

**JIMMA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
DEPARTMENT OF INFORMATION SCIENCE**



**A CITIZEN-CENTRIC EVALUATION OF TAX INFORMATION  
SYSTEM SUCCESS AT ADAMA CITY**

By

Ararso Kemal

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Name and Signature of Advisor and Co-advisor

<u>Name</u>	<u>Title</u>	<u>Signature</u>	<u>Date</u>
Getachew Bayisa	Advisor	-----	-----
Kedir Mohammed	Co-advisor	-----	-----

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## Abstract

Governments across the world have welcomed the revolution of modern ICT's and are increasingly spending on Information system (IS) solution for delivering their services to citizens. This increases the need of measuring IS success to justify these investments which however is a complex and multidimensional process. In 2003, DeLone & McLean revised their original IS success model and gave an open call to validate this model in different contexts. Taking the Tax Information System as a whole and Adama city as study area, the purpose of this paper is to investigate the success of Tax IS from the perspective of citizens, who pays taxes and have experience of using this information system using IS success models. The study adapted DeLone and McLean's updated information systems success models. The model developed includes the constructs of information, system and service quality, perceived usefulness, user satisfaction, and perceived net benefit. Using quantitative approach, specifically face-to-face questionnaire, citizens' responses were gathered regarding the overall use of the system and also DeLone & McLean's updated model was tested. The findings of the study revealed that the system under study was performing at a medium level of success from citizens' point of view and except the link from System Quality to Perceived Usefulness, the hypothesized relationships between the six success variables were significantly or marginally supported by the data. The empirical evidence and discussion presented can help the Tax Authority improve and exploit the potential of Tax Information System for taxation purposes. This paper concludes by discussing limitations that could be addressed in future studies.

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## List of Acronyms

AMOS- Analysis of Moment Structure

ASYCUDA- Automated System for Customs Data

BPR - Business Process Re-engineering

D&M - DeLone and McLean

ERCA - Ethiopian Revenue and Customs Authority

FDRE - Federal Democratic Republic of Ethiopia

GTP - Growth and Transformation Plan

ICT- Information and Communication Technology

IQ - Information Quality

IS - Information System

IT - Information Technology

MoFED - Ministry of Finance and Economic Development

NB - Net Benefits

PU - Perceived Usefulness

SIGTAS - Standard Integrated Government Tax Administration System

SQ - System Quality

SV - Service Quality

TIN - Tax Identification Number

US - User Satisfaction

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# CHAPTER 1

## 1. Introduction

### 1.1. Background

The impressive powers of ICT use and better service delivery of the private sectors are (increasing citizens expectations) revolutionizing the way governments operate. As a result, the recent decades have experienced the paradigm shift in the role of government, where the government's role is redefined as to empower rather than serve customer, to shift from hierarchy to teamwork and participation, to be mission oriented and customer focused, and to focus on prevention rather than cure (Osborne & Gaebler 1992). Specially the role of information, for informed decision making and citizen servicing make them dependent on the implementation of modern information system (IS). Because it has the potential to transform not only the way in which public services are delivered, but also the fundamental relationship between government and citizens.

Governments around the world, including Ethiopia, are investing huge amount of money in computer based IS solutions, to support the work of governmental institutions and agencies. As taxation is a complex system, having complex transactions participating different stake holders of government organizations and citizens, its management is difficult without help of information system. By recognizing this, different computer based IS solutions like use of websites, Standard Integrated Government Tax Administrative System (SIGTAS), and Automated System for Customs Data (ASYCUDA) have been introduced by Ethiopian Customs and Revenue Authority(ERCA) with large amount of budgets to enhance service delivery to citizens.

However, little is known about the use of Information system solutions to deliver public services and information in a more convenient, citizen centric manner from citizens' point of view. And it has been argued that not the IS solution but their utilization is what provides the competitive advantages. Hence, the information system needs to be evaluated from the citizens' perspective.

Evaluation of Information System is a complex concept and requires consideration of multiple perspectives of stakeholders (Alshawi & Alalwany, 2009). However according to Wang & Liao (2007), DeLone & McLean's (2003) updated IS Success model is well

appropriate for evaluating information systems. But the model needs further research and validation and also it can be tested in tax IS context.

## **1.2. Statement of the problems**

Gessi et al (2006) asserted that governments are costly, deliver poor services and are not sufficiently accountable or responsive to citizens in many developing countries. Despite introduction of different information system solutions, these claims appear to be true with Ethiopia as well. As per news report and views expressed by the government authorities, the bureaucracy of taxation system is characterized by persistence, delay, nepotism, favoritism, and corruption. This sad picture is supported by poor ranking of the country in international studies such as ICT development Index (151<sup>st</sup> out of 157 in 2012) and the UN for e-government Index (172<sup>nd</sup> out of 189 in 2012).

Tax administration is among the sectors identified as heavily vulnerable to corruption and rent seeking practices (MoFED, 2013). Accordingly, during the GTP period several reform strategies are laid to combat such malpractices and corruption. The first strategy concerns strengthening of the administration of the tax information system.

To examine the extent to which the goals of implementing Information system initiative have been achieved, and to justify its investment, performance evaluations are necessary. Remenyi et al. (2000) argued that without frequent evaluation it is nearly certain that the information system will not meet the changing needs of the organization. To measure the success of there IS organizations often use monetary indicators such as return on investment (ROI) or total cost of ownership (TCO) and other cost-benefit analysis methods (White,2003).Which can be problematic.

Serafeimidis and Smithson (2000) criticize the traditional approaches to information systems evaluation; they argue that traditional approaches are based on narrow technical and accounting terms, ignoring human and organizational components of information system users. These success measurement approaches do not take into account intangible impacts and intervening environmental variables. Clearly, in order to be comprehensive, success measurement would need to consider both tangible and intangible effects in order to truly judge IS success, to detect potential improvements, and to justify present and future investments in IS solutions. Irani and Love (2002) pointed out the significance of human and organizational factors.

No one has ever looked at the Ethiopian tax Information system as a whole (not as information system scholars). The evaluations were accustomed to traditional ways (even then, of specific projects), SIGTAS, than of comprehensive evaluation frame work as a whole. The Implementation of IS in public sectors of developing countries faces many challenges, and generally have a poor record of success (Qureshi, 2005). In evaluating IS, using traditional evaluation approaches like return on investment (ROI), cost/benefit, payback period, and present worth, can be problematic. Hence, a citizen-centric approach for evaluating tax Information System is desirable.

In an effort to better understand the success of IS, researchers have created models for success (DeLone& McLean, 1992; Ballantine et al., 1996; Seddon, 1997), emphasizing the need for better and more consistent success metrics. After doing minor refinements to their original model and proposing the updated IS Success model, DeLone& McLean (2003) gave call to test and challenge the updated model, in different contexts (DeLone& McLean, 2003). We feel it as a great opportunity to test D&M's Information system success model, to what level the six components (see figure 2.2) of this model are interrelated, in tax IS context.

Though, governments have placed citizens' need at the heart of their service delivery strategies, it is difficult to say the taxation services are organized around citizens' needs. Hence, they must solicit and use customer feedback as the basis for meaningful change in the delivery of services, integrating it into their long-term planning, service delivery and decision-making processes. To examine the extent to which the goals of implementing Information system initiative have been achieved, and to justify its investment, performance evaluations are necessary. However, to the best of the researcher's knowledge; evaluation of Ethiopian tax information system particularly from citizens' point of view has never been examined yet. This leads to need of evaluating their tax information systems success from citizens perspective. This thesis proceeds to make a case study of Tax IS success in Adama, Ethiopia's second largest city.

Based on the problem statements, described above, two research questions were formulated and are stated below:

- How successful is Ethiopian tax Information system from citizens' point of view?
- To what extent the constructs of D & M updated IS Success Model are interrelated?

### **1.3. Objectives**

The main objective of this study isto evaluate Ethiopian taxation IS success from citizen's point of view and test D&M IS success model in this context.

The specific objectives include:

1. To evaluate the current status of Ethiopian tax IS success from citizen's perspective.
2. To test the updated DeLone and McLean's Information system success model in Ethiopian taxation IS context.

### **1.4. Significance**

Information system has received a tremendous interest world over. Significant amount of money is being put into making systems a reality. A number of Projects are being taken up at various levels, it therefore becomes important to make reasonable means of assessment to see whether the information systems have achieved or are going to achieve their planned goals. Proper assessment of information system gives us crucial learning on the kind of changes needed to be done to make them successful.

These evaluation factors can serve as part of an information system evaluation framework. Moreover, the evaluation factors can also be used as means of providing valuable feedback for the planning of future information system initiatives.

### **1.5. Scope**

In order to achieve objectives of this study and answer the research questions IS Success model (McLean & DeLone, 2003) is used for overall evaluation of Ethiopian tax information system and the model will also be tested. It is difficult to study every aspect of information system within the scope of a single research at a time. Therefore other possible aspects outside of this model are not considered. This study is not an in depth evaluation of the system in specific area, instead it aims to evaluate the system in overall sense from citizens' point of view. Besides, the study is based upon the present state of Adama city tax payer settings. So the results of this study may not be generalized in other countries environments and also other potential adjustments from its current situation are not considered.

# **CHAPTER 2**

## **Literature Review**

In light of the above, the purpose of this chapter is to review the literature in the area of evaluation of IS success in general and taxation IS in particular. This review of the literature establishes the framework for the study and highlights the apparent strengths and weaknesses of the previous studies, which, in turn, help in identifying the gap in the literature and formulating the research question and hypothesis for the study.

### **2.1. Overview of Tax System in Ethiopia**

In Ethiopia the year 1991 marked the end of the previous ‘socialist’ regime was toppled by the coalition of rebel forces, the Ethiopian Revolution Democratic Front (EPRDF), which formed the current government. In contrast to the previous policy regime of hard control, EPRDF initiated a wide range of reforms including the tax system. The Constitution of the Federal Democratic Republic of Ethiopia (FDRE), prescribes the powers of the Federal Government and the Regional States in articles 96 and 97 respectively, setting detailed tax types and sources of taxation. The provisions for joint power of taxation, undefined area of tax matters and issuance of directives, and in exercising their mandates is stipulated in articles 98 to 100. Fiscal policy in Ethiopia is confined to the federal level but tax legislation can be enacted at both federal and state levels.

According to Abdella (2010), since the coming to power of the EPRDF, tax reform has gone through several stages. The first stage (1992/93-1995/96) took the form of piecemeal changes. The second stage of the tax reform program (1996/97-2000/01) was expanded in scale and breadth, and brought major changes in the tax system. The third stage (2001/02-2005/2006) was the period for implementation of the studies undertaken during the second stage and improvement in the tax administration. The fourth stage (2006/07 on) has introduced SIGTAS (Standard Integrated Government Tax Administration System), and Business Process Re-engineering (BPR) as part of the efforts to enhance the efficiency of the tax administration.

Tax administration is among the sectors identified as heavily vulnerable to corruption and rent seeking practices (MoFED, 2013). Accordingly, during the GTP period several reform strategies are laid to combat such malpractices and corruption. The first

strategy concerns strengthening of the administration of the tax information system. Public education and communication on taxation is another strategy pursued to improve the tax administration system. Third, strengthening the capacity of the tax administration authority particularly with manpower with the right attitude and skills is crucial to minimize corruption and transform the tax administration system. Finally, strengthening the enforcement of the tax law in such a way that it disciplines all actors also forms part of the strategy during the GTP period. The bold measure taken during the budget year under consideration in fighting corruption involving high profile individuals is worth highlighting here. A number of higher tax officials and other actors suspected of corruption were taken to the court. This effort demonstrates the commitment of the government in fighting corruption and corrupt officials and individuals (MoFED, 2013).

Hence, having efficient taxation system helps to mobilize the revenue required to deliver public services and it will also contribute a lot to good governance in many aspects. Thus, modernizing the tax system is now at the heart of all reforms in ERCA.

Governments around the world, including Ethiopia, are investing huge amount of money in computer based IS solutions, to support the work of governmental institutions and agencies. As taxation is a complex system, having complex transactions participating different stake holders of government organizations and citizens, its management is difficult without help of information system. By recognizing this, different computer based IS solutions were developed and implemented. Among this Standard Integrated Government Tax Administration System (SIGTAS) for domestic tax administration, and Automated Systems for Customs Administration (ASYCUDA++) for Customs procedures facilitation is at the heart of the solutions.

## **2.2. Tax Information Systems in Ethiopia**

Prior to the development and implementation of IS solutions and even after, most of the information processing activities (Collection of tax information, Dissemination of tax information, Storage and retrieval of tax information, Verification of TI, Collection of Tax, Tax payers grievances and redress system) are mainly or partially manual. The tax information, which the tax payers are expected to know, is available to tax payers through telephone, tax leaflets, and through verbal explanations. Dissemination of tax information to taxpayers is done through telephone for urgent matters, but mainly manually by hand delivery

of mails or through post. Actual delivery of mails is emphasized with evidence of a delivery book. However, this method does not facilitate easy flow of information and there is a lot of missing links in information flow. With the introduction of computer based Information system, it is hoped that information flow will improve.

### **2.2.1 SIGTAS**

The Standard Integrated Government Tax Administration System (SIGTAS) is an integrated information system that enables governments to automate the administration of taxes and licenses. This software is designed to meet the needs of developing countries who wish to increase their control over state revenue by equipping themselves with computerized systems. Since 1996, SIGTAS has been implemented in 20 countries located in Africa, the Caribbean, the Middle East, Eastern Europe and Asia. SIGTAS was designed to adapt to the changes affecting the country's tax policy. Accordingly, declaration forms, penalty rates and interest can be modified without programming. Thanks to its integrated nature, SIGTAS is able to manage every facet of the tax management process including: Taxpayer registration; Handling of tax declaration forms; Assessments (including payments and withholdings); Collections case management and objection case management; Cashing, penalties and calculation of interest and penalties; Audit (case tracking and follow-up).

The software also provides for documentation management, objections (appeals) and payment agreements handling. In addition, SIGTAS offers the possibility of developing interfaces to share data with external systems such as customs, government financial software or other government divisions. SIGTAS can operate in three languages simultaneously, which makes it possible for tax agents to perform operations in the language of their choice and facilitate correspondence with taxpayers. Tax Types supported by SIGTAS are: Income Tax, VAT, sales taxes and other indirect taxes, Licenses and permits (alcohol, professional, etc.), Pay as You Earn (P.A.Y.E.), Excise Tax, Driving Licenses and Motor Vehicle Registration, Licenses, General Income, Property Taxes, Withholding Taxes and others (Wollela A., 2009).

### **The Benefits of SIGTAS**

In modern tax administration, computerizing the tax collection procedure satisfies the tax payer's requirements in two possible requirements. On one hand, it makes the work effective and efficient, and on the other hand, fairness and justice rehabilitates the management of the

authority. For governments, it improves the efficiency of the tax collection, simplifying administration of tax law and providing better control over compliance, is fully integrated so that government can easily compare the taxes assessed and taxes collected, provides a detailed tax roll along with each taxpayer's assessments and payments, provides many management and statistical reports to keep the government fully informed on the state of tax administration. For tax authority complete system to manage all aspects of system administration including the taking of late-files and late-payers, exemption period automatically provides an overall view of all taxpayer liabilities and payments, eliminates manual calculation of penalties and interest, help ensure that data collected is valid, provides an easy to use and allows assessment calculation from previous year as well as the current years (Wollela A., 2009).

The system is to serve as a comprehensive integrated computerized database and information system with specific components to support and facilitate the administration of the tax system and also for interfacing with taxpayers to facilitate the process of meeting their tax obligations to the State.

### **2.2.2 Major Activities to Improve Tax IS**

As described above, the first strategy to improve the tax administration system is by strengthening the tax IS. This has the objective of establishing improved efficiency, supply and usage of tax administration information system by using computerized database. The system provides reliable and fast flow of information within and outside the authority, fast service delivery, controls tax evasion, create a dependable database, and help for efficient and effective tax collection. Some of the measures taken, according to MoFED (2013), to implement these strategies over the past years are briefly highlighted below.

**Strengthening Taxpayer Identification Number with biometric (Biometric TIN):** under the current taxpayers' registration system, all taxpayers are expected to have Tax Identification Number (TIN). An automated TIN system has been developed, deployed and supported by biometric finger print system at a national level. In 2012/13, a total of 249,839 finger prints information were collected. From the commencement of the project in 2008/09 till 2012/13 fiscal year, a total of 2,264,750 finger prints were collected which is 141.3 percent of the plan of 1.6 million finger prints information.



With regard to distribution of biometric ID card, a total of 1.5 million (68.2 percent) finger print identification card have been printed and distributed.

**Expanding sales register machine delivery and usage:** In 2012/13 fiscal year, 14 sales register machine and 7 fiscal printer software suppliers have been supervised. During the fiscal year, a total of 20,883 taxpayers purchased and used 22,362 sales register machines. Since the beginning of the project in 2007/08 to 2012/13, at national level 66,250 taxpayers have been using 72,969 sales register machines.

**Increasing delivery of information through technology - SIGTAS E-Filing Deployment:** The objective of this system is to introduce a system which helps taxpayers to declare their tax from their work place and without coming to tax centers. In this regard, in 2012/13, training was given to 816 taxpayers and among these 634 taxpayers have fulfilled the requirements and have started to declare with e-filing system.

**Customers Call Center Service:** Customers call center service has been established in a tax and customs national Call Centre to provide transparent and consistent information on tax and customs laws and other information to the public. During the fiscal year under review, the center has started giving information to its customers through telephone.

However, little is known about the use of Information system solutions to deliver public services and information in a more convenient, citizen centric manner from citizens' point of view. And it has been argued that not the IS solution but their utilization is what provides the competitive advantages. Hence, the information system needs to be evaluated from the citizens' perspective.

### **2.3. Information System Evaluation**

One of most agreed and common definition of information systems (IS) evaluation, in literature, is the process of finding the worth and importance of IS by means of quantitative and/or qualitative methods (Doherty & King, 2005; Willcocks, 1992). It is a process that is mostly performed after implementing new information systems in order to analyze the outcome of the system. According to Davis & Jackson (2005) it is necessary for organization to evaluate system in order to analyze its effectiveness and suggest further system improvements to better meet the organizational objectives and targets.

Evaluation of information system (IS) is a complex concept and requires consideration of multiple perspectives of stakeholders (Wang & Liao, 2007; Alshawi & Alalwany, 2009). The most commonly used evaluation approaches are the traditional ones. They include return on investment (ROI), cost/benefit, payback period, and present worth. Using traditional approaches can be problematic in evaluating information systems investments in general and tax information system investment in particular. The problems in these approaches include the limited definition of stakeholders, targeting only direct tangible costs and benefits, and they are based on accounting and financial instruments (Farbey et al. 1995). Serafeimidis and Smithson (2000) had also criticize the traditional approaches to information systems evaluation; they argue that traditional approaches are based on narrow technical and accounting terms, ignoring human and organizational components of information system users. Hochestrasser (1992) added that such evaluation approaches run the risk of not identifying all the hidden costs and intangible benefits generated from system users.

## **2.4. Information System Success Model**

The IS literature provides several definitions and measures of IS success. As DeLone and McLean (1992) state, there are nearly as many measures as there are studies. Obviously, there is no ultimate definition of IS success. Since there are different stakeholders who assess IS success in an organization (Grover & Jeong & Segars 1996), each group has a different definition. From a software developer perspective, a successful IS is completed on time and under budget, has a set of features that is consistent with the specifications, and functions correctly. Users may find an IS successful if it improves their work satisfaction or work performance. From an organizational perspective, a successful IS may contribute to the company's profits or create a competitive advantage. Consequently, success is always assessed from a certain stakeholder's point of view. Furthermore, IS success also depends on the type of system being evaluated (Seddon & Staples & Patnayakuni & Bowtell 1999).

### **2.4.1 DeLone and McLean: The Quest for the Dependent Variable First Model 1992**

In order to provide a more general and comprehensive definition of IS success, one that covers these different perspectives, DeLone and McLean (1992) reviewed existing definitions of IS success and their corresponding measures, and classified them into six major categories. The authors implement a model in which the dimensions share a dependent relationship (i.e. the system has to be used in order to be satisfactory) as well as temporal and causal

relationships. According to the authors, system quality and information quality both affect use and user satisfaction, both being antecedents of individual impact, and this individual impact should ultimately affect the organizational impact. See Figure 2.1 below for complete model.

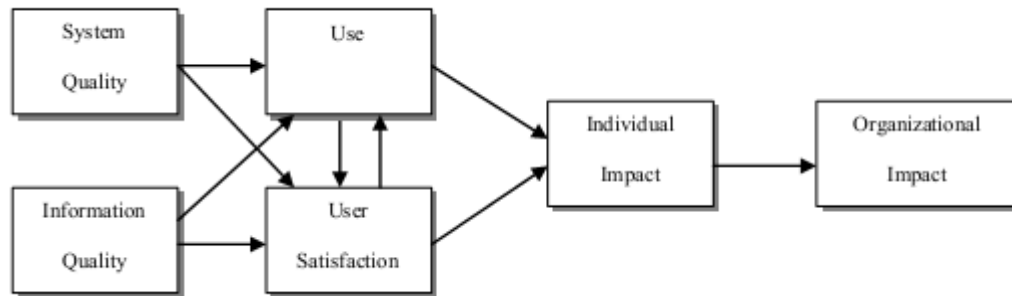


Figure 2.1 DeLone and McLean IS Success Model (1992)

In the proposed model, system quality refers to technical level measures such as reliability of the computer system, online response time, ease of use, response time, and system accuracy. Information quality targets the meaning level of the IS output in terms of accuracy, timeliness, relevance, accessibility, and adaptability. Use is measured as reported by the users (i.e. —System Use) or the actual use as reported by the system in terms of queries by time, connect time, or number of computer functions utilized. User satisfaction refers to measures of how the information affects the user. Individual impact deals with how the information system modifies the user’s experience with the system. Finally, organizational impact contains measures about how the system and the information provided influence the organization.

The authors emphasize that the model should be studied as a whole: “a measurement instrument of overall success, based on items arbitrarily selected from the six IS categories, is likely to be problematic” (DeLone and McLean 1992). DeLone and McLean do not offer a study to validate the model; instead, they strongly appeal to IS researchers to utilize and test it in their studies to validate and further develop the model. The Model received much attention from IS researchers. Since its publication, many researchers have treated IS success as a multidimensional construct and have measured it as such (Urbach et al. 2008).

Motivated by DeLone and McLean’s call for further development and validation of their model, many researchers have attempted to extend or re-specify the original model. A

number of researchers have claimed that the DeLone and McLean Model is incomplete; they either suggest that further dimensions should be included in the model, or they present alternative success models (Seddon 1997, Seddon&Kiew 1994). Other researchers have focused on the model's application and validation (Rai& Lang & Welker, 2002). Although some weaknesses have been revealed, the D&M IS Success Model has become a dominant model for measuring IS success (Hu, 2003).

#### **2.4.2 DeLone and McLean: The 10 year Update – D&M 2003**

After the publication of the DLML model and following the authors' request for validation and extension of the model, IS researchers utilized the model in a myriad of IS environments, such as knowledge management, decision support systems, and accounting IS. The authors identify only two studies, both at the individual level, that attempt to validate the model as a whole: Seddon and Kiew (1994) and Rai et al. (2002). The first validation test (Seddon and Kiew 1994a) finds that system quality and information quality both have significant relationships with user satisfaction and individual impact. At the same time, user satisfaction also has a significant relationship with individual impact. Rai et al. (2002), in their attempt to validate the DeLone and McLean Model, perform a complete model test. Their findings are two-fold. They find that while some of the goodness-of-fit measures were not at the required limits, all the relationships between IS Success dimensions were significant.

In terms of individual relationships between dimensions of the IS Success Model, DeLone and McLean report that 7 different studies find a positive relationship between system use and individual impact (Goodhue and Thompson 1995; Guimaraes and Igarria 1997; Igarria and Tan 1997; Teng and Calhoun 1996; Torkzadeh and Doll 1999; Weill and Vitale 1999; Yuthas and Young 1998). The relationship between system quality and individual impact is also supported as a result of 5 of the studies reviewed by DeLone and McLean (Etezadi-Amoli and Farhoomand 1996; Goodhue and Thompson 1995; Seddon and Kiew 1994a; Teo and Wong 1998; Wixom and Watson 2001). The relationship between information quality and individual impacts is studied in four of the articles reviewed by DeLone and McLean (Etezadi-Amoli and Farhoomand 1996; Seddon and Kiew 1994a; Teo and Wong 1998; Wixom and Watson 2001). All four articles support the significance of the relationship. Overall, 36 out of the 38 articles included in DeLone and McLean's review provide support for the model and the internal relationships between the 6 dimensions of the IS Success Model.

However, not all researchers agree with the model completely, and this work offers criticism of the model. Seddon (1997) argues that the model contains both process and variance variables which make the possible results confusing to describe, evaluate, and understand. Pitt et al. (1995) suggest that due to the increasing importance of the relationship of the user with the IT departments (as opposed to the IT applications) a service quality construct needs to be added to the model. Another criticism of the model is the fact that only individual benefits and organizational benefits are included in it (Myers et al. 1997) so that benefits related to other levels of analysis, such as industry or even society, do not have a place in the model (Peter et al. 1999).

After ten years of validation attempts and criticism, the 1992 DLML Model of IS Success received an update. The 2003 DLMLC IS Success Model includes two important modifications and a clarification: first, the updated model includes the service quality dimension to the model acknowledging the critique of Pitt et al. (1995), and second, accepting Seddon's (1997) suggestion, the authors group both impact measures (individual impact and organizational impact) into a single measure called net benefits. Making this modification increases the scope of the model such as other impacts (such as the market, industry, or society) can be measured with the model if necessary. Finally, the authors clarify that, in a process sense, use should happen before user satisfaction, but in a causal sense, a positive experience with the use of the system will increase the satisfaction of the user. Furthermore, an increased user satisfaction will increase the intention to use which ultimately will increase use (DeLone and McLean 2003).

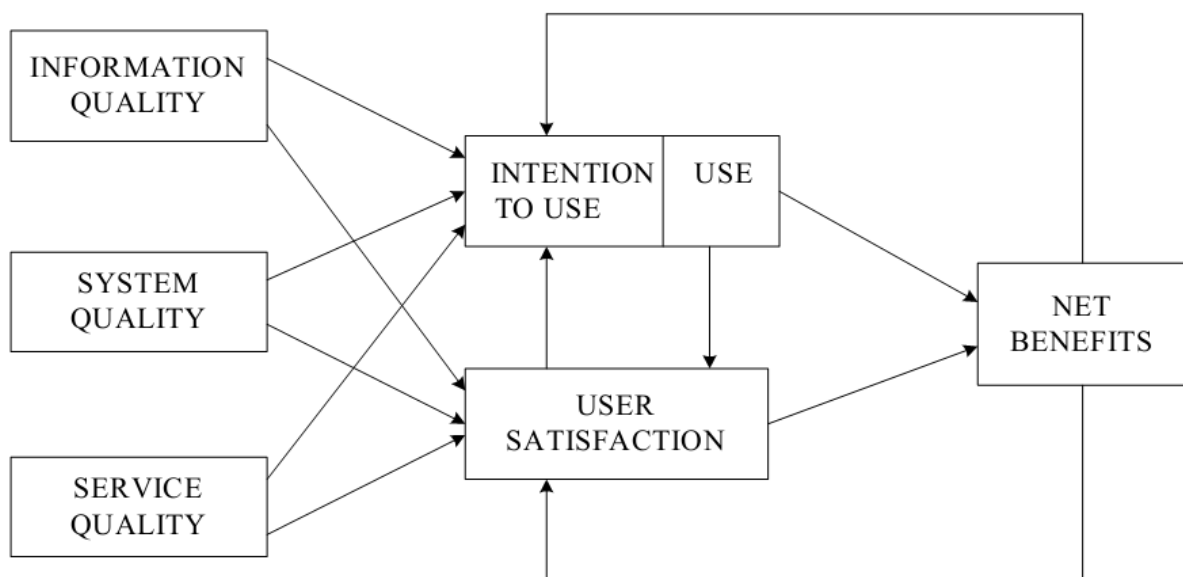


Figure 2.2: Updated D & M IS Success Model (DeLone & McLean , 2003)

In the “10 Year Update,” using previous research and willing to provide a deeper insight in each of the dimensions of the model, DeLone and McLean provide a more detailed description of each one of the shades or dimension of IS success included in the model. According to the authors, system quality refers to those characteristics that are needed or desired in an IS. Some of the measurement examples that the authors provide are ease of use, system flexibility, system reliability, ease of learning, intuitiveness, sophistication, and response times. The second dimension of IS Success is information quality. Information quality represents the output of the system in terms of how relevant, understandable, accurate, concise, complete, timely, and useable is the output produced. The third dimension of IS success, the new one added to the model, is service quality.

According to DeLone and McLean, and in the general context of Information Systems, this new dimension refers to the support that the users of the system receive from their IT area personnel (i.e. responsiveness and knowledge). In the center of the model, we find two more dimensions system use and satisfaction. To avoid the process/casual and volitional/mandatory conflict brought up by Seddon (1997), the authors propose to measure this dimension utilizing intent to use, as an attitude, instead of simply use, as a behavior. However, they caution researchers that matching attitude and behavior as would be necessary for the model to work as presented could be a difficult task so they still recommend utilizing use as their selected measure. System use, then, is defined as the quantity and manner of utilization of the system. In terms of operationalization, system use is measured as the amount, frequency, nature, extent, and purpose of the use. User satisfaction captures how the user feels about the whole experience with the system starting from the system itself, moving to the output as an outcome of the system, and finally including the support services that are provided by the system. Finally, netbenefits covers how much the IS adds to the success of the individual, group, organization, industry, or even nations (Petter et al. 2008). With this update, the authors propose that the model leads itself to be used not only in already existing IS but also in new and developing systems.

## 2.5 Measures of the Constructs

### A. System Quality

According to DeLone and McLean, one of the most studied dimensions of IS success is system quality. It refers to measures of the information processing system itself, basically how well the hardware and the software work together. System quality has been operationalized in many different ways in the IS literature, but some of the most relevant are convenience of access, flexibility of system, integration of system, response time (Bailey and Pearson 1983); reliability, response time, ease of use, ease of learning (Belardo et al. 1982); and perceived usefulness of IS (Franz and Robey 1986). See Table 2.1 for the complete list reported by DeLone& McLean.

System quality measures	
Convenience of access, flexibility of the system, integration of systems, response time	(Bailey and Pearson 1983)
Realization of user expectations	(Barki and Huff 1985)
Reliability, response time, ease of use, ease of learning	(Belardo et al. 1982)
Response time	(Conklin Malcolm and James 1982)
Perceived usefulness of IS	(Franz and Robey 1986)
Usefulness of DSS features	(Goslar 1986)
Usefulness of specific functions	(Kriebel and Raviv 1980)
IS sophistication (use of new technology)	(Lehman 1986)
Flexibility of system	(Mahmood 1987)
Stored record error rate	(Morey 1982)
Response time, system reliability, system accessibility	(Srinivasan 1985)

Table 2.1: System Quality Measures (DeLone& McLean 1992)

### B. Information Quality

According to DeLone and McLean, information quality refers to the quality of the information the system produces. This construct has been operationalized in many different ways. For example, Bailey and Pearson (1983) operationalize information quality by asking if the output of the system is accurate, precise, current, timely, reliable, complete, concise, relevant, and in a preferred format. See Table 2.2 for a complete list of measures:

Information quality measures	
Accuracy, Precision, Currency, Timeliness, Reliability, Completeness, Conciseness, Format, Relevance	(Bailey and Pearson 1983)
Perceived usefulness of specific report items	(Blaylock and Rees 1984)

Perceived importance of each information item	(Jones and McLeod 1986)
Currency, Sufficiency, Understandability, Freedom from bias, Timeliness, Reliability, Relevance to decisions, Comparability, Quantitativeness	(King and Epstein 1983)
Report accuracy, Report timeliness	(Mahmood 1987)
Report usefulness	(Mahmood and Medewitz 1985)
Completeness of information, Accuracy of information, Relevance of reports, Timeliness of reports	(Miller and Doyle 1987)
Usefulness of information	(Rivard and Huff 1984)
Report accuracy, Report relevance, Understandability, Report timeliness.	(Srinivasan 1985)

Table 2.2 - Information Quality Measures (DeLone& McLean 1992)

### C. Service Quality

This construct was new in the updated D & M model and many researchers are including it as a measure of IS success. DeLone& McLean (2003) define service quality as the overall support delivered by service provider regardless of whether this support is provided by an internal IS department, a new organizational unit or outsourced to an internet service provider (ISP). They (DeLone& McLean) also consider it as an important measure since, in e-commerce context, users are customers and poor user support will lead to losing customers and eventually losing sales. Many other researchers define that; service quality is the degree to which a service meets the expectations of customers (Parasuraman et al., 1988).

Taxpayer service usually means service and information, which the Tax Administration provides to taxpayers so that they can fulfill their tax obligations. Taxpayer service is also a question of attitude towards taxpayers. Effective taxpayer service requires a clear commitment of the administration to assist the taxpayer, to treat him fairly, a capacity to understand his concerns and questions and to be foresighted about his needs. This attitude must permeate all contacts with the taxpayer irrespective of the reason for the contact. (Grampert 2001).

SERVQUAL is a popular instrument for measuring IS service quality and is basically designed for marketing research (Pitt et al., 1995). Attributes in SERVEQUAL instrument includes quick responsiveness, assurance, empathy, follow up service and technical support (Parasuraman et al., 1988). But all dimensions of this instrument may not be applied in electronic system or service context, other than those that resemble and also according to



Zeithaml et al., (2002), it needs additional dimensions to be appropriate for e-service quality construct. At the University of Bath, eQual instrument was developed and was initially known as WEBQUAL. The instrument has been developed to measure user perceptions on quality of e-commerce websites. This instrument has been under development since 1998 and at now includes 23 measurable items. The table 2.3 below presents some of the service quality measures used in earlier studies by various researchers.

Some of the service quality measures	
Service quality in e-tax service	Connolly & Bannister (2008)
Success of e-commerce	DeLone& McLean (2003)
Measuring Web-based service quality	Xie et al., (2002)
User perceptions on Quality of e-commerce websites	University of Bath (version 4)
E-S-Qual for assessing electronic service quality	Zeithaml et al., (2005)

Table 2.3: Some of the service quality measures used in past research

#### **D. System Use**

There is no precise definition of system usage at any level (DeLone& McLean, 2003). Seddon (1997) defines system use, using the system for everyday work and tasks purposes. In Petter et al., (2008)‘s point of view it is the degree and manner in which staff and customers utilize the capabilities of an information system‘. In many cases, according to DeLone& McLean (2002), it is a suitable construct to measure success. The construct has been measured as actual (as opposed to reported) use (King and Rodriguez 1978; Lucas Jr 1973; Lucas Jr 1978a; Swanson 1974), and reported use (Fuerst and Cheney 1982; Maish 1979; Raymond 1985).

Another measured facet of use is who is actually using the system: executives (DeLone 1988) or company controllers (Raymond 1985). DeLone and McLean report that use has also been studied at different levels of adoption, for example, Vanlommel and DeBrabander (1975) discuss four levels of use: getting instructions, recording data, control, and planning. See Table 2.4 for a complete summary of measures.

Information system use measures	
Use or nonuse of computer-based decision aids	(Alavi and Henderson 1981)
Use of IS to support production	(Baroudi et al. 1986)
Percentage of time DSS is used in decision making situations	(Barki and Huff 1985)
Use of numerical vs. non-numerical information	(Bell 1984)
Frequency of requests for specific reports	(Bergeron 1986)
Use vs. non-use of datasets	(De Brabander and Thiers 1984)
Motivation to use	(DeSanctis 1982)
Frequency of past use, frequency of intended use	(Ein-Dor and Segev 1978)
Frequency of general use, frequency of specific use	(Fuerst and Cheney 1982)
Frequency of voluntary use	(Hogue 1987)
Frequency of use, voluntariness of use	(Kim and Lee 1986)
Extent of use	(Mahmood and Medewitz 1985; Nelson and Cheney 1987)
Frequency of use, regularity of use	(Raymond 1985)
Average frequency with which user discussed report information	(Swanson 1987)

Table 2.4: System Use Measures (DeLone& McLean 1992)

## E. User Satisfaction

User Satisfaction, defined as the “sum of one’s feeling’s or attitudes toward a variety of factors affecting that situation in a given situation” (Bailey and Pearson 1983), is possibly the most extensively used single measure for IS evaluation (e.g. DeLone and McLean, 1992; Doll and Torkzadeh, 1988; Etezadi-Amili and Farhoomand, 1996; Igbaria and Nachman, 1990; Igbaria and Tan, 1997; Gatian, 1994), with several widely cited studies and standard instruments that measure Satisfaction (e.g. Bailey and Pearson, 1983; Baroudi and Orlikowski, 1988; Doll and Torkzadeh, 1988). DeLone and McLean (1992) identified three reasons for the wide acceptance of user Satisfaction as a dimension of IS success: 1) high degree of face validity, 2) development of reliable tools for measure, and 3) conceptual weakness and unavailability of other measures. Despite recognizing Satisfaction as an important dimension of IS success, early Satisfaction constructs (e.g. User Information Satisfaction - Bailey and Pearson 1983) have been found to have mixed measures of multiple dimensions of success (e.g. System Quality and Individual Impact) rather than measuring ‘Satisfaction’ in isolation. This perplexing treatment of measures of IS success inhibits the development of a standardized instrument to gauge IS success thus the cumulative research tradition.

According to DeLone and McLean, user satisfaction is one of the most important dependent variables used in measuring the success of the system due to the non-volitional status of the majority of the systems. If the system has to be used as mandated by the company implementing it, use by itself becomes an empty dependent variable. In these cases, user satisfaction becomes the preferred measure of IS success.

The variable has been operationalized in multiple different ways and scenarios. The variable has been measured as a single item (Ginzberg 1981; Lucas Jr 1981) or as a multiple item construct (Bailey and Pearson 1983; Ives et al. 1983; Kriebel 1979; Swanson 1974). DeLone and McLean claim that user satisfaction is probably one of the most widely used measures of IS success because of its face validity and the development of multiple measurement tools that have been thoughtfully validated. See Table 2.5 for a summary of the measures evaluated by DeLone and McLean.

User satisfaction measures	
Overall satisfaction with DSS	(Alavi and Henderson 1981)
User satisfaction (39 item instrument)	(Bailey and Pearson 1983)
User information satisfaction	(Barki and Huff 1985; Baroudi et al. 1986)
User satisfaction	(Bruwer 1984; Mahmood and Becker 1985)
Satisfaction with DSS (multi-item scale)	(Cats-Baril and Huber 1987)
User satisfaction (11 item scale)	(Doll and Ahmed 1985)
Overall satisfaction	(Ginzberg 1981; Mahmood 1987),
User satisfaction (Bailey & Pearson instrument)	(Ives et al. 1983; Nelson and Cheney 1987; Raymond 1987)
User satisfaction (25 item instrument)	(Jenkins Justus and Milton 1984)
Overall satisfaction, decision making satisfaction	(Sanders and Courtney 1985; Sanders et al. 1984)

Table 2.5 - User Satisfaction Measures (DeLone& McLean 1992)

## F. Net Benefit

Net benefits construct is concerned with the degree to which IS are contributing to the success of individuals, groups, organizations, industries, and nations (Petter et al., 2008). DeLone& McLean (2003) say that net benefits is the most important construct since it

captures the balance of positive and negative impacts of the e-commerce on customers, suppliers, employees, organizations, markets, industries, economies, and even societies. There are abundance of methods to measure net benefits at both the individual and organizational level of analysis. Perceived usefulness or job impact is the most common measure at the individual level (Petter et al., 2008). A user performance measuring instrument developed by Etezadi-Amoli & Farhoomand (1996) have 4 measures that captures:

- a) Improving the user's quality of work
- b) Making the end user's job easier
- c) Saving the end user time
- d) Helping fulfill the needs and requirements of the end user's job

## **2.6 Related Works**

Regarding the e-taxation services, Wang et al. (2005) argued that computer self efficacy affects the users' behavioral intention to use a website. Ease of use, usefulness and credibility are all important factors. Sharma and Yurcik (2004) showed that the tax payers' tendency to use tax filing websites depends on the easiness of use and safety. Moon and Welch (2005) investigated the attitude of citizens and public employees towards the effectiveness of electronic governing. They showed that civil servants are more familiarized, better informed and more certain for the prospect of governing than the citizens. Furthermore, citizens are worried about the safety and the privacy of online tax filling and e-governing. Perceived ease of use, compatibility and trustworthiness are significant predictors of citizens' intention to use an e-government service (Carter and Bélanger, 2005). Terzis and Economides (2007) as well Economides and Terzis (2008) highlighted critical factors that make a tax website successful. They developed an integrated evaluation framework across 5 quality dimensions. Then they used it to evaluate the tax websites of 5 countries.

For many Canadians, their first experience with the electronic governing was the Netfile, an electronic tax filling system through the internet. Millions of Canadians filled their tax forms electronically with great success and without concern about the safety. Bray (2003) argued that the key for a successful electronic tax system is the confidence and trust between state and citizens. The success of the Canadian e-taxation system shows that the right IT implementation is not only feasible, but it can also improve the operations of taxation (Malazdrewicz, 1992).

Taylor (2003) suggested the Federal and State tax systems in the United States as examples of successful e-Government. Tax payers can communicate with officials via email and phone, and electronically fill their tax obligation forms. Furthermore, using the bar code technology in the tax returns, the tax payers can scan the electronic data automatically in their computer without the need to import the data by hand (Walsh and White, 2000). However, citizens in Taiwan were not willing to use such new systems (Wand, 2003).

## **2.7 Research Model and Hypothesis**

The researchers have adopted the model (Figure 2.3) to fit into the Tax IS of Ethiopia. According to Hu (2002), the collective findings from previous research suggested that systems success or its measurements may vary considerably with key system or organization characteristics. Hence, the model should be modified according to the targeted context. In addition to this, DeLone and McLean (2003) also stated that the model includes arrows to demonstrate proposed associations among success dimensions in a process sense, but does not show positive or negative signs for those associations in a causal sense. The nature of these causal associations should be hypothesized within the context of a particular study.

The main purpose of this research study is to apply and test the updated D&M model of IS success in the context of Tax Information System success. The updated D&M IS Success Model appears to be a sound basis for measuring the success of tax IS because:

- a. It is a comprehensive evaluation framework
- b. The proposed associations have been validated by a large number of empirical studies;
- c. It has been applied to several types of information systems;
- d. It is the dominant evaluation framework in IS research (Urbach et al. 2008).

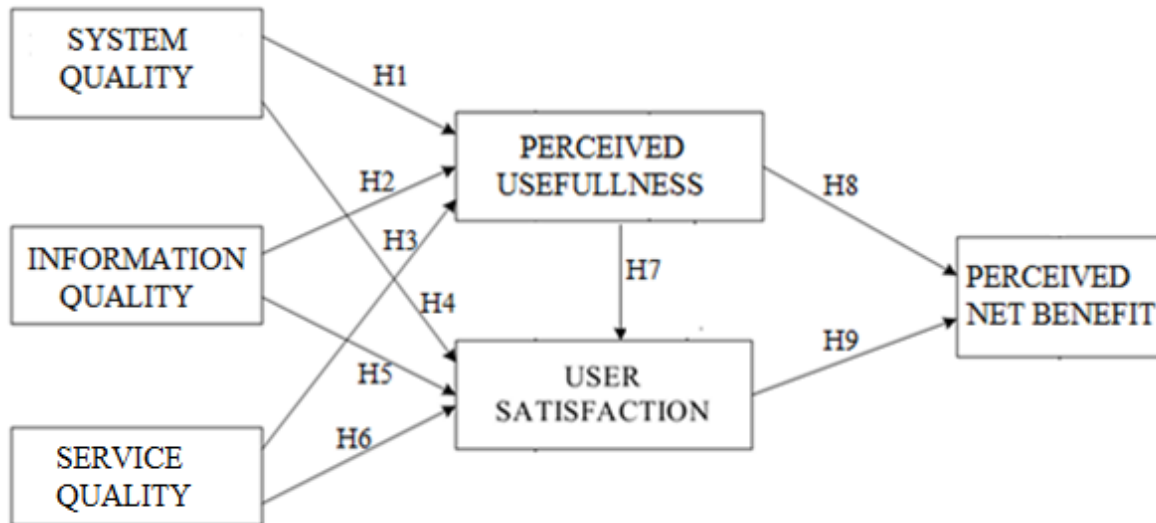


Figure 2.3: Research Model adopted from (DeLone&McLean , 2003)

To measure the success of Ethiopian tax IS and test the relations between the constructs of D&M IS success model the following hypothesis is constructed.

- H1:** System quality will positively affect perceived usefulness in Tax IS context.
- H2:** Information quality will positively affect perceived usefulness in Tax IS context.
- H3:** Service quality will positively affect perceived usefulness in Tax IS context.
- H4:** System quality will positively affect user satisfaction in Tax IS context.
- H5:** Information quality will positively affect user satisfaction in Tax IS context.
- H6:** Service quality will positively affect user satisfaction in Tax IS context.
- H7:** Perceived usefulness will positively affect user satisfaction in Tax IS context.
- H8:** Perceived usefulness will positively affect perceived net benefit in Tax IS context.
- H9:** User satisfaction will positively affect perceived net benefit in Tax IS context.

There are four differences of the proposed model with DeLone and McLean (2003), derived mainly from the mandatory setting under which Tax IS of Ethiopia operates. First, we adopt the perceived usefulness construct of Seddon (1997), instead of use. According to Seddon and Kiew (1996) and Seddon (1997), the implication of using use, as a measure of system success, is that if a system is used, it must be useful, and therefore successful. However, non use does not essentially mean that a system is not useful; it may simply mean that the potential user has other tasks to do (Seddon, 1997; Seddon&Kiew, 1996). In addition, the same researchers argue that when usage is compulsory, the number of hours a system is used conveys little information about system usefulness, and so success. Therefore, they propose perceived usefulness as a more meaningful success construct, especially in cases where usage

is mandatory. Also, Kim and Lee (1986) caution that the degree of system usage cannot be considered as an appropriate measure for IS success, if use is mandatory. DeLone and McLean (2003) reply to this criticism stating that even when use is required, variability in the quality and intensity of this use is likely to have a significant impact on the realization of the system's benefits. Furthermore, they believe that no system use is totally mandatory, because the executive or management committee that has chosen to implement a system always has the option of discontinuing it, if it is not providing the desired results and benefits. Despite these arguments, and taking into consideration the national magnitude of the Tax IS implementation endeavor, we share the view of Seddon. The Tax IS of Ethiopia has to be used, either directly or indirectly (through Employees of ERCA) by all business owners (tax payers) and discontinuation would be difficult. Thus, we assume that use is totally mandatory.

Similarly, the second modification to the model, net benefits dimension is named as perceived net benefit for this study. According to DeLone and McLean (2003), it is impossible to define net benefits without first defining the context or frame of reference and also the focus of any study must be defined. Furthermore, the level of analysis to measure the net benefits must also be addressed. Since the focus of this study is on the measurement of Ethiopian tax IS success from the perspective of citizens, net benefit in this study refers to the citizen-perceived net benefit evaluation.

Third, and in line with Seddon (1997), the simultaneous causality between use and user satisfaction in DeLone and McLean's model has been replaced by one-way causality; perceived usefulness causes user satisfaction. Seddon resorts to semantics in order to justify this one-way causality. His analysis leads him to believe that increases or decreases in usefulness will lead to increases or decreases in user satisfaction with information systems, but not vice versa, because some increases in satisfaction are unrelated to usefulness.

Another change made, to adopt the updated D&M model of IS success for this study, is removal of the feedback arrows from the 'perceived net benefits' construct to both 'Perceived usefulness' and 'user satisfaction' constructs. Similarly the arrow from "user satisfaction" to "Perceived usefulness" was not considered. One reason for not considering these feedback arrows is to avoid the complexity of the model. Another reason for eliminating the feedback arrows in adoption for the IS success model is due to the nature of this study. This study is cross-sectional by nature because the model is tested by obtaining empirical data at a single

point in time hence constructs of the model are measured only once. This implies that this study would not be able to measure the impact of 'perceived net benefits' construct on both the 'Perceived usefulness' and 'user satisfaction' constructs.



## **CHAPTER 3**

### **Research Methodology**

Methodology refers to the rationale and the philosophical assumptions that underlie a particular study whereas method is a specific technique for data collection under those philosophical assumptions (White, 2000). The choice of methodology shapes not only what the researcher does but also how he/she understands the phenomenon under investigation. Deciding on methodology influences the way data will be collected and how it will enable the research to meet its aim and objectives (Gill & Johnson, 2010). In this sense, methodology is a major aspect of a research and discussed in this chapter as follows.

#### **3.1 Research Methods**

Babbie (2010) identifies three purposes of social science research. The purposes are exploratory, descriptive and explanatory. Exploratory studies are often used to familiarize the researcher with a topic. Descriptive studies are used to describe situations and events. The researcher observes and then describes what was observed. The third general purpose of social research, explanatory, is to explain things. Descriptive studies answer the questions of what, where and when, explanatory questions of how (Babbie, 2010). Due to the fact that this study will first explore the evaluation parameters of Tax Information system and then describe to what extent is it successful from citizens point of view, the purpose will be more descriptive.

In addition there are two approaches to theory construction in scientific research, deductive and inductive (Blumberg et al. 2008; Babbie 2010; Herms 2008). Deductive moves from the general to the specific, meaning that it uses a pattern that may be logically or theoretically expected to observations that test whether the expected pattern actually occurs (Babbie, 2010). Inductive, is the other way around and moves from concrete observations to a general theoretical explanation (Babbie 2010). Due to the fact that the study firstly give a general theory and some hypotheses and then explain the specific experiences from the empirical part which supports the initial theories, the research approach is deductive. This chosen research approach belongs to the positivists research philosophy, which focuses on large samples and is mostly quantitative (Saunders et al. 2009). One argument for this approach is that the results are more general, objective, value free and less biased (Blumberg

et al. 2008). Furthermore it is clearer on how to draw conclusions from the given data and it is easier to reproduce the research (Blumberg et al., 2008).

To identify critical success parameters, we follow the recommendation by various authors (e.g., Bharati & Chaudhury, 2004; DeLone & McLean, 2003; Sugianto & Tojib, 2006) to use tested and proven measures if possible. Thus all constructs tested and validated by other researchers in previous studies have been identified by review of state-of-the-art literature in the field. The adopted constructs are modified for use in the tax IS and to evaluate the tax IS and test the D&M IS success model. The constructs were validated later by pilot test and statistical tests of model measurement.

### **3.2 Target Population and Sampling**

The target population for this study includes individuals who have the eligibility to pay taxes and have experiences of paying taxes at Ethiopian revenue and customs Authority office. A typical respondent for the survey is a person who has experience of paying taxes during the summer of 2013 at Adama regional Office.

The number of registered Business/profit tax payers, at Adama regional office, during this tax year was up to 5,234 which may not be possible to achieve such a finely tuned sample for this research. The proposed D&M IS success model includes six constructs and each construct is measured with multiple items. Research has shown that a fairly small sample between 100 and 200 is an appropriate number if several items are used to define each construct (MacCallum, Widaman & Zhang 1999). Hence, based on the population from Adama city, the sample size of 200 tax payers were determined as an appropriate. 162 (81%) questionnaires were collected and analyzed.

It is not possible to access a listing of the exact taxpayer set comprised of those who pay their taxes for informational or other functional purposes. The impossibility arises due to privacy laws that prevent tax authorities from releasing such details. This leads to the situation of using convenience sampling method so as to get the best information to achieve the objectives of the study. Even with the disadvantages inherent in a non-probability sample, it is deemed the most suitable method to achieve a response rate that is as high as possible. This method gave flexibility to the researcher to pick up people who are likely to have the required information and be willing to share it. Since the size of population within the context of this study is large, this sampling method seems to be appropriate.

### 3.3 Data Collection Tools

To get a reasonable understanding of the system, investigate and review the current state affairs needs empirical data. Hence, an exploratory study will be conducted by visiting the revenue authority offices and document study covering available project documents and manuals, websites, and published literatures will be carried out. In addition, an intensive literature review will be conducted to come up with critical success parameters of evaluation framework.

Foremost, the study relies on the most widely used methods for data collection: surveying (Bryman & Bell, 2007; Czaja & Blair, 2005). Survey has been chosen because it enables the identification of certain typical characteristics of the subject of research (Czaja & Blair, 2005); in this study, these characteristics related to the citizens’ assessment of tax IS success. On top of that, survey has been selected due to lack of public data on the variables included in this study. Hence, Different statements will ask the respondents using a five-point likert scale type with anchors from “strongly disagree” to” strongly agree”(1-5) to measure each responses. In this way, a survey may result in more accurate depiction of reality.

According to Bryman (2008), in the survey researchers need to formulate a research instrument and how it should be administered. He has also mentioned different modes for administrating a survey, shown in the figure below.

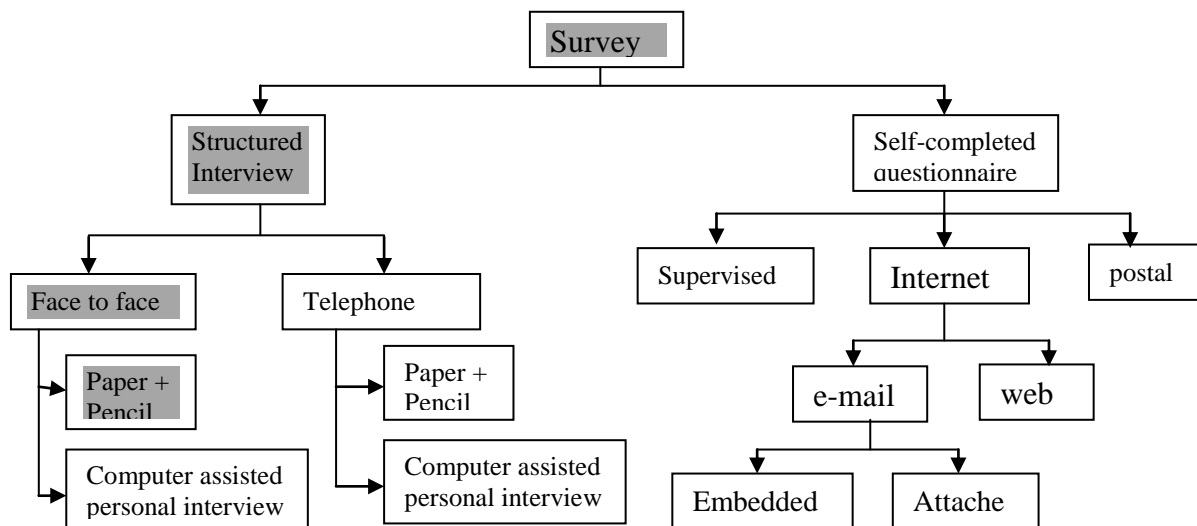


Figure 3.1: Different modes of administering a survey

The designing of the survey instruments took place before the actual conduct of the taxpayer survey; the instrument was given to several academics Management Information System of

Adama Science and Technology University for comments on the contents and comprehensibility of the instrument. However, no comments leading to major changes in the instruments were obtained. The taxpayer survey instrument was also translated into the Amharic language.

### **Questionnaire Design**

In line with the aim of this study, the main purpose of this questionnaire was to overall evaluate the tax information system based on six constructs of DeLone & McLean (2003) model and also to test this model using the data collected through this questionnaire. There is no comprehensive and standard instrument that can be used to evaluate tax Information systems in the literature. Therefore each of the construct was measured by several items that have been tested and validated by other researchers in previous studies (see appendix A). The criteria used while choosing questionnaire items was the popularity of the instrument and the use of the instrument in the studies close to the study. Wordings and format of the items were changed to fit these items into our study's context. By using previously tested and validated measures, according to Bryman (2008), adds validity to the research and also allows researchers to compare results with other studies.

The survey (see Appendix B) contained seven parts, last six parts were aimed at measuring the six constructs of the model and first part contained demographic questions. The questionnaire starts with a preliminary check point question about whether a citizen has experience of using tax system or not. If someone has not used this system this year, he/she was informed not to further proceed with the survey. After this the survey continues with few demographic questions of age, gender, profession, and education level. However results are not analyzed using demographics' but were included to increase the transparency of the study and to know how many of the respondents are male and female, and of what age etc. This will help us in obtaining an overall understanding of the target population.

Appendix A shows summary of the questionnaire design, with all the items taken for each construct of the IS Success model including references. In first part of the questionnaire, for demographic questions, respondents were asked to circle the number of their most appropriate choice. All the later parts required from the respondents to indicate to what extent they agree or disagree with the statements on 5 point Likert scale. If a respondent strongly agrees with the statement, he/she will circle 5 and if a respondent strongly disagrees with the statement

he/she will circle 1. In Sharp et al., (2007)'s point of view the main aim of Likert scale is to get the ideas, opinions, beliefs and attitudes of the users towards a specific product. Therefore, this is a good way to capture the opinions of the real users on the system that is being evaluated.

### **3.4 Data Collection Procedure**

After systematic development of survey questionnaire, a team of 5 data collectors (constituted of Information system under graduate students) were formed and trained on a face-to-face data collection procedures and techniques. Accordingly, a pilot test of 15 questionnaire (three questionnaire for each data collector) were performed of which 11 (eleven) were valid and included with analyzed data. The purpose of the pilot was to assess the comprehensibility of the research instrument, to refine and improve the expressions and the wording of questions and enhance its reliability.

The total research questionnaires of 185 will then be divided among tax payers of Adama city to be filled by respondents. By explaining the purpose and objective of the study, the respondents are instructed to answer the questions by assessing the system as is – not based on their expectations of an ideal system. For each quantitative question, respondents are asked to circle the response which best describes their level of agreement. The data collector proctored the process of filling-in the questionnaires to make sure all questions were clear.

For each question, respondents were asked to circle the response which best described their level of agreement. A total of 162 usable responses were obtained. Approximately, 63% of the respondents are male. The collected primary data were edited for consistency, coded, entered into a computer and verified, following which they were analyzed.

### **3.5 Data Analysis**

Having completed the research method and data collection requirements, the next step is data analysis method and techniques. To obtain the summary of the gathered data in graphical form, frequency distributions, including relative, percentage and cumulative frequency distributions, and histograms are used. To summarize the data in terms of numerical values, measures of central location (mean), variability or dispersion (standard deviation) and shape of a data distribution (e.g. skewness) is used.

To calculate both the descriptive and inferential statistics, the Statistical Package for the Social Sciences (SPSS) Version 20 is used to examine emerged correlations and associations or groupings. This is the most widely employed software package for statistical analysis and it is among the best ones available (Bryman & Bell, 2007).

Data were analyzed using the Structural Equation Modeling (SEM) approach and utilized AMOS (Analysis of Moment Structures) tools. The SEM technique has been employed in this research to evaluate the relationships between the model constructs. Also, SEM has been used to model the complex relationship of multiple independent and dependent constructs (Kline 2005). Gefen et al. (2000) highly recommend the use of SEM in both behavioral sciences and IT/IS research.

This study follows the two-step approach recommended by Anderson and Gerbing (1992); first, the measurement model was assessed to examine reliability and validity and, second, the structural model was assessed to test the research hypotheses and the suitability of the model.

### **3.6 Reliability and Validity**

Reliability is an important issue in research particularly when quantitative methods are used (Bryman, 2008). By many researchers the reliability concept has been divided into two categories of internal and external reliability. According to Seale (1999) internal reliability refers to the extent that different researchers identify similar constructs as the original researchers whereas external reliability is concerned with the overall replication when a research study is carried out in re-study exercises.

To assess the reliability of the survey instrument used, an internal consistency measure was calculated. This measure is known as coefficient alpha or Cronbach's alpha (Cronbach, 1951), and it is most widely used measure of reliability. It basically measures how well a set of indicators explain a single latent construct. The lowest acceptable limit for Cronbach's alpha is 0.70, but in some cases, 0.60 may also be acceptable (Hair et al., 1998).

Another measure of reliability called composite reliability was calculated for this study. Composite reliability gives an indication to how well each of the constructs in the measurement model is described by their indicators. Recommended threshold is 0.70 (Chin, 1998). Over threshold results imply that each construct is well described by its indicators.

According to Henseler et al., (2009), for the assessment of validity, the convergent validity and the discriminant validity are usually examined. Fornell et al., (1981) suggest using the average variance extracted (AVE) as a criterion of convergent validity. An AVE value of at least 0.5 indicates sufficient convergent validity, meaning that a latent construct is able to explain more than half of the variance of its indicators on average.

Discriminant validity examines the degree to which the constructs diverge from each other. When the square root of the AVE for each construct is greater than their correlation with the other constructs, this indicates that they do measure different concepts (Chin, 1998). The second criterion of discriminant validity is usually a bit more liberal: The loading of each indicator is expected to be greater than all of its cross-loadings (Chin, 1998). Although the Fornell et al., (1981) criterion assesses discriminant validity on the construct level, the cross-loadings allow this kind of evaluation on the indicator level (Henseler et al., 2009).

## CHAPTER 4

### Results and Discussions

The previous chapter presented the methodology used in the thesis. More specifically, the chapter was showed the research approaches, methods of data collection, and analysis adopted in the study. This chapter presents the results of the survey and analysis in the context of the existing knowledge reviewed in chapter two. Accordingly, this chapter is arranged into three sections; the first section (4.1) presents demographic characteristics of the respondents. Section (4.2) presents results of descriptive statistics which answers the citizen's evaluation of tax IS success in general. Finally, the detail test, from the lens of the six components of the updated IS success model is presented in section (4.3).

#### 4.1 Demographic characteristics

The demographic characteristics of respondents (age, gender, profession, and education level) are presented in table 4.1 below. However results will not be analyzed using demographics but were included to increase the transparency of the study and to know how many of the respondents are male and female, and of what age etc. This will help us in obtaining an overall understanding of the target population.

		Frequency	Percentage
<b>Gender</b>	Male	102	63
	Female	60	37
<b>Age</b>	20-29	37	23
	30-39	49	30
	40-49	47	28
	50 or more	31	19
<b>Experience</b>	Less than 1	21	13
	1-5	68	42
	6-10	44	27
	More than 10	29	18
<b>Education level</b>	Elementary	36	22
	Secondary	44	27
	Diploma	48	30
	Bachelor	31	19
	Post graduate	3	2

Table 4.1: Characteristics of the respondents



## 4.2 Results of Descriptive Statistics

The principal data sources to this end are the survey conducted to Adama City business profit taxpayers. After collecting the completed questionnaires, a total of 162 (81%) usable responses were obtained, the responders' answers were input to SPSS and prepared for Analysis.

Means of variables were extracted to enable exploration of the existence and importance of the independent and dependent variables. The instrument was scaled as follow:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

If the means value of the variable is more than or equal to 3.5, then the level of agreement with the statements measuring the certain variable is high. If the mean value of the variable ranges between 2.5 and 3.49, then the level of agreement with the statements measuring the certain variable is medium. If the means value of the statement is equal to or less than 2.49, then the level of agreement with the statements measuring the certain variable is low.

Constructs	No. Of items	Mean	Standard Deviation
1. System Quality	3	2.15	1.06
2. Information Quality	4	3.74	0.84
3. Service Quality	4	4.01	2.10
4. Perceived Usefulness	2	3.44	0.92
5. User Satisfaction	2	3.32	1.13
6. Net Benefit	3	3.50	0.61

Table 4.2: Descriptive statistics

The table 4.2 above shows the summated mean and standard deviation for each of the variable. The values in the table suggest that all of the variables (with the exception of system quality) had mean values well above 3 which mean that level of agreement with items was considerably high. In addition to that, examination of the summated mean score of 3.36 with the standard deviation of 0.64 indicates an overall positive response to most of the variables. These above average mean scores imply that Tax Information System is performing at a medium level of success, based on the evaluation of the business profit tax payer citizens.

Based on analysis of our results, Ethiopian tax Information system is partially successful from citizens' point of view, as most of the citizens feel moderately satisfied with the overall use of the system. Results of this part of the research also indicated that the Ethiopian government spending on Tax Information Systems are not going useless. In detail, from the lens of the six components of the updated IS success model, a considerable majority of the citizens agreed with question items asked in all six constructs with little variations, with the exception of system quality.

### 4.3 Test of D&M IS Success Model

#### 4.3.1 Distribution Analysis

Prior to applying statistical measures to gathered data, the distribution analysis is performed. Because the statistical measures used to validate the model required the knowledge of the distribution of the input data. Therefore the answers to survey questions were analyzed in order to find out if they are normally distributed. The normal distribution analysis was performed by calculating the skewness and kurtosis values for responses of each of the questionnaire items. Moreover, a summated scale, for each construct of the IS success model, was created to check if the responses data for each of these constructs is normally distributed. Similarly, the skewness and kurtosis values were calculated for that summated scale. According to Hair et al., (2007), the normal distribution has acceptable range of skewness value from -1 to 1, and Kurtosis value from -1.5 to 1.5. The table 4.2 shows, how each construct fulfils the criteria for normal distribution mentioned by the Hair et al., (2007).

Constructs	Kurtosis	Skewness
1. System Quality	-0.89	-0.34
2. Information Quality	-0.60	-0.05
3. Service Quality	-1.02	-0.47
4. Perceived Usefulness	-1.36	-0.81
5. User Satisfaction	-0.51	-0.32
6. Net Benefit	-0.42	-0.57

Table 4.3: Measure of skewness and Kurtosis

Thus, by looking at the skewness and kurtosis values we can confirm that the responses data is normally distributed hence the desired statistical measures can be applied to test

the measurement and structural model of the DeLone and McLean’s updated IS success model.

### 4.3.2 Measurement Model

The measurement model determines how well the indicators explain their respective construct. The main purpose is to test the reliability and internal consistency of the model.

#### A. Reliability Analysis

The reliability of the measurement model can be assessed by calculating the composite reliability and cronbach’s alpha. According to Henseler et al., (2009), the composite reliability must not be lower than 0.6. For cronbach’s alpha, Moss et al., (1998) suggest that an alpha score of 0.6 is generally acceptable, although this criterion is not as stringent as the more widely recognized 0.7 thresholds (Nunnally, 1978). The values of the composite reliability and cronbach’s are calculated for each construct of the DeLone and McLean IS success model are following:

Construct	Composite Reliability	Cronbach’s Alpha
System Quality	0.70	0.81
Information Quality	0.92	0.83
Service Quality	0.86	0.76
Perceived Usefulness	0.75	0.60
User Satisfaction	0.63	0.74
Perceived Net Benefit	0.65	0.63

Table 4.4: Reliability of the measurement Model

The results from this internal consistency and reliability test of the measurement model showed that all the scores are well above or just around the suggested thresholds. The score for composite reliability range from 0.63 to 0.92, also exceeding the recommended threshold value of 0.60. Inspection of Cronbach’s Alpha scores reveals that the scores range from 0.60 to 0.83 showing well enough scores, except the use construct which is still just around the suggested threshold value. One of the possible explanations for the lower alpha value of the perceived usefulness construct is the fact that they consist of a smaller number of items (Moss et al., 1998).

The reliability and internal consistency analysis for the measurement model for this research study shows us that the latent constructs are well explained by their corresponding indicators (the questionnaire items) and thus indicate robustness and reliability in the model.

### **B. Validity Analysis**

The next step, after the reliability analysis, is to test the measurement model for validity through analysis of convergent and discriminant validity. Convergent validity signifies that a set of indicators represents one and the same underlying construct. According to Fornell and Larcker (1981), the convergent validity is adequate when constructs have an average variance extracted (AVE) of at least 0.5.

Constructs	Average Variance Extracted(AVE)
System Quality	0.64
Information Quality	0.77
Service Quality	0.67
Perceived Usefulness	0.77
User Satisfaction	0.79
Perceived Net Benefit	0.67

Table 4.5: Average variance extracted for each construct

As the table 4.5 above shows that AVE range from 0.64 to 0.79 and this range is above the suggested threshold of 0.50 for all constructs. This clearly shows that the measurement model passes the convergent validity test.

A measurement model should also pass the discriminant validity test. For satisfactory discriminant validity, the AVE from the construct should be greater than the variance shared between the construct and other constructs in the model (Chin, 1998). The following table lists the correlation matrix, with correlations among constructs and the square root of AVE on the diagonal.

	System Quality	Information Quality	Service Quality	Perceived Usefulness	User Satisfaction	Perceived Net Benefit
System Quality	<b>0.64</b>					
Information Quality	0.27	<b>0.77</b>				
Service Quality	0.19	0.35	<b>0.67</b>			
Perceived Usefulness	0.15	0.10	0.14	<b>0.77</b>		
User Satisfaction	0.47	0.45	0.35	0.31	<b>0.79</b>	
Perceived Net Benefit	0.23	0.16	0.11	0.31	0.29	<b>0.67</b>

Table 4.6: Inter-correlation matrix of constructs

We can see that the AVE's (the bold figures) for each item are greater than their correlation with the other constructs, which indicates that the constructs of IS success model measure different concepts. This, in turn, indicates validity of the measurement model (Heeler and Ray, 1972).

### 4.3.3 Structural Model: Test of hypothesis

As mentioned in the chapter 3, the test of the structural model includes estimation of the path coefficients as well as coefficients of determination, i.e.  $R^2$  values. Path coefficients indicate the strengths of the relationships between the dependent and independent variables whereas  $R^2$  values represent the amount of variance explained by the independent variable.

AMOS V.20 was used to calculate the  $R^2$  values for dependant constructs of the D&M IS success model as well as path coefficients between independent constructs (System Quality, Information Quality and Service Quality) and dependant constructs (Perceived Usefulness, User Satisfaction and Perceived Net Benefits). Path coefficients for the structural equation modelling were estimated using 1,000 'bootstrap' samples.

The result of structural analysis of the model, including standardized path coefficients, p-values, and variance explained ( $R^2$ ) for each equation in the hypothesized model are presented in Figure 4.1 below.

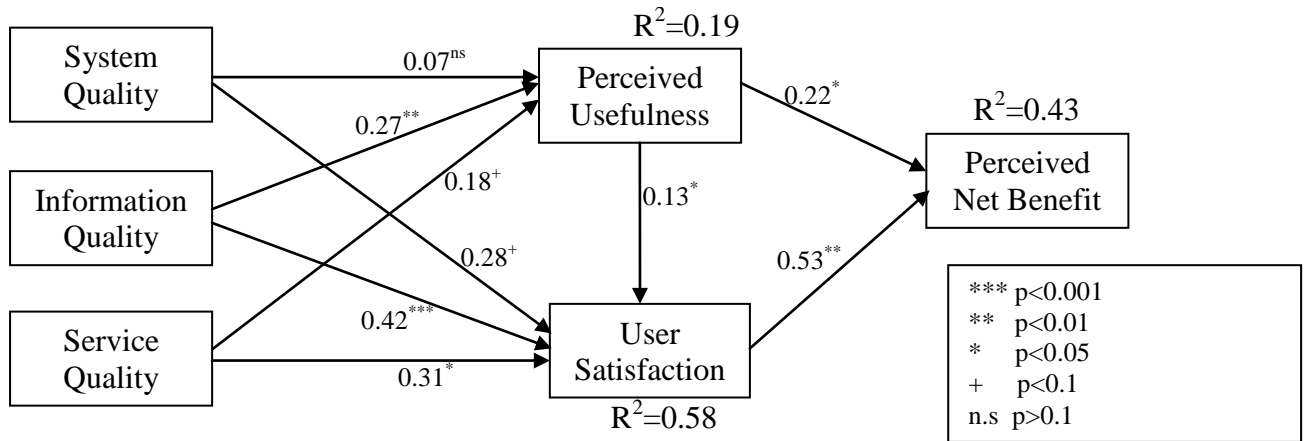


Figure 4.1: Hypothesis testing results

As per hypothesis, all variables are positively correlated with one another, with correlations ranging from 0.07 to 0.53. The relatively high correlations between the IS success constructs were expected and confirm previous research on the relationships between the IS success variables (e.g. Hussein, Karim, & Selamat, 2007; Rai et al., 2002; Seddon & Kiew, 1996).

From a first look of the tables, it can be deduced that all hypothesized relationships are supported with the exception of system quality to perceived usefulness relationship. The system quality construct had positive but non-significant effect on perceived usefulness construct as shown by the path coefficient ( $\beta_1=0.07$ ) in the diagram above. Hence, H1 was not supported. Whereas, influence of system quality on user satisfaction construct ( $\beta_4=0.28$ ) was not significant at  $P < 0.05$ , but significant at  $P < 0.01$  which implies that H4 was marginally supported.

As expected, information quality construct has positive effects on both perceived usefulness and user satisfaction constructs, and has significant influence indicated by corresponding path coefficients, i.e.  $\beta_2=0.27$  and  $\beta_5=0.42$ , respectively. Thus, H2 and H5 were supported.

The influences of Service Quality on perceived usefulness were not significant at  $p < 0.05$ , but significant at  $p < 0.1$ . Thus, H3 was marginally supported with  $\beta_3=0.18$ . Similarly, service quality had a significant impact on user satisfaction making H6 supported ( $\beta_6=0.31$ ).

Furthermore, use had a significant influence on both user satisfaction and perceived net benefits. As a consequence, H7 and H8 were supported ( $\beta_7=0.11$  and  $\beta_8=0.13$ , respectively).

Finally, user satisfaction seems to be a significant determinant of perceived net benefits. H9 was supported ( $\beta_9=0.56$ ). The summary of a hypothesis test results is as follows:

<b>H1:</b> System quality will positively affect perceived usefulness in Tax IS context.	Not supported
<b>H2:</b> Information quality will positively affect perceived usefulness in Tax IS context.	supported
<b>H3:</b> Service quality will positively affect perceived usefulness in Tax IS context.	Marginally supported
<b>H4:</b> System quality will positively affect user satisfaction in Tax IS context.	Marginally supported
<b>H5:</b> Information quality will positively affect user satisfaction in Tax IS context.	supported
<b>H6:</b> Service quality will positively affect user satisfaction in Tax IS context.	supported
<b>H7:</b> Perceived usefulness will positively affect user satisfaction in Tax IS context.	supported
<b>H8:</b> Perceived usefulness will positively affect perceived net benefit in Tax IS context.	supported
<b>H9:</b> User satisfaction will positively affect perceived net benefit in Tax IS context.	supported

Table 4.7 Summary of hypothesis testing results

From all three independent constructs of D&M IS success model, information quality showed a stronger effect than system quality and service quality on both perceived usefulness and user satisfaction. But these independent constructs only explained 19% of the perceived usefulness construct's variance. Moreover, 58% of the variance in user satisfaction was explained by information quality, system quality, service quality, and perceived usefulness. Altogether, this model accounted for 43% of the variance in perceived net benefits, with user satisfaction exerting a stronger direct effect than perceived usefulness on perceived net benefits.

The direct and total effect of User Satisfaction on Perceived Net Benefit was 0.53. However, the direct and total effects of Perceived Usefulness on Perceived Net Benefit were 0.22 and 0.07, respectively. Thus, User Satisfaction exhibited stronger direct and total effects on Perceived Net Benefit than those of Perceived Usefulness. Among the three quality-related constructs, Information Quality had the strongest total effect on Perceived Net Benefit. The direct, indirect, and total effects of Information Quality, System Quality, Service Quality, Perceived Usefulness, and User Satisfaction on Perceived Net Benefit were summarized in Table 4.8 below. For calculation details of indirect effect, see appendix D.

	Direct Effect			Indirect Effect			Total Effect		
	PU	US	NB	PU	US	NB	PU	US	NB
SYQ	0.07	0.28			0.01	0.17	0.07	0.29	0.17
IQ	0.27	0.42			0.04	0.30	0.27	0.46	0.30
SEQ	0.18	0.31			0.02	0.22	0.18	0.33	0.22
PU		0.13	0.22			0.07		0.13	0.29
US			0.58						0.58

Table 4.8: The direct, indirect, and total effect of dominants on Perceived Net Benefit



# CHAPTER 5

## Conclusions

### 5.1 Conclusions

This study evaluated the success of taxation IS from citizens' perspective based on DeLone & McLean's updated IS success Model and tested the model by capturing the multidimensional and interdependent nature taxation IS success. Based on descriptive analysis of our results, the Tax Information System of Ethiopia is performing at a medium level of success from citizens' point of view, as most of the citizens feel moderately satisfied with the overall use of the system. Moreover, the test results indicated that Information Quality, System Quality, Service Quality, Use, User Satisfaction, and Perceived Net Benefit were valid measures of taxation IS success. Except the link from System Quality to Use, the hypothesized relationships between the six success variables were significantly or marginally supported.

This research provides several important implications for tax IS success research and management of ERCA. In order to increase the citizen-perceived net benefit, tax authorities need to develop tax information systems with good information quality, system quality, and service quality, which, in turn, influence citizens' system usage behavior and satisfaction evaluation, and then perceived net benefit of the systems. User Satisfaction was found to have the strongest direct and total effects on Perceived Net Benefit in the model, indicating the importance of system use in promoting citizen-perceived net benefit. While simply saying that more Satisfaction will yield more benefits, user satisfaction is a necessary condition of yielding benefits to the citizens.

The findings clearly supported that the total effects of Information Quality on Perceived Usefulness, User Satisfaction and Perceived Net Benefit are substantially greater than those of System Quality and Service Quality. That is, beliefs about Information Quality, within the tax IS context, are more dominant in influencing perceived Usefulness, User Satisfaction and Perceived Net Benefit than beliefs about System Quality and Service Quality. This means that tax authorities should pay much more attention to promoting the information quality of tax information systems.

While system usage and user satisfaction are commonly acknowledged as useful proxy measures of system success, this study suggest that user-perceived net benefit can be considered as the variable closer in meaning to success than perceived usefulness and user

satisfaction. This research also confirmed that Perceived Usefulness, User Satisfaction and Perceived Net Benefit are complementary yet distinct constructs, and that Perceived Usefulness is partially mediated through User Satisfaction in influencing Perceived Net Benefit of tax information system.

It is worth noting that the effect of System Quality on perceived usefulness was not significant. This may be because citizens do not use the system directly, most of the interactions between tax payers and system is indirect through employees of the tax authority. Hence, the system quality of tax Information System is not critical for citizens in determining usefulness of the system. Thus, respondents showed more concern on information quality and service quality than on system quality. Given that the usage of taxation information systems is compulsory, and that the target user group consists of a large number of people with diversified backgrounds, the findings of this study suggest that in order to increase perceived usefulness and make them satisfied with the systems, it is not enough to make the system easy to interact with. It is of paramount importance to develop taxation information systems that can provide high-quality information and service for people, including sufficient and up-to-date information.

This empirical result also emphasizes the importance of assuming a multidimensional, interdependent analytical approach. It is imperative for the tax authorities to lay stress on various system success levels. Information Quality, System Quality and Service Quality belong to the system development level while System Use, User Satisfaction and Perceived Net Benefit belong to the effectiveness-influence level. Establishing strategies to improve only one success variable is therefore an incomplete strategy if the effects of the others are not considered. The results of this study encourage tax managers to include measures of Information Quality, System Quality, Service Quality, perceived usefulness, User Satisfaction, and Perceived Net Benefit into their present valuation techniques of taxation information system success. The current study has provided reliable and valid measures of these constructs. As the concise success measures with good psychometric properties are periodically administered to a representative set of citizens, tax managers can enhance their understanding of the levels of the citizen-perceived net benefit and its antecedents, and take necessary corrective actions to improve them. Researchers can also use the validated model as the foundation for developing comprehensive taxation information systems success

measures and theories, exploring relationships between the proposed constructs, and comparing taxation IS success empirical studies.

## **5.2 Limitations and Future Research**

Even though the rigorous procedure allowed us to assess and test a model of taxation IS success, this empirical study has several limitations that could be addressed in the future research. First, the results of the report are only suitable for providing a broad assessment of taxation Information system at Adama city. It is possible, that a richer and better weighted (generalizable) sample would have shown stronger support for some of the hypotheses.

Secondly, due to privacy laws and security concerns, as mentioned earlier in chapter 3, the tax authority was not willing to provide the list of people who use system for taxpaying and other purposes. This led to the situation of using convenience sampling which is non-probabilistic sampling method due to which the external validity of the study might have been affected.

Thirdly, this survey focuses on taxation IS success not over time rather on success at the point due to conducting a cross-sectional study. Cross-sectional analysis involves observation of all of a population, or a representative subset, at one specific point in time. But success could be seen as a long process. Therefore the responses of survey are only a snapshot of reality and can lack important information. Cross-validation and longitudinal studies are needed before definitive practical prescriptions are recommended, although the findings of this thesis might suggest some concrete measures. Therefore clearly, supplemental longitudinal studies are desirable for future research to draw more definitive conclusions.

Last but not least, since this study was a quantitative research that evaluated the success of taxation IS from citizens' perspective, it would be interesting to do a qualitative based evaluation research and from the perspective of tax authority. The study can investigate the issues that have been faced, by the tax authority, in implementing the system and in interacting with the citizens. The results of which can be very helpful in improving quality of the system.

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## Appendix A: summary of the questionnaire design

Construct	Item	Reference
System Quality	Interacting with the system is a clear and understandable process	Doll &Torkzadeh (1988)
	The system is easy to use	
	The system provides fast information access.	
Information Quality	The information system provides the precise and accurate information	Doll &Torkzadeh (1988)
	The information system provides sufficient information I need.	
	The information provided by the system is up-to-date.	
	Information is clear and presented in useful format	
Service Quality	The system fulfills the promised service reliably and accurately.	Parasuraman et al. (1988)
	The employees are qualified enough to provide service	
	The services offered by the system is sincere and honest	
	The system provide prompted service and help	
Perceived Usefulness	The system takes into account the desires and needs of its users.	Seddon (1997)
	I find the information system is available and flexible to be used.	
User Satisfaction	The system satisfies user requirements	(Wang & Li ao, 2008)
	The system has met my expectations	
perceived Net Benefit	The system makes my job easier	( Etezadi-Amoli&Farhoomand, 1996)
	The system saves me time	
	The current system enhances my effectiveness on the job.	

## Appendix B: Taxpayer Survey Instrument (English Version)

**JIMMA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**  
**DEPARTMENT OF INFORMATION SCIENCE**

### **Dear Participants**

The researcher is students of Information Science program at Jimma University. This survey is part of research study and will serve purely for academic purposes. The survey aims to evaluate the success of Ethiopian Taxation Information System based on updated DeLone&McLean Information System Success Model. Respondents of the survey can be business profit tax payers who have some experience with taxation information systems.

We will greatly appreciate your time and effort for this survey. Filling the survey will take you around 5 minutes. Your response and information will not be shared with any one, and will be used only for this research. Thank you for your cooperation. If you have any questions please contact us through e-mail: [kookeetii@gmail.com](mailto:kookeetii@gmail.com)

Section I. Background Information (please circle the number that best reflects about yourself)
--

1. What is your Age?
  1. 20-29
  2. 30-39
  3. 40-49
  4. More than 50
2. What is your Gender?
  1. Male
  2. Female
3. When did you start Business
  1. Less than 1 year ago.
  2. 1-5 years ago
  3. 6-10 years ago
  4. More than 10 years ago
4. What is your level of Education?
  1. Elementary
  2. Secondary
  3. Diploma
  4. Bachelor
  5. Post graduate

Based on your experience of taxation information system, all sections below will ask you to indicate to what extent you agree or disagree with the following statements in terms of the overall use of this Information system. There is no right or wrong answer and the main aim is to know your answer that best reflects your opinion. Please indicate your impression by circling the number of likert scale in front of the statements.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>Section II: System Quality</b>						
SQ1	Interacting with the system is a clear and understandable process	1	2	3	4	5
SQ2	The system is easy to use	1	2	3	4	5
SQ3	The system provides fast information access.	1	2	3	4	5
<b>Section III: Information Quality</b>						
IQ1	The provided information is precise and accurate.	1	2	3	4	5
IQ2	The information system provides sufficient information I need.	1	2	3	4	5
IQ3	The information provided by the system is up-to-date.	1	2	3	4	5
IQ4	Information is clear and presented in useful format	1	2	3	4	5
<b>Section IV: Service Quality</b>						
SV1	The system fulfills the promised service reliably and accurately.	1	2	3	4	5
SV2	The employees are qualified enough to provide service.	1	2	3	4	5
SV3	The services offered by the system is sincere and honest	1	2	3	4	5
SV4	The system provides prompted service and help.	1	2	3	4	5
<b>Section V: Perceived Usefulness</b>						
PU1	The system takes into account the desires and needs of its users.	1	2	3	4	5
PU2	I find the information system is available and flexible to be used.	1	2	3	4	5
<b>Section VI: User Satisfaction</b>						
US1	The system satisfies user requirements	1	2	3	4	5
US2	The system has met my expectations	1	2	3	4	5
<b>Section VII: Perceived Net Benefit</b>						
NB1	The system makes my job easier	1	2	3	4	5
NB2	The system saves me time	1	2	3	4	5
NB3	The current system enhances my effectiveness on the job.	1	2	3	4	5

# Appendix C: Taxpayer Survey Instrument (Amharic Version)

ጂሎኔቲቭ

የድህረገጽ ት/ቤት

Information science ት/ክፍል

ሥላግብር መረጃ ስርዓት (Tax Information system success)

ለገብር ክፍያ ቀለበስ መጠይቅ

## የተከበሩ የጥናት ተሳታፊዎች

የዚህ ጥናት አጠቃላይ ዋና ዋና ዓላማዎች ለገብር መረጃ ስርዓት ስኬት ተጠቃሚነት ናቸው፡፡

የዚህ ጥናት ዋና ዓላማ ለገብር መረጃ ስርዓት ስኬት ስርዓቱን ለማሳደግ ለገብር ክፍያ ተሳታፊዎችን ለመለየት ነው፡፡

ጥናቱ የሚካሄደው ለገብር መረጃ ስርዓት ስኬት ስርዓቱን ለማሳደግ ነው፡፡

የጥያቄ ስርዓት ስኬት ስርዓቱን ለማሳደግ ለገብር ክፍያ ተሳታፊዎችን ለመለየት ነው፡፡

ለገብር ክፍያ ተሳታፊዎች ለገብር መረጃ ስርዓት ስኬት ስርዓቱን ለማሳደግ ለገብር ክፍያ ተሳታፊዎችን ለመለየት ነው፡፡

Email: [kookeetii@gmail.com](mailto:kookeetii@gmail.com)

## ክፍል 1: ለገብር መረጃ ስርዓት ስኬት ስርዓቱን ለማሳደግ

1. ዕድሜዎ ስንት ነው?

1. 20 - 29

3. 40 - 49

2. 30 - 39

4. ከ50 በላይ

2. ፆታ?

1. ወንድ

2. ሴት

3. መኖሪያ ወሰን ስንት ነው?

1. ከ1 ዓመት በታች

3. ከ6 - 10 ዓመት

2. ከ1 - 5 ዓመት

4. ከ10 ዓመት በላይ

4. ትምህርት ደረጃዎ?

1. ከ12 ክፍለ ትምህርት

4. ባችለር ዲግሪ

2. 12 ክፍለ ትምህርት

5. ማስተር ዲግሪ ከዚያ በላይ

3. ዲፕሎማ

በዘንድርግበር መረጃ ሥርዓት አተቃቃም ላይ ተግባር ከዘ ወቀጥ ለወቀ ተገ ለፀት ጉዳዩ ችላይ ያለዎቹን አመለካከት ቁጥሩን በሚከተለው መልክ ትኩረት ይደረግዎታል፡፡

		በግምገማታዎች	አልስማማም	ገልልተኝኝ	እስማማለሁ	በግምገማታዎች
<b>ክፍል ሁለት የስርዓቱ ጥራት</b>						
SQ1	የሥራ ሂደቱ ግልፅና የሚያዳግት አሰራር ነው	1	2	3	4	5
SQ2	ስራ ተጠቃሚዎች ጠቀሜታ ላይ ነው	1	2	3	4	5
SQ3	መረጃ አቅርቦት ፈጣን ነው	1	2	3	4	5
<b>ክፍል ሦስት የመረጃ ጥራት</b>						
IQ1	የሚቀርበው መረጃ ትክክለኛ (ከስህተት የፀዳ ነው)	1	2	3	4	5
IQ2	የመረጃ ስርዓቱ ምዕራፍ ገውን መረጃ በበቂ ሁኔታ ይሰጣል	1	2	3	4	5
IQ3	የሚሰጠው መረጃ ጊዜውን የጠበቀ ነው	1	2	3	4	5
IQ4	የተገባው አገልግሎት በታማኝነት / በትክክል ይሟላል፡፡	1	2	3	4	5
<b>ክፍል አራት የአገልግሎት ጥራት</b>						
SV1	ቃል የተጋባው አገልግሎትን በመስተጠት በቀነሰው	1	2	3	4	5
SV2	የአገልግሎት አመራር ሥርዓት አክብሮትና ሐቀኝነት አለው	1	2	3	4	5
SV3	ለሚተየቀነው አገልግሎት አረዳ ታመልሶ ይሠጣል	1	2	3	4	5
SV4	ለሚተየው አገልግሎት አረዳ ታመልሶ ይሰጣል	1	2	3	4	5
<b>ክፍል አምስት ጠቀሜታው ላይ አመለካከት</b>						
PU1	ስርዓቱ የተጠቃሚዎቹን ፈላጊነትና ምኞት ከግምት ያስገባ ነው	1	2	3	4	5
PU2	የመረጃ ሥርዓቱ አጠቃቀም እንደ ሌሎች ጠቀሜታዎቹ ነው	1	2	3	4	5
<b>ክፍል ስድስት የጠቃሚ አርካታ</b>						
US1	አሠራሩ የተጠቃሚውን ፍላጎት ያረካል	1	2	3	4	5
US2	ስርዓቱ የጠበኩት አሟልቶልኛል	1	2	3	4	5
<b>ክፍል ሰባት አጠቃላይ ጠቀሜታ</b>						
NB1	ሥርዓቱ ሥራዎችን አቅሎልኛል	1	2	3	4	5
NB2	ስርዓቱ ገዢዎችን አቅሎልኛል	1	2	3	4	5
NB3	ያለው አሠራር በሥራ ላይ የላቀ አፈፃፀም ያስፈልጋል	1	2	3	4	5

## Appendix D: Calculation of Indirect Path Analysis

### A. Calculation of indirect effects to user satisfaction

Construct	Indirect Path	Indirect Effect
System Quality	$(SQ) \xrightarrow{-0.07} (PU) \xrightarrow{-0.13} (US)$	$0.07 * 0.13 = 0.01$
Information Quality	$(IQ) \xrightarrow{-0.27} (PU) \xrightarrow{-0.13} (US)$	$0.27 * 0.13 = 0.04$
Service quality	$(SV) \xrightarrow{-0.18} (PU) \xrightarrow{-0.13} (US)$	$0.18 * 0.13 = 0.02$

### B. Calculation of indirect effects to perceived net benefits

Construct	Indirect Path	Indirect effect	Total Indirect Effect
System Quality	$(SQ) \xrightarrow{-0.07} (PU) \xrightarrow{-0.22} (NB)$	$= 0.07 * 0.22$ $= 0.02$	$0.02$ $0.15$ $+ 0.01$ $= \underline{0.17}$
	$(SQ) \xrightarrow{-0.28} (US) \xrightarrow{-0.53} (NB)$	$= 0.28 * 0.53$ $= 0.15$	
	$(SQ) \xrightarrow{0.07} (PU) \xrightarrow{0.13} (US) \xrightarrow{0.53} (NB)$	$= 0.07 * 0.13 * 0.53$ $= 0.01$	
Information Quality	$(IQ) \xrightarrow{-0.27} (PU) \xrightarrow{-0.22} (NB)$	$= 0.27 * 0.22$ $= 0.06$	$0.06$ $0.22$ $+ 0.02$ $= \underline{0.30}$
	$(IQ) \xrightarrow{-0.42} (US) \xrightarrow{-0.53} (NB)$	$= 0.42 * 0.53$ $= 0.22$	
	$(IQ) \xrightarrow{0.27} (PU) \xrightarrow{0.13} (US) \xrightarrow{0.53} (NB)$	$= 0.27 * 0.13 * 0.53$ $= 0.02$	
Service Quality	$(SV) \xrightarrow{-0.18} (PU) \xrightarrow{-0.22} (NB)$	$= 0.18 * 0.22$ $= 0.04$	$0.04$ $0.16$ $+ 0.01$ $= \underline{0.22}$
	$(SV) \xrightarrow{-0.31} (US) \xrightarrow{-0.53} (NB)$	$= 0.31 * 0.53$ $= 0.16$	
	$(SV) \xrightarrow{0.18} (PU) \xrightarrow{0.13} (US) \xrightarrow{0.53} (NB)$	$= 0.18 * 0.13 * 0.53$ $= 0.01$	
Perceived Usefulness	$(PU) \xrightarrow{-0.13} (US) \xrightarrow{-0.53} (NB)$	$= 0.13 * 0.53$ $= 0.07$	$= \underline{0.07}$