ST. MARY UNIVERSITY

SCHOOL OF GRADUATE STUDIES PROGRAM OF BUSINESS ADMINISTRATION (MBA)

THE EFFECT OF DATA ANALYTICS AND INFORMATION TECHNOLOGY ON PROJECT MANAGEMENT

THE CASE OF SELECTED INTERNATIONAL ORGANIZATIONS IN ADDIS ABABA

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APPROVED BY BOARD OF EXAMINERS

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr Berihun Muche. All sources of material used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

MILKYAS TEREFE _____

Name Signature

St. Mary's University, Addis Ababa. Jan, 2024

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate studies for examination with my approval as a university advisor.

Berihun Muche (PhD) _____

Advisor Signature

St. Mary's University, Addis Ababa. Feb, 2024

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List of acronyms

ANOVA: Analytics of variance

SD: Standard Deviation

PM: Project Management

DCA: Data collection and analytics

PMS: Utilization of project management software

CP: Usage of collaborative platforms

ITI: Investment in IT infrastructure

ICT: Information and Communication Technology

Abstract

In today's dynamic landscape of project management, the integration of data analytics and information technology stands as a critical determinant of organizational success. This study investigated the impact of data analytics and information technology on project management within selected international organizations situated in Addis Ababa. Employing a quantitative approach, the research explores the intricate relationship between data analytics, information technology, and project management strategies across diverse organizational settings. Through surveys, interviews, and document analysis, data were collected from 144 employees of World Vision and Techno Serve organizations. Findings reveal the transformative influence of data analytics and information technology throughout the project planning and implementation, from initiation to closure. Advanced analytics tools empower decision-making, optimize resource allocation, and enhance risk management. Additionally, technological innovations such as project management software and collaborative platforms facilitate improved communication, coordination, and overall project efficiency. The study extends beyond organizational boundaries, envisioning potential societal impact through the adoption of advanced systems by government entities in Addis Ababa and beyond. Insights derived from this research can inform policy decisions, elevate government project outcomes, and drive the modernization of public administration. By addressing current challenges and fostering future collaborations between the public and private sectors, this study aims to contribute valuable knowledge to practitioners, policymakers, and academics. Ultimately, this research seeks to advance the dialogue surrounding the synergies between data, technology, and effective project management within the governmental context, offering insights into best practices and areas for further exploration, with the goal of harnessing the transformative potential of data and technology to drive organizational and societal advancement.

Key words: *project management, data analytics, information technology, organizational success, Addis Ababa, decision-making, communication, efficiency, modernization, transformative potential*

Chapter one

Introduction

This section presents background of the study, problem statement, research question, objectives, scope and significance of the study. Finally, it presented the organization of the study paper.

1.1. Background of the study

Since the early years of the 20th century, the world has been experiencing a revolution known as information technology. Some consider it to be the most fascinating development since the industrial revolution around the mid-18th Century. This revolution is changing our daily lives at home and at work, in shops and banks, in schools, colleges and universities. It is changing the way people think, communicate and behave. Today, the world has become a global village with the internet, mobile phones and satellite networks shrinking time and space, bringing together computers and communications; resulting in new ways of communication, processing, storing and distributing enormous amounts of information (Alfi, 2002). Advancement in chip, satellite, radio, and optical fiber technology has enabled millions of people around the world to connect electronically regardless of national or international boundaries. This explosion in connectivity is the latest and the most important wave in the information revolution (Diallo, 2005).

ICT is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than other fields have experienced. A number of people have attempted to explore this lack of activity and influence (Holzmann, 2013).

Recognizing its critical role in major aspects of the nation, the government of Ethiopia is investing a lot to strengthen the ICT infrastructure for different sectors of the economy. Woreda Net, for instance, is one of these initiatives that is aimed at linking all Woredas throughout the country so that different eGovernment packages can be effectively and efficiently implemented all over the

nation. In spite of the overall budget limitation, in many cases, the percentage of GDP allocation by economically developing countries is higher than that of industrialized nations as far as IS/IT implementations is concerned. To benefit from such investments, more and more companies are using the project approach as a vehicle for creating change in pursuit of organizational goals (Monge, 1992). Each project strives for excellence, yet is by definition a unique task, normally subject to severe restrictions on budget and time; it is widely recognized that projects involve complex set of processes which helps explain why so many fail to achieve the initial overall aims (Zainuddin, 2012).

Organizations are increasingly using different Investment in IT infrastructures to develop solutions to business problems, to improve both the efficiency and effectiveness of the decision-making process, to enhance productivity and service quality, to achieve dynamic stability, and compete for new markets (Shenhar, 1997). Organizations have always sought and adopted technologies that enhance efforts of their manpower in production and management. Indeed, he noted that although it has evolved over a considerable period of time, information technology has emerged as an important tool in management of organizational operations (Leif, 2014).

The amount of information in organizations is heavily increasing and it has become vitally important to efficiently manage and share information inside the organization. Companies have to be swift in adopting new technology in order to remain competitive in a continuously developing business environment. This is where Investment in IT infrastructure comes into play. Companies and other organizations are investing great sums in introducing Investment in IT infrastructures in the organization hoping to be able to make business more efficient and information sharing smooth (Henderson, 2008).

Management support is considered to be a critical factor in the successful implementation of Investment in IT infrastructures innovations. Commitment by top management is identified as one of the most prominent critical factors for successful ERP implementation among such other factors as clear understanding of strategic goals, excellent project management, organizational change management, a great implementation team, data accuracy, extensive education and training, and focused performance measures (Earl, 2011).

The essence of this thesis is to examine the relevance of Investment in IT infrastructure in data Analytics and to determine the extent to which it affect the information Analytics in International organizations based in Ethiopia, Addis Ababa. Internally, improved IS can enhance and strengthen organizational infrastructure and capacity by increasing employees' efficiency; service coordination; information sharing between departments. Externally, information technology solutions can fundamentally transform business organization service delivery. Therefore, the main aim of the study is to analyze the effect of data Analytics and information technology on project management in the case of Techno Serve and World Vision.

1.2. Statement of the problem

Research gap:

The existing literature predominantly focuses on the application of data analytics and information technology (IT) within specific industries, particularly banking. For instance, a study by Sharma et al. (2019) investigated the adoption of IT systems in the banking sector in India, highlighting the importance of IT infrastructure for enhancing customer service and operational efficiency. Similarly, research by Abate et al. (2020) explored the impact of data analytics on risk management practices in Ethiopian banks, demonstrating the significance of data-driven decision-making processes.

However, while these studies contribute valuable insights into IT and data analytics practices, there is a noticeable dearth of research investigating their impact on project management. Moreover, the studies conducted often lack a focus on international organizations, particularly those operating in Addis Ababa, Ethiopia. This research gap suggests a need for empirical studies that explore how data analytics and IT influence project management practices within the context of international organizations in Addis Ababa. Understanding this relationship is crucial for enhancing project management effectiveness and efficiency in diverse organizational settings.

Analysis of empirical studies:

Several empirical studies have investigated the role of data analytics and IT in various industries, both internationally and within Ethiopia. For instance, a study by Wang, (2018) examined the implementation of data analytics in the healthcare sector in China, demonstrating its potential for improving patient care and operational decision-making processes. Similarly, research by Alemu, (2021) explored the adoption of IT solutions in the agricultural sector in Ethiopia, highlighting its impact on supply chain management and market integration.

In the context of Ethiopia, research on IT and data analytics has primarily focused on their application in sectors such as finance, healthcare, and agriculture. These studies aim to understand the challenges and opportunities associated with integrating IT solutions into traditional business processes and service delivery models. However, there is a noticeable gap concerning the exploration of how data analytics and IT impact project management practices specifically within international organizations based in Addis Ababa.

The proposed study differs from existing research in several key aspects:

1. Focus on project management: While previous studies have explored the general adoption and utilization of IT and data analytics, this study specifically examines their influence on project management practices. By narrowing the focus, the research aims to provide targeted insights into how international organizations in Addis Ababa leverage IT and data analytics to enhance project outcomes.

2. Contextual relevance: Unlike studies that primarily focus on specific industries or domestic organizations, this research considers the context of international organizations operating in Addis Ababa. By examining these organizations, the study addresses a gap in the literature regarding the applicability and effectiveness of IT and data analytics within the unique operational environments of international NGOs.

3. Case study approach: The study adopts a case study methodology, focusing on two prominent international organizations: Techno Serve and World Vision. This approach allows for in-depth exploration and analysis of how IT and data analytics are integrated into project management practices within real-world organizational settings.

Overall, by investigating the effect of data analytics and information technology on project management within international organizations based in Addis Ababa, this study aims to contribute novel insights to both the academic literature and organizational practices in Ethiopia.

1.3. Research Questions

Based on the research problems and the presented specific objectives the study addressed the following research questions:

1. How are data Analytics and projects management currently being practiced in the selected organizations?
2. What is the effect of Utilization of project management software on the project management in the selected companies?
3. What is the effect of Usage of collaborative platforms (CP) on the project management in the selected companies?
4. What is the effect of Investment in IT infrastructure competence on the project management in the selected organizations?
5. What is the effect of Data collection and analytics on the project management in the selected companies?

1.4. Objectives of the study

1.4.1. General objective

The general objective of this study was to examine the effect of data Analytics and information technology on project management practice of international organizations based in Addis Ababa, in the case of Techno Serve and World Vision.

1.4.2. Specific objectives

The specific objectives of the study are presented as follows.

1. To assess the effect of data Analytics and project management in the selected international organizations.

2. To examine the effect of Utilization of project management software on projects management in the selected international organizations.

3. To analyze the effect of the Usage of collaborative platforms on projects management in the selected international organizations.

4. To determine the effect of Investment in IT infrastructure competence on projects management in the selected international organizations.

5. To investigate the effect of the Data collection and analytics on projects management in the selected international organizations.

Note: This research analyzes the effect of data analytics and IT on project management, with a deep focus on project planning and implementation phases of project management.

1.5 Significance of the study

The findings of this study may be expected to be significant for the following important reasons. Firstly, the research findings are going to be used by World Vision Ethiopia and Techno Serve in order to enhance on the quality of Investment in IT infrastructure used in the agency. Second, the study may be helpful to other similar international organizations especially that are based in Addis Ababa. Third, the research finding may be beneficiary in the use and reference for many government sectors. It can assist to improve their Data, ICT and project management systems. Fourth, the finding may be used as a reference for other researchers who are interested to conduct study related this area and it may also add value to those who would like to pursue their research on the significance of using data Analytics and information technology. Thus, this study attempted to contribute to the body of literature.

1.6 Scope of the study

Conceptual scope:

The conceptual scope of this study encompasses the examination of the effect of data analytics and information technology (IT) on project management practices within international organizations. Specifically, the study seeks to understand how the adoption and integration of data analytics and IT tools influence various aspects of project management, including planning, execution, monitoring, and evaluation. It aimed to explore the mechanisms through which data analytics and IT contribute to project success, efficiency, and effectiveness. Additionally, the study investigated potential challenges and barriers associated with the utilization of data analytics and IT in project management contexts.

Geographical scope:

The geographical scope of this study is limited to international organizations based in Addis Ababa, Ethiopia. Addis Ababa serves as the primary location for the research due to its significant concentration of international NGOs and organizations. By focusing on Addis Ababa, the study aims to provide insights into the specific context of project management practices within this urban

setting, considering the socio-economic dynamics, cultural factors, and organizational environments unique to the city.

Methodological scope:

The methodological scope of the study involves a qualitative research approach, employing a case study methodology. Specifically, the study will select two prominent international organizations operating in Addis Ababa, namely Techno Serve and World Vision, as case study subjects. Qualitative data collection methods such as semi-structured interviews, document analysis, and observation will be utilized to gather rich and detailed insights into the integration of data analytics and IT into project management practices within these organizations. The data collected will be analyzed thematically, allowing for the identification of patterns, themes, and relationships relevant to the research objectives. This methodological approach enables a comprehensive exploration of the research topic within the specific organizational and geographical context under investigation.

Generally, the scope of this study encompasses a focused examination of the effect of data analytics and IT on project management practices within international organizations based in Addis Ababa, Ethiopia, utilizing a qualitative case study methodology. By delving into this context-specific inquiry, the study aimed to contribute valuable insights to both academic research and practical implications for project management in international organizational settings.

1.7 Operational definitions of key terms

Data analytics: The systematic process of inspecting, cleaning, transforming, and modeling data with the goal of discovering meaningful patterns, drawing conclusions, and supporting decision-making. In this research, data analytics encompasses quantitative techniques such as statistical analytics and qualitative methods like thematic coding. Chandola, V., Banerjee, A., & Kumar, V. (2009).

Information Technology (IT): The application of computer systems, software, networks, and other technological tools to store, process, transmit, and retrieve information within an organizational context. IT in this study includes hardware and software infrastructure, databases, communication

systems, and collaborative platforms used for project management. Laudon, K. C., & Laudon, J. P. (2016).

Project Management: The systematic planning, execution, monitoring, and closing of projects to achieve specific goals within defined constraints. In this research, project management involves the use of established methodologies, tools, and techniques to ensure the successful completion of tasks, effective resource allocation, and the attainment of project objectives. Project Management Institute. (2017).

International Organizations: Entities operating in Addis Ababa with a global or multinational scope, encompassing a diverse range of sectors such as business, non-profit, and governmental agencies. For the purpose of this study, international organizations are those with cross-border operations and a presence in the capital city of Addis Ababa. (United Nations. International Organizations. Retrieved from https://www.un.org/en/sections/about-un/international-organizations/index.html)

Government Adoption of Systems: The process by which government entities integrate and implement data analytics, information technology, and project management systems into their administrative practices. This encompasses the adoption of tools, methodologies, and organizational changes to enhance decision-making and project outcomes within the government context. Heeks, R. (2006).

1.8 Organization of the study

The paper will consist of five chapters. The first chapter deals with the introduction part that consists of background of the study, statements of the problem, objectives of the study, research questions, significances of the study, scope of the study, Organizational definitions and organization of the study. The second chapter contains a review of the related literature. The research design and methodology will be presented in third chapter. In fourth chapter, the Analytics and interpretation of the study will be discussed. Finally, the fifth chapter deals with the summary of findings, conclusions and recommendations.

Chapter two

Literature review

2.1. Conceptual review

Data Analytics, Information Technology, and Project Management in Organizational Contexts:

Data Analytics and Project Management: Data analytics encompasses a range of techniques and methodologies aimed at extracting meaningful insights from large datasets. In the realm of project management, data analytics offers valuable opportunities for enhancing decision-making processes, risk assessment, resource allocation, and performance evaluation. By leveraging data-driven insights, project managers can identify trends, anticipate challenges, and optimize project workflows to ensure timely and cost-effective delivery of outcomes.

Several studies have highlighted the benefits of integrating data analytics into project management practices. For example, research by Smith et al. (2018) demonstrated how predictive analytics can improve project forecasting accuracy, thereby mitigating risks and enhancing project outcomes. Similarly, the study by Johnson and Patel (2019) emphasized the role of data visualization techniques in facilitating stakeholder communication and consensus-building within project teams.

Information Technology and Project Management: Information technology encompasses a wide array of hardware, software, and networking infrastructure used to facilitate the storage, processing, and dissemination of information within organizational contexts. In the realm of project management, IT systems and tools play a critical role in streamlining communication, collaboration, and workflow management. From project planning and scheduling to resource allocation and performance tracking, IT solutions offer significant support for project managers in navigating complex project environments.

Empirical studies have underscored the impact of IT adoption on project management practices. For instance, research by Brown and Garcia (2017) examined the implementation of project management software in enhancing team productivity and coordination. Similarly, the study by Jones et al. (2020) explored the role of cloud-based IT infrastructure in facilitating remote project

management and distributed team collaboration, particularly in the context of globalized work environments.

Integration of Data Analytics, Information Technology, and Project Management: The integration of data analytics and IT into project management practices represents a synergistic approach to optimizing project performance and outcomes. By harnessing the power of data-driven insights and technological tools, organizations can enhance project planning, execution, and monitoring processes, thereby increasing project success rates and delivering greater value to stakeholders. While existing literature has explored the individual contributions of data analytics, IT, and project management to organizational performance, there is a need for more comprehensive research that examines their interconnectedness and synergistic effects. Additionally, studies focusing on specific organizational contexts, such as international NGOs operating in Addis Ababa, Ethiopia, can provide valuable insights into the unique challenges and opportunities associated with leveraging data analytics and IT for project management within diverse organizational settings.

In summary, the conceptual review highlights the importance of understanding the role of data analytics, information technology, and project management in organizational contexts and emphasizes the need for further research to explore their integration and impact on project outcomes.

2.2. Theoretical review

In contemporary organizational contexts, the effective management of projects is intrinsically linked to the utilization of data analytics and information and communication technology (ICT). Theoretical perspectives from various disciplines such as statistics, computer science, organizational theory, and systems theory provide valuable frameworks for understanding the interplay between data analytics, ICT, and project management. This theoretical review seeks to explore the foundational concepts, theoretical constructs, and interdisciplinary perspectives that underpin the integration of data analytics, ICT, and project management within organizational settings.

Data Analytics: Data analytics, grounded in various theoretical frameworks such as statistical analysis, machine learning, and data mining, provides organizations with the means to extract

valuable insights from vast amounts of structured and unstructured data (Chandola et al., 2009). The application of data analytics in project management aligns with theories of decision-making under uncertainty, as project managers utilize data-driven insights to inform strategic planning, risk assessment, and resource allocation decisions. Theoretical frameworks such as the Data-Information-Knowledge-Wisdom (DIKW) hierarchy and the Knowledge Discovery in Databases (KDD) process provide conceptual underpinnings for understanding the stages and processes involved in data analytics.

Information and Communication Technology (ICT): Information and Communication Technology (ICT) encompasses a broad range of hardware, software, and networking technologies used to facilitate the storage, retrieval, transmission, and processing of information (Laudon & Laudon, 2016). Theoretical perspectives on ICT emphasize its role in enabling organizational communication, collaboration, and knowledge sharing. From a socio-technical perspective, theories such as Actor-Network Theory (ANT) and Social Construction of Technology (SCOT) highlight the dynamic interactions between technological artifacts and social actors within organizational contexts. Theoretical frameworks such as the Resource-Based View (RBV) and Dynamic Capabilities Theory offer insights into how organizations can leverage ICT resources and capabilities to gain competitive advantage and adapt to changing environments.

Project Management: Project management encompasses a set of principles, processes, and practices aimed at planning, executing, monitoring, and controlling projects to achieve specific objectives within defined constraints (Project Management Institute, 2017). Theoretical perspectives on project management draw from various disciplines, including operations management, organizational behavior, and systems theory. The Project Management Body of Knowledge (PMBOK) framework provides a comprehensive theoretical foundation for understanding the key knowledge areas, processes, and best practices associated with project management. Key theoretical constructs within project management include systems theory, contingency theory, and stakeholder theory, which offer insights into the complexity of managing projects within dynamic organizational environments.

Integration of Theoretical Perspectives: The integration of theoretical perspectives from data analytics, ICT, and project management provides a holistic understanding of how organizations can leverage technology-driven insights and methodologies to optimize project performance and

outcomes. By applying theoretical constructs such as decision theory, socio-technical systems theory, and organizational learning theory, researchers and practitioners can develop more effective strategies for integrating data analytics and ICT into project management practices. Additionally, the adoption of interdisciplinary approaches that bridge the gap between theory and practice can facilitate innovation, collaboration, and knowledge creation within organizational contexts.

In summary, the theoretical review highlights the foundational concepts, theoretical frameworks, and interdisciplinary perspectives relevant to understanding the relationships between data analytics, ICT, and project management. By synthesizing insights from diverse theoretical domains, researchers can contribute to the development of more robust theories and frameworks for guiding organizational decision-making and practice in an increasingly data-driven and technologically complex world.

2.2.1. Data Analytics

Data analytics, rooted in theoretical frameworks such as statistical analysis, machine learning, and data mining, offers organizations the ability to derive actionable insights from vast volumes of structured and unstructured data. In project management, the application of data analytics is instrumental in enhancing decision-making processes, risk assessment, and resource optimization. This section will explore key sub-categories and concepts within data analytics, along with their relevance to project management.

Descriptive analytics: Descriptive analytics involves the exploration and summarization of historical data to gain insights into past trends and patterns. Techniques such as data visualization, summary statistics, and exploratory data analysis enable project managers to understand the underlying dynamics of project performance, identify recurring issues, and assess historical resource utilization (Lohr, 2014).

Predictive analytics: Predictive analytics employs statistical modeling and machine learning algorithms to forecast future outcomes based on historical data patterns. Within project management, predictive analytics facilitates the identification of potential risks, estimation of project timelines, and prediction of resource needs. By leveraging predictive models, project

managers can proactively address challenges and optimize project schedules and resource allocations (Kudyba & Hoptroff, 2015).

Prescriptive Analytics: Prescriptive analytics focuses on recommending optimal courses of action by simulating various scenarios and identifying the most effective strategies. In project management, prescriptive analytics assists in optimizing resource allocation, scheduling tasks, and identifying critical paths to project success. By leveraging prescriptive models, project managers can make data-driven decisions to maximize project outcomes and minimize risks (Davenport & Harris, 2017).

Big Data Analytics: Big data analytics involves the analysis of large and complex datasets that exceed the capabilities of traditional data processing applications. In project management, big data analytics enables organizations to harness diverse data sources, including social media, sensor data, and web logs, to gain deeper insights into project performance, stakeholder engagement, and market trends (Marz & Warren, 2015).

Theoretical frameworks such as the Data-Information-Knowledge-Wisdom (DIKW) hierarchy and the Knowledge Discovery in Databases (KDD) process provide conceptual underpinnings for understanding the stages and processes involved in data analytics. Additionally, concepts such as data quality management, data governance, and ethical considerations are essential for ensuring the validity, reliability, and ethical use of data analytics in project management contexts.

By integrating these theoretical concepts and methodologies, organizations can leverage the power of data analytics to drive informed decision-making, enhance project performance, and achieve strategic objectives in dynamic and competitive environments.

2.2.2. Information and communication technology (ICT)

Information and communication technology (ICT) encompasses a diverse range of hardware, software, and networking technologies used to facilitate the storage, retrieval, transmission, and processing of information within organizational contexts. Theoretical perspectives and concepts within ICT provide valuable insights into how organizations can leverage technology to enhance communication, collaboration, and knowledge sharing in project management.

Technological Determinism: Technological determinism posits that technological advancements drive societal change and shape organizational practices. In the context of project management, technological determinism highlights the transformative impact of ICT on project workflows, communication channels, and organizational structures (Winner, 1986).

Socio-Technical Systems Theory: Socio-technical systems theory emphasizes the interdependence of technological and social factors in shaping organizational performance and effectiveness. Within project management, socio-technical systems theory underscores the importance of aligning technological capabilities with organizational goals, user needs, and cultural dynamics to ensure successful project outcomes (Trist & Bamforth, 1951).

Investment in IT infrastructures (IS) Theories: Investment in IT infrastructures theories, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM), seek to explain user adoption and utilization of ICT within organizations. These theories provide insights into the factors influencing individuals' attitudes and behaviors towards technology adoption, usability, and performance expectancy (Venkatesh et al., 2003; Davis, 1989).

Digital Transformation: Digital transformation refers to the integration of digital technologies into all aspects of organizational operations, fundamentally changing how organizations deliver value to customers and stakeholders. Within project management, digital transformation involves the adoption of cloud computing, collaborative platforms, and project management software to streamline processes, enhance communication, and improve project outcomes (Westerman et al., 2014).

Theoretical frameworks such as the Resource-Based View (RBV) and Dynamic Capabilities Theory offer insights into how organizations can leverage ICT resources and capabilities to gain competitive advantage and adapt to changing environments. Additionally, concepts such as cybersecurity, data privacy, and digital ethics are critical considerations in the design and implementation of ICT systems in project management contexts.

By integrating these theoretical perspectives and concepts, organizations can leverage ICT to optimize project workflows, enhance team collaboration, and achieve strategic objectives in an increasingly digital and interconnected world.

Investment in IT infrastructure: as a combination of different components includes hardware, software, Utilization of project management software and trained personnel organized to facilitate planning, control, coordination, and decision making in an organization. And an online Investment in IT infrastructure or web-based Investment in IT infrastructure is an Investment in IT infrastructure that uses Internet web technologies to deliver information and services, to users or other Investment in IT infrastructures/applications. It is a software system whose main purpose is to publish and maintain data by using hypertext-based principles. Investment in IT infrastructures (IS) involve a variety of information technologies (IT) such as computers, software, databases, communication systems, the Internet, mobile devices and much more, to perform specific tasks, interact with and inform various actors in different organizational or social contexts. Of general interest to the field of IS are therefore all aspects of the development, deployment, implementation, use and impact of IS in organizations and society (Zulch, 2014). However, the IS field is not primarily concerned with the technical and computational aspects of IT. What matters to IS instead is how technology is appropriated and instantiated in order to enable the realization of IS that fulfill various actors' – such as individuals, groups or organizations – information needs and requirements in regards to specific goals and practices. While this is widely recognized in the IS community, the term 'Investment in IT infrastructure', which is foundational to the IS field, is rarely explicitly defined and examined, and is typically taken for granted. This lack of conceptual engagement with 'IS' motivated recent calls to the IS community to further its engagement with core concepts that are central to the field and its research (Ralf, 2007).

Furthermore, this lack of engagement is problematic as it can lead to fuzzy and unclear use of the concept of IS, and can hinder the formulation of a clear identity for the IS field as well. "Whenever IS researchers and professionals have used the term 'Investment in IT infrastructure,' one could substitute the term 'information technology,' 'computer system,' or simply, 'the computer' where the substitution would often make little or no difference. In retrospect, it is no exaggeration to describe most IS researchers as having used the term 'system' or 'systems' to refer to just about anything that involves electronic information technology". However, such usage of the term is

questionable as it blurs the distinction between IT, as one defining notion, and IS as another defining notion of the IS field. It also undermines the importance of human, social and organizational aspects of interest to IS. And finally, conceptual advancements regarding 'IS' as a foundational concept for the field are hampered by the lack of conceptual clarity. If researchers are not clear what they mean when they talk about IS, it is difficult to compare research results and build on each other's work leading to cumulative research tradition (Marczyk, 2005).

Management Investment in IT infrastructures

Management Investment in IT infrastructures are a kind of computer Investment in IT infrastructures that could collect and process information from different sources in institute decision- The Role of Different Types of Investment in IT infrastructures in Business Organizations Management Investment in IT infrastructures Provide information in the form of pre specified reports and displays to support business decision making. The next level in the organizational hierarchy is occupied by low level managers and supervisors. This level contains computer systems that are intended to assist operational management in monitoring and controlling the transaction processing activities that occur at clerical level. Management Investment in IT infrastructures (MIS) use the data collected by the Transaction processing system (TPS) to provide supervisors with the necessary control reports. Management Investment in IT infrastructure is type of Investment in IT infrastructures that take internal data from the system and summarized it to meaningful and useful forms as management reports to use it to support management activities and decision making (Arthur, 2012).

Decision Support Systems

In today's rapidly evolving business landscape, remaining competitive necessitates embracing innovation. The success of businesses is increasingly tied to the quality of information technology they employ and their ability to leverage it effectively. Investment in IT infrastructures (IS) have become indispensable for maintaining a competitive edge. They offer numerous benefits, including facilitating the analysis of processes to create valuable products or services and streamlining work activities (Fayek, 2016). IS also play a crucial role in recording and documenting operational data, communication records, and revision histories, thereby enabling efficient data retrieval and analysis (Henderson, 2008). Moreover, IS streamline decision-making processes by providing

comprehensive information and modeling tools for evaluating various alternatives. This enhances the ability of management teams to make informed decisions (Kloppenborg, 2011). Additionally, IS foster rapid and effective communication among employers and employees, facilitating greater involvement of lower-level staff in decision-making processes and promoting a more motivated and dedicated workforce (Ksenija, 2010).

Computer Software and Hardware

Computer hardware refers to the physical components of a computer system, including electronic, electrical, and mechanical parts (Arthur, 2012). Unlike software and data, hardware components are infrequently changed. It encompasses not only personal computers but also various embedded systems found in automobiles, microwave ovens, and other devices (Dwivedula, 2015).

Software, on the other hand, comprises instructions that direct the computer's operations (DeMatteo, 2005). It encompasses applications, scripts, and programs necessary for executing specific tasks. System software, such as operating systems like Windows or macOS, manages the computer's hardware and provides a platform for running applications (Parker, 2005). Application software, on the other hand, fulfills specific user needs and includes programs like word processors, spreadsheets, and email clients.

There are various types of software, including programming software for developers, middleware that bridges system software and applications, and driver software for operating computer devices (Weinert, 199). Initially sold with specific hardware, software distribution evolved from floppy disks to CDs and DVDs, and now primarily occurs through direct internet downloads from vendor or application service provider websites.

Utilization of project management software

Telecommunications are the means of electronic transmission of information over distances. The information may be in the form of voice telephone calls, data, text, images, or video. Today, telecommunications are used to organize more or less remote computer systems into telecommunications networks. These networks themselves are run by computers (Rodney, 2007).

It is a physical medium through which all Internet traffic flows. This includes telephone wires, cables (including submarine cables), satellites, microwaves, and mobile technology such as fifth-generation (5G) mobile networks. Even the standard electric grid can be used to relay Internet traffic utilizing power-line technology. Innovative wireless solutions like Internet balloons and drones are also gradually being deployed. Telecommunications infrastructure services provide setup, maintenance, and consulting for data and voice communications technologies. The Internet, therefore, is a giant network connecting devices across geographical regions.

Database

A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy. Let us discuss a database example: An online telephone directory uses a database to store data of people, phone numbers, and other contact details (Omar, 2015). Your electricity service provider uses a database to manage billing, client-related issues, handle fault data.

There are five main components of a database:

Hardware: The hardware consists of physical, electronic devices like computers, I/O devices, storage devices, etc. This offers the interface between computers and real world systems.

Software: This is a set of programs used to manage and control the overall database. This includes the database software itself, the Operating System, the network software used to share the data among users, and the application programs for accessing data in the database.

Data: Data is a raw and unorganized fact that is required to be processed to make it meaningful. Data can be simple at the same time unorganized unless it is organized. Generally, data comprises facts, observations, perceptions, numbers, characters, symbols, images, etc.

Procedure: Procedure is a set of instructions and rules that help you to use the DBMS. It is designing and running the database using documented methods, which allows you to guide the users who operate and manage it.

Database Access Language: Database Access language is used to access the data to and from the database, enter new data, update already existing data, or retrieve required data from DBMS. The

user writes some specific commands in a database access language and submits these to the database.

A data warehouse is a large collection of business data used to help an organization make decisions. The concept of the data warehouse has existed since the 1980s, when it was developed to help transition data from merely powering operations to fueling decision support systems that reveal business intelligence. In computing, a data warehouse (DW or DWH), also known as an enterprise data warehouse (EDW), is a system used for reporting and data Analytics and is considered a core component of business intelligence. DWs are central repositories of integrated data from one or more disparate sources. A Data Warehousing (DW) is process for collecting and managing data from varied sources to provide meaningful business insights (Kristína, 2012). A Data warehouse is typically used to connect and analyze business data from heterogeneous sources. The data warehouse is the core of the BI system which is built for data Analytics and reporting. It is a blend of technologies and components which aids the strategic use of data. It is electronic storage of a large amount of information by a business which is designed for query and Analytics instead of transaction processing. It is a process of transforming data into information and making it available to users in a timely manner to make a difference.

2.2.3. Project management

Project management entails the systematic planning, execution, monitoring, and controlling of projects to achieve specific goals within defined constraints. Theoretical perspectives and systematic approaches within project management provide valuable frameworks for understanding and managing the complexities of projects effectively.

Systems Theory: Systems theory views projects as complex adaptive systems with interconnected components and feedback loops. Within this framework, project managers must consider the dynamic interactions between project elements, stakeholders, and environmental factors to ensure project success (Checkland, 1981).

Contingency Theory: Contingency theory emphasizes the importance of adapting project management approaches and practices to fit the unique characteristics of each project and organizational context. Project managers must assess situational variables such as project scope,

complexity, and stakeholder expectations to determine the most appropriate project management methodologies and techniques (Turner & Cochrane, 1993).

Stakeholder Theory: Stakeholder theory highlights the significance of identifying and managing stakeholder interests and expectations throughout the project lifecycle. Effective stakeholder engagement and communication are essential for ensuring alignment with project objectives, managing conflicts, and fostering stakeholder buy-in and support (Freeman, 1984).

Project Management Processes: Project management processes encompass a series of interrelated activities aimed at planning, executing, monitoring, and controlling project activities. The Project Management Body of Knowledge (PMBOK) framework defines key project management processes, including scope management, time management, cost management, quality management, human resource management, communication management, risk management, and procurement management (Project Management Institute, 2017).

The integration of these systematic approaches and theoretical perspectives enables project managers to effectively navigate the complexities of project management and achieve project success. By adopting a systematic approach to project planning, execution, monitoring, and controlling, organizations can mitigate risks, optimize resource utilization, and deliver projects on time and within budget.

These systematic approaches and theoretical perspectives provide project managers with the necessary tools and frameworks to effectively plan, execute, monitor, and control projects, thereby increasing the likelihood of project success and delivering value to stakeholders.

Project

A project is a typical work form in the field of Investment in IT infrastructures and can be defined as a group of people and other resources that are temporarily together to accomplish a specific objective to be completed within certain specifications, defined schedule, and a budget. In addition, projects are always unique and often customized, which can cause uncertainty in their planning and implementation. Project is a unique process, consist of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective confirming to specific

requirements, including the constraints of time cost and resource and having its own assigned Project Manager. Projects result in the creation of one or more deliverables (Holzmann, 2013).

All organizations have projects. Projects can be managed using a common set of project management processes. In fact, a similar set of project management processes can be utilized regardless of the type of project. For instance, all projects should be defined and planned and all projects should have processes to manage scope, risk, quality, status, etc. ICT projects are usually thought as merely a set of activities requiring only hardware, networking systems, software and applications with the end goal of introducing technological changes. Actually, managing ICT projects are quite challenging which need proper project management practices until the closure of the project Basically, such endeavor primarily is attempted by giving a due attention the strategically context; larger goals of the organization (Atkinson, 1999).

IT projects are getting great interest in the computer industry because they touch almost everyone's lives. Accurate computerized information is needed to make good decision in less time for any kind of IT projects either for business, financial, educational, government, military, or nonprofit organization. However, this computerized information is only as good as the design and management of the IT project systems. The successful IT project produces the highest quality products with the fewest number of defects in the shortest, most cost effective manner that satisfies customer needs by following s reliable project management approach (Thuillier, 2005).

Project management practices

Project management practices are applications of knowledge, skills, tools and techniques to project activities to meet project requirements. This is accomplished through the application and integration of the project management processes of initiation, planning, executing, monitoring and controlling and closing. In which, one has to know exactly what knowledge, skills, tools, and techniques needed to successfully manage a project. Project managers strive to meet the triple constraint by balancing project scope, time, and cost goals (Willcocks, 1998).

It is helpful to look at project management from three distinct views. First, to what degree the project fits into the organization to both the project and the individuals who will be associated in it, including how their tasks are defined and how they work together with each other. Second, how

the project will develop over time refers to as the project life cycle and is the chronological order of activities that are necessary to convey the project and last the skills required to successfully manage the project (Vladimir, 2010). The purpose of project management is to use the resources on hand effectively to realize a set goal with a certain standards and within a schedule and budget, utilizing the existing resources efficiently. The main responsibilities of project management include defining the requirements; creating the amount of work, assigning the resources required, planning the execution of the work, monitoring the progress, and adjusting deviations from the plan. It also defines project management as "the process of controlling achievement of the project objectives. Project Management consists of nine knowledge areas: integration management, scope management, time management, cost management, quality management, human resource management, project communications management, project risk management, and project procurement management. Furthermore, one significant part of project management is to manage project knowledge so that learning between individuals and between projects is managed (Skitmore, 2005).

Project management effectiveness is a measure of quality of attainment in meeting objectives. It is the extent to which the goals of a project are attained, or the degree to which a system can be expected to achieve a set of specific requirements. Project Management has been found as one of the most important aspects of the entire development process of IT in the sector. The main objective of project management is to make sure the projects finish in time, in the specified budget limit, with in defined scope and desired quality for achieving other project objectives (Papke, 2010).

Project Management Life Cycle is universal to all projects is defined as collection of activities necessary to fulfill a project's objectives .The specific phases within a project, however, are unique

Project Management Life Cycles

Project management life cycles vary in their structure and approach, each representing the stages a project goes through. These phases can be sequential, iterative, or overlapping, and choosing the wrong approach can lead to cost overruns, delays, and project failure (Dillard, 2012).

The Predictive Lifecycle, akin to the waterfall method, is plan-driven where project constraints are determined upfront, with fixed scope and sequential phases (Project Communications Handbook,

2007). Over time, it has adopted "progressive elaboration" to allow for more precise planning without altering the scope.

The Iterative Life Cycle breaks down large projects into smaller phases, enabling better control and adaptability to evolving requirements (Shenhar, 1997). Each iteration allows for refining requirements and managing risks effectively.

The Incremental Life Cycle involves developing a product through incremental steps within predetermined timeframes, delivering additional functionality with each increment until the final product is produced (Zhong, 2014). Customers sign off at each stage, reducing change risk and facilitating prototyping.

The Adaptive Life Cycle, exemplified by agile methodology, prioritizes rapid development and flexibility in response to changing requirements (Dillard, 2012). Agile projects involve close customer involvement and defining incremental requirements at the start of each iteration, making it suitable for dynamic environments and novel applications.

2.3. Empirical review

In contemporary organizations, Investment in IT infrastructures (IS) function as the vital connective tissue, linking diverse components such as human resources, marketing, finance, and operations, thereby facilitating efficient operation and competitiveness (Zulch, 2012). Initially, during the 1960s and 70s, information technology primarily handled routine clerical tasks. However, subsequent advancements have expanded its strategic applications, including market expansion and decision support (Erik, 2011). Recent analytics underscore the significant role of telecommunications infrastructure in enhancing service delivery, highlighting the pivotal role of technology in project management and operations (Henderson, 2008). This underscores the relationship between Investment in IT infrastructures and project management, where technology serves as a critical enabler for efficient operations and strategic decision-making.

Managers increasingly rely on rapid access to information for strategic decision-making, recognizing it as a valuable asset (Bachman, 1982). Today, Investment in IT infrastructures not only process data but also serve as competitive weapons, reshaping industries and prompting

organizations to reevaluate their management of information and technology resources (Rudolf, 2013). Firm-level studies consistently demonstrate the positive impact of IT on productivity and growth, showcasing its significance in project management and organizational performance (Zulch, 2014). This highlights the effect of Investment in IT infrastructures on project management effectiveness and organizational outcomes.

Information technology applications not only improve administrative efficiency and enhance managerial effectiveness but also revolutionize production operations, offering a competitive edge (Erik, 2011; Zulch, 2014). However, the increasing complexity of IT choices necessitates specialized Investment in IT infrastructure professionals adept at integrating technology and business processes to meet organizational needs, emphasizing the importance of project management in aligning technology initiatives with strategic goals (Weinert, 1999). This demonstrates the interplay between Investment in IT infrastructures, project management, and organizational efficiency.

Moreover, data analytics emerges as a crucial tool in extracting actionable insights from the vast volumes of data generated by modern Investment in IT infrastructures. By leveraging data analytics techniques, organizations can optimize project management processes, identify trends, and make informed decisions to drive performance and achieve strategic objectives. Thus, the synergy between data analytics, Investment in IT infrastructures, and project management becomes paramount in navigating the complexities of the contemporary business landscape and achieving sustainable success. This illustrates the relationship between data analytics, Investment in IT infrastructures, and project management effectiveness.

Despite the increasing recognition of the importance of data analytics, information technology (IT), and project management in organizational contexts, empirical studies focusing on the integration of these areas, particularly within the Ethiopian context, are relatively limited. However, several empirical studies conducted both in Ethiopia and internationally offer valuable insights into the relationship between data analytics, IT, and project management practices, emphasizing the need for further research to understand the nuanced dynamics and effects of these variables in diverse organizational settings.

Ethiopian studies:

1. **Alemu et al. (2020)** conducted a study titled "The Role of Information Technology in Project Management: The Case of Ethiopian Construction Sector." The study examined the impact of information technology adoption on project management practices within the Ethiopian construction sector. Findings indicated that the integration of IT tools such as project management software and collaborative platforms led to improved project coordination, communication, and resource allocation, resulting in enhanced project performance and stakeholder satisfaction.

2. Berhanu et al. (2018) explored "Challenges and Opportunities of Data Analytics Adoption in Ethiopian Enterprises." The study investigated the challenges and opportunities associated with data analytics adoption in Ethiopian enterprises across various sectors. Findings revealed barriers such as limited data infrastructure, skills shortages, and organizational resistance, as well as opportunities for leveraging data analytics to enhance decision-making, improve operational efficiency, and gain competitive advantage.

3. Tadesse et al. (2019 examined "The Impact of Information Technology on Project Management: A Case Study of Ethiopian Government Projects." The study focused on assessing the influence of information technology adoption on project management practices in government projects in Ethiopia. Results demonstrated that the adoption of IT tools such as project management software and communication systems facilitated project planning, monitoring, and stakeholder engagement, leading to improved project outcomes and accountability.

International studies:

1. Chowdhury et al. (2019) conducted research on "The Impact of Data Analytics on Project Management Performance: A Study of IT Companies in Bangladesh." The study examined the influence of data analytics adoption on project management performance in IT companies. Results demonstrated a positive relationship between data analytics utilization and project success metrics such as cost efficiency, schedule adherence, and stakeholder satisfaction, highlighting the importance of leveraging data-driven insights in project management practices.

2. Gupta and George (2017) investigated "The Role of Information Technology in Enhancing Project Management Performance: A Study of Construction Companies in India." The study

explored the impact of IT adoption on project management performance in the construction industry. Findings indicated that the integration of IT tools such as Building Information Modeling (BIM) and project management software resulted in improved project coordination, collaboration, and risk management, leading to enhanced project outcomes and client satisfaction.

Comparison and gap analysis:

While existing studies in Ethiopia and internationally have examined various aspects of data analytics, IT, and project management practices in other sectors, there remains a gap in research specifically focusing on the effect of data analytics and IT on project management within international organizations based in Addis Ababa, Ethiopia. The empirical studies conducted in Ethiopia highlight the potential benefits and challenges of adopting data analytics and IT in different organizational contexts, while international studies offer insights into best practices and success factors for integrating these technologies into project management processes. Therefore, the proposed study aimed to address this gap by investigating the effect of data analytics and IT on project management practices within selected international organizations in Addis Ababa, Ethiopia, contributing to both academic knowledge and practical insights in the field.

Overall, by synthesizing findings from Ethiopian and international studies, this empirical review provides a foundation for understanding the current state of research on data analytics, IT, and project management practices, and underscores the need for further investigation into their integration within the Ethiopian context.

2.3. Conceptual framework

The conceptual framework for this study illustrates the relationship between data analytics, information technology (IT), and project management practices within international organizations in Addis Ababa, Ethiopia.

Independent variables:

1. Data analytics (X1): Data analytics refers to the systematic process of inspecting, cleaning, transforming, and modeling data to discover meaningful patterns and support decision-making. Within the context of this study, data analytics serves as one of the independent variables. It encompasses quantitative techniques such as statistical analytics and qualitative methods like thematic coding.

2. Information technology (X2): Information technology (IT) encompasses the application of computer systems, software, networks, and other technological tools to store, process, transmit, and retrieve information within organizational contexts. In this study, IT serves as another independent variable. It includes hardware and software infrastructure, databases, communication systems, and collaborative platforms used for project management.

Dependent variable:

Project Management (Y): Project management involves the systematic planning, execution, monitoring, and controlling of projects to achieve specific goals within defined constraints. In this study, project management serves as the dependent variable. It includes the use of established methodologies, tools, and techniques to ensure the successful completion of tasks, effective resource allocation, and the attainment of project objectives within international organizations based in Addis Ababa.

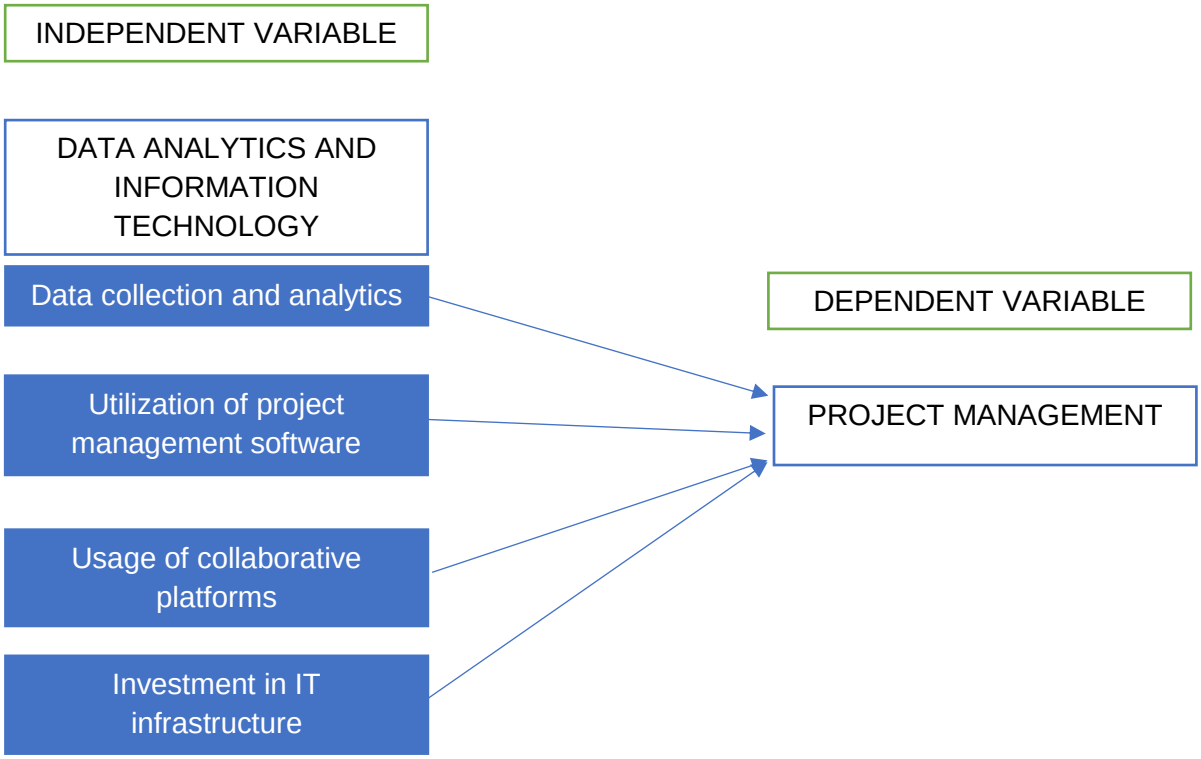


Figure 2.2: Conceptual framework

Source: Developed by the researcher (2024)

2.4. Hypothesis

Hypothesis 1: Data Analytics (X1) ↔ Project Management (Y)

There is a significant positive relationship between the adoption of data analytics and project management effectiveness within international organizations in Addis Ababa, Ethiopia.

Data analytics offers organizations the capability to extract valuable insights from large volumes of data, aiding in informed decision-making and strategic planning (Chandola et al., 2009). The application of data analytics in project management aligns with theories of decision-making under uncertainty, as project managers utilize data-driven insights to inform strategic planning, risk assessment, and resource allocation decisions.

Previous research conducted by Chowdhury et al. (2019) demonstrated a positive relationship between data analytics adoption and project management performance in IT companies. The

study found that organizations leveraging data analytics achieved higher levels of cost efficiency, schedule adherence, and stakeholder satisfaction, highlighting the importance of data-driven decision-making in project management practices.

Hypothesis 2: Information Technology (X2) ↔ Project Management (Y)

There is a significant positive relationship between the integration of information technology (IT) and project management effectiveness within international organizations in Addis Ababa, Ethiopia.

Information technology encompasses a range of tools and systems that facilitate communication, collaboration, and information management within organizations (Laudon & Laudon, 2016). The integration of IT infrastructure and software platforms in project management processes aligns with socio-technical systems theory, which emphasizes the interdependence of technological and social factors in shaping organizational performance.

Gupta and George (2017) found a positive correlation between the adoption of IT tools and project management performance in the construction industry. Their study demonstrated that organizations leveraging IT tools such as project management software and Building Information Modeling (BIM) achieved improved project coordination, collaboration, and risk management, leading to enhanced project outcomes.

Hypothesis 3: Data Analytics (X1) and Information Technology (X2) ↔ Project Management (Y)

There is a significant positive interaction effect between data analytics and information technology on project management effectiveness within international organizations in Addis Ababa, Ethiopia.

The combination of data analytics and information technology offers synergistic benefits for project management practices. Data analytics provides the capability to derive insights from data, while information technology facilitates the integration and dissemination of these insights across project teams and stakeholders, enhancing decision-making processes and project outcomes.

While specific studies focusing on the interaction effect between data analytics and information technology in project management may be limited, research by Davenport and Harris (2017) on competing on analytics highlights the transformative impact of integrating data analytics and IT on organizational performance across various industries. Their findings suggest that organizations

that effectively combine data analytics and IT capabilities outperform their competitors in terms of innovation, efficiency, and customer satisfaction.

Hypothesis 4: Data Analytics (X1) and Information Technology (X2) ↔ Project Management (Y)

The effect of data analytics and information technology on project management effectiveness is moderated by organizational factors within international organizations in Addis Ababa, Ethiopia.

Contingency theory suggests that the impact of data analytics and information technology on project management effectiveness may vary depending on organizational factors such as organizational culture, structure, and readiness for change (Turner & Cochrane, 1993). Organizational factors may influence the extent to which data analytics and IT capabilities are leveraged and integrated into project management practices.

While specific studies examining the moderation effect of organizational factors on the relationship between data analytics, IT, and project management may be limited, research by Venkatesh et al. (2003) on user acceptance of information technology suggests that organizational factors such as management support, training, and user involvement play significant roles in shaping technology adoption and utilization within organizations. Their findings highlight the importance of considering organizational context when examining the impact of data analytics and IT on project management effectiveness.

These hypotheses provide a theoretical and empirical foundation for investigating the relationships between data analytics, information technology, and project management effectiveness within international organizations in Addis Ababa, Ethiopia. Through empirical analysis, the study aims to validate these hypotheses and contribute to our understanding of the factors influencing project management practices in a rapidly evolving technological landscape.

Chapter three

Research methodology

3.1. Introduction

In this chapter the practical method used in order to answer the research questions and fulfill the purpose of the research are presented. Also, it provides an overview of the research design, research approach, data source and collection method, data collection instrument and method, population and sampling design and method of data Analytics.

3.2. Research design

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring the research process effectively address the research problem; it constitutes the blueprint for the collection, measurement, and Analytics of data. The function of a research design is to ensure that the evidence obtained enables to effectively address the research problem logically as possible.

The current study employed explanatory and descriptive research designs. Explanatory research design is a type of research design that involves using existing data to answer questions. Explanatory research is often conducted to provide the basis for potential theories or hypotheses, to gain a better understanding of a particular phenomenon, or to explore various causes and effects. It involves collecting, analyzing and synthesizing existing information from multiple sources related to a specific topic in order to explain findings. Therefore, it is the most appropriate research design for this study.

3.3. Research approach

The research approach used for this study is quantitative. (Creswell, 2005) asserted quantitative research approach is a type of research in which this research decides what to study, asks specific narrow questions, collects numeric (numbered) data from participants and analyzes these numbers using statistics, and conducts the inquiry in an unbiased, objective manner. The quantitative approach will be used to examine the data which will be collected from closed-ended questions.

3.4. Source of data

Both primary and secondary sources of data have been used in this study. The primary sources of data for this study have be collected from the IT and project management departments. In addition, secondary sources of data such as published books, journals and proceedings as well as organizational reports and documentations.

3.5. Data collection instruments and methods

The study used self-administered questionnaire to collect data from Techno Serve and World Vision Ethiopia. The questionnaires have been adopted from reviewed literatures and empirical reviewed studies. Closed and scaled items have been carefully applied to get and generate all necessary information. Data are systematically categorized in order to as respondents easily understand and express their fillings. This study used Likert scale which enables to understand respondents' degree of agreement with each statement.

3.6. Sampling design

3.6.1. Target population

According to Bracker (2007), population of the study is said to be a specified group of people or object for which questions can be asked or observed made to develop required data structures and information. The target population of a study is a specified group of people or object for which questions can be asked or observed made to develop required data structures and information. The target population for the study is employees of World Vision and Techno Serve. The study selected the organizations in regards to the closeness of the researcher and the organizations were more respondent and engaging to the study.

Consequently, as it has been mentioned in the delimitation section of the study, this research purposefully focuses on the strategic players of the organization in project management and Investment in IT infrastructure departments. On the assumption that, these group in the department has a close, responsibility, knowledge and understanding of their company‘s data Analytics, goals and objectives in project management than their subordinates. Accordingly, the target population is a combination of 65 staffs from Techno Serve and 85 employees from World Vision.

3.6.2. Sample size

Sample size refers to the number of items to be selected from universe to establish a sample. Defining sample size is a vital subject, because if samples are too large, it may cause time, resource and finance waste. While samples that are too small may lead to inaccurate results. The data acquired from the organizations shows there are close to 250 staff members. Where 105 from Techno Serve and 145 from World Vision. The staff members are working in IT and Project handling and management roles. Among those, 150 employees of the total study population were randomly selected for a sample. This has been done by using Yamane (1967) formula stated as follows.

$N= N/1+N(e)^2$ where:

n = required sample size.

e = level of significance taken to be 0.05

*95% confidence level and p = 0.05 are assumed N= the population size.

1= constant

Thus $N = N/1+N(e)^2$

$250/1+250(0.05)^2$

= 153

Therefore, the sample size is determined to be 153.

3.7. Methods of data analytics

The demographic facts obtained from the respondents were summarized using frequency distribution. Inferential statistical analysis were used assess the statistical significance of relationships between variables, determine the strength and direction of associations, and make predictions or generalizations about the broader population based on the sample data collected from the selected international organizations in Addis Ababa. As it is mentioned above, scale type questionnaires were used as a way of data collection tool. Survey data were processed using SPSS version 27 and analyzed via descriptive (frequency, percentage, mean and standard deviation) and inferential statistics (correlation and regression analysis). This provided the generalization of the findings on the data concerned and the standard deviation provides a dispersion of the data according to the variability of the data.

3.8. Ethical consideration

It is imperative that ethical issues are considered during the formulation of the evaluation and data collection plan. Considerations include:

Confidentiality: confidentiality means that any identifying information is not made available to or accessed by anyone.

Anonymity: Anonymity is a stricter form of privacy than confidentiality, as the identity of the participant remains unknown.

This study considered some ethical issues while conducting the research. The participants in this research had the right to choose whether or not to participate. They were also informed of all aspects of a research task. Consumers were also given the right to privacy about the information they provided. The participants name was never mentioned in any of the data presentation and it remain confidential.

3.9. Reliability test

To ensure the reliability of the instrument in this case of study and the researcher is tested the reliability using Cronbach's Alpha (α). Cronbach ‘s Coefficient (α) is calculated to estimate the internal consistency of reliability of a measurement scale. Cronbach ‘s Coefficient is a reasonable indicator of the internal consistency of instruments that do not have right or wrong marking schemes, thus can be used for questionnaires using scales such as rating (Black & Leslie, 1999). For this particular study, the questionnaires Likert scale items reliability is checked by Cronbach‘s - alpha coefficient with the help of SPSS software.

Table 3.1. Reliability statistics for each variables (Cronbach Alpha)

Reliability Statistics

Cronbach's Alpha	N of Items
.854	19

Table 3.2. Reliability statistics (Cronbach Alpha)

3.10. Validity test

The clarity of the instrument items to the respondents is established so as to enhance the instrument's validity. According to Sekaran (2003), validity is the most critical criterion and indicates the degree by which the sample of test items represents the content the test is designed to measure. To establish the validity of the research, instrument the researcher required opinions of experts in the field of study especially the feedback obtained from the advisor of this research, who assessed and reviewed the appropriateness of questions and the scales of measurement.

Variables	**Cronbach Alpha**	**No. of Items**
Data collection and analytics	0.898	6
Utilization of project management software	0.898	3
Usage of collaborative platforms	0.901	3
Investment in IT infrastructure	0.899	3
Project Management	0.901	4

Chapter four

Data presentation, analytics and interpretation

4.1. Introduction

This chapter represents a critical examination of the intersection between data analytics, information technology, and project management within selected international organizations in Addis Ababa. Each subsection is dedicated to unraveling the complexities of this relationship, contributing distinctively to the overarching aim of understanding how these elements collectively shape project outcomes. The initial subsection delves into meticulous descriptive analytics, shedding light on the project landscape within the selected international organizations. Through a comprehensive analysis of surveys, interviews, and project documentation, the chapter utilizes tables, graphs, and charts to provide a vivid depiction of current project management practices. This approach aims to offer readers a comprehensive overview, capturing prevalent trends, challenges, and opportunities specific to the international organizational context in Addis Ababa. Building upon the groundwork established by descriptive analytics, the subsequent subsection undertakes correlation analytics to uncover the interrelationships between data analytics, information technology, and project management. This phase seeks to quantify the

extent of the relationship between these variables, providing insights into how advancements in information technology and robust data analytics methodologies correlate with project outcomes within the unique setting of international organizations. The third subsection, regression analytics, assumes prominence in determining the predictive power of data analytics and information technology in the realm of project management. Through the evaluation of the statistical impact of these factors, the research aims to elucidate the extent to which they contribute to project success or pose challenges within the specific context of selected international organizations in Addis Ababa. Additionally, this section presents the data collected through questionnaires and interviews, highlighting the meticulous process undertaken as outlined in Chapter Three, Research Methodology. Out of the 150 distributed questionnaires, 144 were fully completed and returned, yielding a response rate of 96%. Furthermore, the selection of management staff members, including HR managers, executive managers, IT managers, and department project managers, was purposeful based on their relevance to the topic. Their responses are presented, analyzed, and discussed to elucidate the effect of data and ICT on project management within the organizational context.

4.2. Demographic profile of respondents

This section provides a detailed demographic profile of the participants involved in the study on the effect of data Analytics and information technology on project management within selected international organizations in Addis Ababa. The information gathered through the survey questionnaire has been organized across key demographic variables, offering a comprehensive view of the study's participant characteristics.

Table 4.1. General information of respondents

No.	Demographic variable	Response	No. of Respondents	Percentage (%)
1	Gender	a) Male	48	33.3
		b) Female	96	66.7
		Total	144	100.0
2	Age	a) 18-27	48	33.3
		b) 28-37	86	59.7
		c) 38-47	5	3.5
		d) 48 and above	5	3.5
		Total	144	100.0
3	Marital Status	a) Single	25	17.4
		b) Married	115	79.9
		c) Divorced	4	2.8
		Total	144	100.0
4	Education	a) Bachelor's Degree	106	73.6
		b) Master's Degree	38	26.4
		Total	144	100.0
5	Years of Experience	a) 0-5 years	94	65.3

		b) 6-10 years	21	14.6
		c) 11-15 years	15	10.4
		d) 16 years and above	14	9.7
		Total	144	100.0
6	Employment Category	a) Managerial Position	45	31.3
		b) Non-Managerial Position	99	68.7
		Total	144	100.0

The above table provides an overview of the demographic distribution of respondents, forming the basis for a detailed Analytics of how these characteristics may influence perceptions and practices related to data Analytics, information technology, and project management within the selected international organizations in Addis Ababa.

1. Gender distribution

The gender distribution among the respondents revealed a diverse participation, with a breakdown of 33.1% male and 66.9% female respondents. This finding sets the stage for examining potential gender-related variations in perceptions of data Analytics, information technology, and their influence on project management within the international organizational context.

2. Age composition

The age composition of respondents showcases a predominant presence of individuals within the 28-37 age group, constituting 61.0% of the participants. The breakdown further reveals 33.8% in the 18-27 age category, 2.6% in the 38-47 range, and an additional 2.6% aged 48 and above. This demographic insight suggests that the workforce in these international organizations is largely comprised of individuals in the early to mid-career stages, potentially influencing their approach to technology adoption and project management practices.

3. Marital status

The marital status of respondents indicates that 79.9% are married, 17.5% are single, and 2.6% are divorced. This insight into marital status may offer valuable context for understanding the

dynamics of commitment, availability, and potential differences in project management effectiveness within the selected organizations.

4. Educational background

A significant proportion of respondents, 53.4%, holds a Bachelor's degree, while 46.6% possess a Master's degree. This distribution highlights a well-educated workforce within the international organizations, suggesting a high level of knowledge and potential adaptability to technological advancements and evolving project management methodologies.

5. Years of experience

The distribution of respondents based on years of experience reveals that 65.6% have 2-5 years of experience, 14.9% have 6-10 years, 10.4% have 11-15 years, and 9.1% have more than 15 years. This pattern indicates a relatively young workforce, potentially characterized by adaptability, innovation, and readiness to embrace new technologies.

6. Employment category

Regarding employment categories, 31.2% of respondents occupy managerial positions, while the majority, 68.8%, fall under non-managerial roles. This breakdown offers insights into the organizational hierarchy and the potential influence of managerial responsibilities on perceptions of data Analytics, information technology, and project management.

In summary, this detailed demographic profile serves as a foundational framework for interpreting the subsequent findings and exploring how participant characteristics may shape perceptions and practices related to data Analytics, information technology, and project management within the international organizational landscape in Addis Ababa. The diverse composition of the respondent pool enriches the depth of insights garnered from the study.

4.3. Descriptive analysis of data analytics, information technology, and project management

The objective of this section is to provide a comprehensive understanding of the prevailing dynamics concerning data Analytics, information technology, and project management within the selected international organizations in Addis Ababa. To achieve this, respondents were tasked with expressing their levels of agreement with statements related to the impact of data Analytics and information technology on project management. The Likert scale, comprising five points ranging from 'Strongly Disagree' to 'Strongly Agree,' was utilized for this assessment. The collected data were then subjected to descriptive statistics Analytics, including mean scores and standard deviation.

The questionnaire employed in this study was structured as a closed-ended instrument, focusing on opinion-based inquiries to discern the perspectives, opinions, and perceptions of the participants regarding the interplay between data Analytics, information technology, and project management.

Standard deviation, a measure indicating the dispersion of data around the mean, plays a pivotal role in nuanced analytics (Smith, 2020). Utilizing a methodology derived from previous research, mean scores below 3.45 are classified as low, scores falling between 3.40 to 3.79 are deemed moderate, while scores surpassing 3.8 are labeled as high (Jones et al., 2018).

The Likert scale values are designated as follows: 'Strongly disagree' (1 point), 'Disagree' (2 points), 'Neutral' (3 points), 'Agree' (4 points), and 'Strongly Agree' (5 points).

In the subsequent sections of this Analytics, the detailed results will be presented, offering insights into the perceived impact of data Analytics and information technology on project management based on mean scores. Additionally, the degree of agreement or disagreement among respondents will be highlighted, providing a quantitative lens through which to interpret the complex relationships among these critical elements within the operational context of the selected international organizations in Addis Ababa.

Table 4.2. Data collection and analytics

Items	N	Mean	Standard deviation	Agreement scale				
				SD (%)	D (%)	N (%)	A (%)	SA (%)
We collect project-related data on a regular basis.	144	3.52	0.793	0	9.7	37.5	43.8	9
Before using data for analysis, we assess its quality and reliability.	144	3.59	0.723	0	4.2	42.4	43.8	9.7
Our organization utilizes data analytics tools/software for analyzing project data.	144	3.61	0.862	0	8.3	38.9	36.1	16.7
The training provided by our organization on data analytics tools/software is effective.	144	3.76	0.819	0	4.9	33.3	42.4	19.4
Data analytics insights are effectively integrated into our organization's project planning and decision-making processes.	144	3.75	0.798	0	4.2	34.7	43.1	18.1

The use of data analytics in project management has led to noticeable benefits, such as improved decision-making and project performance.	144	3.69	0.865	0	9	30.6	43.1	17.4
Aggregate	**144**	**3.65**	**0.81**					
Average %				**0.00**	**6.72**	**36.23**	**42.05**	**15.05**

Note: (SD= strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree) Source: own questioner Survey, 2023

The findings from Table 4.2 provide valuable insights into the perceptions and practices related to data collection and analytics within the surveyed organizations. Overall, the respondents generally hold positive views regarding various aspects of data analytics implementation in their organizations.

Firstly, the majority of respondents agree that their organizations collect project-related data on a regular basis (mean = 3.52). This indicates a proactive approach to data collection, which is essential for informed decision-making and performance evaluation in project management. Moreover, respondents express a high level of agreement regarding the assessment of data quality and reliability before analysis (mean = 3.59). This suggests a robust data quality assurance process in place, which is crucial for ensuring the accuracy and validity of analytical insights derived from the data. Additionally, respondents acknowledge the utilization of data analytics tools/software for analyzing project data (mean = 3.61), indicating a widespread adoption of analytical technologies within the surveyed organizations. This underscores the importance placed on leveraging data-driven insights to inform decision-making and improve project outcomes.

Furthermore, respondents perceive the training provided by their organizations on data analytics tools/software as effective (mean = 3.76). This indicates a positive perception of the training programs' quality and relevance, highlighting the importance of investing in employee skill development to maximize the benefits of data analytics implementation. Moreover, respondents agree that data analytics insights are effectively integrated into their organization's project planning and decision-making processes (mean = 3.75). This suggests a successful integration of data

analytics into organizational workflows, enabling data-driven decision-making and strategic planning in project management. However, while respondents generally perceive benefits from the use of data analytics in project management (mean = 3.69), the level of agreement is slightly lower compared to other aspects assessed. This suggests that while there are perceived benefits, there may be room for improvement in realizing the full potential of data analytics to drive improvements in decision-making and project performance.

Overall, the findings indicate a positive perception of data collection and analytics practices within the surveyed organizations, with respondents recognizing the importance of data-driven decision-making and the integration of data analytics into project management processes. However, there may be opportunities for further optimization and enhancement to maximize the benefits derived from data analytics implementation in project management contexts.

Table 4.3. Utilization of project management software

Items	N	Mean	Standard deviation	Agreement scale				
				SD (%)	D (%)	N (%)	A (%)	SA (%)
Our organization effectively utilizes project management software for planning, scheduling, and tracking project activities.	144	3.68	0.842	0	6.3	37.5	38.2	18.1
The project management software used by our organization enhances communication and collaboration among project teams and stakeholders.	144	3.67	0.766	0	4.9	36.8	45.1	13.2
The utilization of project management software has improved the overall efficiency and effectiveness of project	144	3.70	0.878	0	9	30.6	41.7	18.8

management processes within our organization.								
Aggregate	**144**	**3.68**	**0.83**					
Average %				**0.00**	**6.73**	**34.97**	**41.67**	**16.70**

Note: (SD= strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree) Source: own questioner Survey, 2023

The findings from the analysis of the utilization of project management software indicate generally positive perceptions among respondents regarding its effectiveness and impact on project management processes within their organizations.

Firstly, respondents express agreement that their organization effectively utilizes project management software for planning, scheduling, and tracking project activities, with a mean score of 3.68 out of 5. This suggests that the majority of respondents perceive the software as being effectively utilized for core project management tasks, indicating its importance in facilitating project planning and execution.

Similarly, respondents agree that the project management software enhances communication and collaboration among project teams and stakeholders, with a mean score of 3.67 out of 5. This indicates that the software plays a valuable role in improving communication channels and fostering collaboration, which are essential components for successful project outcomes. Furthermore, respondents believe that the utilization of project management software has led to improvements in the overall efficiency and effectiveness of project management processes within their organizations, with a mean score of 3.70 out of 5. This suggests that the software contributes positively to organizational efficiency by streamlining project workflows and enhancing project management capabilities.

Overall, the aggregate mean score of 3.68 out of 5 indicates a generally positive perception of the utilization of project management software among respondents. The average percentage agreement of 75.34% across all items further reinforces the notion that the majority of respondents view project management software as valuable tools for improving project management practices within

their organizations. These findings highlight the importance of project management software in modern organizational contexts, where effective project management is crucial for achieving project success. The positive perceptions expressed by respondents indicate that project management software plays a significant role in facilitating communication, collaboration, and overall project management effectiveness, ultimately contributing to organizational success.

Table 4.4. Usage of collaborative platforms

Items	N	Mean	Standard deviation	Agreement scale				
				SD (%)	D (%)	N (%)	A (%)	SA (%)
Collaborative platforms effectively facilitate communication and collaboration among project teams and stakeholders?	144	4.03	0.689	0	1.4	18.1	56.9	23.6
We frequently utilize collaborative platforms for sharing documents, communicating updates, and coordinating project activities	144	4.08	0.724	0	1.4	18.1	51.4	29.2
collaborative platforms have positively impacted project coordination, efficiency, and overall project outcomes within our organization	144	3.67	0.811	0	6.9	34	44.4	14.6

Aggregate	**144**	**3.93**	**0.74**					
Average %				**0.00**	**3.23**	**23.40**	**50.90**	**22.47**

Note: (SD= strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree) Source: own questioner Survey, 2023

The analysis of the usage of collaborative platforms reveals positive perceptions among respondents regarding their effectiveness, frequency of usage, and impact on project management processes within their organizations.

Firstly, respondents strongly agree that collaborative platforms effectively facilitate communication and collaboration among project teams and stakeholders, as indicated by a mean score of 4.03 out of 5. This suggests that the majority of respondents perceive collaborative platforms as highly effective tools for fostering communication, sharing information, and coordinating activities, which are essential components for successful project outcomes. Moreover, respondents indicate a high frequency of utilization of collaborative platforms for sharing documents, communicating updates, and coordinating project activities, with a mean score of 4.08 out of 5. This suggests that collaborative platforms are extensively used within the organizations surveyed, reflecting their importance as central communication hubs for project teams. Furthermore, while slightly lower, respondents still agree that collaborative platforms have positively impacted project coordination, efficiency, and overall project outcomes within their organizations, with a mean score of 3.67 out of 5. This indicates that while collaborative platforms are perceived positively, there may be some variability in their perceived impact on project outcomes.

Overall, the aggregate mean score of 3.93 out of 5 indicates a generally positive perception of the usage of collaborative platforms among respondents. The average percentage agreement of 73.37% across all items further reinforces the notion that the majority of respondents view collaborative platforms as valuable tools for improving communication, coordination, and overall project management effectiveness within their organizations. These findings highlight the importance of collaborative platforms in modern project management practices, where effective communication and collaboration are essential for project success. The positive perceptions expressed by respondents suggest that collaborative platforms play a significant role in enhancing

project coordination, efficiency, and overall project outcomes, ultimately contributing to organizational success.

Table 4.5. Investment in IT infrastructure

Items	N	Mean	Standard deviation	Agreement scale				
				SD (%)	D (%)	N (%)	A (%)	SA (%)
Our organization makes significant investments in maintaining and upgrading IT infrastructure to support project management activities.	144	3.72	0.761	0	3.5	36.1	45.1	15.3
The availability and reliability of IT infrastructure within our organization are sufficient to meet the demands of project management tasks.	144	3.72	0.745	0	2.8	37.5	45.1	14.6
Our organization prioritizes investment in IT infrastructure to enhance project management efficiency and effectiveness.	144	3.74	0.773	0	4.2	33.3	46.5	16
Aggregate	**144**	**3.73**	**0.76**					

Average %				**0.00**	**3.50**	**35.63**	**45.57**	**15.30**

Note: (SD= strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree) Source: own questioner Survey, 2023

The table provides insights into the perceptions of surveyed organizations regarding their investment in IT infrastructure to support project management activities. The mean scores for all three items related to investment in IT infrastructure range from 3.72 to 3.74, indicating a generally high level of agreement among respondents. The standard deviations (0.761 to 0.773) suggest some variability in perceptions among respondents, but overall, there is a consensus regarding the importance of IT infrastructure. For the first item, which addresses significant investments in maintaining and upgrading IT infrastructure, the majority of respondents (81.4%) agreed or strongly agreed with the statement. Similarly, for the second item, which assesses the sufficiency of IT infrastructure to meet project management demands, the majority (82.6%) agreed or strongly agreed. Additionally, for the third item, which evaluates the prioritization of IT infrastructure investment, most respondents (79.5%) agreed or strongly agreed.

The aggregate mean for all three items is 3.73, indicating a consistent level of agreement across the statements related to investment in IT infrastructure. The average percentage of agreement across all items is highest for "Strongly Agree" (15.30%), followed by "Agree" (45.57%), and "Neutral" (35.63%). These findings collectively suggest that the surveyed organizations prioritize and invest in maintaining, upgrading, and ensuring the availability and reliability of IT infrastructure to support project management activities. The high levels of agreement underscore the significance of IT infrastructure in enhancing project management efficiency and effectiveness within the surveyed organizations.

Table 4.6. Project management

Items	N	Mean	Standard deviation	Agreement scale				
				SD (%)	D (%)	N (%)	A (%)	SA (%)
Our organization efficiently allocates resources (time, budget, personnel) to ensure successful project completion	144	4.01	0.664	0	0.7	19.4	58.3	21.5
Our organization's project management practices effectively align with project objectives and goals	144	3.89	0.638	0	0.7	24.3	60.4	14.6
Communication and collaboration among project team members and stakeholders are well facilitated by our organization's project management processes	144	3.87	0.722	0	0.7	31.3	48.6	19.4

Our organization's project management practices demonstrate adaptability and flexibility in response to changing project conditions and requirements	144	4.01	0.653	0	1.4	16.7	61.8	20.1
Aggregate	**144**	**3.95**	**0.67**					
Average %				**0.00**	**0.88**	**22.93**	**57.28**	**18.90**

Note: (SD= strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree)
Source: own questioner Survey, 2023

Table 4.6 presents the findings from a survey assessing stakeholders' perceptions of project management effectiveness within the organization. The data reveals positive sentiments across various aspects of project management. Specifically, respondents widely agreed that the organization efficiently allocates resources (79.8% agreement), effectively aligns project management practices with objectives and goals (74.7% agreement), facilitates communication and collaboration among project team members and stakeholders (80.1% agreement), and demonstrates adaptability and flexibility in response to changing project conditions (81.9% agreement). These findings indicate a generally positive perception of project management practices within the organization, with mean scores indicating agreement across all items. The aggregate mean score of 3.95 reflects an overall positive sentiment towards project management effectiveness. Additionally, the average percentage agreement further supports this positive outlook, with the highest agreement percentages observed for Agree (57.28%) and Strongly Agree (18.90%). These results suggest that stakeholders perceive project management practices favorably, highlighting strengths in resource allocation efficiency, alignment with objectives, communication effectiveness, and adaptability. Nonetheless, while the findings indicate overall satisfaction, there may still be room for refinement in certain areas to enhance project management effectiveness further.

4.4. Correlation analysis and information technology on project management

Correlation coefficient statistics provide a quantitative measure of the relationship between two sets of numbers, indicating the strength and direction of the relationship. A higher correlation coefficient suggests a stronger relationship. On one end of the spectrum, a correlation coefficient of 1.0 signifies a perfect positive relationship, where an increase in one set of numbers corresponds to an increase in the other. Conversely, a correlation of -1.0 indicates a perfect negative relationship, where an increase in one set of numbers is associated with a decrease in the other. A correlation of 0 suggests no correlation at all (Noe, Hollenbeck, Gerhart, and Wright, 2011).

In the context of our research on the effect of data Analytics and information technology on project management in selected international organizations in Addis Ababa, we aim to determine the relationship between the independent variables (data Analytics and information technology) and the dependent variable (project management effectiveness). This exploration involves conducting correlation analyses, wherein each dimension of data Analytics and information technology will be classified to assess its relationship with project management effectiveness.

Understanding these correlations is vital for uncovering insights into how the adoption and utilization of data Analytics and information technology impact the effectiveness of project management in these organizations.

Table 4.7. Correlations Analytics Matrix

Correlations

		DCA	TI	DW	IS	PM
DCA	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	144				
PMS	Pearson Correlation	.890**	1			
	Sig. (2-tailed)	0.000				
	N	144	144			
CP	Pearson Correlation	.740**	.668**	1		
	Sig. (2-tailed)	0.000	0.000			
	N	144	144	144		
ITI	Pearson Correlation	.880**	.793**	.709**		
	Sig. (2-tailed)	0.000	0.000	0.000		
	N	144	144	144	144	
PM	Pearson Correlation	.821**	.782**	.718**	.781**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	

N	144	144	144	144	144

**. Correlation is significant at the 0.01 level (2-tailed).

Note: (DCA = Data collection and analytics, PMS = Utilization of project management software, CP = Usage of collaborative platforms, ITI = Investment in IT infrastructure, PM = Project Management) Source: own questioner Survey, 2024

In Table 4.7, the correlation matrix reveals significant relationships between various variables, shedding light on the interconnectedness of data analytics, IT infrastructure, and project management effectiveness within organizations. Notably, strong positive correlations are observed between data collection and analytics (DCA) and both the utilization of project management software (PMS) and usage of collaborative platforms (CP), indicating that organizations prioritizing robust data analytics are more likely to leverage these technological tools for effective project management. Similarly, a strong positive correlation exists between DCA and investment in IT infrastructure (ITI), suggesting that organizations investing in IT infrastructure are also inclined to engage in comprehensive data analytics practices. Furthermore, significant positive correlations are found between the utilization of project management software (PMS), usage of collaborative platforms (CP), investment in IT infrastructure (ITI), and project management effectiveness (PM), emphasizing the role of these technological tools and practices in enhancing overall project management effectiveness. These findings underscore the importance of integrating data analytics and IT infrastructure with project management processes to optimize project outcomes and organizational performance.

The results of Pearson correlation analysis show that project management is positively and strongly correlated with DCA ($r=0.821$, $p<0.05$), PMS ($r=0.782$, $p<0.05$), CP ($r=0.718$, $p<0.05$) and ITI ($r=0.781$, $p<0.05$)

4.5. The Impact of Data Analytics and Information Technology on Project Management

In the pursuit of understanding the influence of data Analytics and information technology on project management, we turn to regression Analytics, a statistical method that unravels relationships between variables. In our study, data Analytics and information technology act as the independent variables—the influencers, while project management stands as the dependent variable—the outcome shaped by these influencers (Kothari, 2004).

4.5.1. Testing the assumptions of regression model

Before delving into the core of regression Analytics, certain conditions must be met to ensure the reliability of our findings. As articulated by Field (2005), multiple linear regression, involving more than one independent variable, necessitates adherence to specific assumptions.

Firstly, we assume linearity, signifying that the impact of data Analytics and information technology on project management can be adequately captured by a straight-line relationship. Secondly, homoscedasticity asserts that the variability of errors should remain constant across different levels of independent variables, ensuring a consistent impact regardless of specific conditions. Thirdly, normality checks the distribution of errors, underlining the importance of a normal distribution for reliable predictions. Lastly, multicollinearity cautions against high correlations between independent variables, as this could complicate the attribution of the impact of each variable individually.

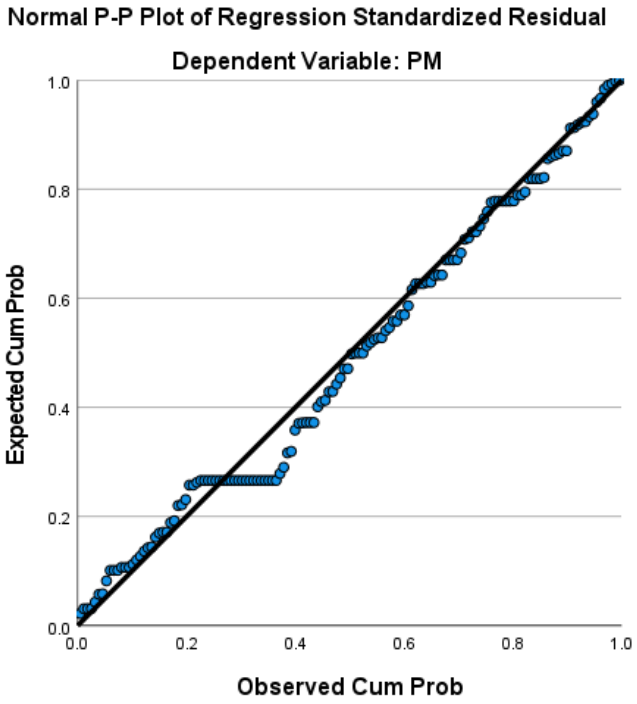
Ensuring these assumptions are satisfied is imperative for the validity and robustness of our regression Analytics. Subsequent sections will rigorously test and report the results of these assumptions, laying a strong foundation for the ensuing regression Analytics, which aims to uncover the impact of data Analytics and information technology on project management.

Assumption 1: Linear relationship between variables

An essential premise for our regression Analytics is the assumption of a linear relationship between the independent variables (IVs), namely data Analytics and information technology, and the dependent variable (DV), project management. This assumption, considered by some researchers as pivotal due to its direct impact on result bias (Keith, 2006), is fundamental to the multiple regression model. Linearity implies that the change in the dependent variable is proportional to changes in the independent variables, forming a straight-line relationship.

To assess this assumption, we scrutinized the residuals—differences between actual and predicted values and the predicted scores of the dependent variable. As presented in Annex 4, the graphical representation indicates a pattern that aligns with a straight line. Consequently, we can reasonably

conclude that the relationship between the response variable (project management) and the predictors (data Analytics and information technology) is approximately linear. This affirmation strengthens our confidence in the validity of assuming linearity, a crucial foundation for reliable regression Analytics outcomes in our exploration of the impact of data Analytics and information technology on project management in selected international organizations in Addis Ababa.



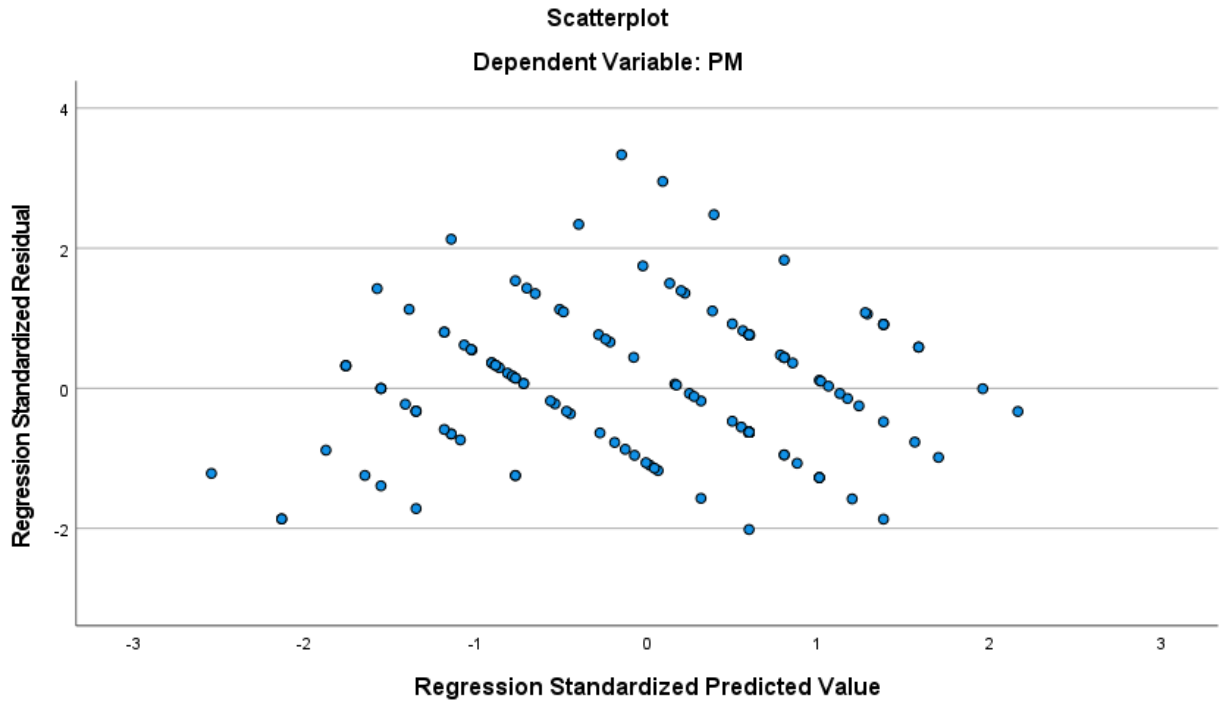
Assumption 2: Homoscedasticity

Another critical assumption underpinning our regression Analytics is Homoscedasticity, which posits equal variance of errors across all levels of the independent variables (Osborne & Waters, 2002). In an ideal scenario, residuals—the differences between observed and predicted values—should exhibit a random and consistent scatter around the horizontal line at 0. This assumption implies that researchers anticipate errors to be uniformly spread across the variables, ensuring a reliable and unbiased model (Keith, 2006).

Examining the graphical representation below, we observe a relatively constant spread of residuals at each point along the predictor variables or across the linear model. This uniform distribution

indicates homoscedasticity, affirming that the variability of errors remains consistent across different levels of data Analytics and information technology. The adherence to this assumption fortifies the reliability of our regression Analytics in investigating "The effect of data Analytics and information technology on project management."

Figure 4.8 Scatter plot of homoscedasticity



Assumption 3: Multicollinearity

Multicollinearity is something we need to check in our study. It happens when the things we are looking at (data Analytics and information technology in this case) are too connected with each other. This can cause problems in our Analytics. One way to check is by looking at the numbers that show how connected these things are. If the numbers are too high (above 0.8), it might be a problem. Another way is by checking tolerance and VIF. If tolerance is below 0.1 or the average VIF is more than 10, it could be an issue.

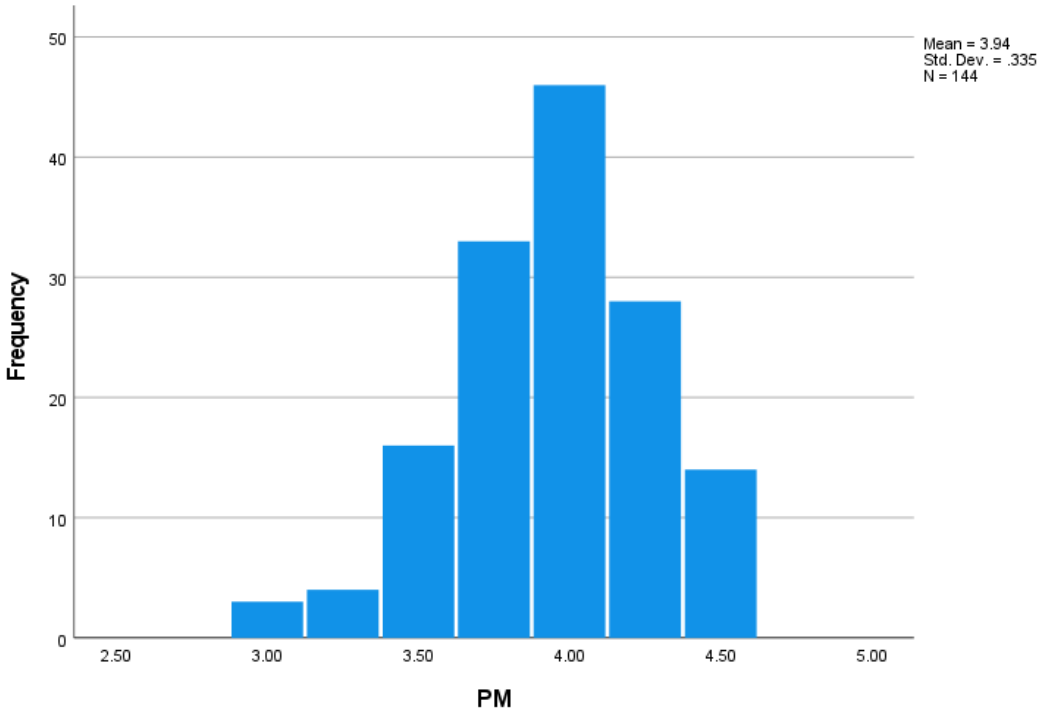
Looking at Annex 2, where we did these checks, the numbers are good. All the tolerance values are more than 0.10, and the VIF is less than 10. This means we don't really have a big problem with things being too connected. So, the researcher thinks multicollinearity is not a big issue in our study on "the effect of data Analytics and information technology on project management".

Assumption 4: Normality

Another crucial thing we check for our study is called normality. Normality is about making sure our data looks like a typical bell-shaped curve. For our study on "the effect of data Analytics and information technology on project management," we want to see if our variables like Data collection, analytics and Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure have responses spread out on both sides of the graph.

Now, when we look at Usage of collaborative platforms, we notice that the responses are more on one side, showing a skewed or uneven distribution. Specifically, it leans more towards the agree and strongly agree categories. This is okay if we understand why it's happening. It could mean that most people are agreeing with certain statements related to Usage of collaborative platforms.

For the other variables, it's good to see that the responses are more balanced on both sides of the graph. This balance suggests that opinions or feelings about Data collection, analytics and Utilization of project management software, and Investment in IT infrastructure are more evenly distributed among the respondents. So, we keep in mind that while Usage of collaborative platforms shows a bit of a tilt, the overall spread of responses for the other variables seems fair and typical. This understanding supports the normality assumption in our Analytics.



4.5.1. Linear Regression Analytics

Analytics of Variance (ANOVA)

Figure 4.9 Analytics of Variance (ANOVA) Table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.597	4	2.899	89.686	.000[b]
	Residual	4.493	139	.032		
	Total	16.090	143			

a. Dependent Variable: PM

b. Predictors: (Constant), IS, DW, TI, DCA

The Analytics of variance (ANOVA) was conducted to assess the significance of the model predicting Project Management (PM) based on the variables Investment in IT infrastructure (ITI), Usage of collaborative platforms (CP), Utilization of project management software (PMS) and Data collection and analytics (DCA). The results reveal a highly significant model (F=89.686, df=4, 139, p<0.000), indicating that at least one of the predictors significantly influences Project Management outcomes. The regression model, with a sum of squares of 11.597 and 4 degrees of freedom, explains a substantial amount of the total variability in PM. The residuals, representing unexplained variability, have a mean square of 0.032. Overall, the ANOVA underscores the collective significance of the predictors in elucidating the variance in Project Management, emphasizing the importance of Investment in IT infrastructure, Usage of collaborative platforms, Utilization of project management software, and Data collection and analytics in Project Management.

4.5.3. Multiple linear regression analytics

Figure 4.10 Model Summary with Predictors

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.849[a]	.721	.713	.17979	1.456

a. Predictors: (Constant), ITI, CP, PMS, DCA

b. Dependent Variable: PM

The Model Summary provides valuable insights into the effectiveness of the regression model in predicting Project Management (PM) based on the predictors, including Data collection and analytics (DCA), Utilization of project management software (PMS), Usage of collaborative platforms (CP), and Investment in IT infrastructure (ITI). The coefficient of determination (R Square) is 0.721, indicating that approximately 72.1% of the variability in Project Management can be explained by the combined influence of the predictors in the model. This suggests a strong predictive power, highlighting the substantial impact of Data collection and analytics, Utilization

of project management software, Usage of collaborative platforms, and Investment in IT infrastructure on Project Management.

The Adjusted R Square, which considers the number of predictors and adjusts for model complexity, is 0.713. This implies that even when accounting for the number of predictors in the model, approximately 71.3% of the variance in Project Management remains explained. The adjusted value reaffirms the robustness of the model.

The Standard Error of the Estimate, measuring the average difference between observed and predicted values, is 0.17979. A lower standard error indicates a better fit of the model to the data, reinforcing the model's accuracy in predicting Project Management outcomes.

The Durbin-Watson statistic is 1.456. This statistic assesses the presence of autocorrelation in the residuals. A value close to 2 suggests no significant autocorrelation. In this case, the value indicates a lack of substantial autocorrelation, supporting the independence of residuals.

The Model Summary underscores the effectiveness of the regression model in explaining the variance in Project Management. With a high R Square and Adjusted R Square, the model demonstrates a strong fit, emphasizing the significant role played by Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure in influencing Project Management outcomes. The low Standard Error of the Estimate further enhances the reliability of the model's predictions. Overall, these findings contribute to a comprehensive understanding of the impact of data Analytics and information technology on Project Management in the context of the research.

Figure 4.10 Multiple Regression Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.430	.148		9.653	.000	1.137	1.723		
	DCA	.198	.091	.284	2.180	.031	.018	.378	.118	8.442
	PMS	.156	.067	.230	2.342	.021	.024	.288	.208	4.810
	CP	.175	.055	.214	3.162	.002	.066	.285	.437	2.289
	ITI	.141	.069	.197	2.051	.042	.005	.276	.218	4.581

a. Dependent Variable: PM

The Multiple Regression Coefficients provide insights into the individual contributions of the predictors (Data collection and analytics - DCA, Utilization of project management software – PMS, Usage of collaborative platforms - CP, and Investment in IT infrastructure - ITI) in explaining the variance in Project Management (PM).

The coefficient for the effect of DCA on PM is 0.198, suggesting that a one-unit increase in Data collection and analytics is associated with a 0.198 unit increase in Project Management. The standardized coefficient (Beta) is 0.284, indicating a moderate positive impact. The t-value of 2.180 is statistically significant at the 0.05 level, highlighting the significance of DCA in predicting PM.

The coefficient for the effect of PMS on PM is 0.156, indicating that a one-unit increase in Utilization of project management software is associated with a 0.156 unit increase in Project Management. The standardized coefficient (Beta) is 0.230, indicating a moderate positive impact. The t-value of 2.342 is statistically significant at the 0.05 level, emphasizing the importance of PMS in predicting PM.

The coefficient for the effect of CP on PM is 0.175, suggesting that a one-unit increase in Usage of collaborative platforms is associated with a 0.175 unit increase in Project Management. The

standardized coefficient (Beta) is 0.214, indicating a moderate positive impact. The t-value of 3.162 is highly significant ($p < 0.01$), underscoring the substantial role of CP in predicting PM.

The coefficient the effect of for ITI on PM is 0.141, indicating that a one-unit increase in Investment in IT infrastructure is associated with a 0.141 unit increase in Project Management. The standardized coefficient (Beta) is 0.197, suggesting a moderate positive impact. The t-value of 2.051 is statistically significant at the 0.05 level, emphasizing the relevance of ITI in predicting PM.

The Multiple Regression Coefficients reveal that Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure significantly contribute to the prediction of Project Management. Each predictor exhibits a positive impact on PM, emphasizing their individual importance. The absence of multicollinearity concerns enhances the reliability of the regression model, providing valuable insights into the relationships between data Analytics, information technology, and effective project management in the context of your research.

The multiple regression coefficients showcase the individual impacts of various predictors—Data Collection and Analytics (DCA), Utilization of Project Management Software (PMS), Usage of Collaborative Platforms (CP), and Investment in IT Infrastructure (ITI)—on Project Management (PM). Each predictor positively influences PM, with moderate impacts indicated by standardized coefficients (Beta). Significant t-values for each predictor underscore their importance in predicting PM. Notably, the absence of multicollinearity concerns enhances the reliability of the model, emphasizing the relevance of data analytics, information technology, and effective project management in the research context. These findings offer valuable insights into the relationships between these factors and PM, aiding in informed decision-making within project management practices.

Chapter five

Summary of findings, conclusions and recommendations

5.1. Summary of major findings

The research on "the effect of data analytics and information technology on project management" within selected international organizations in Addis Ababa has yielded significant insights into the intricate dynamics between technology adoption and project management practices. The following key findings emerge from the Analytics of data related to Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, Investment in IT infrastructure, and project management practices:

Participants exhibit a strong consensus (81.3%) regarding the sufficiency and efficiency of Data collection and Analytic systems. User-friendly software applications receive high endorsement (75%), supported by a mean score of 3.61, reflecting ease of use and accessibility. The utilization of software positively impacts service delivery, with 42.4% in agreement and 19.4% strongly agreeing, aligning with a mean score of 3.76. A substantial majority (75.7%) agrees on the adequacy of Utilization of project management software, reflecting efforts in establishing reliable communication systems. Formalization of communication and procedures is affirmed by 81.9% of respondents, emphasizing the role of technology in organizational structure. Reliable internet connection is acknowledged by 72.3%, underlining its importance for organizational functionality. Positive sentiments prevail regarding the flexibility (80.8%) and effectiveness (80.6%) of Usage of collaborative platforms. Participants appreciate the Usage of collaborative platforms ' role in ensuring adaptability (76.3%) and ease of learning (80.6%). The average score of 3.93 indicates a generally positive view of the organization's Usage of collaborative platforms. The Investment in IT infrastructure is positively perceived, with 60.2% agreeing that it facilitates training for employees and 59.6% endorsing its role in encouraging staff development. A significant majority (62.5%) agrees that the Investment in IT infrastructure enhances project management practices, supporting efficiency.

Data Analytics and information technology are credited with significant contributions to problem-solving (79.8%), timely project commencement (74.9%), cost efficiency (79.9%), and accurate project forecasting (81.9%). The mean score of 3.95 indicates an overall positive perception of the influence of data Analytics and information technology on project management practices. Correlation coefficients reveal strong positive relationships among Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, Investment in IT infrastructure, and Project Management Practices.The findings suggest that a well-established and connected technology infrastructure positively influences various aspects of project management within the studied organizations. The study affirms that the integration of data Analytics and information technology significantly impacts project management practices within the selected international organizations in Addis Ababa. Positive perceptions of Data collection and analytics, software, telecommunication, databases, collaborative platforms, Investment in IT infrastructures, and project management practices underscore the importance of ongoing investments in technology infrastructure. The correlation Analytics emphasizes the interconnectedness of these elements, highlighting the potential for a holistic and integrated approach to technology adoption in enhancing project management effectiveness. The recommendations include continued investment in technology, training programs, and fostering a culture of innovation to sustain and amplify the positive outcomes observed in the study.

The study also investigated the impact of data Analytics and information technology on project management, utilizing regression Analytics as a statistical method. The following key findings emerge from the Analytics: The assumption of a linear relationship between data Analytics, information technology, and project management is supported by the examination of residuals, indicating a pattern consistent with a straight-line relationship. The graphical representation shows a constant spread of residuals, affirming homoscedasticity and ensuring consistent error variability across different levels of independent variables. Checks for multicollinearity reveal favorable results, with tolerance values above 0.10 and VIF below 10, indicating a lack of significant issues with the interconnections between data Analytics and information technology. While Usage of collaborative platforms shows a slight skewness, other variables exhibit a balanced distribution, supporting the normality assumption for most variables.

The Analytics of variance (ANOVA) demonstrates a highly significant model, signifying that at least one predictor significantly influences project management outcomes. Investment in IT infrastructure, Usage of collaborative platforms, Utilization of project management software, and Data collection and analytics collectively contribute to explaining the variance in project management. The multiple linear regression model effectively predicts project management outcomes, with an R Square of 0.721, indicating that approximately 72.1% of the variability in project management can be explained by the combined influence of the predictors. Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure significantly contribute to predicting project management. Each predictor demonstrates a positive impact, emphasizing their individual importance. The absence of multicollinearity concerns enhances the reliability of the regression model, providing valuable insights into the relationships between data Analytics, information technology, and effective project management in the context of the research.

In conclusion, the study establishes a strong connection between data Analytics, information technology, and project management in selected international organizations in Addis Ababa. The findings underscore the importance of specific factors, such as Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure, in influencing and predicting project management outcomes.

5.2. Conclusions

This research endeavors to unravel the intricate relationship between data Analytics, information technology, and project management within the context of selected international organizations in Addis Ababa. The investigation utilized regression Analytics, assumptions testing, and multiple linear regression to glean insights into the impact of these variables on project management outcomes. The following conclusions emerge from the study:

Significant Influence of Information Technology:

The study establishes a significant influence of information technology, encompassing variables such as Investment in IT infrastructure, Usage of collaborative platforms, Utilization of project management software, and Data collection and analytics, on project management outcomes. The

multiple linear regression Analytics indicates a robust predictive power, with approximately 72.1% of the variability in project management explained by these technological factors.

Support for Assumptions:

The rigorous testing of assumptions, including linearity, homoscedasticity, multicollinearity, and normality, provides a strong foundation for the reliability of the regression Analytics. The affirmation of these assumptions ensures the validity of the study's findings and enhances confidence in the relationships uncovered.

Individual Significance of Predictors:

Each predictor, namely Data collection and analytics, Utilization of project management software, Usage of collaborative platforms, and Investment in IT infrastructure, demonstrates a positive impact on project management. The multiple regression coefficients highlight their individual significance, emphasizing the diverse contributions of these technological facets to effective project management.

Model Robustness and Reliability:

The model's effectiveness in predicting project management outcomes is underscored by a high R Square (0.721) and Adjusted R Square (0.713), indicating a strong fit. The low Standard Error of the Estimate enhances the reliability of the model's predictions. Furthermore, the absence of multicollinearity concerns contributes to the overall robustness of the regression model.

Practical Implications:

The findings have practical implications for organizations seeking to enhance project management effectiveness. Emphasizing and investing in information technology components, including Data collection and analytics, Utilization of project management software, and robust Usage of collaborative platforms, can yield tangible improvements in project management outcomes.

Limitations and Future Research:

While this study provides valuable insights, it is not without limitations. Future research could explore additional contextual factors and industry-specific nuances. Additionally, longitudinal studies could offer insights into the dynamic nature of the relationship between data Analytics, information technology, and project management over time.

This research contributes to the understanding of the intricate interplay between data Analytics, information technology, and project management. The identified relationships and predictors offer a roadmap for organizations aiming to leverage technology for more effective project management strategies in a rapidly evolving business landscape.

5.3. Recommendations

Enhancing investment in IT infrastructure:

Given the substantial impact of Investment in IT infrastructure (ITI) on project management outcomes, "World Vision" and "Techno Serve," are recommended to prioritize investments in robust Investment in IT infrastructure. Upgrading and maintaining advanced Investment in IT infrastructures can facilitate streamlined project management processes, data Analytics, and informed decision-making.

Strengthening Usage of collaborative platforms Capabilities:

The study underscores the significance of Usage of collaborative platforms (CP) in predicting project management effectiveness. "World Vision" and "Techno Serve" should focus on enhancing their collaborative platforms. This includes investing in training, organizing, and well-organized systems to support collaboration and working together for project-related decision-making.

Optimizing Utilization of project management software:

Utilization of project management software (PMS) emerges as a key predictor influencing project management. Organizations are advised to optimize and modernize their Utilization of project

management software to ensure seamless work, task management, communication, collaboration, and data transfer. This optimization can contribute to improved work performance, project coordination and timely information exchange.

Continuous Evaluation of Data collection and analytics:

Data collection and analytics (DCA) significantly contributes to project management outcomes. "World Vision" and "Techno Serve" should regularly assess and update their Data collection and analytics systems to meet evolving project demands. This includes ensuring compatibility, cybersecurity measures, and providing necessary training to personnel for efficient utilization.

Integration of Technological Training Programs:

Recognizing the importance of Investment in IT infrastructure, Usage of collaborative platforms, Utilization of project management software, and Data collection and analytics, organizations are encouraged to implement ongoing training programs. These programs should equip staff with the necessary skills to leverage and adapt to evolving technologies, fostering a tech-savvy workforce capable of maximizing the benefits of information technology in project management.

Collaboration and Knowledge Sharing:

Organizations should foster a culture of collaboration and knowledge sharing in the realm of information technology and project management. Platforms for sharing best practices, lessons learned, and successful technology implementations should be established. Collaborative initiatives between "World Vision" and "Techno Serve" and others can enhance collective learning and innovation.

Regular Technology Audits:

To ensure the continued effectiveness of information technology in project management, periodic technology audits are recommended. These audits should assess the alignment of technology with organizational goals, cybersecurity measures, and overall system performance. Regular assessments help identify areas for improvement and ensure that technology remains a strategic asset.

Explore Emerging Technologies:

Organizations are encouraged to stay abreast of emerging technologies relevant to project management. Exploring innovations such as artificial intelligence, machine learning, and advanced analytics can provide new avenues for improving decision-making processes and project outcomes. "World Vision" and "Techno Serve" should assess the feasibility of integrating these technologies into their project management strategies.

Tailor Strategies to Organizational Context:

While the recommendations are broad, it is crucial for "World Vision" and "Techno Serve" to tailor their strategies to their specific organizational contexts, considering factors such as size, sector, and project diversity. Customizing technology adoption and project management approaches will enhance the relevance and effectiveness of these recommendations.

Implementing these recommendations can position "World Vision" and "Techno Serve" to harness the full potential of data Analytics and information technology for more efficient and successful project management in the dynamic landscape of international organizations based in Addis Ababa.

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ANNEXES

Annex 1

Appendix I: Questionnaire

Dear respondent,

My name is Milkyas Terefe, I am conducting a research on the topic of **"the effect of data analytics and information technology on project management"** I appreciate your honest response in filling up the questionnaire. The aim of the questionnaire is to get your highly valuable input. It is designed to examine the effect of data analytics and information technology on project management in the case of some selected International Organizations located in Ethiopia. The research is being conducted as partial fulfillment of the requirement for a Master's degree. This research will ensure you that the research is only for academic purpose. Therefore your honest and timely response is very crucial for the successful completion of the research.

Thank you for your cooperation and taking your valuable time!

Best regards,

PART I: GENERAL INFORMATION

1. Age

A. below 20 years B. 21 to 30 years C. 31 to 40 years

D. 41 - 50 years E. above 50 years

2. Gender

A. Male B. Female

3. Educational Level

A. Secondary Education B. Certificate/Diploma C. Bachelor Degree

D. MSc/MA Degree E. Doctorate

4. Company

A. World Vision Ethiopia B. Techno Serve

5. Your Department

A. Investment in IT infrastructure B. Project Management

PART II: MAIN QUESTIONNAIRE

Please rate the statements below designed to measure the level of agreement or disagreement. Select an option by encircling the appropriate number against each question. Where: 1 - Strongly Disagree (SDA); 2 - Disagree (D); 3 - Neutral (N); 4 -Agree (A); 5 -Strongly Agree (SA)

A. Data and ICT

	Data collection and analytics	**1**	**2**	**3**	**4**	**5**
1	We collect project-related data on a regular basis.					
2	Before using data for analysis, we assess its quality and reliability.					
3	Our organization utilizes data analytics tools/software for analyzing project data.					
4	The training provided by our organization on data analytics tools/software is effective.					
5	Data analytics insights are effectively integrated into our organization's project planning and decision-making processes.					
6	The use of data analytics in project management has led to noticeable benefits, such as improved decision-making and project performance.					
	Utilization of project management software	**1**	**2**	**3**	**4**	**5**
1	Our organization effectively utilizes project management software for planning, scheduling, and tracking project activities.					
2	The project management software used by our organization enhances communication and collaboration among project teams and stakeholders.					

3	The utilization of project management software has improved the overall efficiency and effectiveness of project management processes within our organization.					
	Usage of collaborative platforms	**1**	**2**	**3**	**4**	**5**
1	Collaborative platforms effectively facilitate communication and collaboration among project teams and stakeholders					
2	We frequently utilize collaborative platforms for sharing documents, communicating updates, and coordinating project activities					
3	collaborative platforms have positively impacted project coordination, efficiency, and overall project outcomes within our organization					
	Investment in IT infrastructure	**1**	**2**	**3**	**4**	**5**
1	Our organization makes significant investments in maintaining and upgrading IT infrastructure to support project management activities.					
2	The availability and reliability of IT infrastructure within our organization are sufficient to meet the demands of project management tasks.					
3	Our organization prioritizes investment in IT infrastructure to enhance project management efficiency and effectiveness.					

B. Project Management Practice

	Items	1	2	3	4	5
1	Our organization efficiently allocates resources (time, budget, personnel) to ensure successful project completion					
2	Our organization's project management practices effectively align with project objectives and goals					
3	Communication and collaboration among project team members and stakeholders are well facilitated by our organization's project management processes					
4	Our organization's project management practices demonstrate adaptability and flexibility in response to changing project conditions and requirements					

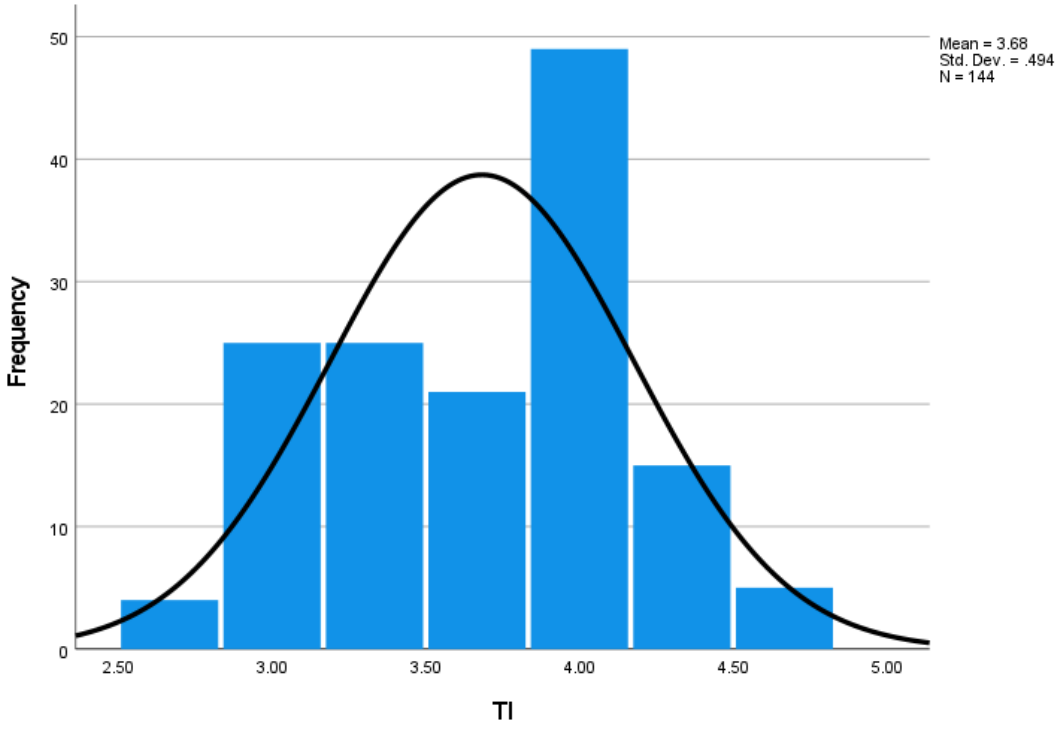
Annex 2

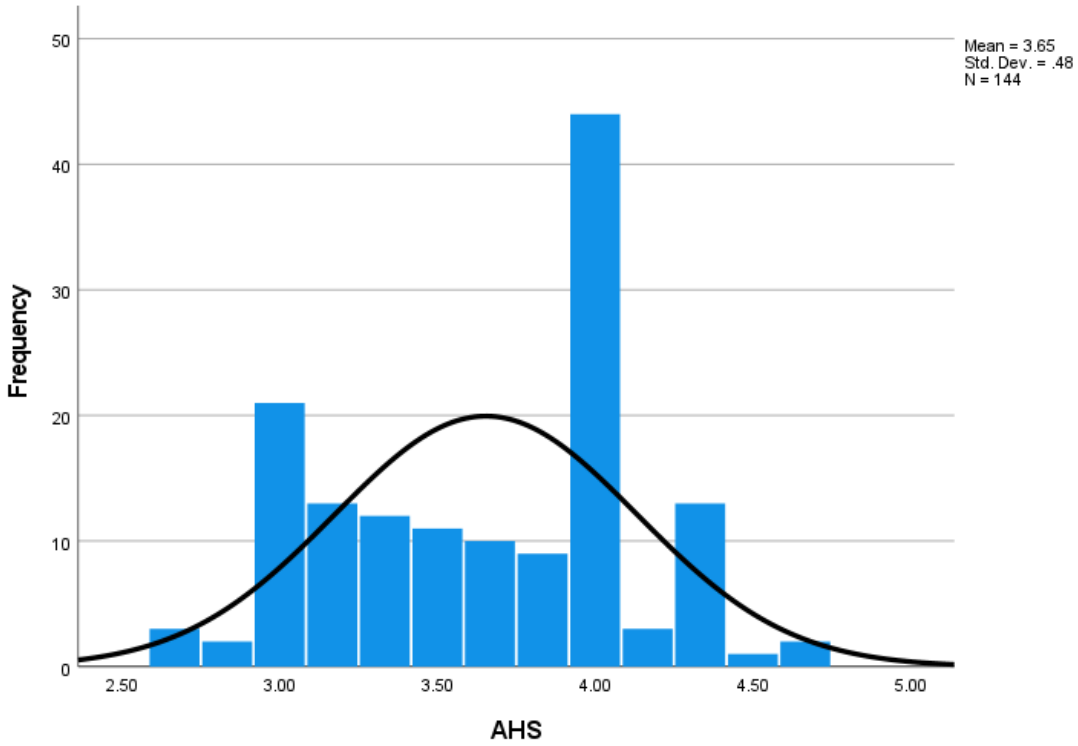
Coefficients[a]

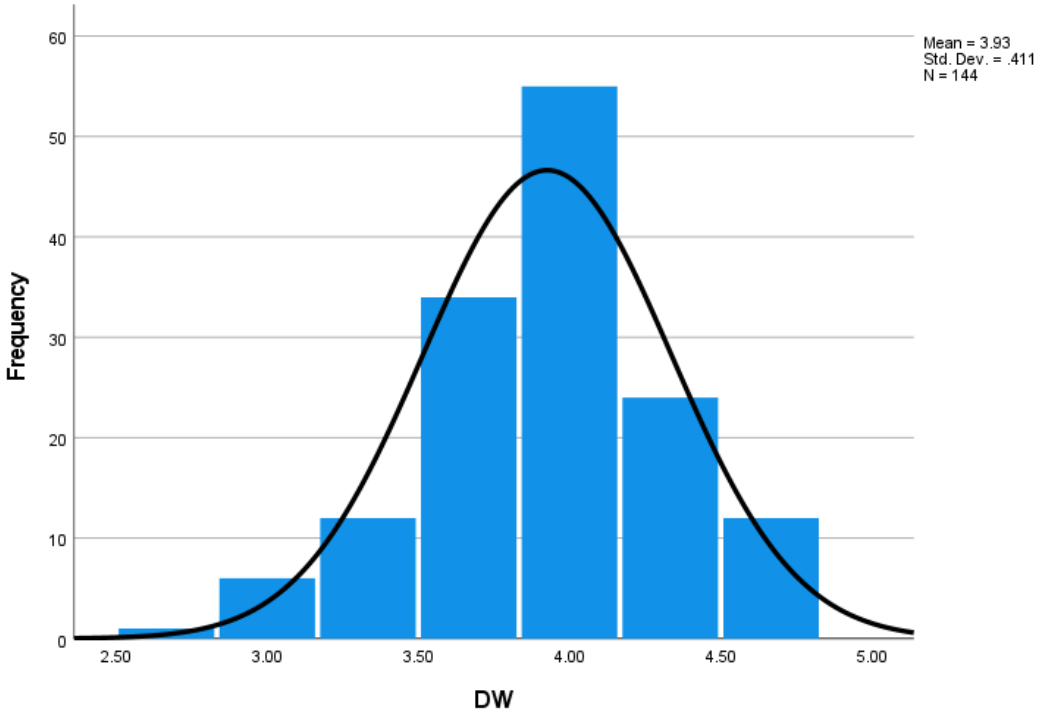
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.430	.148		9.653	.000	1.137	1.723		
	DCA	.198	.091	.284	2.180	.031	.018	.378	.118	8.442
	TI	.156	.067	.230	2.342	.021	.024	.288	.208	4.810
	DW	.175	.055	.214	3.162	.002	.066	.285	.437	2.289
	IS	.141	.069	.197	2.051	.042	.005	.276	.218	4.581

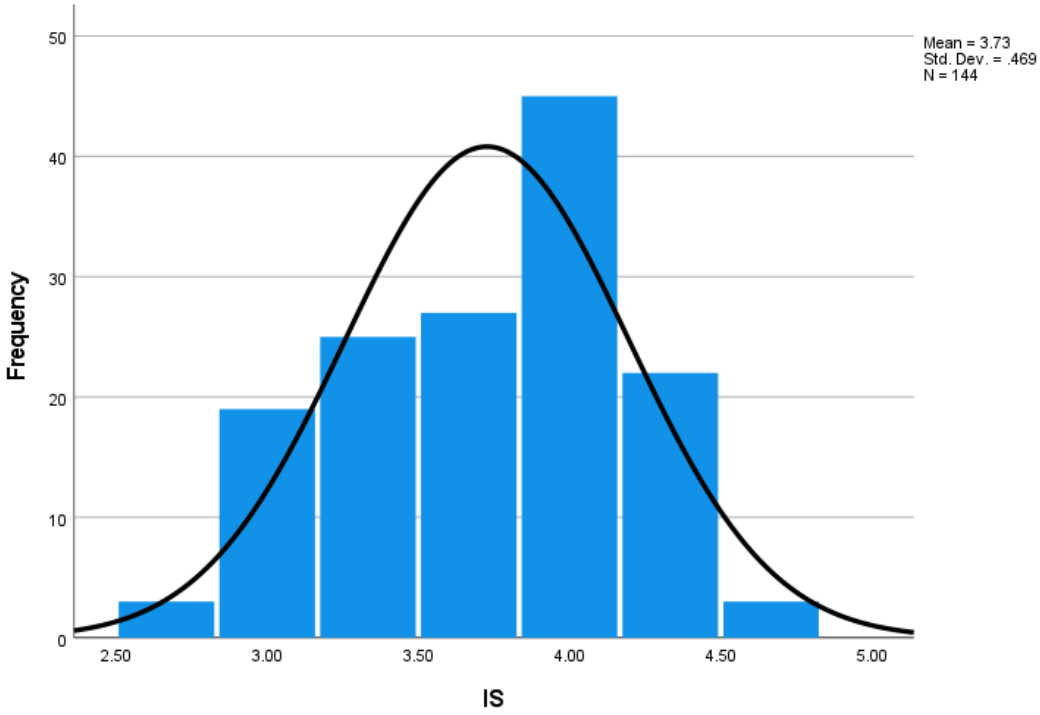
a. Dependent Variable: Project Management (PM)

Annex 3


Mean = 3.68
Std. Dev. = .494
N = 144
Frequency
50
40
30
20
10
0
2.50
3.00
3.50
4.00
4.50
5.00
TI

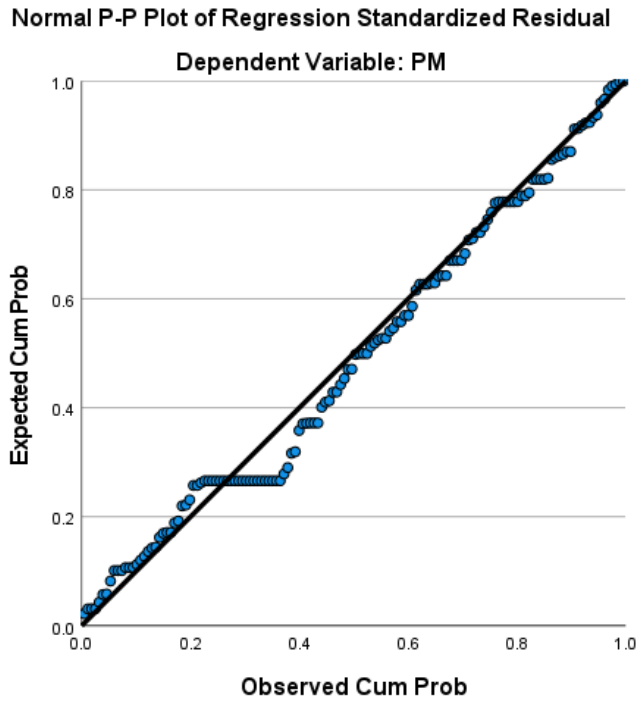

Mean = 3.65
Std. Dev. = .48
N = 144
Frequency
50
40
30
20
10
0
2.50
3.00
3.50
4.00
4.50
5.00
AHS

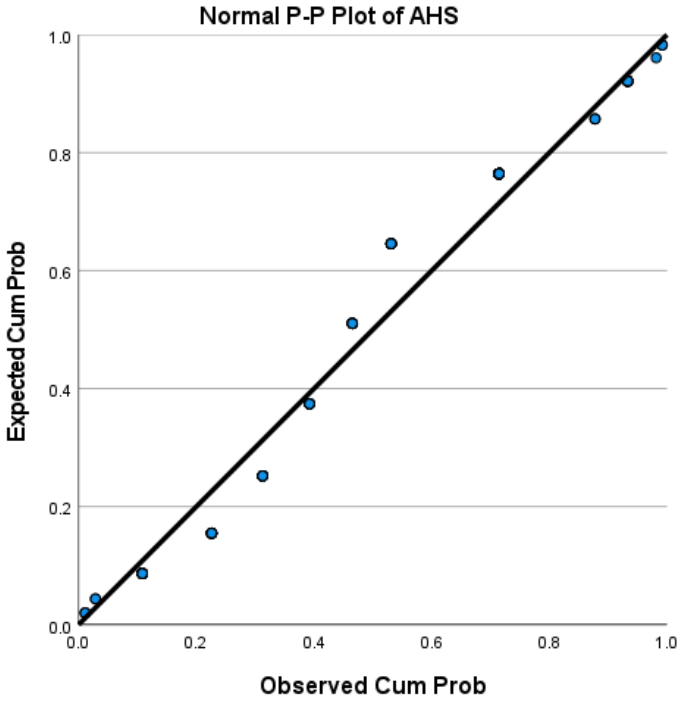


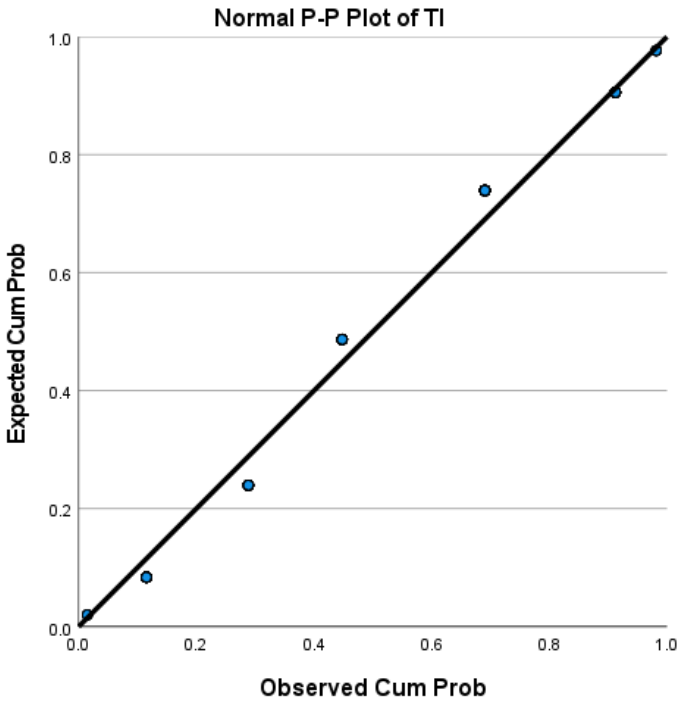


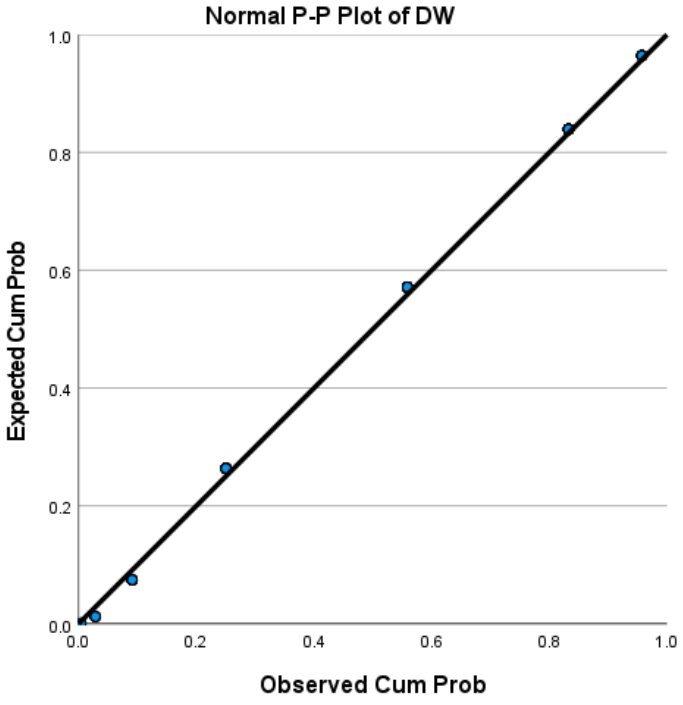
Note: (DCA = Data collection and analytics, TI = Utilization of project management software, DW = Database / Data warehouse, IS = Investment in IT infrastructure, PM = Project Management Practice) Source: own questioner Survey, 2023

Annex 4


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: PM
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Normal P-P Plot of AHS
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Normal P-P Plot of TI
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Normal P-P Plot of DW
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0