ADDIS ABABA UNIVERSITY COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE SCHOOL OF INFORMATION SCIENCE (INFORMATION SYSTEM TRACK)

CRITICAL SUCCESS FACTORS OF SCHOOLNET: THE CASE OF MISRAK POLYTECHNIC COLLEGE

By:

Habtamu Zewdu

September, 2020

Addis Ababa, Ethiopia

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A Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Information System

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Declaration

This thesis has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that the thesis is a result of my own investigation except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

Signature: _____

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This thesis submitted for examination with my approval as university advisor.

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Abstract

E-government and e-governance are interchangeable concepts, but both have different meanings. E-government more focus on the infrastructure of information and communication technology that makes interconnection between government services and citizens. The purpose of this research study is to identify critical success factors influencing SchoolNet implementation success in TVET sector. The study is guided by the following two research questions: What are the factors influencing of the SchoolNet implementations in Addis Ababa City Administration TVET Colleges? And which factors are more critical or directly influencing in the successful implementation of SchoolNet? The study used both qualitative and quantitative research methods. Qualitative research method was used to explore factors that determine SchoolNet implementation success and to develop and test critical success theoretical model. The primary and secondary data source of the study is Misrak Polytechnic College comprising a total number of population 600 out of which 406 are trainers and the remaining 194 are ICT department trainees. Total sample size considered is 146 from both trainers and trainees. The study identified seven factors that determine SchoolNet implementation success: college context, SchoolNet content quality, administration factors, SchoolNet systems quality, and SchoolNet services quality, intention to use, and user satisfaction.

Keywords: *Information System Model, SchoolNet implementation, Critical Success Factors*

Table Contents

List of Tables

List of Figures

List of Acronyms

- ICT – Information Communication Technology
- E-Government – Electronic Government
- E-Governance – Electronic Governance
- ITs – Information Technologies
- SSA – Sub-Saharan Africa
- NII – National Information Infrastructure
- CzRM – Citizen Relationship Management
- BPR – Business Process Re-engineering
- CSFs – Critical Success Factors
- FDRE– Federal Democratic Republic of Ethiopia
- EGDI– E-Government Developmental Index
- ICT4D – Information Communication Technology for Development
- GDP – Gross Domestic Product
- SDGs – Sustainable Development Goals
- SchoolNet – School Network
- ISS – Information Systems Success
- TVET – Technical and Vocational Education and Training
- WWW – World Wide Web
- ITV – Instructional Television
- ESDP – Ethiopian Sustainability Development Plan
- KPIs – Key Performance Indicators
- e-Gov – Electronic Government

CHAPTER ONE

1.1. Introduction

E-government and e-governance was interchangeable concepts (Bernhard, 2013), but the two have had different meanings. E-government more focuses on the infrastructure of information and communication technology that makes interconnection between government and the citizen based on the services of the government that give to citizen.

E-governance means giving service or delivering services for citizens based on regulations and policies to control by using e-Government (Kafle, 2018). According to World Bank definition e-Governance refers to the uses of information technologies (ITs) and utilizing the internet & the World Wide Web (WWW), for delivering governmental information and services to users (T. W. Bank, 2009). Information and communication technology (ICT) has the greatest role in the implementation of the e-government system.

E-government implemented for the purposes of making effective service, accountability, and democratic inclusion between governments with citizens. It can apply for education, health, and others sectors. In many developing countries especially, in African countries' governments gave more attention for ICT as development tools and gave the main application area of the use of ICTs to support education in schools by implementing SchoolNet.(United Nations, 2018)

ICT has been accepted all over the world for supporting the quality of education in each country. The main functions of ICT in education system is to connect schools by using ICT technologies, sharing resources for all equally in rural and urban areas as well (Heeks, 2018b). It also improves transparency by providing access to information, increases accountability and easy supervision of the school management on the implementation. It also enables participation through the two-way knowledge and experiences sharing between school managements and their stakeholders. That makes possible SchoolNet services collaboration on evidence-based decision and policy-making, both across the silos of national ministry of education and schools. "*African countries have a low level implementation of ICT infrastructure when compared with the others contents*" (United Nations, 2018). The three ways of ICT are the digital, electrical, and all in one(Heeks, 2018b).

- **Digital ICT**: includes the digital data process like smart phones, personal computers.
- **Electrical ICT**: used the digital ICT and electro-magnetic form devices like radio and TV
- **All ICT**: include electrical ICT plus paper based technologies like pens, typewriters and books.

All above scopes have roles in the educational system, for example, if we take radio and TV, Ethiopia uses as one technology for delivering education and training for all in urban and rural areas in the country. The major objective of information and communication for development (ICT4D), is to maximize the ability of organizations to achieve the desired goals and the objectives (Heeks, 2018a). But most of the developing countries have limitation on implementing ICT successfully depending on each country context. The given application to support education was very less on the implementation of ICT infrastructure for different reasons, for example implementation of successful Information System in TVET Colleges (United Nations, 2018).

A number of studies have been conducted about e-government implementation on SchoolNet. Even if the former researchers identified several challenges and issues, institutional and environmental factors may differ in SchoolNet implementation and strongly needs investigation in order to adopt and use the system efficiently and effectively (Altameem et al., 2006). SchoolNet implementation adopted successfully in one organizational culture, region, or nationwide, may be failure in another(Bernhard, 2013; Lim et al., 2013). Hence, exploring critical factors influencing SchoolNet implementation in TVET colleges is important. Due to this reason, the researcher is motivated to conduct investigation on this area. Further research is needed to identify the critical factors influencing the SchoolNet implementation.

This chapter introduces about the thesis. It presents background and motivation of the study, it consists the problem statement, research questions, and objectives of the study, scope of the study, significance of the study, and organization of the thesis are included.

1.2. Statement of the Problem

In the SchoolNet system, ICT has role to connect the government systems to work at once together. According to FDRE information and communication technology policy and strategy the main role of ICT is accelerating the development of Ethiopia by socio-economic development (MCIT, 2016).

ICT also has the capacity on the upgrading. It cannot limit the range of the place, but it needs good ICT infrastructure. The main benefit of ICT is facilitating the communication of the educators and learners in the education system also ICT has a role on the quality of education and training in the schools. According to Aragaw (2018) stated that, "*Information and Communication Technologies' (ICTs) role is a powerful mechanism in every aspect of education: teaching and learning; teacher training, local-language instruction, monitoring and assessment of student performance, education-systems management, coaching and mentoring, and preparing students for a world in which Information and Communication Technology (ICT) is a necessity for successfully navigating their future careers and lives and contributing to their national economies*".

The Ethiopian government set e-government strategic implementation plan to explore and propose possible paths toward organization, renovation, and development of resources, tools, and services, driven by principles of greater efficiency, effectiveness, and accessibility of government services to the general public up to 2020 G.C (MINT, 2020). Also, Ethiopia established education development road map for the coming 2030 G.C. As the education development roadmap raise as a major challenge in class program. So, to solve the problem of on class program the Ethiopian government developed education development roadmap for twelve years (Tefera et al, 2018). This roadmap helps as a benchmark of the improvement of education. One of the e-government project in Ethiopia is SchoolNet. The main questions, asked on this SchoolNet implementation were how to alleviate and achieve the targeted objective in implementing SchoolNet in TVET colleges. This is a critical question because it needs answers for the question about identifying the success factors of the SchoolNet implementation. According to Dabaghkashani (2012) describe the critical success factors said that the influence of the success of the project implementation. Based on the definition of this research identifying the critical success factors based on influencing the success of SchoolNet project implementation in Addis Ababa City Administration TVET College context.

Many scholars conducted research on the SchoolNet success and challenges also related to SchoolNet. Aklog (2019) identified the technical factors of affecting SchoolNet implementation in Addis Ababa, he stated four technical factors that affect SchoolNet implementation in the school. But he did not address the *governing factors and organizational factors of SchoolNet project implementation*. Critical success factors of e-government implementation categories into three, these are governing factors, technical factors (IT security, IT infrastructure, IT standards, National Information Infrastructure, collaboration, citizen relationship management (CzRM)) and organizational factors (Altameem et al., 2006). Also, as Aklog (2019) work more focused on the technical factors of affecting the SchoolNet implementation, but he missed to address the following governing and organizational factors of SchoolNet success: vision, strategy, funding, top management support, citizen centric, policy & legal issue, technical staffs, system quality, organizational culture and organizational structure. The governing and organizational factors have their own impact on the implementation of SchoolNet. Because the governing factors helps as the roadmap of the project and the organizational factors helps to manage and control the operation of the system (Buabeng-Andoh, 2012; Mengistu, 2018).

Ethiopian government took initiative on the SchoolNet project to improve the performances and the quality of education & training in the school. Satellite Plasma TV project was one of the SchoolNet project implementations in secondary and preparatory schools in Ethiopia. As Assefa (2017) stated the objectives of Satellite Plasma TV projects were resolving of overcomes the shortage of qualified teachers, shortage of textbooks, inefficiency of teaching materials distributed, traditional method of teaching that focus on the rote knowledge memorization, to standardize of delivering education in nationwide and creating the international competent students worldwide and to train youths with the new technology and prepare them. But he has seen the benefits and challenges of Satellite Plasma TV in Ethiopia educational system. Also Assefa (2017) said that the Ethiopian educational problem classified in three ways, these are: infrastructural, instructive and motivational problems. He said that the Satellite Plasma TV resolving the problem of instructional and motivational but the interferences of the decision maker was not good. The decision has created a problem in the teaching and learning process; these problem also reflected on teachers and students as well. The teachers have no time to summarize portions covered by plasma TV teacher to explain in details to the students in the proper way they will understand, since the lesson is given in English language. The points addressed by Assefa (2017) are focused mostly on the

process after the implementation of the instructional TV (ITV) but not fully focused on the infrastructure before implementation such as the technical factors.

Therefore this study is motivated on the critical success factors influencing of e-government implementation of the SchoolNet in Addis Ababa City Administration: the case of TVET collages. The recent research addressed the benefits and challenges of the ITV and the most researchers properly addressed the technical factors of the e-government implementation especially the SchoolNet project implementation based on our country. Recently Addis Ababa TVET agency took initiative for improving education and training by SchoolNet project. In the SchoolNet seen some problems with regard to governing and organizational factor categories; for example, almost in all TVET colleges linked by ICT infrastructure do not have regulation and policies for accessing and regulating the services. This is directly related to the organizational and governing factors issues, since there is no technical staff in every governmental colleges to resolve the technical issues timely (CNBM International Engineering CO. LTD, 2016). Consequently, teachers and students frustrate and loss their interest to access the system (Assefa, 2017). So, the main issue is identifying the basic factors influencing the SchoolNet in the time of implementation directly and overcome the challenges and use all opportunities for the desired success (Altameem et al., 2006). Hence the main focus of this research is to identify the critical success factors of SchoolNet implementation and select out the most major factors that directly influencing the SchoolNet implementation in Addis Ababa City Administration TVET Colleges.

1.3. Research Question

The research questions to be answered by the research are:

- What are the factors influencing the success implementations of SchoolNet in Addis Ababa City Administration TVET Colleges?
- Which factors are more critical or directly influencing in the success implementation of SchoolNet?

1.4. Objectives of the Study

1.4.1. General Objective

The overall objective of this study is to identify the issues that critically or directly influencing the successful implementation of SchoolNet in TVET colleges in Addis Ababa city administration.

1.4.2. Specific Objectives

The specific objectives of the study are:

- To identify the factors influencing the SchoolNet implementation related to governing factors and organizational factors in TVET colleges.
- Find out the different levels of importance of each of the factors in the management process;
- Suggest different ways of managing those critical factors in order to accomplish the success adoption or implementation of SchoolNet in the TVET colleges.

1.5. Significance of the Study

This research helps to investigate critical challenges of SchoolNet project implementation and minimize those challenges at initial stage. It will also recommend possible solutions to the challenges facing the SchoolNet program implementation. Furthermore, it will inform the TVET college principals, ICT staffs, policy makers and TVET college governing bodies to fill the gaps in the implementation of the SchoolNet program, since the research tries to investigate the critical success factors in implementing the project, the success of the system will benefit TVET college communities. And it will also serve as a baseline to inspire other researchers in area of similar study.

1.6. Scope of the Research

The purpose of the study is to investigate the critical success factors influencing SchoolNet implementation in selected TVET colleges in the Addis Ababa city also in this study more focus on the organizational success factors.

1.7. Organization of the Study

This thesis focused on success factors of SchoolNet implementation in Addis Ababa City Administration: the case of selected TVET collage. It is organized into six chapters inclusive of the introduction. Chapter two literature review of the e-government implementation factors specifically on SchoolNet project implementation in Ethiopia and all of the world also related works. Chapter three is research model and hypothesis development based on SchoolNet implementation success in the TVET College. Chapter four focus of the Research Methodology I use in this thesis that deals with the research design, research methods, research samples, data collection method and data evaluation techniques. The fifth chapter finding and analysis part this more focus on the gating data, synthesize and setting the gate result based on the research question also lastly making suggesting success factors e-government implementation model or framework of SchoolNet program. Also contains discusses a framework for the SchoolNet program implementation. The last chapter conclusion and recommendation part this lists out the fund out of the last results and I recommend what doing the next time to implement SchoolNet also to set the future work.

CHAPTER TWO: LITERATURE REVIEWS

2.1. Introduction

This chapter contains literature review processes and information related to issues of problem statement and research questions. It starts by setting the process of literature reviews and then continues explaining the definition of e-government and related issues. Also explaining the definition of SchoolNet and selecting the most suitable definition for the study. So it indicates, ICT has a greater role in education, trends in ICT combination and implementation in education, factors influencing ICT combination of education, the SchoolNet project initiatives, ICT education in Ethiopia, the SchoolNet project in Ethiopia since all of these topics highly correlate to the research as well as to build understanding of these concepts. The factors that influencing SchoolNet project implementation have been collected from different previous studies and theories. Moreover, the possible measures taken to overcome the critical success factors that influencing of e-government implementation of SchoolNet project was discussed at the end of this chapter.

2.2. ICT in Ethiopia

According to Aklog (2019), the use of ICT in Ethiopia is lower level than other countries; it seems that the situation has been improving recently. For example, the number of the Internet users has increased more than twenty times in the last decade. The improvement can be explained by the national policy which places importance on ICT. The Ethiopian Government has naturally made the development of ICT one of its strategic priorities and has placed a significant emphasis on its role of economic infrastructure as set out in the second Growth and Transformation Plan (GTPII) (MCIT, 2016). This policy shows the role of ICT in Ethiopia for the development of social-economy. The expansion of ICT has significant changes, but still has limitations and challenges on the development of ICT sectors in Ethiopia. The mission of the Ethiopia on ICT is developing, deploy and use information and communication technologies to improve the livelihood of every Ethiopian, and optimize their contribution to the development of the country (MCIT, 2016).

According to Tolla (2018) presentation, Ethiopian government takes initiatives as a national a level that helps to address information and communication technology for all sectors. As his description ICT initiative classified into perspective the first one is national and the second one sectoral. For a national perspective, he was looking from the different aspects like policy, e-government vision, ICT goal alignment with a national plan, and strategy (enabling environment, e-readiness, usage, and operating model). In other hand, he saw sectoral perspective from infrastructural, standard and regulatory, human capital management, and applications (Tolla, 2018). As his presentation, Ethiopian government gives the key point for the country development by accelerating the building of good governance. The Ethiopian government as well gives more attention for education to support by information and communication technology (ICT).

So, the government sets three main streams for ICT in education implementation strategy. These are Ethiopian National SchoolNet Initiative, The National ICTs in Higher Education Initiative, The National ICT Education, Training and Awareness Initiative. The major aimed of the Ethiopia national SchoolNet initiative was deploying and exploring of ICTs to facilitate the teaching and learning process within Ethiopia education institutes or organizations in secondary and TVET colleges (*Infrastructure - Mint*, n.d.). The ICTs in Higher Education Initiative focuses on deploying ICTs within the universities, colleges, and research institutions (*Infrastructure - Mint*, n.d.). And, finally, the National ICT Education, Training and Awareness initiative promote ICT awareness and literacy, lifelong and adult education, and distance and virtual education and learning (Hare, 2007). Again Atsede (2017)stated on the final master paper work, the ESDP III discusses that ICT infrastructures are provided to schools to receive satellite education transmission to enhance the quality of education at secondary level. Moreover, with the objective of improving the quality of education and supporting teachers, the process has started to make use of the SchoolNet service for the 161 preparatory schools, grade 11-12 (Atsede, 2017).

2.3. Critical Success Factors

Critical success factors (CSFs) refer as 'the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization' (Mike, 2016; Napitupulu, 2014). The others authors define critical success factors measured based on key performance indicators (KPIs) that must keep to the SMART (specific, measurable,

achievable/attainable, relevant and time-bound) criteria (*Performance Measurement: Critical Success Factors and Key Performance Indicators - Accounting Weekly*, n.d.). Also the Ethiopian Ministry of Communication and Information Technology (MCIT) set strategies for the improvement of livelihood by developing, deploying and using ICT and optimize its contribution for the development of the country. As the ministry focusing point on e-government is to create SMART (Simple Moral Accountable, Responsive and Transparent) Government ("Executive Summary of the E-Government Strategy," 2013). These CSFs definitions tells us to make the measurement of the success of the SchoolNet project criteria. So the Service Quality Division point, three main criteria those in order to ensure that measures are critical and meaningful. The first criteria are information must be critical to the success of your company or organization, the second is measurable and quantifiable, and the last is baseline must be established in order to measure progress or changes (*Critical Success Measures – ASQ Service Quality Divison*, 2016).

In this research the critical factors focus on the main challenge of the SchoolNet project implementation success and it measures from the project success and the impact on the teaching and learning quality in the TVET Colleges. Basically CSFs addressing factors in the process of the SchoolNet project implementation and the accessing of the project in the TVET Colleges. Some scholars identified critical success factors for implementation of e-government. Mostly classified into three categories these are governing factors, technical factors, and organizational factors. Each category factors has sub factors (Aklog, 2019; Al-Naimat et al., 2013; Altameem et al., 2006). SMART helps to measure the critical success factors of SchoolNet project implementation in each school and college. As Belassi & Tukel (1996) critical success factors classified into two aspects these are construction or building and development project aspect. They said construction project mostly, if not all, consider the weather condition and the development project, consider the lifetime spam (Belassi & Tukel, 1996). They saw the factors from four areas such as factors related to the project, factors related to the project manager and the team members, factors related to the organization, and factors related to the external environment.

2.4. Definition of E-Government

E-Government enhance the distribution of government service area to the community through a combined and interoperable network of inheritance systems, improved with the latest technology. In its entirety, e-Government entails the use of Information and Communication Technologies (ICTs) by the government in the provision of public services (B. Mokone et al., 2018; Joseph, 2017). According to Al-Shafi & Weerakkody (2010) said that "*e-Government has been defined and conceptualized in different ways in normative literature. Some definitions view e-government from a narrow perspective of exploiting the accessibility of ICT and the Internet to improve the efficiency of government systems. Others view it from a broader perspective that of a system of reform and government process engineering. Nevertheless, despite several conceptions, the definition of e-government remains vague and a concept of some debate among the various e-government scholars*".

E-Government means, electronic government refers to the digital government, online government, and transformations government. E-Government have many definitions, but it differs from one to the others that mean it has no common standard definition, concepts up to now(Lessa, 2015). This phenomenon is a worldwide phenomenon taking place in developed and developing countries (Al-Naimat et al., 2013). As Grönlund & Horan (2005) stated that e-government has three goals, such as more efficient government, better services to citizens, and improved democratic processes. This point, tells that the e-government more efficient compare with the traditional government system in the giving service for citizens. E-government is associated with the use of ICT in government by focus on the distribution of services and processes, the widest meaning includes all aspects of government movement (Grönlund & Horan, 2005). This definition describe e-government implementation need ICT infrastructure, and the government functions and services.

As World Bank definition "*the pragmatic use of the most innovative information and communication technologies, like the Internet, to deliver efficient and cost effective Government services, information and knowledge*" and "*government-owned or operated systems of information and communications technologies (ICTs) that transform relations with citizens, the private sector and/or other government agencies so as to promote citizen empowerment, improve service delivery, strengthen accountability, increase transparency, or improve government efficiency*" (W.

Bank, 2002). The World Bank both definitions are told that e-government implementation take highly ICT infrastructures to connect the government system with civilian or clients for delivering of services. So, E-government is the use of information and communications technologies (ICT) to transform government by making it more accessible, effective and accountable. It includes that, providing greater access to government information; promoting civic engagement by enabling the public to interact with government officials; making government more accountable by making its operations more transparent and thus reducing the opportunities for corruption; and providing development opportunities, especially benefiting rural and traditionally underserved communities (Khalil et al., 2002). As explained earlier in the definition of E-Government, that the purpose of E-Government is to improve the performance and functions of government services by utilization of digital media. At the end, all stakeholders can obtain government services and public information from the result.

2.5. Definition of SchoolNet

UNESCO defines a school network, or SchoolNet, as a network that is set up to support effective use of the information and communication technologies (ICT), particularly the Internet, helps to enhance to establish a good education system in the schools network by supporting communication technologies that improve the performances of the student activities among in schools network. From an organizational perspective, SchoolNets vary from being private, non-profit, governmental or intergovernmental initiatives (UNESCO, 2007). In this definition we can get different platforms of SchoolNet projects, which means the implementation of e-government system in educational sector within different formats like satellite broadcasting or VSAT, portals or web 2.0 formats. In SchoolNet project needs the collaborations of stakeholders and the organization working in the education sectors. In computer supported collaborative learning emphasizes that ICT has a part to play in the SchoolNet implementation (Scimeca et al., 2009). In the SchoolNet program the main actors are schools, country, school network associated with the given project, and activity within the school network in which the teacher is participating. According to Wasserman & Faust said that, school network (SchoolNet) considers as a social network was the arrangement of which is made up of nodes and edges. Nodes are the individual actors (e.g. teacher, school) within the school networks and the edges are the relationships between the actors (e.g. an activity) (Dekker & Hendriks, 2005).

According to National Council of Teachers of Mathematics said that SchoolNet which can lead you to a multitude of useful ideas and resources (Lazerick, 2014). In SchoolNet project includes different projects like School or College official websites this gives information for their users or clients, Satellite Plasma Television Broadcast this project helps to disseminate education by equality for all students at the same level with quality by using ICT infrastructure and telecommunication infrastructure (Melesse et al., 2011). Ethiopian government gives more intention for Information Communication Technology (ICT) for different purposes like for education to increase the quality of teaching and training to produce the qualifying manpower for the country. According to Ethiopia Ministry of Innovation and Technology the National SchoolNet program is mainly aimed at the deployment and the exploitation of ICTs to facilitate the teaching and learning process within primary, secondary, technical and vocational schools. It aims at providing, facilitating internet connectivity with adequate bandwidth to schools & other educational institutions in order to provide information & services to all stakeholders in the Education sector (students, teachers, Government/regulatory agencies, and educational institutions) efficiently using ICT, and enable all stakeholders to contribute & participate in the development of the Education Sector (eGov Infrastructure, 2019). According to Heeks (2018), educational information system or e-education system must be consider or give intention for the key education systems actors such as education policy makers, education managers, teachers/lecturers, and students/learners. These actors have great roles on any education project implementation become to the success or fail (Heeks, 2018b). So SchoolNet, one of this education project implemented in Ethiopia high schools and preparatory schools to improve the education system dissemination and quality (Assefa, 2017; Atsede, 2017).

2.6. Context for SchoolNet Implementation in Ethiopia

In this SchoolNet system have major problems like for example the network system is idle between end of May to the end of September each year(the available capacity is not fully utilized) because of the system setup made by MOE to function only for 9 months. Consequently it leads to huge resources wastage and influence on the country economy (Samuel, 2007). The implementation of the SchoolNet program is a one-way system which does not consider the stakeholders using the system like VSAT (Very Small Aperture Terminal) satellite connection. Why looking the case in Addis Ababa the implementation of the SchoolNet program relatively better than others cities and

small towns in the country. But it doesn't mean that there is no problem in Addis Ababa, because the SchoolNet has a different problem/challenging factors with regard to implementation of the SchoolNet program.

According to Assefa (2017) on Educational Technology Implementation in Ethiopian High Schools: Benefits and Challenges of the Instructional Plasma TV study said that "*educational system should be designed in such a way that it can create conducive environment for delivery of knowledge in such a way that it can be easily assimilated by students*" (Assefa, 2017). This tells us when building the education system, it must be much the system with the reality of the stakeholders' status. At the designing of the SchoolNet must be compatible with the facts of the schools environment and other factors that can affect the system. Because Assefa (2017) said that, educational problems are classified into infrastructural, motivational, and instructional. Infrastructural problems as Temtim said that there is no adequate infrastructure in all high schools. As stated by Mesfin (2004) the national ICT capacity building program on different projects such as the satellite education (multi-channel interactive TV), SchoolNet, agriNet, HealthNet and WoredaNet (Mesfin, 2004). So, this shows that the Ethiopian government took the initiative of developing the e-government project all over the country, especially on satellite education, SchoolNet, agriNet, HealthNet and WoredaNet projects.

Also Belachew (2010) on e-Government initiative in Ethiopia work mentioned that, the major initiatives can be divided in infrastructure, application, standards/guidelines and human resource development. As he stated that "*SchoolNet is another big network connecting the different schools distributed all over the country. In this network, a total of 756+ schools is connected which are 574+ of them are high Schools and 191+ of them are preparatory Schools. Services like video education (synchronous, unidirectional), digital library and internet are provided in the Schools connected to this network*" (Belachew, 2010). This shows that the Ethiopian Government gave more attention SchoolNet program to increase the quality of the teaching and learning system. In this activity, ICT plays a great role connecting schools. According to Assefa (2017) said "*the Ethiopian education system approach is using a one-way system that means top-down*".

Ethiopia Ministry of Education on education sector development program V action plan takes ICT as one component to improve educational quality. These is a great opportunity to expand SchoolNet infrastructure all over Ethiopia. It is stated the document that "*the government is*

committed to the expansion of ICT use in education in order to improve the quality of teaching and learning" (FME, 2015). But still teaching and learning system has problems or it failed partially or fully to some extents. These have many reasons for the failure of teaching and learning system due to inadequate infrastructure. Infrastructural problem is not only for the SchoolNet project, but also for others e-government project as well. Where ever there is good infrastructure the system will be implemented successfully. This proves that infrastructure is one of the influencing factors of e-government implementation. In fact the ICT infrastructure in our country has many problems when comparing with other parts of the world. According to United Nations e-Government Survey 2008 and 2018 report Ethiopia is categorized under lower level e-Government Development Index (EGDI) (Belachew, 2010; United Nations, 2018).

According to Atsede (2017) on the research stated that "*improving all aspects of the quality of education and ensuring excellence of all is mainly aimed to bring recognized and measurable learning results that are accomplished by all, particularly in knowledge, proficiency and critical life-skills. ICTs have significant contributions to changes in learning and teaching practices, school change and innovations, and community services*". As her explanation Ethiopian government gave more attention to ICT to support the educational sectors, but have a limitation on the implementation. According to Belachew (2010) said that "*schools network solves a number of problems associated with the educational processes, like unavailability of qualified teachers in different subjects, the shortage of educational materials, inconsistent content delivery of the same subjects in a different location, etc. Using this network, the above mentioned limitations are somehow solved in the schools connected to the network*". All of local researchers mentioned the Ethiopian government took the initiative of SchoolNet project to improve the educational quality and dissemination for all equivalent levels in both urban and rural areas.

2.7. Models or Frameworks of Information System Success

Many scholars proposed the information system project success models like DeLone & McLean (2003) information system success model, Ziemba et al. (2013) conceptual model of success factors for e-government adoption, Belassi & Tukel (1996) critical success/failure factors in projects model, Altameem et al. (2006) critical factors for e-government adoption model, and Tesfaselassie (2019) e-learning systems success model.

2.7.1.DeLone & McLean (2016) Information Systems Model

Updated D&M IS success model has been reviewed by Nkanata (2020) "*the evaluation of an information system's success is considered an important aspect of the information system field both in practice and research. E-government project evaluation helps to identify the strengths, weaknesses and best practices for both local and international integration*". This show that D&M ISS model has advantage on the success of SchoolNet implementation.

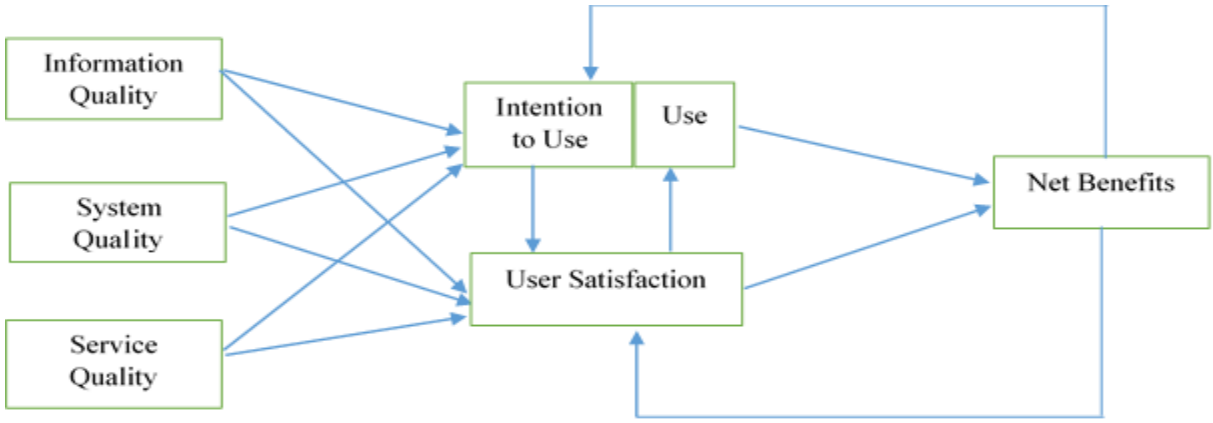

Figure 1: Updated D&M IS success model

The updated DeLone and McLean information system success model somehow has a slight difference from the original DeLone and McLean information system success model. The updated model more elaborates the seven success dimensions.

- **System Quality: -** "*The desirable characteristics of an information system. For example, ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times*".
- **Information Quality: -** "*The desirable characteristics of the system outputs; i.e., management reports and Web pages. For example, relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability*".
- **Service Quality: -** "*The quality of the support that system users receive from the information systems organization and IT support personnel. For example, responsiveness, accuracy, reliability, technical competence, and empathy of the IT personnel staff*".

- **Use: -** "*The degree and manner in which employees and customers utilize the capabilities of an information system. For example, amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose of use*".
- **User Satisfaction: -** "*Users' level of satisfaction with reports, Web sites, and support services. For example, a couple of the most widely used multi-attribute instruments for measuring user information satisfaction (UIS)*".
- **Net Impacts: -** "*The extent to which information systems are contributing (or not contributing) to the success of individuals, groups, organizations, industries, and nations. For example: improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development*".

Source Doc: (DeLone & McLean, 2016a)

2.7.2.Ziemba et al. (2013) Conceptual Model of Success Factors for e-Government Adoption

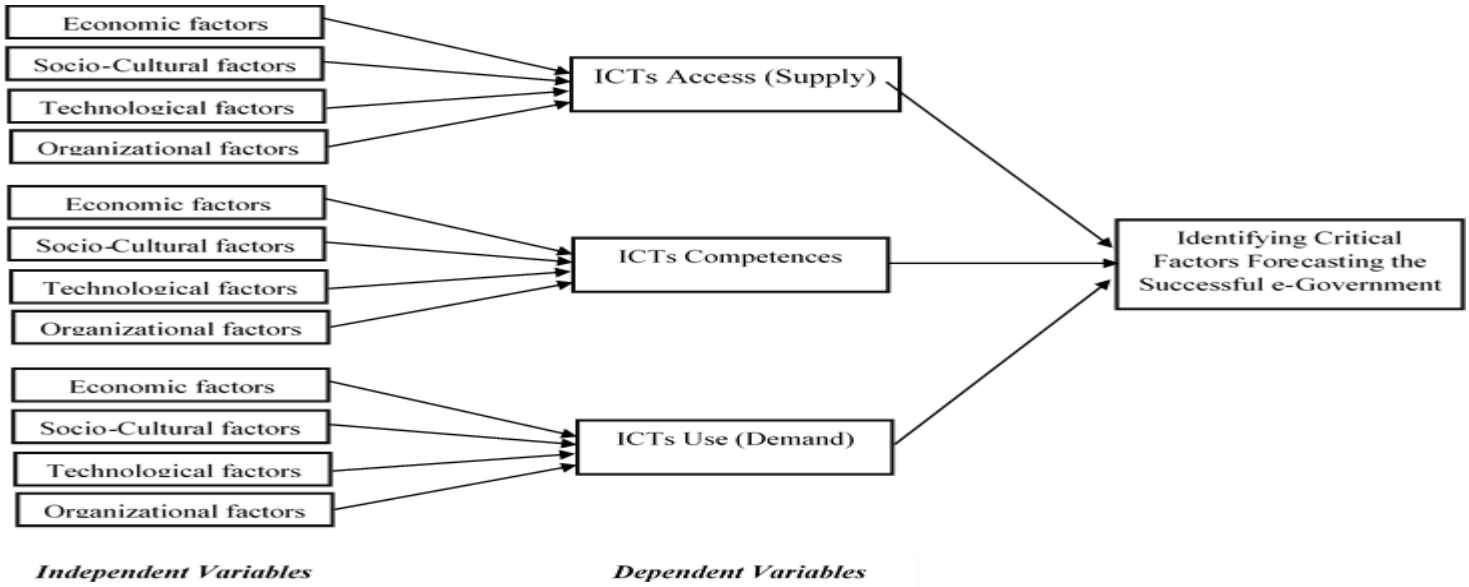

Figure 2: Ziemba et al. (2013) conceptual model of success factors for e-government adoption

E-Government adoption requires "*firstly, technical and economic accessibilities of ICTs: - ICTs access (supply) stage, secondly competences and awareness related to the use of ICTs: - ICTs competences and awareness stage, and thirdly usage of ICTs by government units, citizens and businesses: - ICTs use (demand) stage*" (Ziemba et al., 2013). They identified three dependent

variables and four independent variables. Then after they design the success factors model to improve the adoption of e-government. Below critical success factors for e-government adoption conceptual model proposed by them.

In this conceptual model the dependent variable helps as eye glass to examine the independent variables to find out the critical factors to achieve the objectives and goals of the given e-government project implementation and adoption (Ziemba et al., 2013). Based on the above conceptual model it has four discussion issues such as economic factors, socio-cultural factors, technological factors, and organizational factors related to e-government implementation or adoption.

2.7.3.Belassi & Tukel (1996) Critical Success/Failure Factors in Projects Model

As Belassi & Tukel (1996), the critical factors most of related to theoretical based or empirically proved. They focused on four areas that influence the system these are factors related to the project, the project manager and the team members, the organization, and the external environment (Belassi & Tukel, 1996).

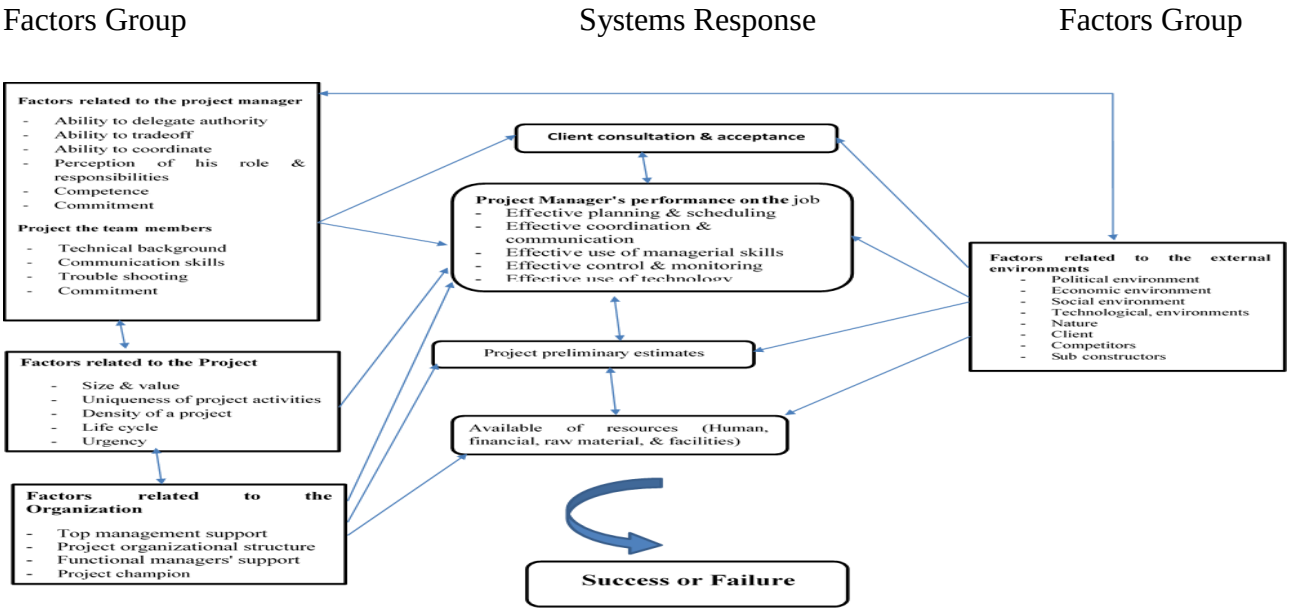

Figure 3: Belassi & Tukel (1996) critical success/failure factors in projects model

As Belassi & Tukel (1996) defines critical/failure factors which lead to effects on project (called "system responses"). The one group factors influence other groups on the project success or failure.

On the document stated there are many challenges based on one project to answer the problem was impossible. So, they categorized into four groups as the factors, behaviors to improve the challenges of the project (Belassi & Tukel, 1996). On Belassi & Tukel (1996) stated that critical success or failure factors model based on the project design have external and internal factors that influence any project implementation. In the internal side have three factors groups (project and team members, project, and organization) and external side only has the external environment. Most of the time SchoolNet project fails in many factors, according to Belassi & Tukel the project fails due to several factors inherent in projects (Belassi & Tukel, 1996). These are:

- **Factors related to project**: - They listed six characteristics influence the project success/fail these are the size and the value of a project, the uniqueness of project activities (vs. standard activities), the density of a project network, project life cycle and the urgency of a project outcome (Belassi & Tukel, 1996).
- **Factors related to the project manager and the team members**: - "*The project manager's commitment and competence become most critical during the planning and termination stages. The competence of the team members is also found to be a critical factor during the implementation stages. Note that these factors not only affect project performance but they also have an impact on client satisfaction and project acceptance*" (Belassi & Tukel, 1996).
- **Factors related to the organization**: - "*Clearly, full support from the organization for the project helps to facilitate and implement strategies for the successful completion of projects*" (Belassi & Tukel, 1996).
- **Factors related to the external environment**: - "*A number of environmental factors, such as political, economic, and social, as well as factors related to the advances in technology or even factors related to nature affect project performance, either positively or negatively*" (Belassi & Tukel, 1996).

2.7.4.Altameem et al. (2006) Critical Factors for E-Government Adoption Model

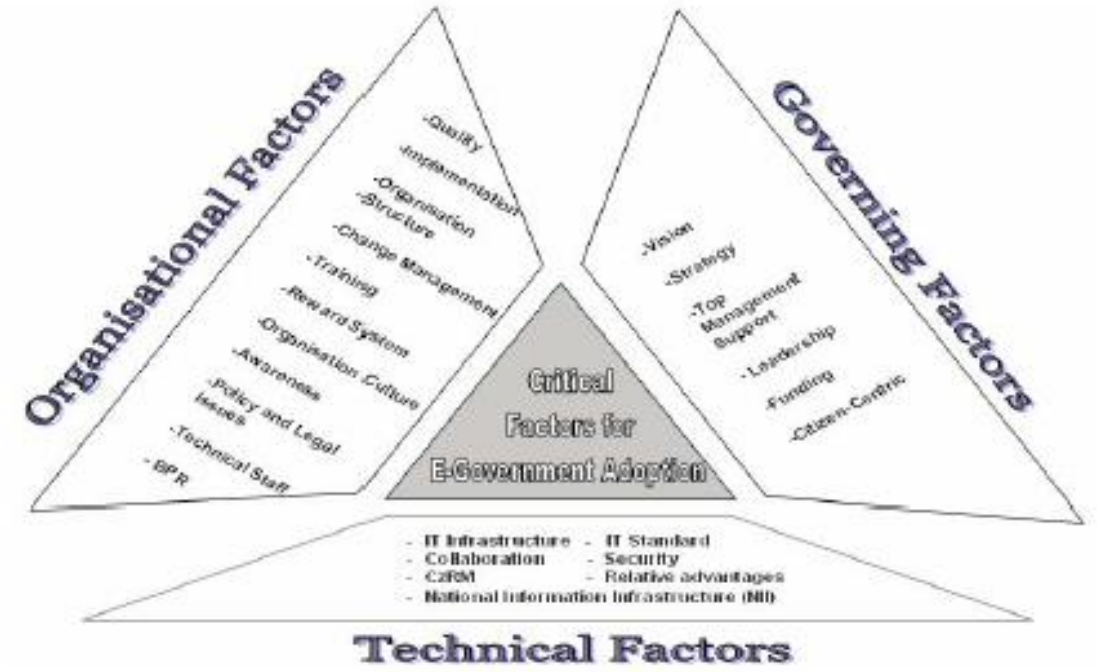

Figure 4: Altameem et al. (2006) critical factors for e-government adoption model

Altameem et al. (2006) identified that the critical factors for e-government adoption or implementation success. According to them, the critical factors classified into three parts these are technical factors, organizational factors, and governing factors (Altameem et al., 2006). The technical factor includes different sub-factors that affects the e-government implementation in the organizations. Some of them are IT infrastructure, IT standard, security, collaboration, relationship management, relative advantage and others (Aklog, 2019; Altameem et al., 2006). Governing factors means the decision of the management to implement e-government in the organization. Some of sub-factors that include under governing factor like vision, strategy, and top management support, leadership, citizen-centric, and funding or budget. In organizational factors for successful e-government implementation are policy & legal issue, quality, reward system, implementation, training, and organizational structure (Ajoye & Nwagwu, 2014; AlAwadhi & Morris, 2009; Altameem et al., 2006).

2.7.5.Tesfaselassie (2019)Proposed E-learning Systems Success Model

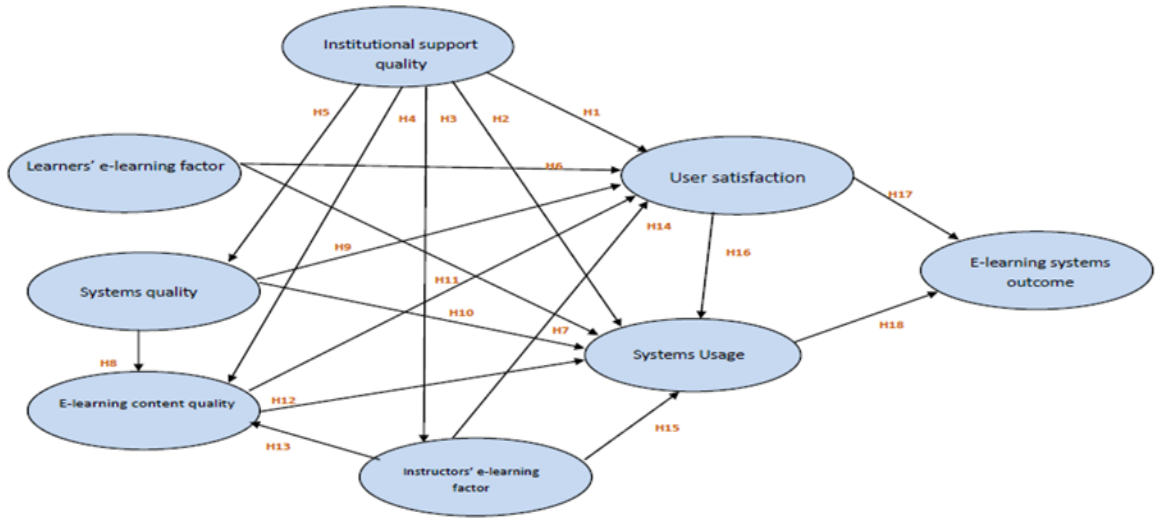

Figure 5: Tesfaselassie (2019) e-learning systems success model

As (Tesfaselassie, 2019) proposed e-learning systems success model concepts derived from DeLone and McLean Information Systems Success Model. Because he mentioned on the document "the constructs of the updated ISS model were used as seed constructs or scaffolds to develop the study's model" (Tesfaselassie, 2019). So the constructs of the Yonas proposed e-learning systems success model come from the DeLone and McLean IS Success Model constructs. These are: system quality, information quality, service quality, user satisfaction, systems use, and net benefit (Tesfaselassie, 2019). As his explanation:

- **System quality**: measures the desired characteristics of e-learning system.
- **Information quality**: measures the desired characteristics of the output of the e-learning system.
- **Service quality**: tangibles, assurance, empathy, responsiveness and reliability constructs in order to measure the service quality.
- **User Satisfaction**: measured in terms of the user's satisfaction in relation to the system performance
- **Systems use:** plays significant role in the success of IS in that more use will produce more system benefits and declining usage may signify that the expected system benefits are not being realized.
- **Net Impact**: - Final outcome of the system implemented.

Table 1: Summary of Information Systems Success Models

DeLone and McLean Information Systems Success Models	Ewa Ziemba, Rafał Żelazny and Tomasz Papaj Conceptual Model of Success Factors for e-Government Adoption	Walid Belassi and Oya Icmeli Tukel critical success/failure factors in projects model	Yonas Hagos Proposed E-learning Systems Success Model	Torki Altameem, Mohamed Zairi, and Sarmad Alshawi CFs for E-Government Adoption Model
- Information quality - System quality - Services quality - Intention to use - Use - Satisfaction of users - Net benefits	- Economic Factors Related to e-Government Implementation or Adoption ICT competent - Socio-cultural Factors Related to e-Government Implementation or Adoption - Technological Factors Related to e-Government Implementation/Adoption - Organizational Factors Related to e-Government Implementation/Adoption	- Factors related to the project - Factors related to the project manager and the team members - Factors related to the organization - Factors related to the external environment -	- Learners' e-learning factor - Systems' quality - E-learning content quality - Institutional support quality - Instructors' e-learning factor - User satisfaction - Systems Usage - E-learning system's outcome	- Technical Factors - Governing Factors - Organizational Factors

As explained above, out of the five models mentioned, based on the D&M ISS model for this study it is easy to identify the basic factors influencing the SchoolNet success mentioned on the statement problem and fill the gap as may be appropriate based on the objectives. Hence, this model enables us to see from various perspectives. According to Nkanata (2020) review D&M ISS model has "*six attributes of successful information systems, which are multidimensional and closely interrelated*" and "*E-government is considered to be an aspect of an information system and the D&M Model can be applied to assess its effectiveness. The key primary purpose with which the two scholars, DeLone and McLean, came up with the model was to synthesize the previous information systems research into more coherent knowledge, which can be used as a guide for future researchers*".

2.8. Dimensions of Information Systems Success

During the literature, some dimensions of ISS are obviously stated as system quality, information quality, and intention to use, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 2016a). Jaafreh (2017) pointed out that System Quality dimension refers "*as technical side in IS model. It is the desired characteristics of the information system itself, which produces the information*" (Jaafreh, 2017). The characteristics of the System Quality (SQ) are ease of learning, ease of use, availability, response time, system reliability, flexibility, personalizability, system interactivity, and system security (DeLone & McLean, 2016a; Gorla et al., 2010; Jaafreh, 2017; Kim et al., 2003). Under this perspective DeLone & McLean (2016) explained that "*the perceived variability in 'System Quality' has diminished; and, because it varies less, it is having less of an impact on desired outcomes. Nevertheless, 'System Quality' must still remain a key variable in measuring the success of information systems*". In addition to this, the structural dimension of system quality refers to the technical side in information systems model to show the degree of the quality.

2.9. Understanding Factors Influencing E-Government Implementation

Different scholars discussed on the factors of e-government implementation in different point views like political factors, organizational factors, technological factors, and social factors (El-Haddadeh et al., 2010), e-government strategy factors, business and IT alignment factors, e-

government initiatives factors (Al-Shboul et al., 2014), organization factors, technology factors, and people factors (Al-Naimat et al., 2013). According to the Association for Information Systems identified four factors themes influence e-government implementation. These are political, organizational, technological, and social/people (El-Haddadeh et al., 2010). Also barriers of using new ICTs another factor to influence the e-government implementation (Al-Shboul et al., 2014). The above factors also the factors o the SchoolNet implementation in Addis Ababa City Administration TVET Colleges.

2.9.1. Organizational Factors Influencing E-Government Implementation

According to Müller & Skau (2015) said the characteristics of the organization influence the IT project implementation success. As they mentioned the rules, values, and norms of the organization along with management, the employees, teachers, students, and their willingness to change and access the SchoolNet project in the schools (Müller & Skau, 2015). Cultures of the organization one of the main influencing or affecting the implementation of the SchoolNet project in both sides' success and failure. According to Usun (2004) stated "*Culture is a complex whole that includes knowledge, beliefs, arts, morals, laws, customs and any other capability and habit by a human being as a member of the society. Language is one of the major factors that hinder the easy assimilation of ICTs by many developing countries. This hinders the transfer of technology. The radio and TV programs, computer software and the printed texts are produced in different countries bearing different cultural backgrounds. As such, such tools may fail to impress students of another country*". Both articles explained the organization characteristics and culture directly influences the information communication technology project implementation like SchoolNet, HealthNet and others projects. The other thing is financial factors, according to Müller & Skau (2015) stated "*the economy and financial resources that determine implementation failure or success. The budget of the organization is also important, because it reflects the priorities of the organization on a symbolic level*".

2.9.2. Technical or Technological Factors Influencing E-Government Implementation

As soon as a technology is selected, there are certain other factors that necessitate the concern of policy makers. Because, "*the use of technology in education networks rely on two key elements. These are considered to be information resources and tools*" (Study, 2005). Information resources means educational resources in teaching learning context. "*Education resources refer to all human, material, non-material audio-visual school environment and community materials available in an academic environment to facilitate school administration and simplify the teaching learning process*" (Usman, 2016). "*The infrastructure includes the organizing principles which influence organizational behavior, both internally and externally*"(Müller & Skau, 2015). The organizational infrastructure should therefore be given attention as "*it impacts implementation readiness; and the existing data and information foundation is of significance in the sense that e-government implementation is facilitated by a well-developed infrastructure*" (Müller & Skau, 2015).

2.9.3. Political Factors Influencing E-Government Implementation

Politics have a great role in the development of the e-government system in Ethiopia. The major role is to achieve the suitable developmental goal of Ethiopia. According to (Wales et al., 2016) said that, "*one striking gap is the lack of analysis of how education systems interact with the political context in which they operate*". The political system in the country will also influence on the educational system in the nation. As Wales et al. (2016) mentioned that "*we would expect any political settlement to have varying degrees of influence on the different aspects of education reform*".

When launched 2006 SchoolNet program in Ethiopia there was high political interference, and the stakeholders roles on the suitability & use of the new system was not considered (Assefa, 2017). According to Wales et al. (2016), "*a political settlement exists where powerful groups have agree to stop fighting and pursue their aims through peaceful politics*". Also Usun (2004) stated that "*The perceptions and attitudes of a political system greatly affect the acceptance and growth of technology in any society. The same holds true for all the ICTs relevant to Distance Education. A*

political system conscious of the payoffs of ICT for the enhancement of the educational profile of a country will frame appropriate policies for the adoption and dissemination of ICT throughout the length and breadth of the country. ICT should always be selected in accordance with its end result that is the extent to which it can bring about positive pedagogic outcomes".

2.9.4. Social Factors Influencing E-Government Implementation

One of the success factors regularly stated in the literature is the significance of information and knowledge sharing. Several employees own tacit knowledge dynamics to an application, and a lack of information and knowledge sharing is challenging because it entails humble organizational learning and social interaction (Müller & Skau, 2015).

2.10. Related Works

Researchers have been done by scholars from abroad regarding assessment factors affecting SchoolNet project implementation positively and negatively on the success. Some of them are discussed as follows.

Aklog (2019) focus on the major technical factors which affect SchoolNet project implementation were identified and put based on the critical level of importance of the project, by reviewing the literatures and identifying of the sources of technical factors that affecting the SchoolNet project. As he stated four sources of technical factors that influencing the success of SchoolNet project implementation. These are ICT infrastructure, IT Security, IT Standard, and Technical Experts. Also, he was addressing the ICT implementation related to educational and learning process; the management of technical issues like IT Security management, IT Infrastructure management, IT Experts management, and IT Standard management; and the specification of technical factors of SchoolNet project implementation. He used case study survey research strategy and for data collection also used a structured interview (Aklog, 2019).

Tesfaselassie (2019) focuses on E-Learning success model the case of Ethiopian higher education institutions. As he stated the Ethiopian higher education have the lack of consensus towards determinant factors of e-learning system's success that would be applicable across all settings (Tesfaselassie, 2019). So he was addressing the highlight of E-Learning system definition, and the

current level in Ethiopia. Also, he identified four major categories of E-Learning definitions such as technological definitions, delivery system oriented definitions, communication oriented definitions, and educational paradigm oriented definitions. He adopted DeLone and McLean information success model for his E-Learning Success Model. He used positivism philosophical paradigm also he used inductive and deductive research approach. And he used case study research approach (Tesfaselassie, 2019).

Aragaw (2018) discussed practices, challenges, prospects of SchoolNet implementation in secondary schools of Addis Ababa city administration. In this study, the researcher found three main results such as, inadequate infrastructure, teachers' lack of ICT skills, poor administrative practices, shortage of electrical power, and the limited internet connectivity. Also the most teachers used a blackboard and charcoal for learning and teaching process, but they have limitations on the using of ICT for learning and teaching purpose. And the most management staffs have poor awareness the advantages of ICT in the learning and teaching process so they are not given attentions (Aragaw, 2018).

Assefa (2017) focus on investigating the process of live broadcast instructional television (ITV) integration in Ethiopian high schools and its benefits on student learning specifically in Addis Ababa City Administration. According to Assefa (2017) the opportunity and the challenge of broadcast instructional television (ITV) are coming from three educational problems, these are infrastructure, instructional, and motivational. As per his findings stated the following points Ethiopian high schools have shortages of qualified teachers, shortage of resource to duplicate adequate copies for all students, and lack attention and show low participation during question answer session (Assefa, 2017)

Atsede (2017)the research assesses the implementation process of plasma mode education and its challenges that are hindering the achievements of education quality goals in secondary schools of Addis Ababa. As she declared the main reasons are inadequate knowledge of language, operating plasma TV, power, collaboration, and motivations. "*Teacher's capacity is related to English language proficiency in understanding plasma TV teachers, lack of skill by some teachers in operating the plasma TV. Frequent power interruption and lack of functioning power backup as a big challenge, lack of collaboration from other governmental service providers like the Ethiopian*

Electric Utility and Etho-Telecom, and lack of interest in plasma mode education, students are deliberately interrupting the plasma transmission" (Atsede, 2017).

Lessa (2015) the research focus on the suitability framework for e-government success the case of WoredaNet services in Ethiopia specifically focused on efforts to implement and sustain a G2G e-government initiative in Ethiopia and its subsequent challenges. As researcher founds that "*leadership outshined as a vital factor, the degree of top management commitment and support to the new system, the degree of top management commitment to recognize the strategic role of the WoredaNet function, the degree of perceived usefulness of the system by stakeholders, the crucial role of motivated staff on the success of new systems. E-Government projects can be successful and sustainable if appropriate measures are taken to maintain the enabling institutional and socio-historical conditions*" (Lessa, 2015).

Kassa (2012) the research focus on the reason for ICT4D project failures and solutions to avoid and overcome the failures through analyzing a distance education project called 'SchoolNet' in Ethiopia. As he founds different factors that affecting the success of SchoolNet project. As described by the researcher that, inadequate knowledge of language, teachers and students' motivation on plasma TV, the incentive for IT teachers paid for additional work, and the limitation of budget in the schools are major factors influencing the SchoolNet project implementation . Out of which the budget has a great impact on the learning teaching process.

Melesse et al. (2011) focus on determining the implementation status of satellite plasma television broadcast in Ethiopia from the perspectives of teachers. Specifically, it investigated the state of Mathematics and Science lesson implementation in 22 secondary schools in four regional states (Melesse et al., 2011).

Al-Rahbi et al. (2012) the research focus on identifying and describing the technical factors affecting the adoption of e-government for the management, prospective of e-government projects in turn, to enhance the e-services of those projects and to improve the development process of e-government adoption by illustrating the level of importance for technical factors in the current e-government stages. They founded four technical factors affecting e-government adoption. These factors are an ICT infrastructure, IT security, IT standards and technical expertise. They used deductive research approach and the qualitative study based on case study strategy.

Table 2: Summary of Related Works

Title of the paper	Purpose/Objective	Methodology	Key Finding/result
Author: Yonas Aklog **Year:** March 2019 Addis Ababa University School of Information Science (Thesis)	To identify the technical issues that affect the successful implementation of SchoolNet projects in Kolfe-Keranyo Sub-city secondary schools in Addis Ababa city administration	The research strategy was a case study survey Qualitative research approach For data collection: interview, document review, and observation For data analysis: descriptive analysis and thematic analysis approaches For data validity and reliability: triangulation method	The external factors influencing on the implementation of the SchoolNet project are ➢ Lack of accountability and responsiveness ➢ Lack of fund raising activities for the project ➢ Citizens awareness ➢ Over enrollment of the students in a school result shortage of ICT resources and other learning materials
Author: Yonas Hagos Tesfaselassie **Year:** March 2019 Addis Ababa University School of Information Technology (Specialization of Information Systems) (Dissertation)	To develop an e-learning systems success model in Ethiopian higher education institutions context.	The research approach both deductive and inductive The research strategy case study by combining qualitative and quantitative research approach	**Institutional Support Quality** measured by Technical support; Quality assurance Mechanism; Motivation; Computer training; Intellectual property protection; E-learning policy; Availability of e-learning infrastructure **E-Learning Systems Quality** measured by Ease of use; user friendly; system interactivity; system response; systems useful features; systems availability; secure

			E-Learning Content Quality measured by Course Quality, Relevant content; Up-to- date **Instructors' E-Learning Factor** measured by Computer self-efficacy; Attitude towards e-learning; Creating e-learning environment; timely response **Learners' E-Learning Factor** measured by Computer self-efficacy; Attitude towards e-learning **Systems Usage** measured by Frequency of use; Dependability **User Satisfaction** measured by Enjoyable experience; Overall satisfaction **E-Learning Systems Outcome** measured by Time savings; Cost savings; Enhanced Academic and teaching performance
Author: Hussien Said Aragaw **Year:** June 2018 Addis Ababa University Department of Curriculum and Instructions (Thesis)	To examine the practices, challenges and prospects of School Net Implementation in Secondary Schools in Addis Ababa City Administration.	Descriptive survey research design Mixed research method Data collection instruments such as questionnaires, interview, direct observations and document analysis.	**Inadequate infrastructure:** this includes an inadequate number of computers in the schools, inadequate power supply and limited internet connectivity.

		SSPS computer software for data analysis T-test techniques used for data analysis	**Teachers' lack of ICT skills**: Teachers have poor training in ICT because only very few have taken training in ICT. **Poor administrative practices**: The administrative practices include leading the teaching learning activities.
Author: Dr. Temtim Assefa **Year:** October 2017 Addis Ababa University Department of Information Science College of Natural Science (Article)	To investigate the process of live broadcast instructional television (ITV) integration in Ethiopian high schools and its benefits on student learning specifically in Addis Ababa City Administration.	Systematic literature review and qualitative case study research methods. Purposive sampling methods Thematic analysis method For data collection purpose interviews, observations and document survey methods	Educational problems can be classified as infrastructure, instructional and motivational problems. Ethiopian high schools have a shortage of qualified teachers. Shortage of resource to duplicate adequate copies for all students. Lack attention and show low participation during question answer session
Author: Atsede Getahun Gebre **Year:** June 2017 Addis Ababa University Department of Public Management and Policy (MPMP) (Specialization of Development Management)	To analyze the challenges of the ICT use towards satellite TV (plasma) in terms of bringing quality education. Focus on the implementation process of	Empirical research design Mixed Methods as a research approach Purposive sampling technique Both qualitative and quantitative data collection techniques such as	Teacher's capacity is related to English language proficiency in understanding plasma TV teachers, lack of skill by some teachers in operating the plasma TV Frequent power interruption and lack of functioning power back up as a big challenge

(Thesis)	the policy for ICT in education, also look into the consistency and management of the satellite TV broadcast in selected secondary schools of Addis Ababa.	questionnaires, in-depth and semi-structured interviews For data analysis: different forms as tables, figures and graphs.	Lack of collaboration from other governmental service providers like the Ethiopian Electric Utility and Etho-Telecom. Lack of interest in plasma mode education, students deliberately interrupting the plasma transmission.
Author: Lemma Lessa Ferede **Year:** December 2015 Addis Ababa University School of Information Technology (Specialization of Information Systems) (Dissertation)	By exploring as to how the relationship between the two concepts is formed and what it consists of, this research proposes a sustainability framework for e-government as a potential input in the effort to fill the research gap.	Case study, research design Qualitative research methodology Data collection: documents examined, archival records, interviews, direct observation, participant observation, and physical artifacts Data validity and reliability: reliability, construct validity, internal validity, and external validity	Leadership outshined as a vital factor The degree of top management commitment and support to the new system The degree of top management commitment to recognize the strategic role of the WoredaNet function The degree of perceived usefulness of the system by stakeholders The crucial role of motivated staff on the success of new systems. E-Government projects can be successful and sustainable if appropriate measures are taken to maintain the enabling institutional and socio-historical conditions.

Author: Fikru Kassa **Year:** May 10, 2012 Indira Gandhi National Open University (IGNOU) Department of Business Administration (Thesis)	To evaluate the extent that the School Net project is effectively implemented in Ethiopia to achieve the grand objectives of educational goals at the most effective level of understanding.	Qualitative and quantitative research design and approach For data collection: Questionnaires, Semi Structured Interview, Direct Observations Data Sampling Technic: purposive sampling technique Data Validation and Analysis: descriptive analysis and comparative approaches	The lectures are only in English spoken by native speakers. But, the English is too difficult for students to follow because many teachers teach in local languages in reality. Students cannot ask questions timely Video lectures-centered teaching actually reduces the teachers' workload. But, it also undermines their dignity and motivation. Local IT teachers follow the order of their director. IT teachers are reluctant to do extra work without additional payment. Schools have enough facility and budgets to prepare handouts for the video lectures. Some schools do not have a printer. Even if they have it, they do not have enough budgets to buy ink and papers.
Authors: Kassahun Melesse, Zelalem Teshome, Addis Simachew, and Akalewold Eshete **Year:** 2012 Addis Ababa, Ethiopia	To determine the implementation status of satellite plasma television broadcast in Ethiopia from the perspectives of	Descriptive survey method A mixed approach used (qualitative and quantitative) Random sampling method for sample technique Questionnaire data collection	The plasma lessons were found to be well-planned and well-organized. Insufficient time for the school teacher involvement and students to take their own notes and do class exercise followed by discussion,

(Journal)	teachers. Specifically, it investigated the state of Mathematics and Science lesson implementation in 22 secondary schools in four regional states.	Presentation rating by using parameters SSPS-PC version 14	No opportunity for visually impaired students, where the weaknesses of the new technology implementation.
Authors: Yaqoob Al-Rahbi; Suleiman Al-Harrasi; Sami Al-Wahaibi **Year:** 2012 Lund University School of Economics and Management Department of Informatics	To identify and describe the technical factors affecting the adoption of e-government in six different e-government agencies and the management plan for those factors, in turn, to enhance the e-services of those agencies and to improve the development process of e-government adoption in Oman by illustrating the level of importance for technical factors in the current e-government stages.	Deductive approach as existing theories Qualitative research approach Case study, research design Data collection technique: literature review, interview, document examination.	They identified for technical and two non-technical factors of e-government adoption. These are: Four Technical Factors: • IT Infrastructure • IT Security • IT Standards • Technical expertise Two Non-Technical Factors: • IT Governance. • Citizens‘ awareness

As described by Aklog (2019), he gave more emphasis to the technical aspect, even the national information infrastructure and collaboration were not covered in this portion (Altameem et al., 2006). Other influential factors on the implementation of the SchoolNet project were not considered like Governing factors & Organizational factors, hence the main objective of my study is to identify the influential factors on the implementation of the SchoolNet project other than the technical aspects.

Most of the studies are focused on the implementation of e-learning. E-learning by itself is part of the SchoolNet, hence justifying whether critical factors influencing on e-learning system have influence on SchoolNet program or not is the other objective of this study. Besides most of the studies I have seen so far on the SchoolNet project are focusing on secondary and preparatory schools. However I haven't seen a study made what influences does it makes on TVET colleges.

2.11. Research Model/Framework

Based on the above mentioned various IS success models and e-government adoption models, the TVET college behavior should be adjusted accordingly. Most of the researchers have customized the DeLone & McLean IS success models to their firm's context.

In most cases many researchers don't have similar awareness on the IS success model. Because each model has got its own limitations. As explained by Tesfaselassie (2019), DeLone & McLean IS success models "*The model is still criticized for some of its limitations. One of the limitations of the model is for its being context dependent*. *The model exhibits different results depending on the objective of the study and the organizational contexts in which the research is conducted*" (Tesfaselassie, 2019). Likewise DeLone & McLean has explained themselves that: - "*context should dictate the appropriate specification and application of the D&M IS Success Model*" (DeLone & McLean, 2016a). On the other hand Halonen et al. (2009) has explained on their study that: - "*DeLone and McLean (1992, 80-81) highlight four conclusions from their research:*

1. *The IS researcher has a broad list of individual dependent variables to choose from.*
2. *Significant reductions in the number of different dependent variable measures are needed so that research results can be compared.*
3. *There are too few MIS field study research attempts to measure the influence of the MIS effort on organizational performance.*

4. *MIS success is a multidimensional construct and it should be measured as such*" (Halonen et al., 2009).

Based on the above points it is possible to customize to the desired structure/ framework D&M IS success model. In this case if we apply the D&M IS success model alone for SchoolNet project implementation it will not be compatible with the organizational culture and structure. Therefore, it should be constructed in consideration of the TVET college context and objectives.

Information System Success has different kind of dimensions to measure the success. We can categorize these dimensions into three parts: technical factors, governing factors, and organizational factors. Also the D&M ISS model variables included in the technical, governing, or organizational factors. As Altameem et al. (2006) the adoption of e-government model factors categorized into technical, governing, or organizational factors.

2.11.1. Organizational Factors

Organizational factors are a significant factors influencing the implementation of e-government projects, especially SchoolNet project in schools and colleges. Ziemba (2016) declared that "*need to make people's lives easier and people's satisfaction with e-products and e-services delivered by enterprises and public administration were found to encourage ICT usage and adoption*" (Ziemba, 2016). There are a number of challenges related to inadequate organizational structure. According to Ewa Ziemba make sure that the new system makes easier comparison with the current system, the user satisfaction with the new system, and obligation of the new system usage (ICT usage) (Ziemba, 2016). Also King & Boyatt (2015) discussed that "*the lack of a coherent institutional-wide approach, offering the guidance, resources and recognition necessary to encourage and support staff*" (King & Boyatt, 2015). As explained by King & Boyatt (2015) an organization need to establish policy, guidance, and others think that to support the organization employees and others users using the new system. This helps to control the system and to pass the system for the next generation.

2.11.2. Technological or Technical Factors

Many authors discussed on the technical factors of e-government implementation challenges. According to Aklog (2019) stated four sources of technical factors, these are ICT infrastructure,

IT security, IT standards, and IT expertize (Aklog, 2019). Also Khanh (2014) stated the technical factors address the four factors these are IT infrastructure, IT standard, national information infrastructure, and collaboration (Khanh, 2014). And others authors identified others technical factors of influencing e-government implementation like Venezky (2002) said that "*technical difficulties were reported as a major barrier to usage and a source of frustration for students and teachers*" (Venezky, 2002). As he explained the technical support was varies widely because whole responsible person perform their tasks independently, for example, each teacher expected to clean the using ICT devices for teaching and learning processes. And Yonas Aklog said that "*Technical Problems are related to the configuration standards of the computers, as well as other factors such as the speed of Direct PC connection and the bandwidth available*" (Aklog, 2019).

2.11.3. Governing Factors

Now a day the governing factors are one of influencing e-government implementation in every place, same implies on SchoolNet project implementation, since it is the part of the e-government project in Ethiopia in the educational system. According to Khanh (2014) stated governing factors contains the four factors these are vision of the project, top management support, leadership, and funding (Khanh, 2014). As Khanh (2014), vision the broad idea it give a big image for the planners and users to understand the project objectives and in the other way he said that "*top management needs to publicly and explicitly identify the project as a top priority*" (Khanh, 2014). According to Altameem, Zairi, and Alshawi said that "*governing factors influence people's decisions to adopt e-government initiatives and furthermore can assist or limit the public sector's effort to diffuse e-government initiatives*" (Altameem et al., 2006).

CHAPTER THREE: RESEARCH MODEL & HYPOTHESIS DEVELOPMENT

3.1. Introduction

This chapter discusses the development of the research model and the hypotheses. DeLone and McLean Information Systems Success Model, this study proposes a model (Figure 6) to study the SchoolNet implementation success in Addis Ababa city administration TVET colleges.

3.2. SchoolNet Implementation

The dependent variable in this study is SchoolNet Implementation Success. Eight factors have been identified from reviewed literatures to determine the implementation of SchoolNet success. They are college context, SchoolNet content quality, administration factors, SchoolNet systems quality, and SchoolNet services quality, intention to use, user satisfaction, and SchoolNet implementation success. These are the seven independent variables and one dependent variables:

3.2.1. SchoolNet Content Quality (Information Quality)

SchoolNet Content Quality (Information Quality) is determined by the contents of the information with respect to the desired task and complete information. We measure the quality of the information by the following four dimensions: - Accuracy, Completeness, Currency, and Format. Information quality impacts both a user's satisfaction with the system and the user's intentions to use the system, which, in turn, impact the extent to which the system is able to yield benefits for the user and organization. SchoolNet Content in terms of access to computer labs, access to internet, providing consistent SchoolNet service, motivating trainers to use SchoolNet systems for training, encouraging trainees to continuously use SchoolNet systems for learning are all important factors that impact systems usage and satisfaction (DeLone & McLean, 2016a; Jiang & Ji, 2014; Keung, 2013; Suryanto et al., 2016; Whitten, 2004; Xu et al., 2011). Different literatures shows that the degree of information quality has an impact on the administration quality, on the standard of ICT usage in the college, the relationships between trainers with trainees and others. The quality

of administrating service is also dependent on SchoolNet content in term of design, policy & legal issues, top management support, and ICT standards. Hence, the study hypothesize that:

H1: SchoolNet content quality has a direct effect on administration quality

3.2.2. College Context

An independent variable to be considered as per the college context. Hence, it has got its own influence on the SchoolNet implementation. For example: - Top management involvement, the college community, the college vision & strategy, Reward system & others. As Raymond (1989) be present among the first in pointing to "*the organizational context as a determinant of information systems (IS) success. The latter in fact proposed a series of hypotheses relating various organizational factors such as size, maturity, resources, and time frame to the successful implementation of information systems*". Also Xu et al. (2011) declared that "*organizational context framework consists of six perspectives to classify the components of organizational context research in IS. They are general organization (including basic characteristics, structure, culture/climate, resources, and internal technology), department, project, workflow, individual, and external environment*". According to the scholars papers shows that the college context has great influence on the SchoolNet project implementation like the quality of ICT infrastructure, budget, organizational culture, vision, goals and others (Ajoye & Nwagwu, 2014; AlAwadhi & Morris, 2009; Al-Shboul et al., 2014; Tesfaselassie, 2019; DeLone & McLean, 2016a). These implies the college context directly influence on the SchoolNet systems quality, administration quality, and SchoolNet content quality. The quality of SchoolNet systems, administration, and SchoolNet content also dependent on the college context. Hence, the study hypothesizes that:

H2: College context has a direct effect on administration quality

H3: College context has a direct effect on SchoolNet content quality

H4: College context has a direct effect on SchoolNet Systems quality

3.2.3. Administration Factor

Organization system context, Government policy and Information Quality directly influence on system quality. If the quality of the system design is not perfect it will have a very big influence

on the SchoolNet Service quality, Intension use and user satisfaction directly or indirectly. The administrator should be control and manage the SchoolNet system quality, service quality, and content quality. The most important general controls are the measures that control access to computer systems and the information stored or transmitted over telecommunication networks. General controls include administrative measures that restrict employee access to only those processes directly relevant to their duties, thereby limiting the damage an employee can do (Loorbach et al., 2013; Poels & Cherfi, 2006; Xu et al., 2011; M. ΘΕΟΔΩΡΟΥ, n.d.; Keung, 2013). The quality of SchoolNet services directly dependent on the administration quality. Hence, the study hypothesize that:

H5: Administration factor has a direct effect on SchoolNet services quality

3.2.4. SchoolNet Systems Quality

"System interaction typically occurs within an organizational context with the goal of completing a particular task; therefore, it is useful to consider dimensions of system quality using a spectrum that ranges from system to task" (DeLone & McLean, 2016a). The defined properties that are largely independent of usage are: - Accessibility, Reliability, Flexibility, Response time, and Integration. The SchoolNet addressed many important barriers to increased use of ICT in the TVET College for training purpose. These included availability of connectivity, professional development for trainers, poor ICT infrastructure (including old, slow computers), limited computers connected and networked, slow Internet access, etc. Hence, the study hypothesizes that:

H6: SchoolNet systems quality has a direct effect on intention to use

H7: SchoolNet systems quality has a direct effect on user satisfaction

3.2.5. SchoolNet Service Quality

"*The construct service quality has been defined as the degree of discrepancy between customers' normative expectations for service and their perception of service performance*" (DeLone & McLean, 2016a). In the present model, the service quality construct is measured by four indicators: Reliability, Responsiveness, Assurance and Empathy. Services quality directly influence intension to use and user satisfaction on SchoolNet project implementation. "*Service quality is based on the difference between what the consumer expects, and what they actually receive*" and "*measured as*

the difference between the sum of customer's expectations and perceptions of actual performance levels for a set of service attributes" (Whitten, 2004). These indicates the degree of intention to use and user satisfaction increase depend on the SchoolNet services quality. Hence, the study hypothesizes that:

H8: SchoolNet services quality has a direct effect on intention to use

H9: SchoolNet services quality has a direct effect on user satisfaction

3.2.6. Intension to Use

"*The success dimension (Intension to) use represent the degree & manner in which an IS is utilized by its users*"(DeLone & McLean, 2016a). Accordingly in the SchoolNet system the users are Trainers, Trainees, staff members and others. Any user who have got an awareness on the System Quality & Service Quality can use the system to the maximum and those who do not have will be the opposite. "*Intention to use is predicted by information quality, system quality, service quality, and user satisfaction. Since behavioral intention to use is drawn theoretically from psychology discipline while information quality and system quality were drawn from technical aspect of communication theory, therefore it will raise an internal consistency from theoretical perspective*" (Mardiana et al., 2015). Hence, the study hypothesize that:

H10: Intention to use has a direct effect on SchoolNet implementation success

3.2.7. User Satisfaction

"*Satisfaction instrument to measure users' general satisfaction with the information provided by the data processing group of the organization*"(DeLone & McLean, 2016b). Hence, in order to enhance the satisfaction of users the service quality should also be maintained properly. Hence, the study hypothesize that:

H11: User satisfaction has a direct effect on SchoolNet implementation success

3.2.8. SchoolNet Implementation Success

This construct or higher level category determines the overall users benefit while using the system (DeLone & McLean, 2003). This study finds out that the overall success of a SchoolNet system is

ultimately measured in terms of the benefits it provides to trainees and trainers. Trainers expect the system to enhance his/her training performance with the systems' various useful features. The same is true to trainees; trainees expect the system to enhance their course understanding in a way that would save their time and enhance their academic performance. The different scholars show that this construct is the ultimate system outcome which is dependent on trainees' continual systems usage. Similarly, user satisfaction determines the level of realizing the benefit of using the system. If users are not satisfied while using the system, the benefit of the system (i.e. expressed in terms of SchoolNet Implementation Success) wouldn't be meaningfully realized (DeLone & McLean, 2003)

3.3. The Study Proposed Model

The proposed framework or model is developed by modifying the D&M ISS model to determine the critical success factors influence SchoolNet. Therefore, the researcher used the critical concepts from DeLone and McLean Information Systems Success Model and Critical Factors for e-Government Adoption Model. The proposed model is the result from empirical investigation of TVET Colleges. That mean it is based on the assessed previous model as reviewed by researches and tried to address the critical success factors influence SchoolNet implementation in TVET colleges. As discussed under chapter 2.7. Information Systems Model, the model have five independent variables and one dependent variable so, the proposed model contains all variables of the D&M ISS model and also added two independent variables (administrative quality and college context). Based on the explanation the following variables are identified in accordance with their respective usage.

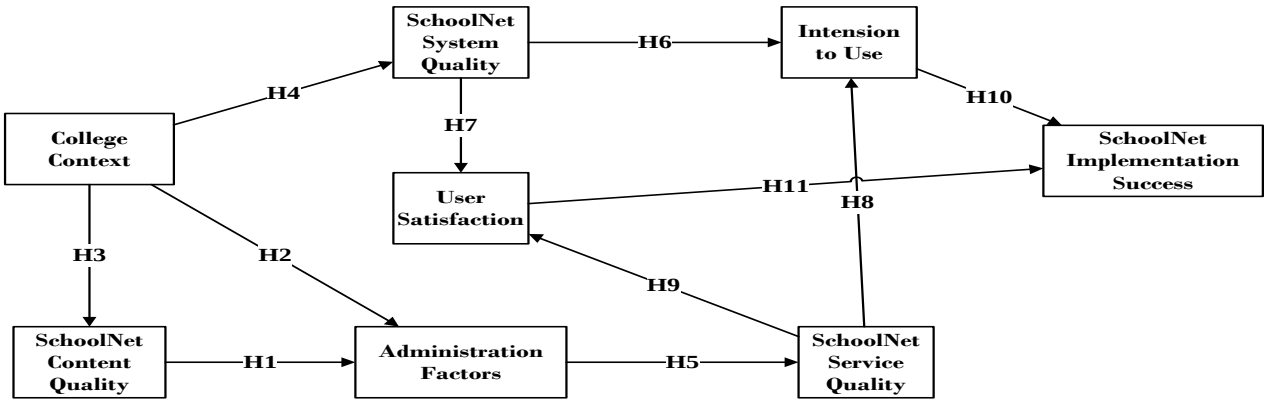

Figure 6: Proposed SchoolNet Implementation Success Model

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1. Introduction

As Miller (2006) stated that "*the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the data, analyzing the facts and reaching certain conclusions either in the form of solutions(s) towards the concerned problem or in certain generation for some theoretical formulation*". According to Kothari (2004) stated that "*research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically*". In this regard, this research paper studies the various steps of the research problem in detail along with the logic behind it. This chapter outline the research methodology that was used to carry out the study, briefing the selection of the design, the target participants, sampling methods used, data collection technique and how data was analyzed, interpreted and presented.

4.2. Research Process

The research process in this study starts from the literature reviews scoping and choosing the problem and continues up to the end. The clarification of factors influencing e-government implementation on SchoolNet mission and extra issues in chapter two of this study were held by diverse literature.

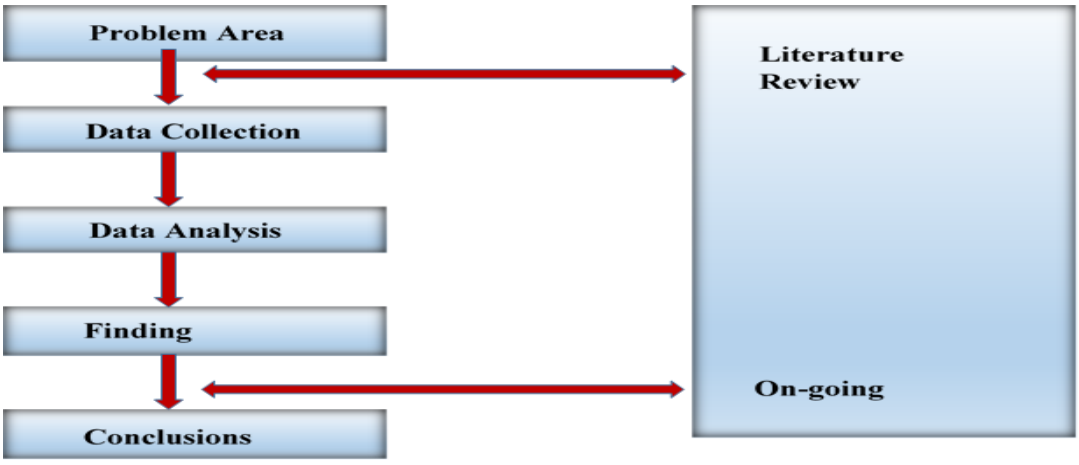

Figure 7: Research process

Also, some findings from other similar literature were discussed and analyzed from what has been written in that part. Also, the researcher followed the same procedure for the results that were collected after the findings in order to explain them in discussion and conclusions part. The research process of the study is illustrated in figure 7.

4.3. The Research Design

"*Research Design is a blue print that essentially maps out the research objectives (research questions or hypothesis, methods (tools and techniques for collecting and analyzing data) in a concise and clear manner*" (Tefera & Ahmed, 2015).In this study apply explanatory research design to study the critical success factors influence SchoolNet implementation in TVET Colleges. Also this study uses both qualitative and quantitative research approaches.

Qualitative research approach in this study used to understand which factors have effects or influences on the SchoolNet implementation in the TVET colleges. According to Tefera and Ahmed 2015 stated that "*qualitative researchers aim to gather an in-depth understanding of human or things behavior and the reasons that govern such behavior*". So the aim of this study researcher is to find out the critical factors influences SchoolNet implementation in TVET colleges in Addis Ababa, to explore the main SchoolNet implementation factors from TVET colleges' perspective, and to understand the degree of the factors that influence SchoolNet implementation.

Also according to Tefera & Ahmed (2015) recommended that quantitative research uses for the purpose of measurement techniques and tools that yield numerical data to be analyze and interpret statistically. For this reason the researcher use quantitative research approach to measure the effects of the constructs that formulated by the researcher this means which constructs have more influence on the SchoolNet implementation Success.

4.4. The Study Population

Misrak Poly Technic Collage was established in 1969 as Asfaw Wosen Secondary School. From 1977-2001 it is named as Misrak comprehensive School offering both technical & general education. Based on the new educational policy of 2002 it is totally shifted toward TVET institute. Then until 2015 is call as institute, finally on 2016 declared as Misrak Poly Technic Collage. The

college has availed SchoolNet facilities such as computer labs and networking its different campuses. Consequently, it attempted to make available relevant SchoolNet technologies and facilities by assigning IT and SchoolNet experts to support the training and learning process (source form Misrak Polytechnic College publisher (Brusher)).

Target populations are the Misrak Polytechnic College Dean, Vice Dean, ICT Trainers, Department Heads, and College Trainers. In general, Misrak Polytechnic college have one (1) dean, six (6) vice dean, seventeen (17) ICT trainers, twelve (12) department heads, one hundred ninety four (194) ICT trainees, and four hundred six (406) trainers.

4.5. Sampling

4.5.1. Sample Frame

In deciding appropriate sample for the study there is the need to define population in terms of its location and characteristics. Kothari (2004) defines study population as "*total of items about which information is desired*". The same author defined sampling frame as "*elementary units or the group or cluster of such units may form the basis of sampling process in which case they are called sampling units. A list containing such sampling units is known as sampling frame*". The study population consists dean, vice deans, department heads, ICT trainers, and college trainers. The total numbers of Misrak Polytechnic college have one (1) dean, six (6) vice dean, seventeen (17) ICT trainers, twelve (12) department heads, one hundred ninety four (194) ICT trainees and four hundred six (406) trainers.

4.5.2. Sampling Techniques

For Qualitative Research Approach

"*In qualitative research, the samples are likely to be chosen in a deliberate manner known as purposive sampling*" (Yin, 2009). In this concept, a purposeful sampling procedure is use to select the qualitative research approach.

The purposive sampling technique is follow by this study on qualitative research approach part, which recommended for qualitative research (Tefera & Ahmed, 2015; Zegeye et al., 2009), in order to identify key participants within the Misrak Polytechnic College leaders and

ICT department trainers. The sample is developed on the basis of predetermine eligibility criterial of respondents from the college leaders and ICT department trainers. The basic eligibility criteria are that the professional should have minimum four years of experiences and a sinner ICT department trainers. A delimiting time frame of four years is decide by the researcher to ensure adequate experiences in TVET College on training and learning process.

For Quantitative Research Approach

The study uses probability sampling technique utilized. Stratified sampling is the most widely used techniques which enable to get more representative sample from wide geographical areas. Stratification leads to reduced sampling error because it can ensure that all relevant portions of the population are included in the sample. Stratified random sampling method applied to avoid heterogeneity of the population (Tefera & Ahmed, 2015; Zegeye et al., 2009). If a population from which a sample is to be drawn does not constitute a homogeneous group, stratified sampling technique is generally applied in order to obtain a representative sample. Under stratified sampling the population is divided into several sub-populations that are individually more homogeneous than the total population (the different sub-populations are called 'strata') and then the researcher select items from each stratum to constitute a sample. Since each stratum is more homogeneous then the total population, we are able to get more precise estimates for each stratum and by estimating more accurately each of the component parts, the researcher can get better estimation from Misrak Polytechnic College the total number of population. It consists dean, vice deans, department heads, ICT trainers, ICT trainees, and college trainers. Therefore the researcher could use college trainers and ICT trainees as strata for quantitative research approach. So the total number of college trainers and ICT trainees are six hundred (600).

4.5.3. Sample Size

For Qualitative Research Approach

The purposive sample in this study for the qualitative research approach part consists Misrak Polytechnic College dean, vice deans, department heads, and ICT department trainers because they are directly involved on SchoolNet implementation in the Misrak Polytechnic College.

It has great impact to empower participants towards critical success factors influence SchoolNet implementation in the college.

Table 3: Selected Participants for Qualitative Research Approach

Respondents Categories	Number of Respondents
College Dean	1
College V/Deans	3
Department Heads	4
ICT Trainers	4
Total	12

For Quantitative Research Approach

According to Singh (2006) researchers are concerned with the number of subjects to be included in the sample. Although there is no one single rule that can be applied in determining a sample size, the question with sample size goes with the precision that the researcher uses in estimating the population parameter. According to Field (2009), whenever it is possible to access the entire population, it is possible to collect data from sample and use the behavior within the sample to infer things about the behavior of the population. Therefore the formula for sample size determination which is obtained by solving the maximum error of estimate with actual absolute difference of sample estimated. Therefore the sample size determine by using Yamane, 1967 formula:

$$n = \frac{N}{1 + N(e)^2}$$

N = total population

n = sample population

e = maximum error of estimate

Sample of college trainers

$n = \frac{406}{1+406(0.1)^2}$ ➔ $n = \frac{406}{1+406(0.01)}$ ➔ $n = \frac{406}{1+4.06}$ ➔ $n = \frac{406}{5.06}$ ➔ n = 80

Sample of ICT trainees

$n = \frac{194}{1+194(0.1)^2} \rightarrow n = \frac{194}{1+194(0.01)} \rightarrow n = \frac{194}{1+1.94} \rightarrow n = \frac{194}{2.94} \rightarrow$ n = 66

Total sample:

Total Sample = College Trainers Sample + ICT Trainees Sample

Total Sample = 80 + 66 ➔ Total Sample = 146

Table 4: Questionnaires distribution Sample

Type of strata	Sex	Total Number of Population			Sample Number of Population		
		Masters	Degree	Level IV	Masters	Degree	Level IV
College Trainers	Female	30	98	36	6	19	7
	Male	72	146	24	14	29	5
ICT Department Trainees	Female	-	-	88	-	-	30
	Male	-	-	106	-	-	36
Sum		102	244	254	20	48	78

4.6. Data Collection Method

One of the qualities of research is it involves multiple data collection methods to triangulate findings. Triangulation is defined as the use of two or more independent sources of data collection methods to complement research findings within a study (Myers, 2009; Yin, 2009). The use of triangulation in explanatory research provides stronger substantiation of constructs and hypothesis (Eisenhardt & Graebner, 2007).

Furthermore, Mintzberg (1979) stressed that although qualitative methods provides the foundation for theory building through rich description about the research phenomena, it uncovers the relationships in the hard data; but it is only through quantitative methods that we can exploring the critical factors influence SchoolNet implementation found in the TVET colleges.

Accordingly, the study used in-depth personal interviews, document reviews and the researcher‘s personal observations as qualitative data collection instruments to meet the first and second

research objectives "*To identify the factors influencing e-government implementation on the SchoolNet project related to governing factors, technical factors, and organizational factors in TVET colleges*" also "*To review literature to identify the factors influencing ICT integration in TVET colleges*" and in order to achieve the third and fourth research objectives *"Find out the different levels of importance of each of the factors in the management process"* also *"Suggest different ways of managing those critical factors in order to accomplish the adoption or implementation of SchoolNet in the TVET colleges"* questionnaires as data collection instruments were used for the quantitative research method.

4.6.1. Interview

Interview is used as the data collection techniques used for this study. The interview questions adopted from Aklog (2019) and Assefa (2017). However for this study qualitative method also be used to get more information. In order to obtain the information for the explore the factors and for the validity of the research the researcher used interview like personal interview and telephone interviews used as a technique at college experts, users and college deans.

Interview Process

The researcher of this thesis have used additional manpower to collect responses from Interviewed personnel's. According to AKLOG (2019) concluded that "*in order to have a successful SchoolNet project implementation the government must understand the importance of different factors affecting the SchoolNet project implementation in order to avoid the failure of SchoolNet services in their current SchoolNet project or future projects*". For this reason, the researcher of this thesis devotes full time in order to make this paper the subject of a benchmarking study on the merits of continued investigation on critical success factors of influence e-government implementation in SchoolNet project in Addis Ababa City Administration TVET College. To make this happen in reality, this research paper employed semi-structured interview in order to get information and evidences from multiple sources (Yin, 2009). Interview consists 32 questions based on three categories of factors of e-government implementation (technical, governing, and organizational factors).

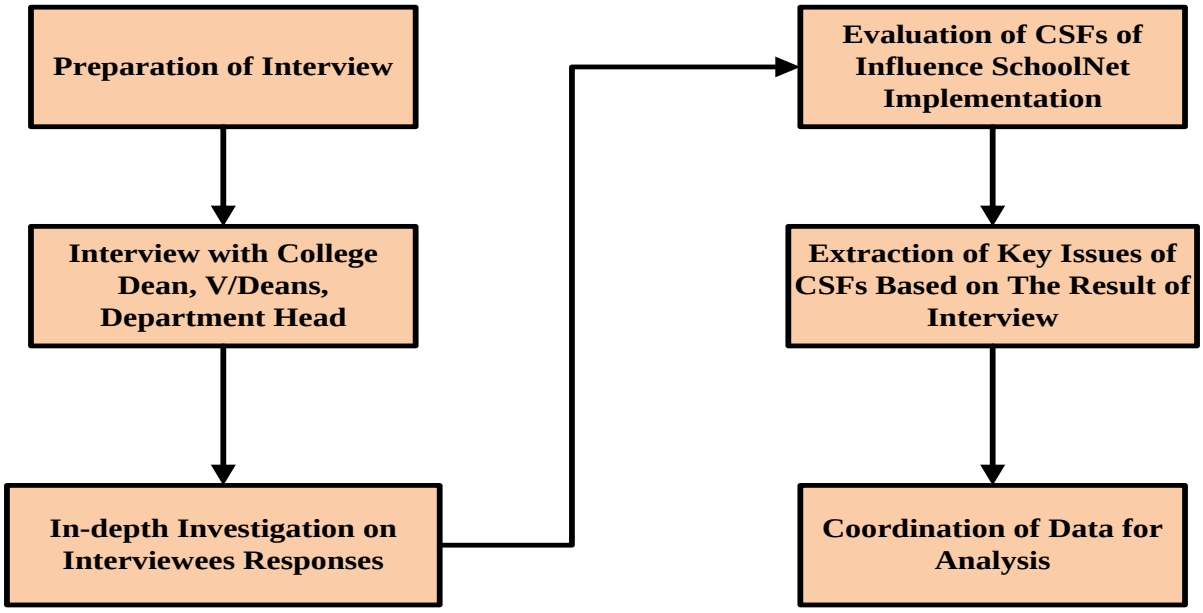

Figure 8: Interview process of the research to reach multiple sources

4.6.2. Document Analysis

In order to obtain additional information and to understand about the SchoolNet project within the college, document and internet were used as source of data. In the case website is assessed to get the general background and profile. Additionally, some of the documents that were analyzed like skilled human resource, finance and management offices that are documented about SchoolNet system implementations in the college.

Based on the comprehensive literature review of primary data collection, the questionnaire with relevant questions is prepared. And also if the questionnaire must be prepared through email and hard copy. Document analysis is a systematic procedure for reviewing or evaluating documents both printed and electronic (computer-based and Internet-transmitted) material. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted to elicit meaning, gain understanding, and develop empirical knowledge (Bowen, 2009). Document analysis is often used in combination with other qualitative research methods as a means of triangulation the combination of methodologies in the study of the same phenomenon.

4.6.3. Observation

As one form of qualitative data collection instruments, observation involves the researcher to look over what happened, perceptions about the feelings and expressions of the respondents and the available infrastructure which adds to the richness of data complementing other forms of data collection instruments (Bhattacherjee, 2012). The researcher guided by observation checklist (see Appendix 3) took diary notes to record what was observed in the overall data collection process such as the kind of Learning Management System (LMS) used by the institutions, trainees and trainers degrees of access to computers, internet access, and operationalist of SchoolNet unit. This observation guide is also in line with the recommendation of Khan (Khan, 2005).

4.6.4. Questionnaire

The researcher used relevant document about the system within Misrak Polytechnic College also survey questionnaire. The survey questionnaire use to test the relationship between the constructs based on the proposed model and to get the primary source data for this research from the college. Hence questionnaire is used for this study mainly to rank the levels of factors for SchoolNet implementation in TVET Colleges. The relevant document helps to understand the factors influence the SchoolNet project implementation. The survey questions adopted 30 questions from Aklog (2019) and Assefa (2017).

Table 5: Questionnaires distribution for trainers and trainees

Type of strata	**Sex**	**Number of Respondents**				**Number of Actual Study Participants**				**Response rate**
		Masters	**Degree**	**Level IV**	**Total**	**Masters**	**Degree**	**Level IV**	**Total**	
College Trainers	Female	6	19	7	**32**	6	18	6	**30**	**93.75%**
	Male	14	29	5	**48**	14	27	5	**46**	**95.83%**
ICT Department Trainees	Female	-	-	30	**30**	-	-	28	**28**	**94.44%**
	Male	-	-	36	**36**	-	-	34	**34**	**93.33%**
	Sum	**20**	**48**	**78**	**146**	**20**	**45**	**73**	**138**	**94.52%**

4.7. Reliability and Validity Analysis

Validity and reliability are the two fundamental elements in the evaluation of a measurement instrument. Validity indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2004). In this research content validity test was conducted. Content validity assesses the extent to which a measuring instrument provides adequate coverage of the topic under study.

After developing the data collection instrument, it was forwarded to four IT/IS trainers (who have practical experience in TVET colleges training and learning process) as well as two academicians for comment (to modify unclear/ambiguous questions, get rid of unnecessary questions and to include additional questions if any) accompanied with cover letter. Based on the reviewers comments some unclear questions were rephrased, the order of some questions were rearranged, one question was removed from the list. Reliability is concerned with the ability of the data collection instrument to provide consistent result (Kothari, 2004). Once the final data collection instrument was approved by the advisor, a pilot test was conducted using 18 respondents from two TVET colleges. According to Connelly (2008), a pilot study sample should be at least 10% of the sample projected for the study. In this research 19% of the sample size was used to test the reliability of the instrument (questionnaire).

Table 6: Cronbach's alpha result of the pilot test (Source: reliability test 2020)

Case Processing Summary					
		N	%	Reliability Statistics	
Cases	Valid	18	100.0	Cronbach's Alpha	N of Items
	Excluded[a]	0	0.0	**.851**	80
	Total	18	100.0		
a. List wise deletion based on all variables in the procedure.					

The value of alpha normally ranges between 0 and 1. The closer the Cronbach's alpha coefficient is to 1 the greater the internal consistency of the items. According to (George & Mallery, 2003; van Teijlingen & Hundley, 2014) alpha coefficients above 0.70 are considered acceptable. As shown on Table 5, the internal reliability analysis of the test produces Cronbach's alpha coefficients of .851 which confirms that the survey instrument was reliable and can produce consistent results.

Following the positive outcome of the pilot test, the final survey instrument (questionnaire) was distributed to 146 respondents accompanied with cover letter which clearly explain the purpose of the study and confidentiality of the information collected from participants (see Appendix 2). The survey instrument comprised of two parts. The first part contains 5 demography questions. The second part consists of 25 items categorized in to SchoolNet Implementation Success respectively.

4.8. Data Analysis Techniques

The computations of certain indices or measures along with searching for patterns of relationships that exist among the data groups are called Analysis (Kothari, 2004). After collecting and organizing the necessary data separately for each item to answer the questions raised in the problem statement. Analyses for the qualitative and quantitative results were done in the integration phase for its needed interpretations. For both qualitative and quantitative research approach processing is in its phase independently.

Thematic analysis is a commonly used qualitative method to identify, report, and analyze data for the meanings produced in and by people, situations, and events (Floersch et al., 2010). An interview technique is used to gather primary data for almost all kinds of qualitative research. Interviews are valuable for finding out people's motivations, and their rationale as to why they did certain things (Myers, 2009). Therefore, in this study the qualitative part analysis done by used NVivo version 12.0. (Look appendix 5). The quantitative data which were collected through questionnaire was analyzed with descriptive statistics using statistical package for social scientists (SPSS v20). The qualitative data which were collected from college leaders and IT trainers through interview was coded and analyzed using closed coding method based on predefined themes (thematic analysis). Then the result was verified by the respondent and presented under the theme: technical factors, governing factors, and organizational factors. To sum, the survey result, analysis of the qualitative data and review of key documents were triangulated and complemented each other to answer the research questions.

CHAPTER FIVE: ANALYSIS, FINDING, RESULT & DISCUSSION

5.1. Introduction

The earlier chapter examined and justified the adopted research methodology employed by this research paper. The expectation of this part is to exhibit the discoveries from the investigation of the study analysis. In light of the case descriptions, procedure proposed by (Yin, 2009), this research paper examines here the levels and story of CSFs of influence SchoolNet implementation in Misrak Polytechnic College. As noted in the previous chapter, the research investigation was exploring the factors influences SchoolNet implementation success. Consequently, the researcher attempted to understand this phenomenon in terms of the meanings the participants bring to them based on their actual experiences in SchoolNet services.

Table 7: Interviewees list and their short role descriptions

Code	Group	Interview Duration
D1	Dean	120 minutes
VD1	Vice Dean	100 minutes
VD2	Vice Dean	100 minutes
VD3	Vice Dean	100 minutes
HD1	Department Head	90 minutes
HD2	Department Head	90 minutes
HD3	Department Head	90 minutes
HD4	Department Head	90 minutes
IT1	IT Trainer	120 minutes
IT2	IT Trainer	120 minutes
IT3	IT Trainer	120 minutes
IT4	IT Trainer	120 minutes

The following section provides detailed analysis and descriptions of the study. The descriptions are developed mainly from the investigation of the data obtained from interviews, observations, questionnaires, and document analysis. The data analysis follows, the research questions and specific objectives of the study by giving a brief outline on critical factors influence SchoolNet project implementations.

Table 8: Critical factors of influence SchoolNet project case analysis

No	Outline
1	SchoolNet project implementation • Factors of influence SchoolNet project implementation
2	Factors influencing successful SchoolNet project implementation (Research question 1) • From technical factors theme perspective • From governing factors theme perspective • Organizational factors theme perspective
3	The critical factors that directly influence SchoolNet project in TVET college based on the three factors theme or Model testing. (Research question 2) • From IS success measurement dimensions like system quality, information quality, services quality, intention to use, individual impact, and organizational impact

5.2. Qualitative Analysis

5.2.1. SchoolNet Project Implementation

According to the research participants' responses, Addis Ababa City TVET Agency leaders take initiative to continue the implementation of SchoolNet in TVET Colleges. As Misrak Polytechnic College management staffs and ICT department work hardly on ICT implementation. According to the college vision by using ICT make a good environment for learning and training process. But, it has limitation on the implementation of SchoolNet or ICT in the college for different reasons. The major reasons are with regard to the leader awareness about SchoolNet project requirements and the usage of ICT in training and learning. Also the college leaders' intervention in training and learning process the trainers to use ICT infrastructure. This makes the intention to use the SchoolNet (ICT) system for training and learning process becomes less and less also some research participants explained at interview sessions as follows:

> "*To some extent good but not adequate sometime there is lack of facilities regarding with ICT. Most of equipment's are outdated means it require maintenance and others*". [DH1]

"*Almost without OBT no leader is involved in ICT implementation process. I said leaders are not willing to suggest use about ICT for trainers*". [DH2]

"*They have limitation with regard to support to trainers to use ICT infrastructure. But, they run for the simple events only, they do not consider the coming time.*" [DH3]

The above research participants' responses shows that, the college leader have the lack of awareness about the SchoolNet or ICT system requirement to implement. For this reason the critical issues are the lack of infrastructure and awareness. The main advantage of SchoolNet service described by participants increasing the training and learning performance. Misrak Polytechnic College has a good ICT infrastructure but most of the time, the college community uses internet for the purpose of viewing social media or entertainment channels. This shows that, the college communities have shortage of access SchoolNet services or ICT System hence, it needs proper control mechanisms in the college.

5.2.2. Factors of SchoolNet Implementation (Answer for Research Question 1)

5.2.2.1. Data from Interview Sessions

According to respondents' explanation at the interview sessions, they described lot of factors that influences the SchoolNet system in the college. Those respondents' listed some factors related with the SchoolNet implementation. For example, lack of budget, the lack of appropriate materials for training and learning process (like PC, projector, and others), most trainers have skill gap on ICT access, the awareness of leaders & college staff on the ICT advantage, and others. These factors are directly and indirectly influence the implementation of SchoolNet success in the TVET colleges. So, the participants responses shows the School Net implementation process have many kinds of factors that influence the success of SchoolNet implementation in the TVET colleges. Therefore, Misrak Polytechnic College found in the Addis Ababa City Administration TVET Agency. In this college, different factors shows regarding to ICT implementation based on technical, governing, and organizational factors. Some of the evidence the participants gave responses at the interview session are listed as follow:

"*In our college have different factors like lack of appropriate and adequate technologies and resources, the trainers and trainees have wrong attitude on the using of ICT infrastructures*". [IT1]

"*Lack of top management support, wrong outlook of ICT advantages by middle level and top level leaders, lack of commitment of to apply ICT in the training and learning process by trainer, lack of the users participation on the implementation of the project, and other reasons the system partial fails in our college."* [DH1]

"*In my opinion the factors of SchoolNet implementation we can see in three categories. The first category is the top management or the leaders, in this group it have the lack of intervention in the facilitating of the resources, wrong outlook for ICT advantages, less support of the technical staffs and the college communities, and the motivational system are have backwardness to motivate the actively used the ICT infrastructure*". [IT2]

"*Regarding to the shortage of budget the college got different challenges on the college activities. From these college activities one of them are the ICT implementation movement is one. So, the awareness of the college communities are related the budget constraints. In this case some factors have in our college such as the shortage of resources (like PC, Projectors, Printers), properly using of ICT infrastructure have limitation in the trainers side, and others*". [D1]

"*The attitude of the college communities have less focus on the implementation of ICT for educational purposes, the interest of the users are another issue in the college from the getting of wrong information for ICT usage, and others. And also in this college there is no technical staff for the ICT implementation control and manage."* [IT3]

"*The function the equipment is poor and the quality also poor in our college. This problems came from different reasons for example, some materials usage date are outdate, improper access of the materials, and others. These makes unwanted attitude in the college by the communities and leaders.*" [DH2]

"*The understanding level of the college communities on the vision and strategy plan of the college are very less. So, the trainers have the lack of awareness on ICT, the trainees parent participation on the building of ICT in the college is less. The factors are the attitude of trainers and the IT trainers on the top management staff and leader have not confidence. Because may have different means the first on the previous experience, and some leaders made the wrong attitude to build by the communities.*" [VD2]

"*The interest of trainers and trainees to use ICT infrastructure are very less also have not governing or controlling mechanism policy in the college to control unwanted usage or without the desired goal.*" [DH3]

"*The big challenge of this college is the organization culture. We can see the influence on the different project implementation in the college. Regarding to ICT implementation the whole communities have not confidences on the top management support. Because the college communities need training based on the accessing of ICT infrastructure but in the have the limitation of training schedule to build the communities capacity of ICT skill.*" [IT4]

The above interview responses show in TVET colleges have their characteristics. So, in TVET colleges have different factors influences the SchoolNet services. The following tables describe the findings, factors influencing the SchoolNet project implementations.

Table 9: Technical factors themes found from the interview respondents

No	ISS dimension	Factors influencing SchoolNet	Evidences
1	System Quality	IT Infrastructure	"*in our college somehow have the shortage of IT infrastructure (like limited Internet connection, shortage of computer lab, limited computers)* " [IT2] "*The ratio of trainees with IT infrastructure are not equal this tells as the college leaders and other the government*

			body need to improve this problem. Because, ICT is now a day have a great role on the delivering of the training." [IT3]
		System Security	"*Security is one of the confidence of the user on the system. To improve or add the interest of the user we need protect the privacy of the system user. This is increase the confidence of the user and adds their value on the success of the project but otherwise the system quality degrade.* " [IT4]
2	Information Quality	Relationship Management	"*The relationship between trainers with trainees, technology with the system, leaders with expert, and other relation affect relationship become strong or weak depend on using managing system. Relationship management is have impact on one systems like SchoolNet and other projects success."* [D1]
		IT Standard	"*The function the equipment is poor and the quality also poor in our college. This problems came from different reasons for example, some materials usage date are outdate, improper access of the materials, and others. These makes unwanted attitude in the college by the communities and leaders.*" [DH2]
3	Service Quality	System Features	"*The service must be consider the organizational context and user need also the system to extent fulfil the need of the end users. Without the participation of the end users the system can't effective that means the system features target the end user need and the organization objectives.*" [IT1]
4	Intention to Use	System Integration with the user	"*There are different factors affecting integration of ICTs in education. The main barriers faced by Ethiopia colleges in integration to Internet access specifically are limited infrastructure generally and network infrastructure in particular, high cost of telephone and internet, limited*

			expertise and ICT skills levels. So, in our college has no good integration with the SchoolNet system (ICT system).” [DH1]
5	User Satisfaction	System Collaboration	“*The college leader should be strongly work on the collaboration of the governmental bodies to improve the user satisfaction. They can communication different organization to support necessary IT equipment it helps to training learning process.”* [VD1]
6	Net Impact	Individual and Organizational Impact	“*Always one system measure base on the result of the system output. This means one system have their own impact by positive and negative way. So, in our case the SchoolNet project implementation measure by the effect of the individual (system users) and organizational context.*” [IT3]

Table 10: Governing factors themes found from interview respondents

No	ISS dimension	Factors influencing SchoolNet	Evidences
1	System Quality	Budget (Funding)	“*Budget on factors in our country. The same together in our college have the budget limitation by this case the project completion date and other like purchasing of materials affect*”. [VD3]
2	Information Quality	Vision	“*In our college leaders, need the clear vision about the ICT implementation for the purpose of the quality of the training learning process deliver in the college? Because the college vision come from the good leader vision this tells our college leader need work this factor.*” [DH3]
		Strategy	“*The main problem of the college, the strategy is hidden or invisible. So, the communities have the lack of information*

			on the ICT implementation strategic plan for the support of training learning process quality. " [DH1]
3	Service Quality	Leadership Involvement	"*Leadership is an important component in guiding the training learning process. Principal as college leaders have a major responsibility on initiating ICT implementation to deliver training learning process through the use of ICT Technology. Hence, the college leaders must understand, promote and implement the natation that technology integration is not about the technology. Because it is the focusing on the future generations and leading the college training learning process."* [DH1]
4	Intention to Use	Top Management Support	"*The top management have role in the success/failure of SchoolNet implementation. In my opinion, the top management manage the whole college activities like by the supporting budget for the project, motivational activities.*" [DH4]
5	User Satisfaction	Administration Quality	"*Quality is another issue to improve the user satisfaction and to use the system."* [IT2] "*In the college context have a good IT infrastructure in my observation. But regarding to the quality of IT expert run system case the system become idle. So, the college leaders develop the expert skill by giving training and reward the effective expert on the implementation of ICT in the college."* [DH2]
6	Net Impact	Leader Impact	"*I think in my opinion the leader have a great role to get success or fail of the system implementation. This means if the college leader properly work their responsibly on the time the success of system become good but if the opposite way the result is oppose.*" [IT1]

Table 11: Organizational factors themes found from interview respondents

No	ISS dimension	Factors influencing SchoolNet	Evidences
1	System Quality	Change Management	"*Effective decision to provide by top management level; the change management it should be available resource foot provide for ICT implementation; the financial shortage results for supplies of need for ICT implementation.*" [VD1]
2	Information Quality	Organizational Culture	"*The big challenge of this college is the organization culture. We can see the influence on the different project implementation in the college. Regarding to ICT implementation the whole communities have not confidences on the top management support. Because the college communities need training based on the accessing of ICT infrastructure but in the have the limitation of training schedule to build the communities capacity of ICT skill.*" [IT4]
		Policy & Legal Issues	"*The interest of trainers and trainees to use ICT infrastructure are very less also have not governing or controlling mechanism policy in the college to control unwanted usage or without the desired goal.*" [DH3]
3	Service Quality	Implementation	"*Almost without OBT no one leader is involved in ICT implementation Process. I said before leaders are not willing to suggest use about ICT for trainers.*" [VD2] "*The implementation of ICT in schools requires a vision on ICT use in school, the formulation of clear strategic goals, and the planning and organization of the use of ICT in school. The pursued goals are those points we want to reach for the learner by setting up ICT use in school. At*

			the same time the pursued goals are the results of using ICT as expected by the stakeholders, being the learner, the teacher, the ICT coordinator, and on an indirect way the parents." [DH4]
		Technical Staff	"*The attitude of the college communities have less focus on the implementation of ICT for educational purposes, the interest of the users are another issue in the college from the getting of wrong information for ICT usage, and others. And also in this college there is no technical staff for the ICT implementation control and manage."* [IT3]
4	Intention to Use	Training	"*Give training on ICT training and policy, provide resources and spaces, trainees' skilled person on the area, develop maintained strategy and improve collaboration, experience and performance in the sector.*" [IT1]
5	User Satisfaction	Rewarding System	"*Not prioritize which area/department need equipment based on training (project based training).They are not motivate (give reward) for trainers and trainees. They have poor reward system. Some managers force to do works without their job function.*" [IT2]
6	Net Impact	Awareness	"*Regarding to the shortage of budget the college got different challenges on the college activities. From these college activities one of them are the ICT implementation movement is one. So, the awareness of the college communities are related the budget constraints. In this case some factors have in our college such as the shortage of resources (like PC, Projectors, Printers), properly using of ICT infrastructure have limitation in the trainers side, and others*". [D1]

5.2.2.2. Data from Observation

The researchers' observation discovered that most of the problem on SchoolNet implementation drives from three factors themes. In the TVET colleges there are different challenges affects the SchoolNet implementation. Some factors are listed as follow:

- Lack of IT Standard and a good strategic plan
- Lack of appropriate ICT resources for the purpose of training learning process
- Sometime the system fail because of electricity power problem and network breakdown
- There is limited skilled IT expert
- There is no IT technical staff or team to maintain the system problems
- There is limited fund or budget raising activity
- There is a lack of awareness on the system usage and advantages
- There is limited internet connection
- Most colleges don't have their own portal websites.

The researcher observed that only few computers are used by trainers in ICT lab to teach ICT trainees. Most of the computers don‘t work. ICT department trainees have more computer accessibility relatively compared with the other department's trainees.

5.3. Quantitative Analysis

This session reports results of quantitative data analysis of trainees' and trainers' samples data while testing the proposed model. The section of the session presents results from testing the model over trainees and trainers samples data. SPSS (version 20) was used to analyze the demography of participants' statistics and SMART-PLS (version 3.3.2) was used to test the model on two levels. The model was tested in two dimensions: testing the measurement model and testing the structural model. The measurement model tests measures of the model‘s constructs. On the other hand, the structural model tests the relationships between the model‘s constructs as represented by the ISS model measurement dimensions.

5.3.1. Demographic

This section shows Numbers of respondents in organization and background information of respondent's gender, age, levels of education and years of experience in colleges. In addition, it

contains their responses whether they have used SchoolNet in their respective colleges or not and to what extent implemented successfully as well as USERS acceptance in SchoolNet system.

Table 12: Demographic data based on respondent's information

		Frequency	Percent (%)
Gender	F	38	26
	M	108	74
	Total	**146**	**100.0**
Age	20-30	93	63.7
	31-40	25	17.1
	41-50	15	10.3
	51-60	13	8.9
	Total	**146**	**100.00**
Level of Education	Certificate	3	2.1
	Degree	79	54.1
	Diploma	24	16.4
	Master	40	27.4
	Total	**146**	**100.00**
Work Experiences	<5 years	43	29.4
	>15 years	23	15.8
	11 up to 15	13	8.9
	5 up to 10	67	45.9
	Total	**146**	**100.0**
Experiences on SchoolNet (like e-learning) system	<2 years	86	58.9
	3-5 years	42	28.8
	6-10 years	18	12.3
	Total	**146**	**100.0**
SchoolNet used in the college	Yes	146	100.0
SchoolNet implemented successfully	Large extent	49	33.6
	Small extent	97	66.4
	Total	**146**	**100.0**
USERS accept the implementation of SchoolNet system	Less willing	22	15.1
	Very willing	9	6.2
	Willing	115	78.8
	Total	**146**	**100.0**

Table 12 show that the participants' demographic statistics depend on gender, age educational status, and work experiences. Also, the table result show that, the SchoolNet implementation success and users acceptances. As the result show that 74% males and 26% females reacts or participated on the research. Also regarding to age almost 63.7% show that under 20 up to 30 category from 146 total sample populations. The other result shows that related with the educational status 54.1% are the degree holders and 27.4% are second degree holders. The result shows 45.9% participants have 5 up to 10 years, 29.4% participants have less than 5 years, 15.8% participants have more than 15 years, and 8.9% participants have 11 up to 15 years. So these result show the participants have good work experiences in TVET college. Related with the SchoolNet implementation success the result show that 66.4% small extent 33.6% large extent. So this indicated the SchoolNet implementation success have limitation in TVET colleges. Also, the user acceptances shows 78.8% has willing to access the systems but 15.1% has less willingness to access the system.

5.3.2. Validating the Measurement Model (Answer for research question 2)

The assessment results of the reflective measurement model were evaluated based on unidimensionality, convergent validity, discriminate validity and internal consistency reliability. Smart PLS 3.3.2 was employed to eliminate those items with outer loadings of less than the threshold values after sequence of iterative processes.

"*Construct Reliability tests of the measurement model were measured using Cronbach's Alpha and Composite Reliabilities. Similarly, convergent validity test of the measurement model falls within the recommended threshold value as measured in terms of Average Variance Extracted (AVE)"*(Henseler et al., 2014; Latan & Noonan, 2017; SmartPLS, 2015). Table 13 presents the study's model constructs overall reliability and validity test results.

Table 13: Reliability and Validity Test Results

The Study Model Construct	Reliability and Validity Test			
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Administration Factors	0.968	0.970	0.968	0.773
College Context	0.896	0.927	0.903	0.552
Intention to Use	0.964	0.968	0.965	0.776
SchoolNet Impementation Suc	0.894	0.901	0.896	0.813
SchoolNet Service Quality	0.978	0.980	0.978	0.726
SchoolNet System Quality	1.000	1.000	1.000	1.000
SchoolNet Content Quality	0.953	0.967	0.956	0.635
User Satisfaction	0.892	0.902	0.896	0.744

Similarly, "*discriminant validity tests using Fornell-Larcker Criterion and Cross-Loading was used to test whether the model constructs meet the discriminant validity criteria. The Square roots of AVE values (Diagonal values) were higher than correlation values in the off-diagonal elements of corresponding rows and columns*" (Alarcón & Sánchez, 2015; Henseler et al., 2014; Shahid et al., 2019; SmartPLS, 2015). Accordingly, the proposed model meets this criterion (see Table 14).

Table 14: Discriminant Validity Test

Constructs Matrix									
	Constructs								
Constructs	Administration Factors	College Context	Intention to Use	SchoolNet Impementation Success	SchoolNet Service Quality	SchoolNet System Quality	SchoolNet Content Quality	Technical Factors	User Satisfaction
Administration Factors	0.958								
College Context	0.896	0.830							
Intention to Use	0.767	0.743	0.844						
SchoolNet Impementation Success	0.684	0.658	0.574	0.837					
SchoolNet Service Quality	0.901	0.544	0.744	0.743	0.753				
SchoolNet System Quality	0.844	0.551	0.556	0.568	0.556	0.904			
SchoolNet Content Quality	0.758	0.674	0.580	0.454	0.580	0.790	0.783		
Technical Factors	0.874	0.799	0.486	0.546	0.486	0.901	0.574	0.918	
User Satisfaction	0.902	0.803	0.443	0.474	0.443	0.890	0.696	0.883	0.870

5.3.3. Validating the Structural Model

After validating the measurement model in terms of reliability and validity tests of the constructs, the next step is to validate the model's constructs' relationships. Accordingly, the structural model tests the predictive capabilities, path coefficients, and endogenous constructs of the overall proposed model. The relationship among the constructs were assessed in a similar technique as it was performed for the trainees' and trainers' samples (see Figure 9 for details).

Path Coefficients

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: | Excel Form

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
Administration Quality -> SchoolNet Service Quality	0.857	0.856	0.023	36.568	0.000
College Contexts -> Administration Quality	0.335	0.327	0.112	2.989	0.003
College Contexts -> SchoolNet Content Quality	0.916	0.916	0.026	34.972	0.000
College Contexts -> SchoolNet System Quality	1.030	1.030	0.005	191.714	0.000
Intention to Use -> SchoolNet Implementation Success Factors	0.649	0.644	0.058	11.157	0.000
SchoolNet Content Quality -> Administration Quality	0.693	0.702	0.112	6.168	0.000
SchoolNet Service Quality -> Intention to Use	0.220	0.220	0.037	5.908	0.000
SchoolNet Service Quality -> User Satisfaction	0.380	0.379	0.046	8.328	0.000
SchoolNet System Quality -> Intention to Use	0.811	0.812	0.034	23.778	0.000
SchoolNet System Quality -> User Satisfaction	0.686	0.688	0.049	13.969	0.000
User Satisfaction -> SchoolNet Implementation Success Factors	0.344	0.349	0.058	5.963	0.000

- *P value between 0.000 up to 0.05 is the construct is significant*

Figure 9: Structural Model Testing for Bootstrapping Direct Effect Results

5.3.4. Model Testing

Proposed SchoolNet Success Model is extensively tested and evaluated the association between constructs of the model. These tests ensure that Proposed SchoolNet Success Model meet the following criteria:

- Which construct associate which constructs
- The model is resolve the challenges of the TVET system
- Necessary input data are available to drive the models, including the hypothesizes are correct or not
- Models are accurate enough to reproduce data from tracer tests to Misrak Polytechnic College incidents
- Models are fast and robust enough to be used for emergency response applications

Furthermore, Figure 10 presents the overall results of the assessment of measurement and structural model tests.

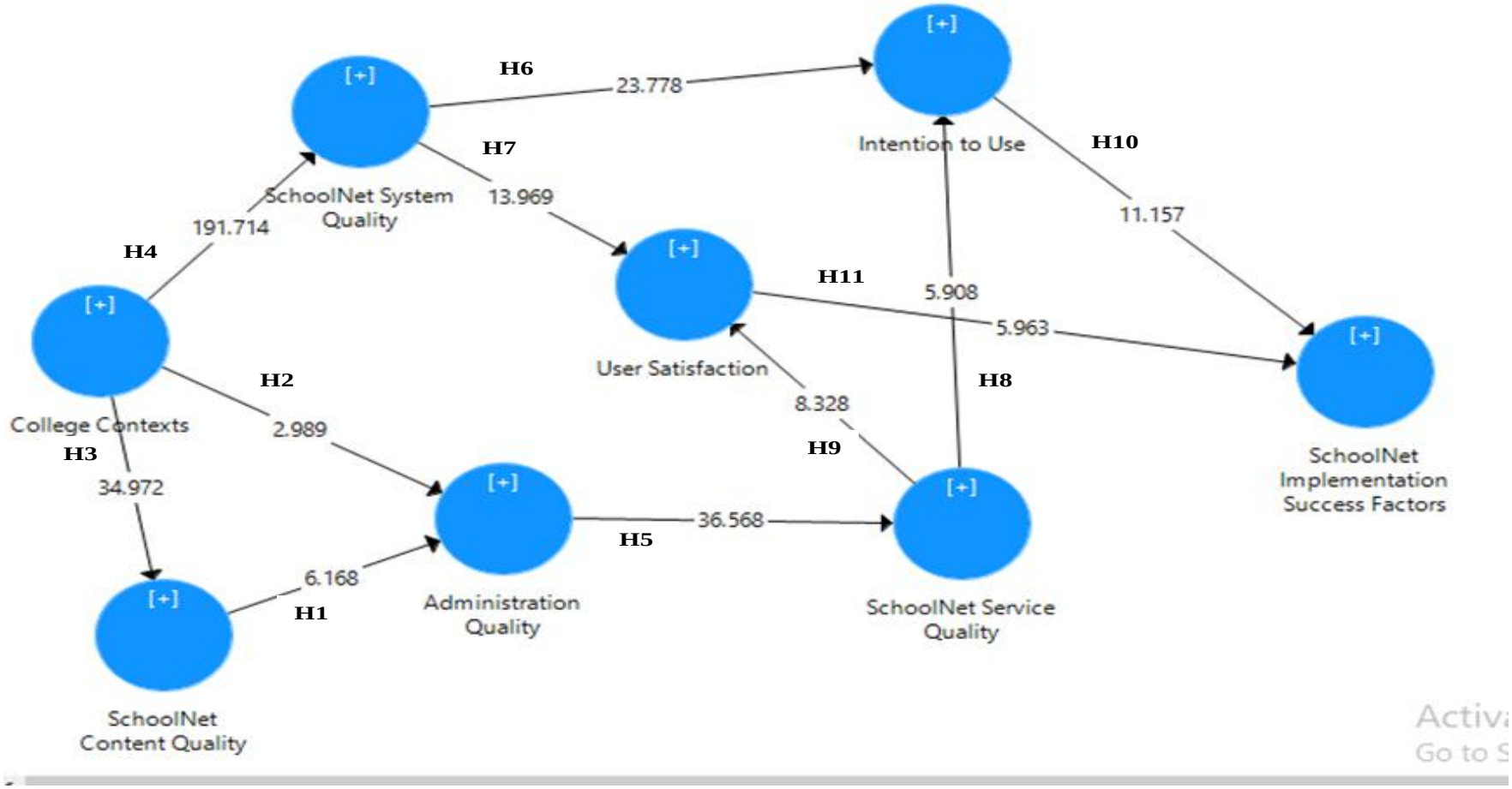

Figure 10: Proposed Model Test

Our data will be analyzed using structural equation modeling (SEM) technique to reveal the significant relationships and path coefficients in the tested model. Confirmatory factor analysis (CFA) will be employed to evaluate reliability through factor loadings, Cronbach's alpha, and composite reliability. Convergent validity will be checked using average variance extracted (AVE) while discriminant validity will be checked through comparing the square root of AVEs with other variables coefficients. Collinearity between variables will be assessed via variance inflation factor (VIF). Common method variance will be tested through conducting a Harman's single-factor test (Fan et al., 2016; Mâţă et al., 2020; Said et al., 2011).

5.4. Discussion

This sub-section describe the structural model tests results as presented in figure 10 and depicted in figure 11.

1. **College Contexts:** After structural model tests for this construct under the trainees' and trainers' samples (see figure 9 and 10). The direct effects of College Contexts on SchoolNet System Quality, Administration Quality, and SchoolNet Contents Quality were assessed and the analysis results were (O 0.335, P 0.003), (O 0.916, P 0.000), and (O 1.030, P 0.000) respectively. This confirms that *the (H4): College Contexts has direct effect on SchoolNet System Quality, (H2): College Contexts has direct effect on Administration Quality, and (H3): College Contexts has direct effect on SchoolNet Contents Quality*.
2. **SchoolNet Contents Quality:** The direct effect of SchoolNet Contents Quality on Administration Quality was assessed and the analysis result was (O 0.693, P 0.000) respectively. This proves that the *(H1): SchoolNet Contents Quality has a direct effect on Administration Quality*.
3. **SchoolNet Systems Quality:** This construct was assessed in relation to its direct effect on Intention to Use and User Satisfaction. As a result, Smart PLS analysis results were (O 0.811, P 0.000) and (O 0.686, P 0.000) respectively. This shows that *(H6): SchoolNet System Quality has direct effects on Intention to Use and (H7): SchoolNet System Quality has direct effects on User Satisfaction*.
4. **Administration Quality:** This construct was assessed the direct effect on relation to SchoolNet Service Quality. The analysis result was (O 0.875, P 0.000) respectively. The

analysis result show *(H5): Administration Quality has direct effect on SchoolNet Services Quality*.

5. **SchoolNet Service Quality:** This construct was assessed in relation to its direct effects on User Satisfaction and Intention to Use. The analysis result was (O 0.380, P 0.000) and (O 0.220, P 0.000) respectively. This leads the *(H9): SchoolNet Service Quality has direct effects on User Satisfaction and (H8): SchoolNet Service Quality has direct effects on Intention to Use*.
6. **User Satisfaction:** The direct effect of User Satisfaction on SchoolNet Implementation Success Factors was assessed and the analysis result showed (O 0.334, P 0.000) respectively. This show *(H11): User Satisfaction has direct effect on SchoolNet Implementation Success Factors*.
7. **Intention to Use:** The direct effect of Intention to Use on the SchoolNet Implementation Success Factors was assessed and the Smart PLS analysis result showed that (O 0.642. P 0.000). This confirm that *H10: Intention to use has a direct effect on SchoolNet implementation success.*
8. **SchoolNet Implementation Success Factors:** This endogenous or outcome construct of the study model showed that 90% of the variance in SchoolNet Implementation Success Factors.

CHAPTER SIX: CONCLUSIONS & RECOMMENDATIONS

6.1. Introduction

This study was conducted on the critical success factors influence SchoolNet project implementation in the case of Addis Ababa City Administration TVET colleges. The proposed model (see Figure 6) is an attempt to provide vital insights into the critical success factors influence SchoolNet project implementation in TVET colleges.

6.2. Summary of Key Findings

This study deals with developing SchoolNet implementation success model. Addis Ababa City Administration TVET colleges implement SchoolNet project were purposefully selected in a way that would achieve the study‘s objectives. Accordingly, this study was conducted to achieve two major research questions:

> **The study’s question #1: What are the factors influencing the SchoolNet project implementations in Addis Ababa City Administration TVET Colleges?**

From literature reviews and the participants responses identified 21 major factors that influence SchoolNet implementation success. These factors are categorized into three factor themes (i.e. technical factors themes, governing factors themes, and organizational factors themes).

Table 15: Selected Factors Themes from the Literature Reviewed

Governing Factor Themes	**Technical/Technological Factor Themes**	**Organizational Factor Themes**
• Vision • Strategy • Top management support • Leadership	• IT Infrastructure • IT Standard • Collaboration • Security	• Policy & legal issue • Quality • Reward system • Implementation

• Student centric • Funding	• Relative Advantage • National Information Infrastructure	• Training • Organizational structure • Technical staff • Change management • Awareness

The study's question #2: Which factors are more critical or directly influencing in the successful implementation of SchoolNet project?

This study's research question was achieved using two stages of research work. The first stage was done by reviewing relevant literature. Accordingly, six information systems success measurement dimensions (constructs): systems quality, information quality, service quality, intention to use, user satisfaction, and net benefits were taken from the updated ISS model (DeLone & McLean, 2003) and it can categorized into three factors themes: technical factors, governing factors, and organizational factors (Altameem et al., 2006). In the second stage: adopting Eisenhardt (1989) theory building from case study research technique, these seed constructs were used to categorize relevant constructs serving as "scaffolds". Accordingly, Misrak Polytechnic College was selected based on theoretical sampling method (Eisenhardt, 1989; Yin, 2003). To this end, single case study was employed to enhance its external validity of the study findings.

Multiple data collection methods were used to triangulate the findings. Assisted by NVivo Pro 12 qualitative data analysis tool, eight higher level categories (constructs) were identified from the qualitative phase of the study grounded with extant literature as factors that determine SchoolNet Implementation Success. Six out of the eight higher level categories of the model that measure SchoolNet implementation success related to the updated ISS model were: SchoolNet systems quality, SchoolNet services quality, and SchoolNet content quality, intention to use, user satisfaction and SchoolNet implementation success. However, most of the sub-categories of these six higher level categories related to the updated ISS model are quite different from the ISS model's construct measures. On the other hand, two new constructs (i.e. college context, and administration quality) emerged from this study.

Table 16: Summary of The Study's Key Findings

Proposed Model Constructs	**D&M ISS Model Constructs**	**Finding Constructs**	**Measures**

College Context	-	College context emerged as a new construct not available in the updated ISS model.	Computer self efficacy; Attitude towards SchoolNet project; Creating SchoolNet service environment; timely response
SchoolNet Contents Quality	Information Quality	Confirmed this construct as of the updated ISS model in the context of this study as well.	Accuracy; timeliness; completeness; relevance; ease of understanding; personalization; consistency
SchoolNet Systems Quality	Systems Quality	Confirmed this construct as of the updated ISS model in the context of this study as well.	Ease of use; user friendly; systems interactivity; systems response; systems useful features; systems availability; secure
SchoolNet Services Quality	Service Quality	Confirmed this construct as of the updated ISS model in the context of this study as well.	Tangibles, Reliability, Responsiveness, Assurance, Empathy
Administration Factors	-	Administration factors emerged as a new construct not available in the updated ISS model.	Technical support; Quality assurance Mechanism; Motivation; Computer training; Intellectual property protection; SchoolNet service policy; Availability of SchoolNet infrastructure
Intention to Use	Intention to Use	Confirmed this construct as of the updated ISS	Frequency of use; Dependability

		model in the context of this study as well.	
User Satisfaction	User Satisfaction	Confirmed this construct as of the updated ISS model in the context of this study as well.	Enjoyable experience; Overall satisfaction
SchoolNet Implementation Success	Net Benefits	Confirmed this construct as of the updated ISS model in the context of this study as well.	Time savings; Cost savings; Enhanced Academic and training performance

Furthermore, the structural model tests the relationships among the constructs of the proposed model as represented by the eleven hypotheses. The followings are key findings of testing the structural model based on the trainees' and trainers' samples:

1. *College context* significantly and directly affected three constructs: *Administration factors, SchoolNet content quality, and SchoolNet systems quality.*
2. *SchoolNet systems quality* significantly and directly affected two constructs*: intention to use and user satisfaction.*
3. *Administration factor* significantly and directly affected one constructs: *SchoolNet services quality.*
4. *SchoolNet service quality* significantly and directly affected two constructs: *intention to use and user satisfaction*.
5. *User satisfaction* is a determinant of one constructs: *SchoolNet implementation success.*
6. *Intention to use* determines one construct: *SchoolNet implementation success.*

6.3. Conclusion

In Ethiopia, quite most of the education sectors has been using ICT in education to improve the delivering system of knowledges and skills to the public. However, Addis Ababa City Administration TVET Agency has a well-organized ICT infrastructure which connects 13 colleges found in Addis Ababa city. From these TVET colleges, Misrak Polytechnic College is one of

them. This college has a well-organized ICT infrastructure as well, but there is a limitation on accessing this ICT infrastructure by the college communities. So, the aim of this study is to identify the issues that directly influencing the successful implementation of SchoolNet projects in TVET colleges in Addis Ababa city administration. Consequently, a case study research is made based on the previous history of Misrak Polytechnic College on ICT implementation applied so far to enable us obtain a deeper understanding of the challenges for the implementation of SchoolNet project.

The six information systems success criteria /dimensions/ based on the model of (DeLone & McLean, 2003) are used as a process to address the factors influencing SchoolNet implementation. The result of each dimension from the rigorous analysis has pointed out clearly accordingly (see table 8, 9, & 10). Therefore, Information Systems Success helps to improve the delivering of knowledge and skill to the community from TVET college aspects of organizational culture, system usage (intention to use), user satisfaction, and it also helps to improve the systems quality and service quality in the TVET colleges.

The research concluded with several findings through the replies obtained from the interviews and questionnaires. From the interview discussion principals confirmed that loss of accessories, lack of physical infrastructure like ICT furniture‘s; printers are some of the challenges related with ICT infrastructure in TVET College. Similarly, all of the respondents indicate there is no assigned appropriate skilled ICT expert in TVET colleges. All interviewee agree that technical problems, governing problem, and organizational problem related with ICT infrastructure influence the implementation of SchoolNet drives from both physical infrastructure and network infrastructure.

IT trainers agree that most TVET College don‘t meet ICT standard due to infrastructure issue and lack of ICT expert at national level. IT trainers also agree lack of accountability, low awareness of the community on ICT service, technophobia, less technical support, lack of clear guidelines & policy and lack of responsiveness are the major issues on the implementation of the SchoolNet project in TVET colleges.

All participants regarded the absence of maintenance, technical assistance and unavailability of skilled person as a hindrance for sustainable operation of the training process on SchoolNet project activities in TVET colleges, which has a direct impact on trainer’s daily activities due to constant

system breakdowns or failures. Assefa (2017) stated that there is no skilled person to maintain the physical damage on the IT infrastructure in the schools.

The following major factors influencing the implementation process directly or indirectly has been stressed by the participants:-

- From trainers' and trainees' aspects: - lack of ICT skill to access the infrastructure, lack of awareness, lack of positive attitude, lack of interest, and others.
- From management and leaders side: - lack of commitment, poor follow up practice, lack of management support, lack of control mechanism, lack of immediate feedback respond mechanism, and others.
- From the college perspective: - the shortage of training ICT equipment, poor internet connectivity, shortage of computer lab, and others.

6.4. Recommendations

The following recommendations forwarded to different stakeholders' in the sector with regards to SchoolNet Implementation can be made based on the conclusion provided by the research.

- Establish a guideline on policy & legal issues at college level.
- Avail adequate budget for the desired sustainable project.
- Organize a skilled technical staffs to look after the system.
- Develop incentive scheme for IT trainers and management staffs.
- Prepare upgrading course for the existing staffs and trainers.
- Arrange a forum in collaboration with other similar colleges for experience sharing.
- Avail adequate training materials /literatures/ to the trainees.
- Upgrade the speed or broadband of internet connectivity to avail equal access distribution for all departments.
- Develop portal website owned by every TVET college.
- Maintain a periodical survey /Audit/ on the system.

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Appendixes

Appendix 1

Interview guide (for project office and principals and ICT Technicians)

The study is purely for academic research purpose required for partial fulfillment of MSC of Addis Ababa University (AAU). The main objective of the research is to investigate critical success factors and indicate the possible measures in managing such factors that influence the implementation of SchoolNet project in Addis Ababa City Administration TVET Colleges. Your frank and genuine responses to the questions are highly indispensable.

Therefore, indicating that you may not need to mention your name, and promising that all the information that is collected from you would be kept confidential and used only for the purpose of the study, the researcher hereby kindly request your cooperation for the same.

Thank you so much for giving this chance to conduct the interview with you, the researcher a student form AAU, The researcher conducting interview for master thesis and my topic is about the critical success factors of influence e-governemt in SchoolNet implementation the case of Addis Ababa City Administration TVET Colleges. First of all I would like you to give me a background about this project, and tell when the initial start of it took place.

Habtamu Zewdu, 2020. Phone :- +251-921685804

Interview method: ……. Time/Date: ……

Opening questions: (adopted from AKLOG, (2019))

1. College name:……..
2. Title Name: ……..
3. Can you explain your major responsibilities in your job?
4. Have you been trained in ICT? What specific training did you receive? If not, how did you gain the skills?
5. What strategies should be used to train more trainers?
6. What is the vision of your college with regard to ICT implementation?
7. How does the college leadership facilitate the ICT implementation process?

8. How involved is the college leadership? Does the college leadership suggest or prescribe to you the type of ICT for use in a classroom?

SchoolNet project implementation:

9. Could you please give me a background about the SchoolNet project in your college and since when did the ministry of education adopt the SchoolNet project?
10. What‘s the future plan of the management to avoid the problem influence the implementation of SchoolNet project?
11. What are the factors that influence ICT integration in college?
12. What is your opinion about the factors which influences the implementation of the SchoolNet projects?
13. Can you mention the major types of problems you faced on the implementation of SchoolNet project experienced?
14. Which factor of the following technical factors, governing factors, and organizational factors has applied the most challenges to your college? Could you explain why?

    - System Quality dimension
    - Information Quality dimension
    - Services Quality dimension
    - Intention to Use dimension
    - User Satisfaction dimension
    - Individual Impact dimension
    - Organizational Impact dimension

15. What about other factors do you think they are influence implementation of schoolNet program? Can you reorder them from the most to the least important or the one which does not related?
16. Is there any factor that you would like to add to this list? How this factor influences the implementation of the SchoolNet project and how do you plan to manage it?

The management of a factor:

17. What is your plan to manage the factor of system quality, information quality, and service quality? Is the management of this factor influenced by external pressures or limitations, e.g. public policies or the level of technical skills of the public; and so on? If yes, what are those external pressures?
18. What is your plan to manage the factor of intention to use and user satisfaction? Is the management of this factor influenced by external pressures or limitations? What are they?
19. What is your plan to manage the factor of net benefits? Is the management of this factor affected by external pressures or limitations? What are they?
20. What is your plan to manage the factor (additional factor if any)? Is the management of this factor influence by external pressures or limitations? If yes, could you explain more?
21. Of the six factors we have in this interview, system quality, information quality, service quality, intention to use, user satisfaction, and net benefits. Which one would you give the most important factor? Why?
22. How would you integrate these technical factors, governing factors, organizational factors and work to minimize the problem as a result of the implementation of the SchoolNet.

Closing questions:

23. Would you like to add anything more?
24. Could I use your name in this thesis? ……..
25. Could I contact you for a follow-up questions and how I can contact you?

Thank You!

Appendix 2

Survey Questionnaires

Dear respondents,

I am Habtamu Zewdu, a postgraduate student in Information science department at Addis Ababa University, College of Natural and Computational Sciences. Currently I am doing masters' thesis entitled "***Critical success factors influence e-government implementation on SchoolNet project the case of selected Addis Ababa City Administration TVET colleges."*** My objective is identifying critical issues that influence SchoolNet system implementation in TVET Colleges in context to Addis Ababa City Administration.

As you may know, organizations are widely implementing SchoolNet systems to modernize the delivering knowledge and skill. However different issues influence the SchoolNet system that leads to challenges holding colleges back. In order to address those challenges it requires collecting data for identifying the critical factors that faced in TVET colleges.

Therefore, in this study I want to kindly ask you participate in my survey questionnaires. Because you are functionally and/or technically involved in SchoolNet system and you have knowhow about the system as well as have a good experience on the area. You are selected purposely to participate on this questionnaire. It requires about 15 minutes filling the questionnaires. The information that you provide me is very important and valuable to accomplish my study successfully and addressing the problems properly. It will help the TVET colleges to understand the SchoolNet factors and properly implement and utilize the system.

I would like to assure you that; the information that you provide me is used for the research purpose only and your privacy and confidentiality kept. Therefore, considering the information that you obtain from the above, I would like to appreciate you have spending the time to answer the questions based on the instruction of each parts.

Habtamu Zewdu, If you require additional information and questions, please contact me via, Email: habtamu2012z@gmail.com, Mobile: 0921685804

Thank you for your willingness to participate in this study!

General Respondent Information

Instruction: Please read the statements carefully and circle your response number.

1. Age

   1. 20-30 2. 31-40 3. 41-50 4. 51-60

2. Gender

   1. Female 2. Male

3. Highest qualification:

   1. Certificate 2. Diploma 3. Degree 4. Master and above

4. Work experience:

   1. Less than 5 years 2. 5 to 10 years 3. 11 to 15 years 4. More than 15 years

5. Years of experience in SchoolNet adopted College:

   1. Less than 2 years 2. 3-5 years 3. 6-10 years 4. Above 10 years

Factors Influencing SchoolNet implementation

1. Do you use SchoolNet (e-learning) in your department?

   A. Yes B. No

2. To what extent does SchoolNet implementation successfully implemented?

   A. Very large extent B. large extent C. small extent D. no extent

3. How did the USERS accept the implementation of SchoolNet system?

   A. Very willing B. Willing C. less willing D. not willing

The following statements are factors that influence SchoolNet system. Please select the levels of your agreement with each statement.

0- strongly agree 1- Agree 2-Nither agree nor disagree

3- Disagree 4-Strongly disagree

Statements	**0**	**1**	**2**	**3**	**4**
A. Governing Factor Themes					
Vision of the college are influence SchoolNet project implementation					
Implementation strategy and time frame influence SchoolNet system					
Top management support and commitment influence SchoolNet implementation					
Leadership influence SchoolNet implementation					
End user involvement influence SchoolNet implementation (citizen centric)					
Budgetary constraints influence SchoolNet implementation (Funding)					
B. Technical/Technological Factor Themes					
Availability and facilitation of IT Infrastructure influence SchoolNet system					
IT Standard influence SchoolNet implementation					
Collaboration					
Security					
Relative Advantage of SchoolNet project influence SchoolNet implementation					
National Information Infrastructure					
C. Organizational Factor Themes					
Policy & legal issue					
Quality of the system influence SchoolNet implementation					
Reward system					
Implementation					
Training influence SchoolNet implementation					
Organizational structure					
Technical staff work composition for the SchoolNet project affect SchoolNet system					
Change management influence SchoolNet implementation					
Awareness of stakeholders influence the SchoolNet implementation					

What would you recommend to be done to enhance SchoolNet implementation in any TVET colleges?

_____

_____

_____

_____

_____

_____

Thank you for your co-operation!!

Appendix 3

Researcher observation

Infrastructure related	**Standard issues**	**Security related**	**Expert related**
Loss of UPS & Sep top box materials in class room	1 computer for about five to seven trainees used in ICT lab	Most computers don‘t have Updated antivirus and they are stacked	Lack of ICT experts Lack of training,
Projectors and printers are not available sufficiently on each ICT labs	Few ICT labs for large number of trainees	Switches are not locked and the network cables are easily damaged	Low cost employee
	Most computer furniture are not suitable to use	Stealing of HDMI cables, mouse, and other	Unrelated professionals at the position
Lack of spare parts & accessories		Low processing capacity computers/ too old generation computers used	
Not sufficient printers in college		Structural and design issues	
Lack of generator most in case of power interruption			

Appendix 4

Analysis Results

Path Coefficients

Mean, STDEV, T-Values, P-Val... | Confidence Intervals | Confidence Intervals Bias Co... | Samples | Copy to Clipboard: Excel Format | R F

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
Administration Quality -> SchoolNet Service Quality	0.857	0.856	0.023	36.568	0.000
College Contexts -> Administration Quality	0.335	0.327	0.112	2.989	0.003
College Contexts -> SchoolNet Content Quality	0.916	0.916	0.026	34.972	0.000
College Contexts -> SchoolNet System Quality	1.030	1.030	0.005	191.714	0.000
Intention to Use -> SchoolNet Implementation Success Factors	0.649	0.644	0.058	11.157	0.000
SchoolNet Content Quality -> Administration Quality	0.693	0.702	0.112	6.168	0.000
SchoolNet Service Quality -> Intention to Use	0.220	0.220	0.037	5.908	0.000
SchoolNet Service Quality -> User Satisfaction	0.380	0.379	0.046	8.328	0.000
SchoolNet System Quality -> Intention to Use	0.811	0.812	0.034	23.778	0.000
SchoolNet System Quality -> User Satisfaction	0.686	0.688	0.049	13.969	0.000
User Satisfaction -> SchoolNet Implementation Success Factors	0.344	0.349	0.058	5.963	0.000

Path Coefficients

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: | Excel Form

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
Administration Quality -> SchoolNet Service Quality	0.857	0.856	0.023	36.568	0.000
College Contexts -> Administration Quality	0.335	0.327	0.112	2.989	0.003
College Contexts -> SchoolNet Content Quality	0.916	0.916	0.026	34.972	0.000
College Contexts -> SchoolNet System Quality	1.030	1.030	0.005	191.714	0.000
Intention to Use -> SchoolNet Implementation Success Factors	0.649	0.644	0.058	11.157	0.000
SchoolNet Content Quality -> Administration Quality	0.693	0.702	0.112	6.168	0.000
SchoolNet Service Quality -> Intention to Use	0.220	0.220	0.037	5.908	0.000
SchoolNet Service Quality -> User Satisfaction	0.380	0.379	0.046	8.328	0.000
SchoolNet System Quality -> Intention to Use	0.811	0.812	0.034	23.778	0.000
SchoolNet System Quality -> User Satisfaction	0.686	0.688	0.049	13.969	0.000
User Satisfaction -> SchoolNet Implementation Success Factors	0.344	0.349	0.058	5.963	0.000

Total Indirect Effects

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: Excel Format

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
Administration Quality -> Intention to Use	0.189	0.188	0.033	5.655	0.000
Administration Quality -> SchoolNet Implementation Success Factors	0.234	0.236	0.040	5.931	0.000
Administration Quality -> SchoolNet Service Quality		0.000	0.000		
Administration Quality -> User Satisfaction	0.326	0.325	0.042	7.691	0.000
College Contexts -> Administration Quality	0.635	0.643	0.110	5.765	0.000
College Contexts -> Intention to Use	1.019	1.019	0.009	117.025	0.000
College Contexts -> SchoolNet Content Quality		-0.000	0.000		
College Contexts -> SchoolNet Implementation Success Factors	1.013	1.012	0.011	93.013	0.000
College Contexts -> SchoolNet Service Quality	0.831	0.830	0.027	31.082	0.000
College Contexts -> SchoolNet System Quality					
College Contexts -> User Satisfaction	1.023	1.023	0.014	72.260	0.000
Intention to Use -> SchoolNet Implementation Success Factors					
SchoolNet Content Quality -> Administration Quality					

Total Indirect Effects

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: Excel Format | R Form

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
SchoolNet Content Quality -> Administration Quality					
SchoolNet Content Quality -> Intention to Use	0.131	0.130	0.022	5.853	0.000
SchoolNet Content Quality -> SchoolNet Implementation Success Fa...	0.163	0.164	0.031	5.290	0.000
SchoolNet Content Quality -> SchoolNet Service Quality	0.594	0.600	0.095	6.240	0.000
SchoolNet Content Quality -> User Satisfaction	0.226	0.227	0.040	5.594	0.000
SchoolNet Service Quality -> Intention to Use					
SchoolNet Service Quality -> SchoolNet Implementation Success Fac...	0.274	0.275	0.043	6.323	0.000
SchoolNet Service Quality -> User Satisfaction					
SchoolNet System Quality -> Intention to Use					
SchoolNet System Quality -> SchoolNet Implementation Success Fac...	0.762	0.761	0.042	18.127	0.000
SchoolNet System Quality -> User Satisfaction					
User Satisfaction -> SchoolNet Implementation Success Factors					

Total Effects

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: Excel Format | R F

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
Administration Quality -> Intention to Use	0.189	0.188	0.033	5.655	0.000
Administration Quality -> SchoolNet Implementation Success Factors	0.234	0.236	0.040	5.931	0.000
Administration Quality -> SchoolNet Service Quality	0.857	0.856	0.023	36.568	0.000
Administration Quality -> User Satisfaction	0.326	0.325	0.042	7.691	0.000
College Contexts -> Administration Quality	0.970	0.970	0.012	83.096	0.000
College Contexts -> Intention to Use	1.019	1.019	0.009	117.025	0.000
College Contexts -> SchoolNet Content Quality	0.916	0.916	0.026	34.972	0.000
College Contexts -> SchoolNet Implementation Success Factors	1.013	1.012	0.011	93.013	0.000
College Contexts -> SchoolNet Service Quality	0.831	0.830	0.027	31.082	0.000
College Contexts -> SchoolNet System Quality	1.030	1.030	0.005	191.714	0.000
College Contexts -> User Satisfaction	1.023	1.023	0.014	72.260	0.000
Intention to Use -> SchoolNet Implementation Success Factors	0.649	0.644	0.058	11.157	0.000
SchoolNet Content Quality -> Administration Quality	0.693	0.702	0.112	6.168	0.000

Total Effects

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples | Copy to Clipboard: Excel Format

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/...	P Values
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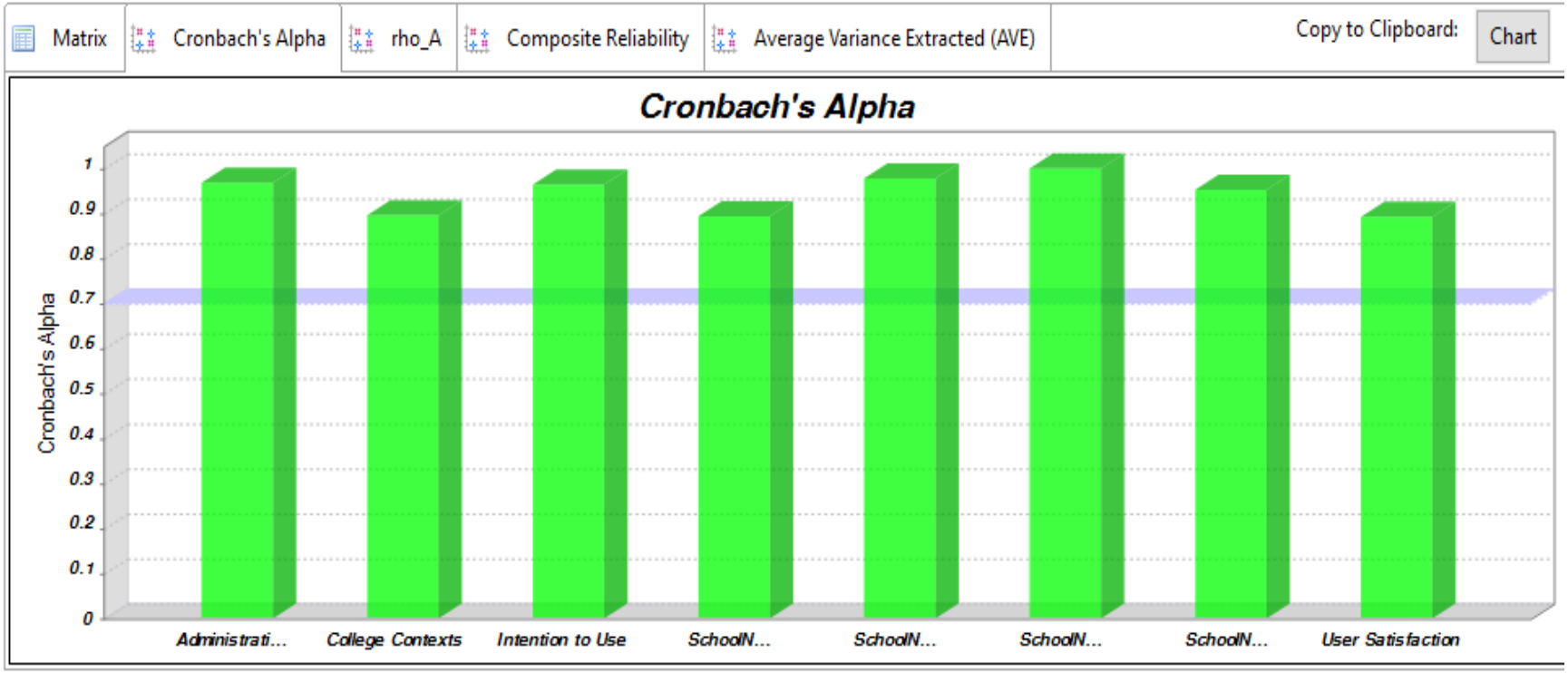
SchoolNet System Quality -> User Satisfaction	0.686	0.688	0.049	13.969	0.000
User Satisfaction -> SchoolNet Implementation Success Factors	0.344	0.349	0.058	5.963	0.000

Construct Reliability and Validity

Matrix | Cronbach's Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE) | Copy to Clipbo

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Administration Quality	0.968	0.970	0.968	0.773
College Contexts	0.896	0.927	0.903	0.552
Intention to Use	0.964	0.968	0.965	0.776
SchoolNet Content Quality	0.894	0.901	0.896	0.813
SchoolNet Implementation Success Factors	0.978	0.980	0.978	0.726
SchoolNet Service Quality	1.000	1.000	1.000	1.000
SchoolNet System Quality	0.953	0.967	0.956	0.635
User Satisfaction	0.892	0.902	0.896	0.744

Construct Reliability and Validity



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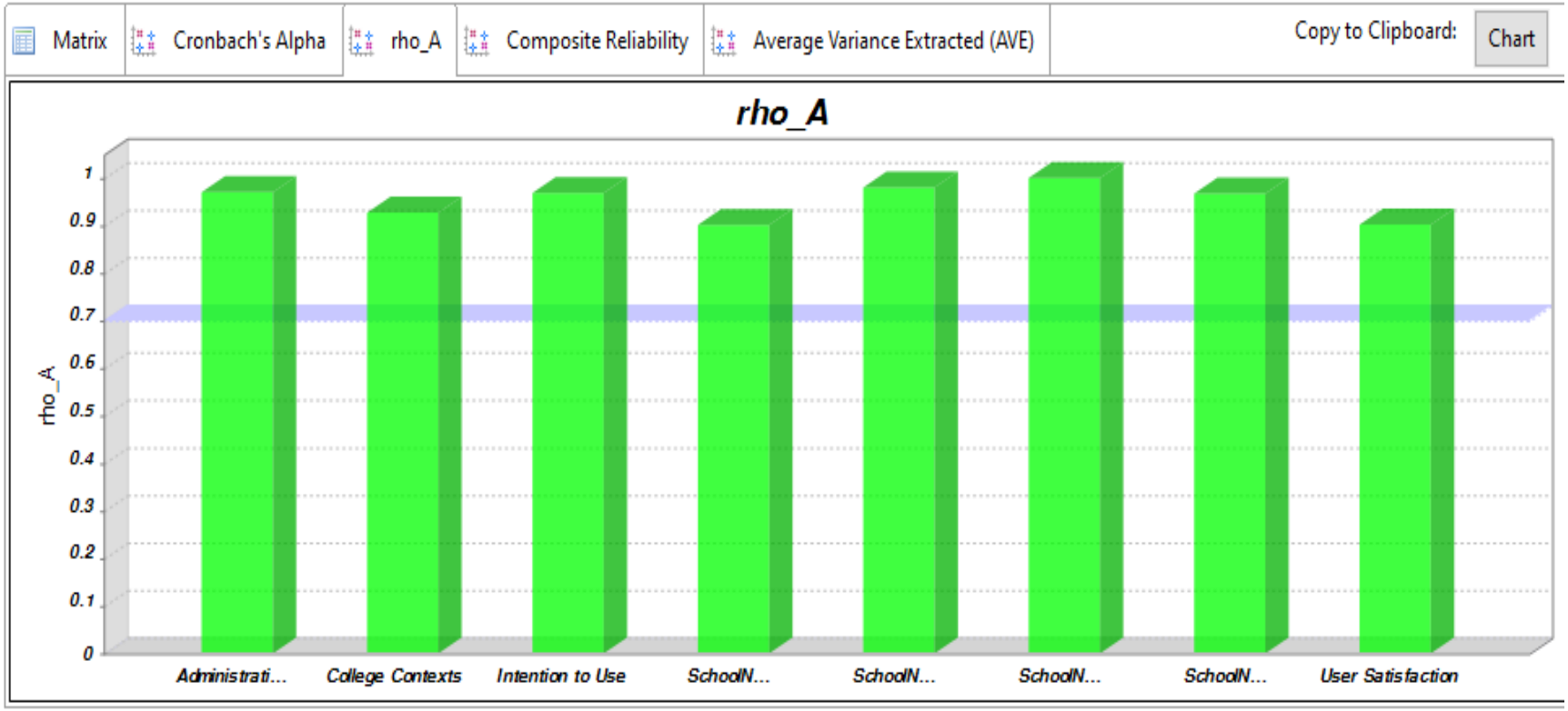

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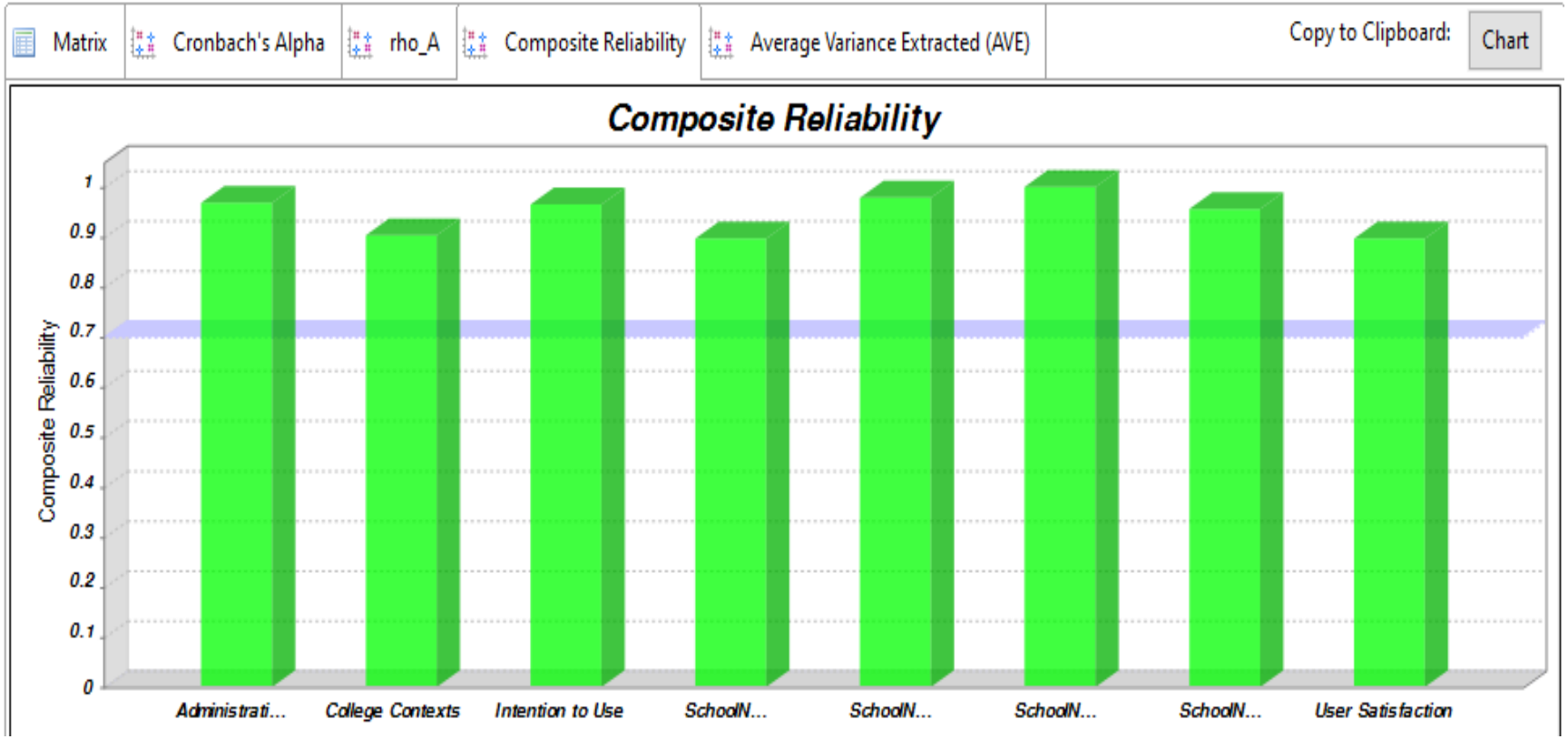

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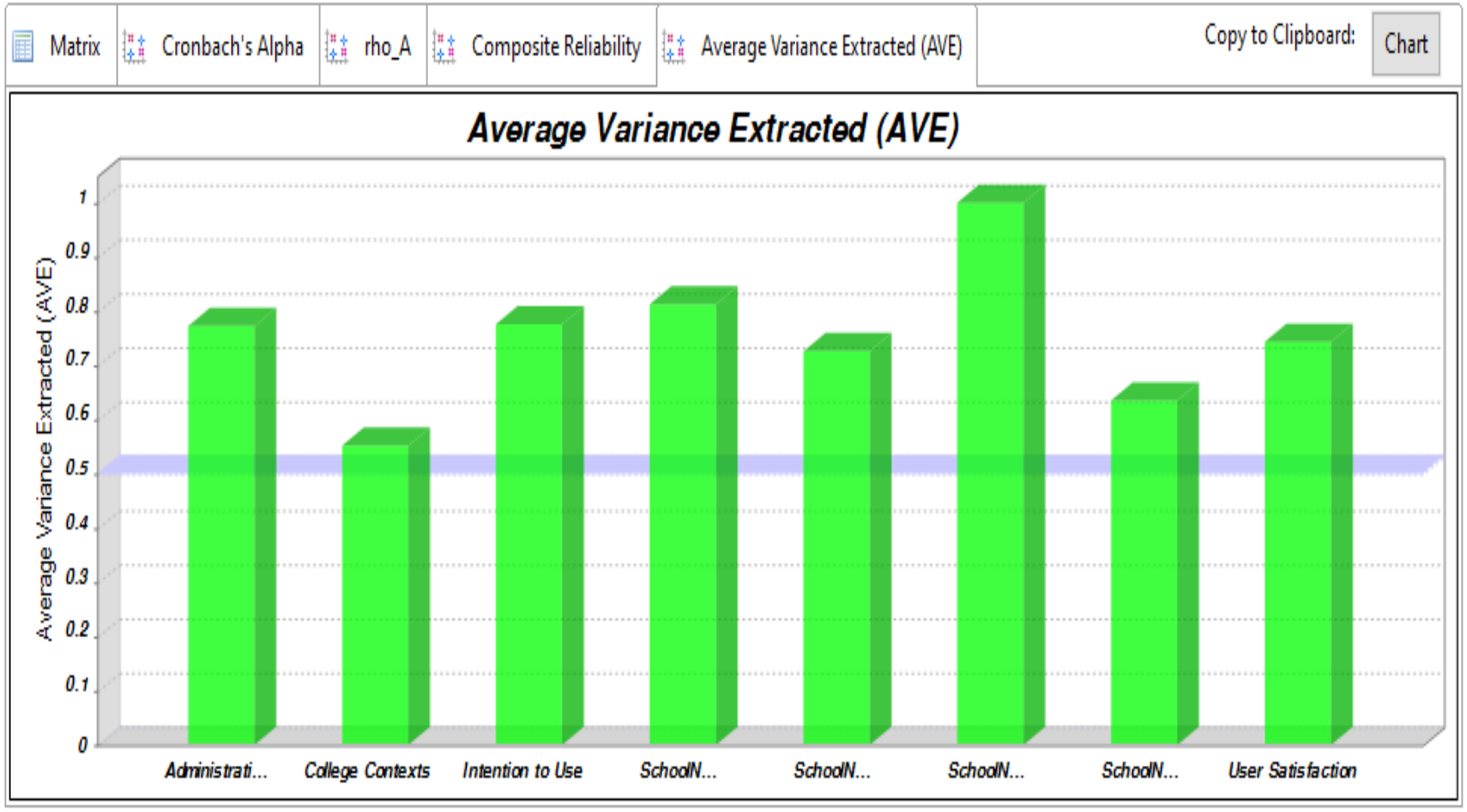


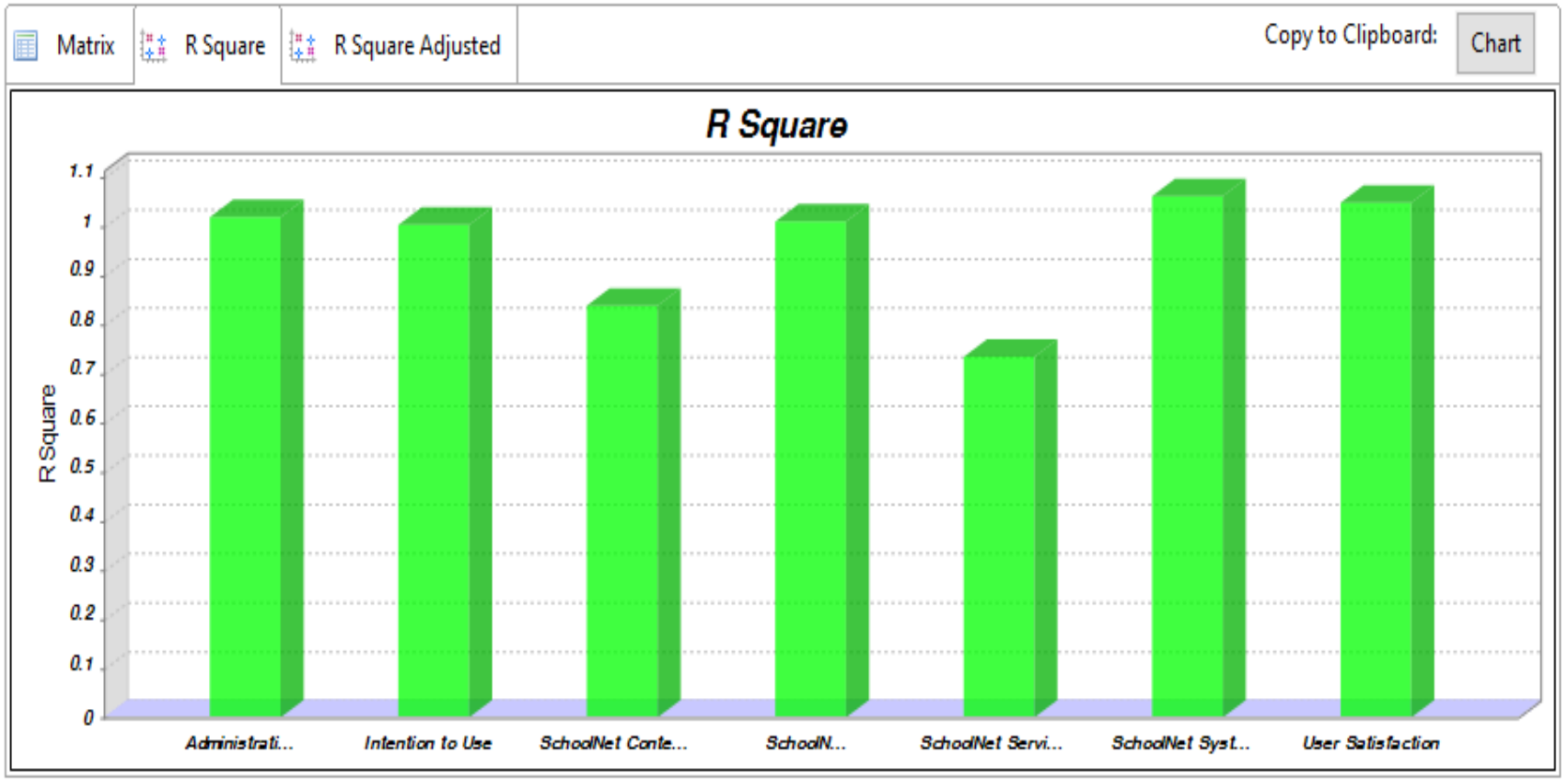
R

R Square

Matrix | R Square | R Square Adjusted

	R Square	R Square Adjusted
Administration Quality	1.019	1.019
Intention to Use	1.003	1.003
SchoolNet Content Quality	0.839	0.837
SchoolNet Implementation Success Factors	1.010	1.010
SchoolNet Service Quality	0.734	0.732
SchoolNet System Quality	1.062	1.062
User Satisfaction	1.048	1.049

R Square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User Satisfaction

R Square

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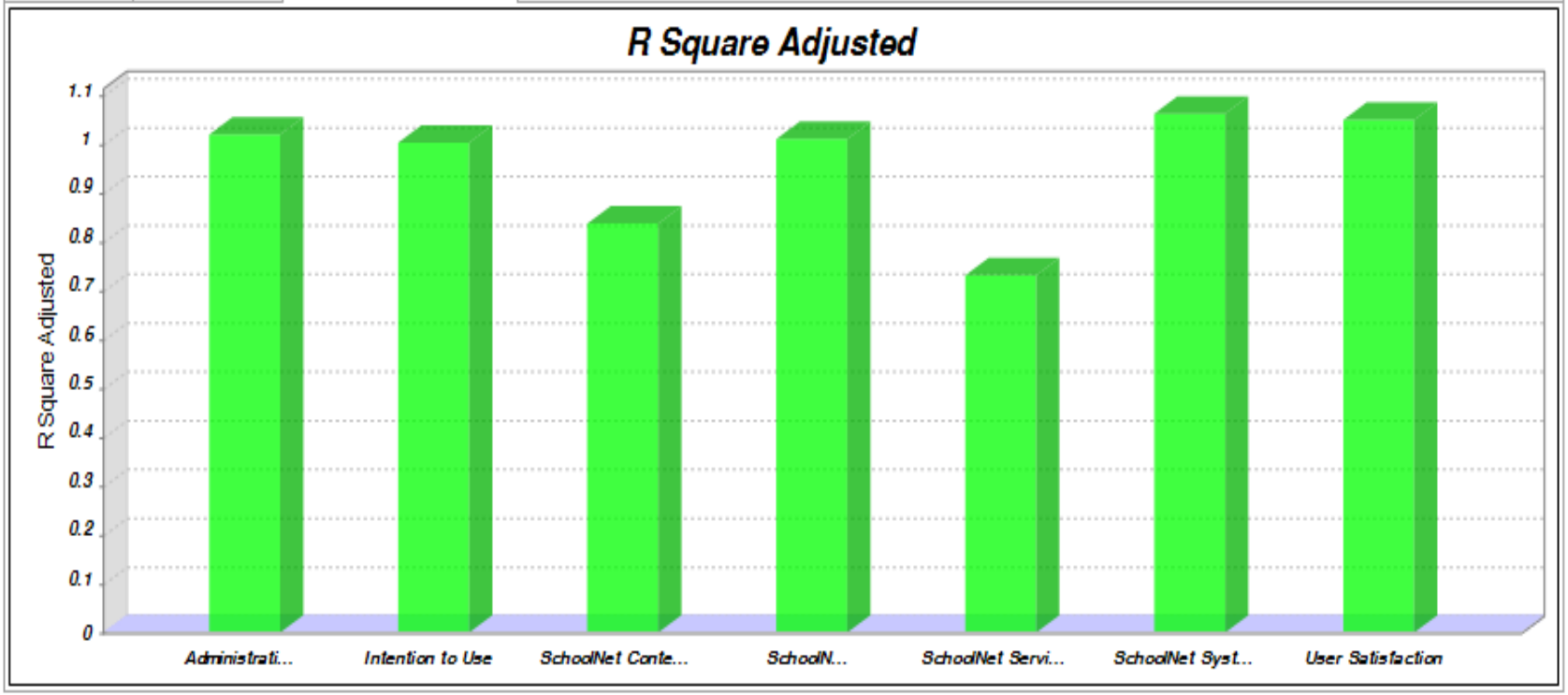

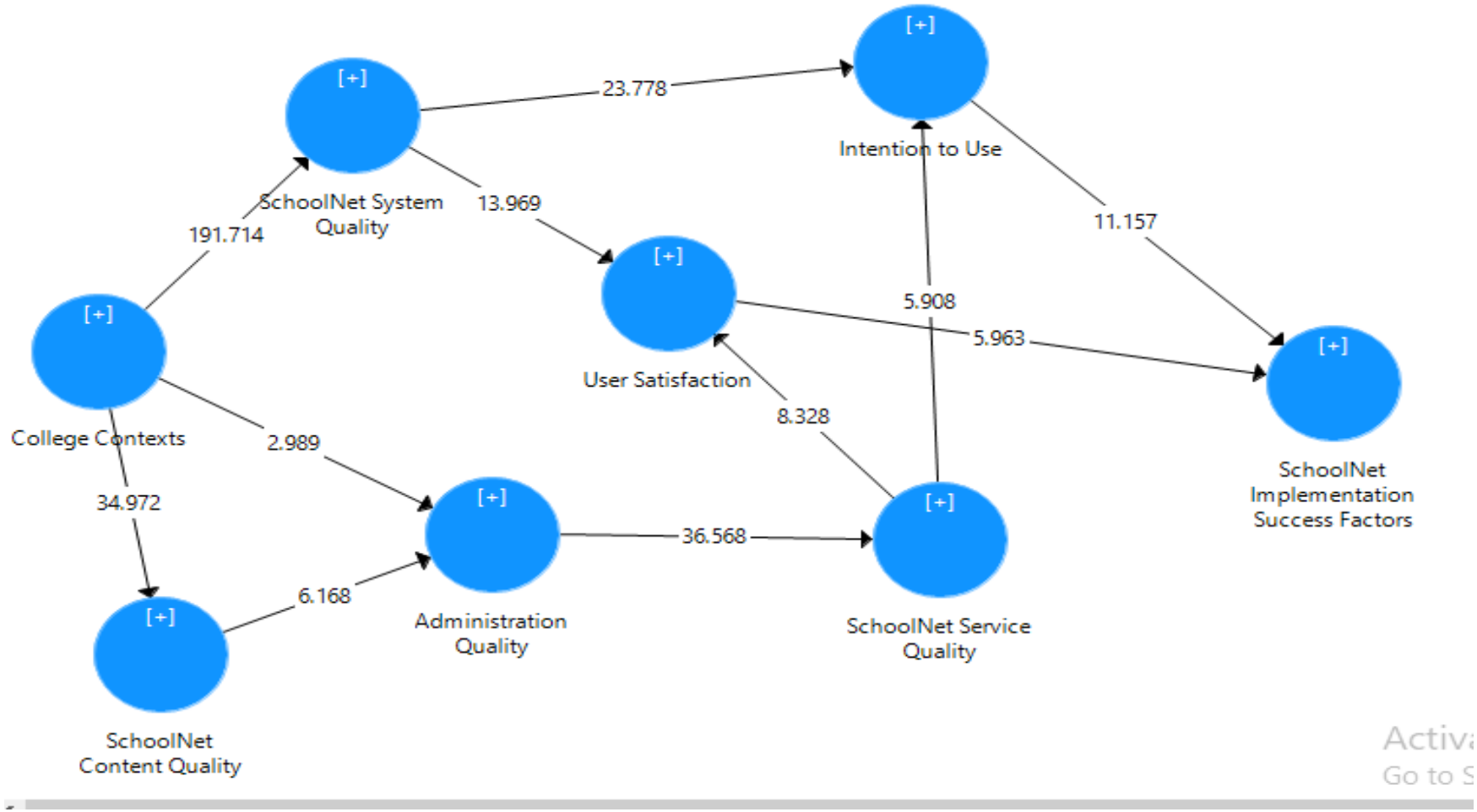
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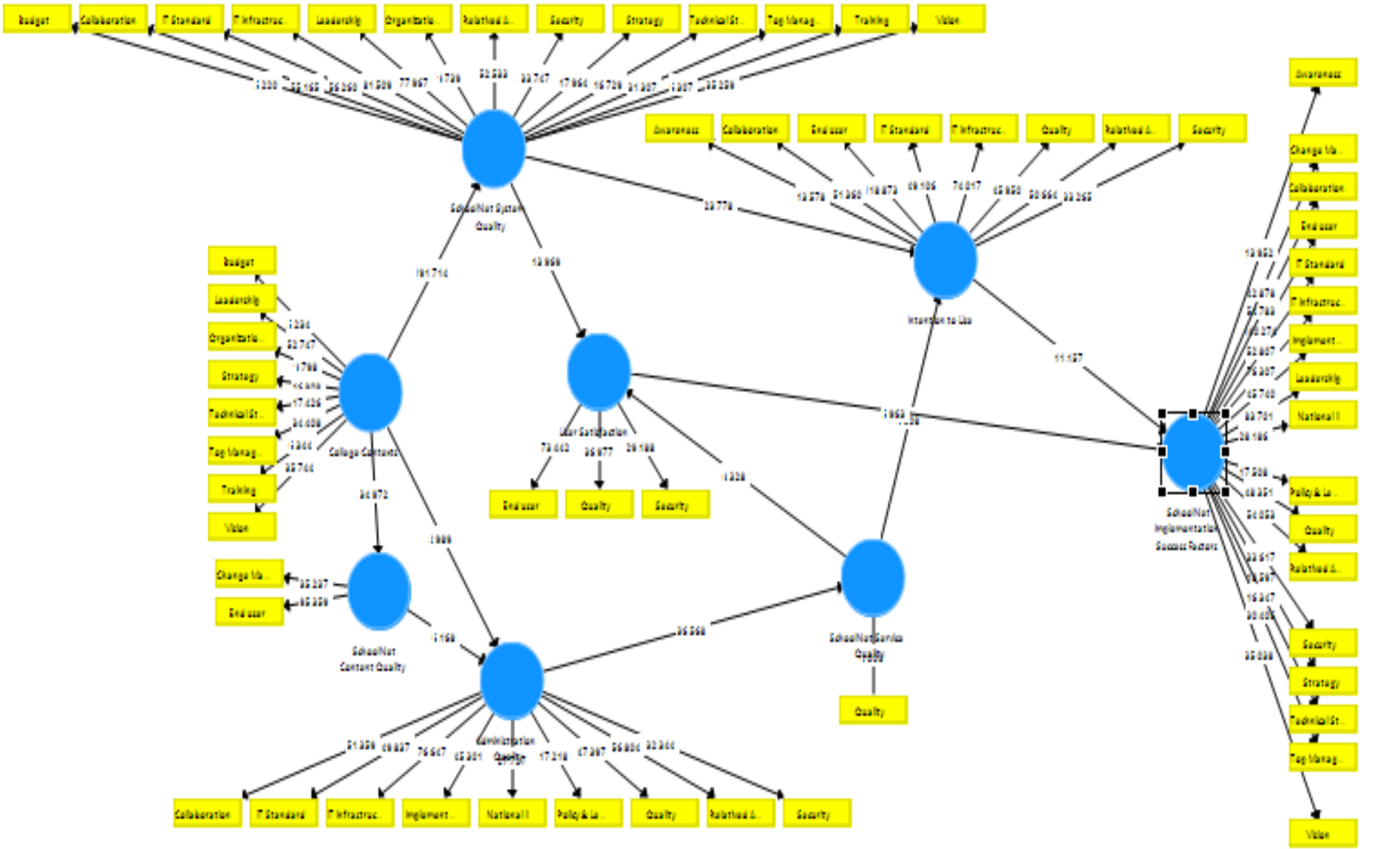
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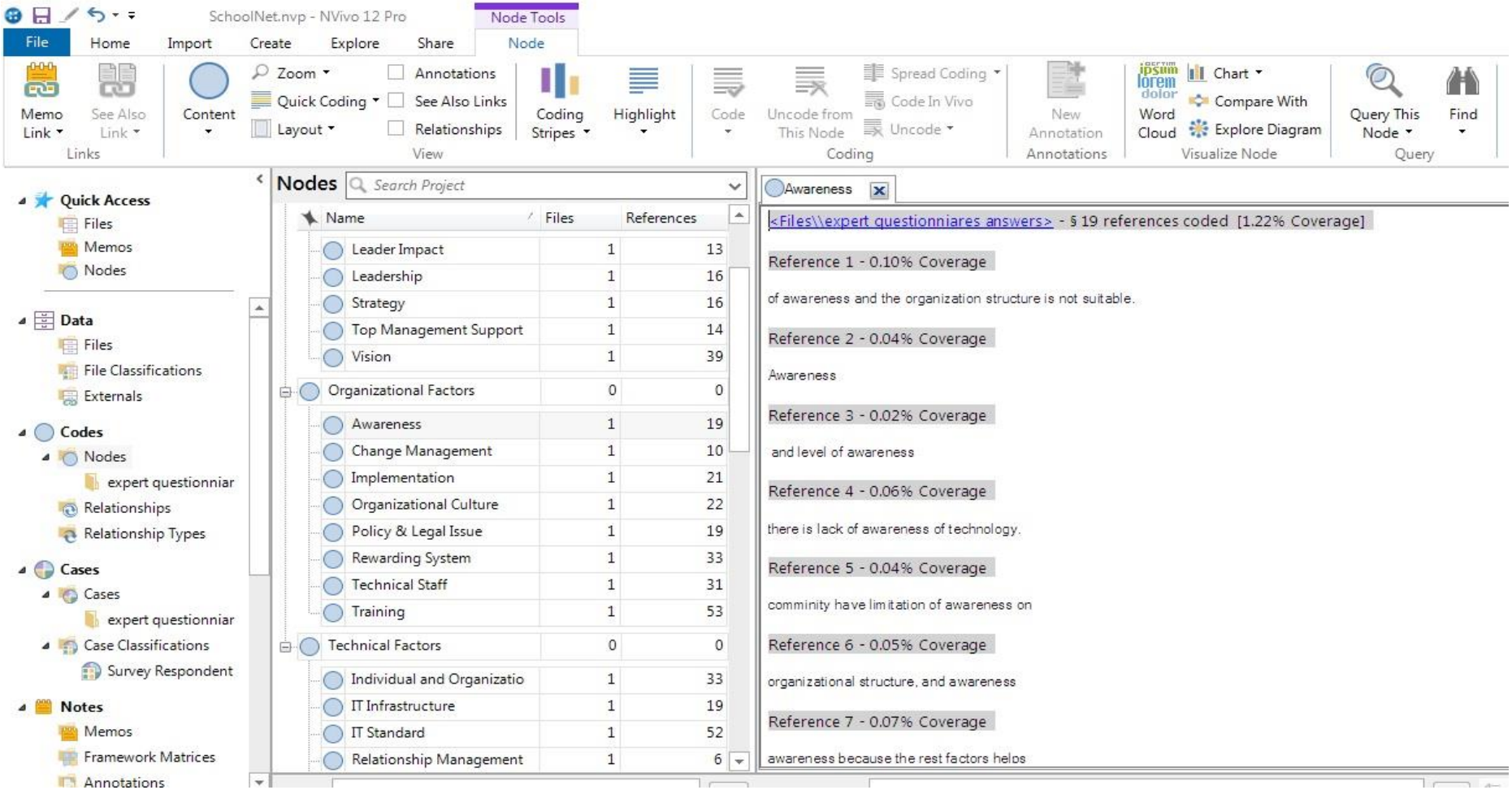
Appendix 5


SchoolNet.nvp - NVivo 12 Pro
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Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
Code
Uncode from This Node
Spread Coding
Code In Vivo
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New Annotation
Word Cloud
Chart
Compare With
Explore Diagram
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Leadership 1 16
Strategy 1 16
Top Management Support 1 14
Vision 1 39
Organizational Factors 0 0
Awareness 1 19
Change Management 1 10
Implementation 1 21
Organizational Culture 1 22
Policy & Legal Issue 1 19
Rewarding System 1 33
Technical Staff 1 31
Training 1 53
Technical Factors 0 0
Individual and Organizatio 1 33
IT Infrastructure 1 19
IT Standard 1 52
Relationship Management 1 6
Awareness
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Reference 1 - 0.10% Coverage
of awareness and the organization structure is not suitable.
Reference 2 - 0.04% Coverage
Awareness
Reference 3 - 0.02% Coverage
and level of awareness
Reference 4 - 0.06% Coverage
there is lack of awareness of technology.
Reference 5 - 0.04% Coverage
comminity have limitation of awareness on
Reference 6 - 0.05% Coverage
organizational structure, and awareness
Reference 7 - 0.07% Coverage
awareness because the rest factors helps