questionnaire and an in-depth unstructured
interview. The population of the study represented all large and medium scale manufacturing enterprises of Amhara region which are 57 in number. The sample of the study takes all this enterprise managers, finance officers and IT experts and 170 questionnaires are distributed to all of them and 136 valuable questionnaires were collected successfully.

7. Data analysis

7.1. Results for descriptive analysis

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>101</td>
<td>74.3</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>25.7</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-29</td>
<td>10</td>
<td>7.4</td>
</tr>
<tr>
<td>30-39</td>
<td>70</td>
<td>51.5</td>
</tr>
<tr>
<td>40-49</td>
<td>48</td>
<td>35.3</td>
</tr>
<tr>
<td>Above 50</td>
<td>8</td>
<td>5.9</td>
</tr>
<tr>
<td>Educational status</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Certificate and less</td>
<td>13</td>
<td>9.6</td>
</tr>
<tr>
<td>Diploma</td>
<td>34</td>
<td>25</td>
</tr>
<tr>
<td>Degree</td>
<td>75</td>
<td>55.1</td>
</tr>
<tr>
<td>Masters and above</td>
<td>14</td>
<td>10.3</td>
</tr>
<tr>
<td>Work experience of respondents</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Less than a year</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>1-5 year</td>
<td>49</td>
<td>36.0</td>
</tr>
<tr>
<td>6-10 year</td>
<td>62</td>
<td>45.6</td>
</tr>
<tr>
<td>Above 10 year</td>
<td>22</td>
<td>16.2</td>
</tr>
<tr>
<td>Experience in current position</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Less than a year</td>
<td>28</td>
<td>20.6</td>
</tr>
<tr>
<td>1-5 year</td>
<td>63</td>
<td>46.3</td>
</tr>
<tr>
<td>6-10 year</td>
<td>41</td>
<td>30.1</td>
</tr>
<tr>
<td>&gt;10 year</td>
<td>4</td>
<td>2.9</td>
</tr>
<tr>
<td>Category of enterprise</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Medium scale</td>
<td>71</td>
<td>52.2</td>
</tr>
<tr>
<td>Large scale</td>
<td>65</td>
<td>47.8</td>
</tr>
<tr>
<td>Experience in ICT(AISs)</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Less than a year</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>1-5 year</td>
<td>85</td>
<td>62.5</td>
</tr>
<tr>
<td>6-10 year</td>
<td>32</td>
<td>23.5</td>
</tr>
<tr>
<td>Sector of the enterprise</td>
<td>N</td>
<td>Percentage</td>
</tr>
<tr>
<td>Public sector</td>
<td>33</td>
<td>24.3</td>
</tr>
<tr>
<td>Private sector</td>
<td>103</td>
<td>75.7</td>
</tr>
</tbody>
</table>

Source: survey data (2019)

7.2 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. An omnibus test of model coefficients is testing the null hypothesis that adding predictors to the model has not significantly increased our ability to predict the likelihood of AISs implementation. In this study the Omnibus test of model coefficients shows a Chi-Square of 127.273 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 implementation among large and medium scale manufacturing enterprise.

### Omnibus Tests of Model Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>127.273</td>
<td>7</td>
<td>.000</td>
</tr>
<tr>
<td>Block</td>
<td>127.273</td>
<td>7</td>
<td>.000</td>
</tr>
<tr>
<td>Model</td>
<td>127.273</td>
<td>7</td>
<td>.000</td>
</tr>
</tbody>
</table>

#### 7.3 Model summary

The result of Cox and Snell R2 and Nagelkerke R2 in the above table is 0.608 & 0.828 respectively. However, the Nagelkerke R2 (a modification of the Cox and Snell R2) is more common and considered a better indication to observe the strength of association between the dependent and predicting variables (Field, 2009). Hence, the Nagelkerke R2 of 0.828 implies that 82.8% of the variance in the dependent variable (i.e. the likelihood AISs implementation) is explained by the predictor variables included in this study.

### Model Summary

<table>
<thead>
<tr>
<th>Step</th>
<th>-2 Log likelihood</th>
<th>Cox &amp; Snell R Square</th>
<th>Nagelkerke R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>52.672*</td>
<td>.608</td>
<td>.828</td>
</tr>
</tbody>
</table>

*a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.*

#### 7.4 Hosmer and Lemeshow test

The other method of overall goodness of fit assessment of the logistic regression is Hosmer and Lemeshow test, which measures the correspondence of the actual and predicted values of the dependent variable. As can be below the significant values is greater than 0.05 (0.697 > 0.05). Hair et al. (2010) argued that if the significant value in Hosmer-Lemeshow test is greater than 0.05, then the applied model in study is feasible for further analysis.

### Hosmer and Lemeshow Test

<table>
<thead>
<tr>
<th>Step</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.552</td>
<td>8</td>
<td>.697</td>
</tr>
</tbody>
</table>

#### 7.5 Testing the hypothesis

### Variables In The Equation

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization structure</td>
<td>-1.924</td>
<td>.760</td>
<td>6.411</td>
<td>1</td>
<td>.011</td>
<td>.146</td>
</tr>
<tr>
<td>Financial capacity</td>
<td>2.855</td>
<td>.720</td>
<td>15.721</td>
<td>1</td>
<td>.000</td>
<td>17.372</td>
</tr>
<tr>
<td>Employees attitude</td>
<td>-.346</td>
<td>.785</td>
<td>.194</td>
<td>1</td>
<td>.659</td>
<td>.707</td>
</tr>
<tr>
<td>Environmental factors</td>
<td>.738</td>
<td>.305</td>
<td>5.849</td>
<td>1</td>
<td>.016</td>
<td>2.092</td>
</tr>
<tr>
<td>Compatibility</td>
<td>-.129</td>
<td>.300</td>
<td>.185</td>
<td>1</td>
<td>.667</td>
<td>.879</td>
</tr>
<tr>
<td>Complexity</td>
<td>-1.184</td>
<td>.398</td>
<td>8.837</td>
<td>1</td>
<td>.003</td>
<td>.306</td>
</tr>
<tr>
<td>Relative advantage</td>
<td>.897</td>
<td>.388</td>
<td>5.339</td>
<td>1</td>
<td>.021</td>
<td>2.452</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.409</td>
<td>3.846</td>
<td>2.776</td>
<td>1</td>
<td>.096</td>
<td>.002</td>
</tr>
</tbody>
</table>

Since the econometric model (equation) in a binary logistic regression model is non-linear, only the signs of the coefficients can be directly interpreted as follows. The results presented in the table suggest that all the independent variables had significant regression coefficients apart from employee attitude and compatibility of accounting information systems.

The result of the regression shows a statistically significant positive relationship between organizational structure and implementation of AISs. Therefore, the alternative hypothesis, organizational structure has positive significant influence on the implementation of AIS is accepted. This finding is consistent with the finding of Brynjolfsson et al. (2002), who concludes that in the presence of complementary organizational structure more intense implementation and use of AISs in the enterprises should avail. Similarly, Mahdi Salehi et al. (2013) found that organizational structure is a contributory factor on the implementation of AISs. Enterprises extent of implementing AISs is dominantly affected by their inefficient organizational structure (both in aligning AISs and evolving a structure).

The result of binary logistic regression shows a statistically significant positive relationship between financial capacity and the implementation of accounting information system with a P-value of 0.000. Thus, the alternative hypothesis, There is a significant positive relationship between financial capacity and implementation of AIS in large and medium scale manufacturing firms is accepted and this relationship between financial capacities and AISs implementation is similar with the findings of Juris ulmanis (2011) and contradicted with Mahdi Salehi et al. (2013) result. As shown from the above regression result table there exists a negative but insignificant relationship between employees attitude towards AISs and the likelihood of AISs implementation (β = -0.552, P-value > 0.05). Therefore the hypothesis, there is significant positive relationship between employees attitude towards AISs and implementation of AISs is rejected. This implies that employees attitude towards AISs has little impact on the enterprise’s decision to implement AISs. However, contrary to this finding, Juris ulmanis (2011) argued that employee’s attitude towards AISs is a significant barrier for the implementation of AISs among large and medium scale business enterprises.

With regard to the effect of environmental factors (competitive pressure, government support, rivalry’s in the industry and enterprises internal environment), the study found a positive and 54 statistically significant relationship between environmental factors and AISs implementation therefore the alternative hypothesis is accepted. This finding is consistent with the finding of Juris ulmanis (2011); Mahdi Salehi et al. (2013) and Kumilachew (2015).

As revealed in the binary logistic regression result above Compatibility of AISs has a negative insignificant relationship with the implementation of AISs. This result indicates that the impact of compatibility of AISs is little in influencing the decision of manufacturing enterprises whether to implement AISs or not. However, many of researchers (Tornatzky, 1982; Juris, 2013; Ndekw, 2015) argued that compatibility of AIS technologies with the current accounting practices, structure and values of business organization is a key factor that affects AISs implementation so the alternative hypothesis is rejected.

With regard to complexity of AISs, the result of binary logistic regression shows negative and significant relationship with AISs implementation with a p value of 0.003. Thus, the alternative hypothesis is accepted and this relationship between AISs implementation and complexity of AIS leads to the argument that if the AISs are more complex (difficult to understand & use, require high technical & operating skill and need cooperation) the tendency to implement AISs should be lower. This finding is consistent with Juris (2013); Ngadiman et al. (2014) and Amanamah et al. (2016).

Since relative advantage of AISs and implementation of accounting information systems found to be having a positive and significant relationship in this study, the alternative hypothesis is accepted. This suggests that if the manufacturing enterprises perceive that AISs reduce poor communication, reduce
costs of business process, accomplish accounting tasks accurately and quickly and enhance market
opportunities, the extent of implementation of AISs should be high. The result is consistent with the
findings of Tornatzky et al. (1982). Similarly, Budiarto et al. (2013) has found significant relationship
between relative advantage and AISs implementation. Amanamah et al. (2016) also confirmed that
there exist a positive and significant relationship between relative advantage and implementation of
AISs.

8 Conclusion

The first objective in this study was to determine the extent of AISs implementation among
large and medium scale manufacturing enterprises of selected metropolitan cities of Amhara region.
The result of this study shows that 62.5% of enterprises do not implement accounting information
systems in their business so as to modernize their systems and remain competitive in the strongly
fierce business world which is abreast of quick changes and only 37.5% enterprises implement AISs so
as to be sustainable and continually competitive in business. This finding implies and acknowledges
that there exist low implementations of AISs in large and medium scale manufacturing companies of
selected metropolitan cities of Amhara region; Due to that the level of modernity in using current and
timely information of the businesses affair via computerized accounting information systems which
uses latest online real time processing and reporting method is inefficient which constitute only 19.9%.
The results of the binary logistic regression shows that flexible and appropriate organizational
structure, adequate financial capacity, stiff global competition and relative advantage from the use of
AISs are the driving factors for the implementation of AISs among large and medium scale
manufacturing enterprises of Amhara region. The study has also examined the relationship between
complexity of AISs and AISs implementation and found that the only impeding factor under this
study for having good tendency of implementing accounting information system is complexity of AIS.

9 Recommendation

Based on these findings of the study the following recommendations are forwarded that may
help the enterprises, policy makers, practitioners of AISs, IT technical and functional experts, and
managers, owners of manufacturing enterprises and those parties who have an interest on it to
successfully implement AISs and obtain all required and available merits from it. Accordingly, the
organizational structure should be more flexible to accept changes because it enables the enterprises to
acquire new packages, enterprises should have sufficient financial capacity that enables them to
implement AISs in a proper manner without any great constraint in technology and trained manpower,
also they should have to strive on implementing and using AISs to be competent on the global market
and managers and executives of the enterprises must strive in developing new strategies that enable
them to be the fittest, AISs shouldn’t be as such complex and require high technical and operating skill
that brought tension for enterprises and employees for implementation and finally, managers and AISs
practitioners are responsible in doing cost benefit analysis of the AISs to opt the cheapest and high
yield AISs that can make the enterprise successful and efficient in all respects.

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