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# Influencing factors and prospects of electronic service implementation in higher educational institutions of Ethiopia

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**ABSTRACT**

This study examines the influencing factors and prospects of electronic service implementation in Ethiopian higher education institutions. The study employed a descriptive and explanatory research design with a quantitative research approach. A multistage sampling technique was used to acquire the relevant data from 364 selected graduate programme students. With the help of Stata-16 software, the collected data were analysed using descriptive and inferential statistics. The study's findings showed that electronic service implementation has a potential advantage for educational provision regarding flexible access, greater speed, unlimited service time, and accuracy using the technology to assist teaching. However, the practice of electronic service implementation is weak. A web is present in the universities and the active functionality in terms of interaction, transaction, transformation, and full integration was at a low stage. The main factors that affect electronic service implementation are students' electronic service usage capacity, top managerial commitment, information communication technology infrastructure, employee commitment, and training. Thus, there is a need to put a higher effort to facilitate the full implementation of service delivery by improving top management commitment, providing training for staff and students, improving information communication technology infrastructure, and developing students' electronic services use capacity.

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Electronic service implementation; higher institution; students

## Introduction

People, businesses, and government sectors can access available organisational information without a time limit through electronic service, which is provided through information communication technologies. Streamlining and reorganising operating procedures can reduce costs and levels of organisational processes (Kvasnicova et al., 2016). Efficiency, reduced transactional costs, increased transparency, and increased services for citizens are just a few of the advantages of using electronic services to save money and improve government service operations (Solinthone & Rumyantseva, 2016).

One of the key drivers of globalisation and development is Electronic Service Implementation (ESI). It has become a significant source of organisational service delivery innovation and improvement. By transforming traditional service delivery into modern service delivery, it can affect every aspect of goal achievement and customer satisfaction. The implementation of the electronic service appeared to be reaching a critical point to provide a service with greater speed and accuracy (Kim-Soon et al., 2014).

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Developing countries face numerous hurdles than developed countries when implementing E-services (Apleni & Smuts, 2020; Desta et al., 2019). Developing countries are implementing E-services at a slower pace than they have anticipated. Approximately 85% of implementations were failures (Ingram et al., 2018). This suggests that a developing country's E-service delivery lags behind the developed country's E-service delivery, indicating that more research is needed.

Universities have been at the forefront of providing E-Services. Regular evaluation and appraisal of their E-Services provided to stakeholders could help them keep up with the rapid changes in learning technology and the diversification of service offerings (Koudiki & Janardhanam, 2017). Examining the quality of E-Service implementation and university status, on the other hand, is very weak (Ingram et al., 2018). The Ethiopian Ministry of Innovation and Technology (MITE) has been highly motivated to implement and sustain E-services by making it a priority in achieving Ethiopia's 2030 Sustainable Development Goals (SDG) (Tolla, 2018). As a result, the primary goal of this research is to look into the influencing factors and prospects of implementing electronic services in Ethiopian higher education institutions.

## Literature review

### *Electronic service*

Service can be defined as a system that provides something that the public needs, organised by the government or a private company (Hornby, 2010). E-service can be provided by the internet-based applications (Tiwana & Balasubramaniam, 2001). According to Taherdoost et al. (2014), E-Service was defined as the provision of interactional, content-centred and electronic-based service over electronic networks. Similarly, Kvasnicova et al. (2016) indicated the term Electronic-based service as a service is provided through information communication technologies. These authors further added that the expression E-Service has numerous applications and can be used in many disciplines. As can be observed from the concepts given by previous scholars listed, E-service can have a common definition as the provision of different services using the internet-based application and other electronic media as a means of delivery.

According to Scupola et al. (2009), the characteristics of E-service can be perceived as a technical artifact that is typically internet-based and connected to other information systems. As such, it should be understood in relation to its intended use and users, meaning that issues, such as accessibility and usability, are important aspects (Askari et al., 2016).

### *Benefits of E-service*

E-service has many benefits for citizens, businesses, and government entities. It allows people, businesses, and government sectors to access available organisational information without time limitations, which improve the quality of services. It can reduce costs and levels of organisational processes by streamlining and reorganising operating procedures. Moreover, E-Service systems can improve the performance of government agencies because they will be able to deliver public service effectively and efficiently to all customers. In addition, E-Service has great benefits regarding economising and improving governments' service operations, including efficiency, reduced transactional costs, increased transparency, and increased services for citizens (Solinthone & Rumyantseva, 2016).

Alshehri and Drew (2010) indicated that E-service is important to reduce the time, effort, and cost of service seekers and service providers. It is also important to improve service delivery, customer satisfaction, and good governance practice. They also added that E-service benefits the creation of new business and improves efficiency and effectiveness because it shares information among all service seekers on one database at the same time.

### E-service implementation

According to Ground and Horan (2014), since the early 1990s, many governments have adopted and implemented E-Services solutions, ranging from a simple web-based presence and one-way communication to two-way communication and transactions with diverse stakeholders, such as citizens and businesses. This phase of government transition progressed to a more integrated web presence and e-participation.

Many researchers have tried to understand the E-Services implementation from an evolutionary point of view by dividing the E-Services development process into many stages (Layne & Lee, 2001; Moon, 2002). These and several other researchers exemplify that developing and implementing a robust infrastructure for delivering e-services requires a staged approach, with the development focus shifting from immature to mature; these terms are frequently used to characterise the state of a given level in a continuous process (Andersen, 2004). Standard electronic service delivery needs full integration with public administration. It will require the underlying re-think and change of organisations and their constituents to accentuate that the concept of E-Services represents a fertile anthology of organisational and technological issues (Irani et al., 2006).

Incorporating the concept of maturity or immaturity does not strengthen the e-government concept's ontology. Furthermore, Hassan et al. (2011) emphasise the importance of using qualitative and quantitative measures to determine what differentiates different levels of maturity (Irani et al., 2006; Olatokun & Adebayo, 2012). It may enable the government (including local governments) to attract more citizens to use E-Services.

The E-Services implementation process passes through different stages until it reaches its highest potential stage, i.e. the integration of electronic services at different government systems, in different departments, and for different functions enable citizens to obtain fast government services and information online from a single point of access (Sharma & Gupta, 2003). The literature on electronic service disciplines shows that many researchers (from individual academic researchers to institutions) have developed and proposed new concepts and electronic service stage models, which are presented next.

### The growth model of E-service implementation

Many private and public organisations around the world have adopted electronic service delivery solutions, starting with a simple web presence and one-way communication to two-way communication and transactions with different stakeholders (Abdulbaqi, 2014; Bhandari, 2014; Haque, 2012). The implementation of E-Services delivery can be understood as comprising several stages. This section reviews the stages of the implementation of E-Services delivery, as defined by different pieces of literature.

The growth model that has been introduced by Janssen and Van Veenstra (2005) may assist public managers in formulating an appropriate strategy to pursue their organisational objectives. It is also used by public decision-makers as guidance and direction for architectural development. So, the growth model could be applied to reduce the complexity of the progression of E-Services implementations. Compared to other models, the growth model can be viewed as a learning model where the stage of implementation is influenced by different factors.

The implementation of e-government has several stages. The stages of e-government implementation refer to the levels of website development in providing services. In this regard, literature was found to vary in using the terminology and contents of the stage that should be concluded in each (Alshehri & Drew, 2010). The common growth model of E-service implementation developed by different scholars were web presence, interaction, transaction, transformation, and networked presence.

## Methodology

### Research design

In this study, explanatory and descriptive research designs were employed. The explanatory research design was used since it is the best if the research objective is to identify factors associated or to understand the best predictors of the dependent variable (Oleary, 2004). The descriptive research design also helps to answer questions concerning the current practices and prospects of E-service implementation. This type of research design had a definite and clear advantage of being an effective way of collecting data from a large sample easily and abundantly. Moreover, it is also the best method available to researchers who are interested in collecting original data (Kothari, 2012).

### Sample and data collection

The researcher used a multistage sampling technique to achieve the objectives of the study. In the first stage, Hawassa University, Addis Ababa University, and Adama University were selected purposively based on their year of experience and several graduate programmes. As per the report of selected Universities (2020), 4010 graduate programme students have been currently enrolled. Based on this, representative sample size was determined using the formula developed by Yamane (1967) with a 5% error. Accordingly, the sample size become 364. In the second stage, colleges were stratified. In the third stage, departments were selected purposively based on the number of students they have. In the fourth stage of sampling, an individual respondent in each sample department was selected using a systematic random sampling technique to ensure that there is no over- or under-representation in the sample as it is in the sampling frame (Bhattacherjee, 2012). In systematic random sampling, the respondents were selected from the list of students by the $k^{th}$ interval. Accordingly, if the first individual (i) would be selected randomly from between 1 and $k$, and the next member would be $(i+k)^{th}$, then $(i+2k)^{th}$, and follows for each stream in the same fashion until $n$ respondents were achieved.

Data were collected through a questionnaire since the questionnaire is practical and inexpensive and involves large groups, is easily interpreted, is well suited for simple and short questions, and can get more information over a short time. As such, the survey questionnaire is very important and relevant to collecting descriptive data (Kothari, 2012). This questionnaire was administered to university students of respective universities. The questionnaire was prepared to collect information on the demographic, social and economic characteristics of the respondents. Furthermore, the influencing factors and prospects of E-service implementation are included in the questionnaire.

### Analysing of data

The quantitative data were collected, edited, coded, and entered in a computer software using Stata for window version 16. The analysis techniques were performed using descriptive statistics, such as frequencies, percentages, Mean, and Standard Deviation, to assess the prospects of E-service implementation. Furthermore, inferential statistics, such as multiple linear regression, were used to identify the factors that influence electronic service implementation.

## Findings/results

### Factors influencing electronic service implementation

The factors that affect the implementation of electronic service delivery were identified through multiple regression analyses. A multiple linear regression analysis was adopted to evaluate multiple independent variables' effect levels on a dependent variable.

Table 1 outlines the multiple linear regression results that examined the effect of independent variables on the dependent variable. Basic assumptions, such as multicollinearity problem, heteroscedasticity, and violation of normality, were checked before regression analysis. The regression results showed that the computed F-statistic (297.5) was significant at 1%. This justifies the suitability of the regression model in determining the E-service implementation. The $R^2$ value of 0.8 implies that about 80.6% of the variation of E-service implementation has been explained by Student's E-service Usage Capacity, Top Managerial Commitment, ICT Infrastructure, Training, and Employee Commitment. The remaining 19.4% of the variance in E-service implementation was not accounted for by the independent variables considered in the model.

According to Table 1, a student's E-service usage capacity has a positive and statistically significant effect on E-service implementation ($\beta = 0.2$, $p < .001$). The result of the regression coefficient indicates that, on average, a one-unit increase in Student's E-service Usage Capacity brings a 0.22-unit increase in E-service implementation.

Based on Table 1, top managerial commitment has a positive and statistically significant effect on E-service implementation ($\beta = .2$, $p < .001$). The result of the regression coefficient indicates that, on average, a one-unit increase of Top Managerial Commitment will increase the value of E-service implementation by 0.2 unit.

As presented in Table 1, ICT infrastructure has a positive and statistically significant effect on E-service implementation ($\beta = 0.13$, $p < .001$). The result of the regression coefficient indicates that, on average, a one-unit increase of ICT Infrastructure brings 0.131 unit to increase in E-service implementation.

Based on Table 1, training has a positive and statistically significant effect on E-service implementation ($\beta = 0.3$, $p < .001$). The result of the regression coefficient indicates that, on average, a one-unit increase of Top Managerial Commitment will increase the value of E-service implementation by 0.26 unit.

As shown in Table 1, Employee Commitment has a positive and statistically significant effect on E-service implementation ($\beta = 0.15$, $p < .0$). The result of the regression coefficient indicates that, on average, a one-unit increase in Employee Commitment brings 0.15 unit to an increase in E-service implementation.

### *Prospects of E-service implementation*

This section presents respondents' perceptions about the prospects of E-service implementation in terms of knowledge improvement, innovation, and service quality improvement.

Concerning item 1, as presented in Table 2, 80% of sampled respondents agreed that E-service implementation could have a great potential for education, while 6.7% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation can have a great potential for education.

**Table 1.** Factors that affect electronic service implementation.

| E-service implementation | Coef. | St. Err. | *t*-Value | *p*-Value | [95% CI] | |
|---|---|---|---|---|---|---|
| Student's E-service usage capacity | .221 | .018 | 12.26 | .000 | .185 | .256 |
| Top managerial commitment | .217 | .018 | 12.17 | .000 | .182 | .252 |
| ICT infrastructure | .131 | .017 | 7.69 | .000 | .098 | .165 |
| Training | .261 | .018 | 14.56 | .000 | .226 | .296 |
| Employee commitment | .153 | .014 | 10.86 | .000 | .125 | .181 |
| Constant | .084 | .075 | 1.11 | .267 | −.064 | .231 |
| *R*-squared | 0.806 | | | | | |
| *F*-test | 297.5 | | | | | |
| Number of obs | 364 | | | | | |
| Prob > *F* | 0.000 | | | | | |

**Table 2.** Prospects of E-service implementation to improve knowledge and innovation.

| No. | Statements | SDA | | DA | | N | | A | | SA | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| 1 | E-service implementation can have a great potential for education | 12 | 3.3 | 13 | 3.4 | 48 | 13.2 | 72 | 19.8 | 219 | 60.2 |
| 2 | E-service implementation encourages students to learn | 12 | 3.3 | 24 | 6.6 | 37 | 10.2 | 133 | 36.5 | 158 | 43.4 |
| 3 | E-service implementation improves knowledge by providing different alternatives | 11 | 3.0 | 4 | 1.1 | 46 | 12.6 | 134 | 36.8 | 169 | 46.4 |
| 4 | E-service implementation has a future innovative prediction | 12 | 3.3 | 24 | 6.6 | 25 | 6.9 | 132 | 36.3 | 171 | 47.0 |
| 5 | With all the challenges, e-services have the power to satisfy the need of the academic community | 6 | 1.6 | 8 | 2.2 | 85 | 23.4 | 121 | 33.2 | 144 | 39.6 |
| Overall mean (*SD*) | | 4.17(.918) | | | | | | | | | |

Note: SDA = strongly disagree, DA = disagree, N = neutral, A = agree, SA = strongly agree.
Source: Own survey data, 2021.

In line with item 2, Table 2 indicates that 79.9% of sampled respondents agreed that E-service implementation encourages students to learn, while 9.9% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation encourages students to learn.

Regarding item 3, as presented in Table 2, 83.2% of sampled respondents agreed that E-service implementation improves knowledge by providing different alternatives, while 9.9% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation improves knowledge by providing different alternatives.

Regarding item 4, as presented in Table 2, 83.3% of sampled respondents agreed that E-service implementation in the university has a future innovative prediction, while 9.9% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation in the university has a future innovative prediction.

Regarding item 5, Table 2 indicates that 72.8% of sampled respondents agreed that with all the challenges, e-services have the power to satisfy the need of the academic community, while 3.8% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that despite all the challenges, e-services have the power to satisfy the need of the academic community.

As presented in Table 2, the overall average value of knowledge and innovation is 4.17 with a standard deviation of 0.918. This showed that the mean value is greater than 3.4, which relied on the agreement level based on Al-Sayaad et al. (2006)'s proposed techniques of mean score ranges for five-point Likert scale questions. Therefore, the sampled respondents in the study area

**Table 3.** Prospects of E-service implementation to improve service quality.

| No. | Statements | SDA | | DA | | N | | A | | SA | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| 1 | E-service implementation account to improve service efficiency | 12 | 3.3 | 25 | 6.9 | 36 | 9.9 | 134 | 36.8 | 157 | 43.1 |
| 2 | E-service implementation can improve service effectiveness | 12 | 3.3 | 37 | 10.2 | 36 | 9.9 | 133 | 36.5 | 146 | 40.1 |
| 3 | E-service implementation can enhance service accountability | 12 | 3.3 | 12 | 3.3 | 49 | 13.5 | 182 | 50.0 | 109 | 29.9 |
| 4 | E-service implementation can enhance service transparency | 8 | 2.2 | 8 | 2.2 | 58 | 15.9 | 132 | 36.3 | 158 | 43.4 |
| 5 | E-service implementation can improve access to information | 12 | 3.3 | 12 | 3.3 | 61 | 16.8 | 48 | 13.2 | 231 | 63.5 |
| Overall mean (*SD*) | | 4.11 (.936) | | | | | | | | | |

Note: SDA = strongly disagree, DA = disagree, N = neutral, A = agree, SA = strongly agree.
Source: Own survey data, 2021.

perceived that the E-service implementation has good contribution to improving improve knowledge and innovation.

In line with item 1, Table 3 indicates that 79.9% of sampled respondents agreed that E-service implementation accounts to improve service efficiency, while 10.2% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation accounts to improve service efficiency.

On the subject of item 2, as presented in Table 3, 76.6% of sampled respondents agreed that E-service implementation can improve service effectiveness, while 13.3% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation can improve service effectiveness.

In line with item 3, Table 3 indicates that 79.9% of sampled respondents agreed that E-service implementation can enhance service accountability, while 6.6% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation can enhance service accountability.

In line with item 4, Table 3 indicates that 79.7% of sampled respondents agreed that E-service implementation can enhance service transparency, while 4.4% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation can enhance service transparency.

On the subject of item 5, as summarised in Table 3, 76.7% of sampled respondents agreed that E-service implementation can improve access to information, while 6.6% of them disagreed with the idea. The result implies that the majority of sampled respondents agreed that E-service implementation can improve access to information.

Table 3 indicates that the overall average value of service quality is 4.11 with a standard deviation of 0.936. This showed that the mean value is greater than 3.4, which relied on the agreement level based on Al-Sayaad et al. (2006)'s proposed techniques of mean score ranges for five-point Likert scale questions. Therefore, the sampled respondents in the study area perceived that E-service implementation has a high contribution to improving the service quality.

## Discussion

The study revealed that a lack of knowledge among service users impedes the proper implementation of electronic service delivery. Mambo et al. (2015) support this finding by stating that the customer's usage capacity influences the implementation of electronic services. Customers' knowledge and experience with e-service technology impact how smoothly it is implemented. The study also found that having top management commitment in the university improves electronic service delivery. Worku (2016) agreed with this finding, stating that top management commitment influenced successful electronic service implementation because top management teams can make strategic decisions, and their decisions impact programme implementation; the higher the commitment, the more likely the programme will succeed.

The study found that the university's ICT infrastructure is critical to the success of electronic service implementation. Nkohkwo and Islam (2013) found that poor ICT infrastructure was one of the main barriers to e-government implementation. Gossa (2015) also claims that technical and institutional issues, such as repeated system failure, frequent electronic power interruption, and frequent network failure, influenced the implementation of electronic services. Likewise, properly trained employees and service users can use electronic services successfully. This finding is consistent with Iskender and Ozkan (2015), who found that training is an internal factor in implementing E-Services in developing countries because training can change stakeholders' attitudes, knowledge, and behaviour through learning to perform a task fully. Individuals' abilities to successfully implement electronic services were improved through training.

Employee commitment is critical to the successful implementation of electronic services. Endalew's (2017)'s findings also proved that employee commitment was the number one factor

influencing the full implementation process of electronic service delivery in developing countries, among many barriers. Employee service consistency can be improved in any business by combining emotional and continuous commitment, a psychological state. Employees, who want to devote themselves to the organisation, because it is their primary focus, will do so.

Regarding the prospects of electronic service implementation, the study found that E-service improves knowledge and innovation. Amin (2013) confirms that electronic service implementation changes the characteristics of learning tasks and hence plays an important role as a mental development mediator, facilitating the acquisition of generic intellectual competencies that are essential for living in our knowledge society. Students using electronic services for learning purposes become immersed in the process of learning, and students are increasingly using computers as information sources and cognitive tools. Unlike static, text- or print-based educational technologies, E-service in education can show different learning pathways and different articulations of knowledge. Proper implementation of E-service allows students to explore and discover rather than merely listen and remember. The technological diffusion theory also proved that electronic service delivery facilitates innovation for individuals and community members (Rogers, 2003). The technology diffusion theory is important in guiding organisations to initiate change and adopt technologies in service delivery in the shift towards world-class service delivery (Stanley et al., 2018).

The study also found that E-service implementation has a high contribution to improving service quality. In connection with this finding, Kiflie and Filmon (2019) found that electronic service implementation can ensure public sector organisations' service quality. It improves and promotes good governance practices and enhances public sector capacities to ensure equality, fairness, efficiency, and effectiveness of service delivery. It also facilitates the public organisation to get feedback and provide a consistent connection with their customers.

Moreover, free, open-source materials via broadband or wireless internet allow students to be less reliant on a textbook, physical location, or even instructors to learn because of mobile learning and tablet computing. Students can be satisfied due to the full implementation of electronic service delivery since it can be used as a tool to minimise cost issues and overcome time and distance barriers. Similarly, the stakeholders' theory indicated that electronic service implementation could minimise cost, save time, improve service delivery quality, and facilitate organisational transparency and customer's satisfaction (Zimmermann & Finger, 2005).

## Conclusion

The main factors that influence electronic service implementation in higher institutions in Ethiopia were students' E-service usage capacity, top managerial commitment, ICT infrastructure, employee commitment, and training. Students' knowledge shortage hinders the proper implementation of electronic services. Likewise, the availability of top managerial commitment in higher institutions in Ethiopia improves electronic service implementation. Moreover, the availability of ICT infrastructure in the higher institution in Ethiopia is important to help the success of electronic service implementation. In addition, employee commitment is a key to the facilitation of electronic service implementation. Furthermore, training is an internal factor of E-Service implementation in higher institutions in Ethiopia.

Electronic service delivery has prospects to improve knowledge, innovation, and service quality. E-service implementation can have a great potential for education, encourage students to learn, improve knowledge by providing different alternatives, and have a future innovative prediction. Likewise, E-service implementation accounts to improve service efficiency, improve service effectiveness, enhance service accountability, enhance service transparency, and improve access to information.

## Recommendations

This study highlighted specific issues that influence E-service implementation and prospects of E-service implementation. The study recommends that the universities should improve students' E-Service usage capacity and develop their IT competence by providing comprehensive continuous training, workshop, learning, and education. The students and university staff should be involved early in the E-service delivery process to play an active and defining role in improving the E-service implementation of the universities. Equally, they should also engage in different pieces of training related to E-service delivery. The university needs to prepare and distribute manuals and standards, tender documents, advice, and assistance in E-service delivery activities. Likewise, the Ministry of Science and Higher Education should give attention to and make an effort to improve top management's commitment to provide training for staff and students, improve ICTs infrastructure, provides updated technologies and develop students' E-Services usage capacity to achieve E-service implementation in the public universities.

## Limitations

The study was limited to public universities in Ethiopia. Public universities in Ethiopia were 53; however, this study was carried out in Hawassa University, Addis Ababa University, and Adama University. These restrictions might reduce the generalisability of the research findings in other universities. The research could be expanded to include other universities in the country in the future.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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