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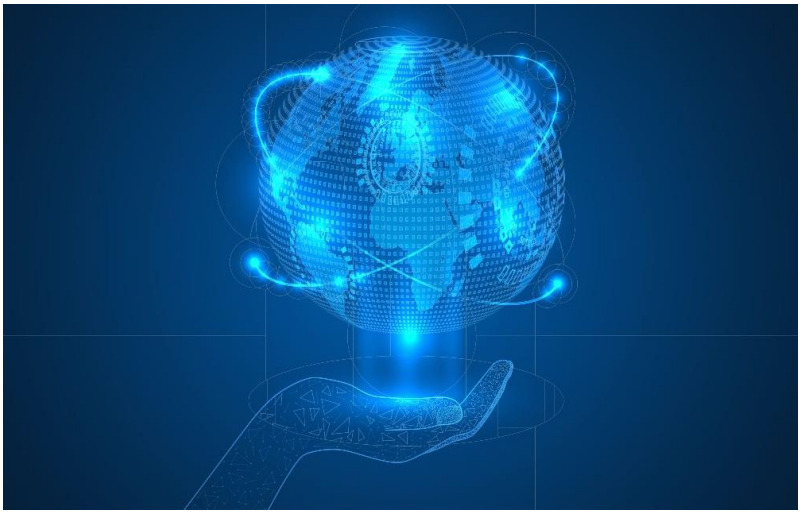
DIGITAL TRANSFORMATION IN LOCAL GOVERNMENTS: A CASE STUDY OF ABU DHABI MUNICIPALITY TRANSPORT DEPARTMENT

Alia Sahmi Jaber Al Ahbabi



June 2023

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Alia Sahmi Jaber Al Ahbabi

This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Science in Information Technology Management

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Cover: Digital transformation in local government: A case study of Abu Dhabi municipality transport department
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Declaration of Original Work

I, Alia Sahmi Jaber Al Ahbabi, the undersigned, a graduate student at the United Arab Emirates University (UAEU) and the author of this thesis entitled "*Digital Transformation in Local Governments: A Case Study of Abu-Dhabi Municipality Transport Department,"* hereby, solemnly declare that this thesis is my own original research work that has been done and prepared by me under the supervision of Dr. Farag Sallabi, in the College of Information Technology at UAEU. This work has not previously been presented or published or formed the basis for the award of any academic degree, diploma, or similar title at this or any other university. Any materials borrowed from other sources (whether published or unpublished) and relied upon or included in my thesis have been properly cited and acknowledged in accordance with appropriate academic conventions. I further declare that there is no potential conflict of interest with respect to the research, data collection, authorship, presentation, and/or publication of this thesis.

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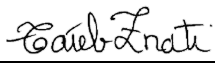
Signature 

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Abstract

The new generation is rapidly adapting to the digital era, where government and private services are being transformed into electronic services, commonly known as E-services. Cities are leveraging digitalization to streamline their business processes and business services. This digitalization has improved service delivery time and quality for individuals. With digitalization, business processes align with technology, enhancing performance and customer satisfaction. However, there are challenges associated with digitalization, particularly people working in various municipality departments who find it challenging to adapt to digitization. Employees may take time to adjust to the new techniques and technologies, which may hamper the actions of the municipality departments. Therefore, the main objective of this research proposal is to investigate the benefits of digital transformation in different departments of local municipalities. In this research, we will use qualitative and quantitative methods for data collection through surveys. The study will be conducted in the Transport Department of Abu Dhabi Municipality, targeting the employees and customers in the Abu Dhabi and Al Ain centers. The results indicate that around 86% of the respondents believe that service delivery has improved due to digital transformation, with 96% of the participants considering digital transformation essential. Customer satisfaction is closely linked to the development of online service, and a considerable percentage of respondents confirm that service delivery time and efficiency have significantly improved due to digital transformation. Finally, a reference framework for digital transformation will be presented, and discuss the result outcomes based on this reference framework.

Keywords: Digitalization, City transport services, Municipality departments, Smart cities.

Title and Abstract (in Arabic)

التحول الرقمي في الحكومات المحلية: دراسة حالة لدائرة النقل ببلدية أبوظبي

الملخص

يتكيف الجيل الجديد بسرعة مع العصر الرقمي حيث يتم تحويل الخدمات الحكومية والخاصة إلى خدمات إلكترونية والمعروفة باسم الخدمات الإلكترونية وتستفيد المدن من الرقمنة لمواءمة عملياتها التجارية وخدمات الأعمال. وقد أدت هذه الرقمنة إلى تحسين وقت تقديم الخدمات وجودتها للأفراد لذلك مع الرقمنة تتوافق العمليات التجارية مع التكنولوجيا مما يعزز الأداء ورضا العملاء. ومع ذلك هناك تحديات مرتبطة بالرقمنة لا سيما الأشخاص الذين يعملون في مختلف إدارات البلدية الذين يجدون صعوبة في التكيف مع الرقمنة و قد يستغرق الموظفون وقتاً للتكيف مع التقنيات الجديدة مما قد يعيق إجراءات إدارات البلدية لذلك يتمثل الهدف الرئيسي من هذا البحث هو فهم فوائد التحول الرقمي في للإدارات المختلفة للبلديات المحلية و سنستخدم الأساليب النوعية والكمية لجمع البيانات من خلال الدراسات التحليلية وسنقوم بتطبيق الدراسة في دائرة النقل ببلدية أبوظبي وسيستهدف دراسة التحليل موظفي مركز أبوظبي والعين وايضا سيتم إجراء مقابلات لجمع البيانات النوعية. بحيث أن نتائج الدراسة 86٪ من المشاركين الذين ذكروا أن تقديم الخدمات يتحسن بسبب التحول الرقمي، وذكر حوالي 96٪ من المشاركين أن التحول الرقمي ضروري ويرتبط رضا العملاء ارتباطا وثيقا بتطوير الخدمات عبر الإنترنت، وتؤكد نسبة كبيرة من المشاركين أن وقت تقديم الخدمة وكفاءتها قد تحسنت بشكل كبير بسبب التحول الرقمي وأخيرا، سيتم تقديم اطار التحول الرقمي ومناقشة المقترحات بناءً عليه.

مفاهيم البحث الرئيسية: الرقمنة، خدمات نقل المدينة، أقسام البلدية، المدن الذكية.

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May Allah bless you all.

Dedication

To my beloved parents and family

Table of Contents

Title i
Declaration of Original Work iii
Approval of the Master Thesis iv
Abstract vi
Title and Abstract (in Arabic) vii
Acknowledgments viii
Dedication ix
Table of Contents x
List of Tables xii
List of Figures xiii
List of Abbreviations xiv
Chapter 1: Introduction 1
1.1 Overview 1
1.2 Integrated Transport Centre (ITC) 3
1.2.1 The Vision of ITC 3
1.2.2 The Mission of ITC 4
1.2.3 Values of ITC 4
1.3 Problem Statement 5
1.4 Research Objectives and Questions 6
1.5 Literature Review 6
Chapter 2: Research Methodology 11
2.1 Research Philosophy 12
2.2 Research Design 12
2.3 Research Approach 13
2.4 Data Collection Method 14
2.5 Employees and Customer Data Collection 14
2.5.1 Employees Data 14
2.5.2 Customers Data 14
2.6 Data Analysis Method 14
Chapter 3: Results Analysis and Discussion 16

3.1 Employee Survey 16
3.1.1 Discussion of Employee Survey Analysis 22
3.2 Customer Survey 23
3.2.1 Discussion of Customer Survey Analysis 27
Chapter 4: Digital Transformation Framework and Recommendations 31
4.1 Digital Business Strategy 31
4.2 Digitization 32
4.3 Emerging Technologies 33
4.4 Innovation 35
4.5 Social Communication 36
4.6 Customer Engagement 37
4.7 Delivery Application 37
Chapter 5: Conclusion 39
5.1 Research Implications 39
5.2 Challenges 40
5.3 Limitations and Future Work 40
References 41
Appendices 45
Appendix A 45
Appendix B 50

List of Tables

Table 1: Levels and justifications of quantitative research design 13
Table 2: Selection and justification of research approach 13

List of Figures

Figure 3.1: Division of employees age and gender in Integrated Transport Center 16
Figure 3.2: Working experiences of employees in the Integrated Transport Center 17
Figure 3.3: Digital transformation benefits in the economic growth of the country..... 17
Figure 3.4: Role of digital transformation to develop relation with customers 18
Figure 3.5: Improvement in the productivity of the municipal and transport center of Abu Dhabi through digital transformation..... 18
Figure 3.6: The role of digital transformation in combatting the COVID-19 pandemic 19
Figure 3.7: Digital transformation provide a flexible work environment 19
Figure 3.8: Effectiveness of training attended by the employees on digital technologies..... 20
Figure 3.9: Customers feedback on service of digital transmation 20
Figure 3.10: The potential of digital transformation to provide a better environment for innovation..... 21
Figure 3.11: Ability of digital transformation to provide better cultural environment for collaboration among colleagues..... 21
Figure 3.12: Respondents age according to their referred services..... 23
Figure 3.13: Diversity of gender among costomers 23
Figure 3.14: Significant of service population concept..... 24
Figure 3.15: Improvement in service delivery of digital tranformation..... 24
Figure 3.16: Reduction in long service delivery time due to digital transformation..... 25
Figure 3.17: Statistics of how digital transformation is essential..... 25
Figure 3.18: Importance of change management for digital transformation..... 26
Figure 3.19: Positive impacts of digital transformation on service delivery..... 26
Figure 3.20: Importance of digital transformation for future generation 27
Figure 3.21: Effects of online service development on customer satisfaction 27
Figure 3.22: Communication, engagement and new skills learnt through digital transformation 28
Figure 3.23: Objective and Implementation of Digital Transformation in the UAE 29
Figure 4.1: Digital transformation framework 31

List of Abbreviations

ADM	Abu Dhabi Municipality
AI	Artificial Intelligence
DA	Data Analytics
DT	Digital Transformation
IaaS	Infrastructure as a Service
ICT	Information and Communication Technology
IoT	Internet of Things
ITC	Integrated Transport Centre
ITS	Integrated Transport System
PaaS	Platform as a Service
SaaS	Software as a Service

Chapter 1: Introduction

The digital transformation of the local government is essential. It uses advanced technology to enhance the council's caters and offers services to fulfill the needs of its people and other community stakeholders (Veleva & Tsvetanova, 2020). It facilitates the service delivery process, thus employees and residents can easily access the data they need rapidly and conveniently. Digital transformation reduces risks, boosts efficiencies, and develops innovation in the local government.

1.1 Overview

The current study highlights the digital transformation in the local government of the Abu Dhabi Municipal Transport Department. In recent years, people are more attracted to the use of technology. Digitization has helped people in various ways, it has made the life of people easier and simpler. Though it has numerous positive and negative impacts. The Abu Dhabi Municipal Transport Department has incorporated digital transportation efforts such as developing an online portal for the people to access the information facilities. These initiatives have enhanced the convenience and accessibility of their services for the people, as this leads to raise the customer satisfaction and boosts the utilization of public transportation. In addition, one of the negative effects of the digital transformation includes job displacement, as this leads to unemployment. The improper adoption of the digital system also led to data breach or other cybersecurity issues. However, new generations focus on the use of advanced technology. The use of advanced and modern technology has not only made the life of people easier and smarter, but it also has detrimental impact as well. Although, it has higher contributed toward the development of Abu Dhabi city and helped develop transforming Abu Dhabi into a technologically smarter city.

The adaptation of digital technology has enabled a vast transformation from conventional to non-conventional methods, such as business processes, meeting customers' expectations, business culture, and market requirements. The most well-known technologies used in various sectors are AI (Artificial Intelligence) technology, Cloud computing, and Robotics technology. In addition, there are various advanced technologies such as, renewable energy, blockchain, big data analytics, green technology, virtual networking, virtual transaction, and visual infrastructure.

Technology improves the efficiency and accuracy of work and streamlines the workflow of the business processes. Globalization pushed businesses to enhance their productivity and conduct their business activities worldwide. It gives them ample opportunity to expand their businesses worldwide in support of globalization. In this regard, the United Arab Emirates (UAE) has supported adopting digital technology in all public sectors along with the country's private sectors.

The digital transformation is an ongoing and current trend across the transportation sector and also in the public sector. The Abu Dhabi Municipal Transport Department refers to a well-known entity in the transportation sector of the UAE and it is actively working toward becoming more digitized. Thus, Abu Dhabi Dubai Municipal Transport department has been chosen to evaluates and explore the effect of the digital transformation on the outcomes and performance of the organizations. The Master thesis on the digital transformation in Abu Dhabi Municipal Transport department offered valuable knowledge and skills, as this makes it more competitive in the job market. The master thesis can be a valuable and relevant topic for the research, as it has the potential to contribute to the development of the knowledge as it has a positive influence on the company and broader transportation sector across the UAE.

Abu Dhabi's local authority is divided into two groups such as municipalities and transportation. The municipal government of Abu Dhabi looks after not only the development of smart cities but also the safety and security of residents. This sector also maintains technological development and sustainability. One of the central visions of the Abu Dhabi municipal department is to fulfill the task or vision of the President of the United Arab Emirates and the Ruler of Abu Dhabi, H.H. Sheikh Mohammed bin Zayed Al Nahyan.

In the pre-digitization era, UAE citizens and residents had to travel long distances to the particular municipal department office to get government services. In this possession, UAE citizens and residents had to drive to the municipal department office, which contributed to environmental pollution, where the country is already suffering from the effects of environmental pollution and global warming.

Global trends have made population accept the importance and effectiveness of advanced technology. Digital transformation has transformed things easier, which has a positive impact on the population daily life. However, it has some negative effects on the day-to-day life of people such as job displacement, unemployment, cybersecurity issue or improper use can lead to data breach. The acceptance of digital transformation has increased the effectiveness of transforming a city into a technologically developed and smarter city.

1.2 Integrated Transport Centre (ITC)

The Integrated Transport Centre (ITC) is a government agency in Abu Dhabi and Al Ain responsible for developing and managing a world-class transportation system (Kwon et al., 2021). The ITC has a clear vision, mission, and values guiding its work toward creating safe, sustainable, and accessible transportation systems.

1.2.1 The Vision of ITC

The vision of ITC in Abu Dhabi and Al Ain is to create a world-class transportation system that is safe, sustainable, and accessible for everyone. The ITC aims to develop a comprehensive and integrated transportation network that enables people to move easily and efficiently throughout the region.

The ITC is committed to leveraging cutting-edge technology and innovation to achieve its goal. The ITC is also focused on promoting environmental sustainability by reducing the carbon footprint of transportation and making it more energy-efficient.

It seeks to incorporate the latest advancements in transportation technology, including smart mobility solutions. These solutions will help to improve the transportation experience for residents and visitors (Kwon et al., 2021).

1.2.2 The Mission of ITC

The mission of ITC in Abu Dhabi and Al Ain is to provide a comprehensive, safe, and efficient transportation network that meets the needs of residents, businesses, and visitors. To achieve this aim, ITC works to improve the quality of transportation services by providing the most advanced technology and systems to deliver a seamless experience for all stakeholders.

One of the key areas of focus for ITC is developing an integrated transportation system that meets the needs of all residents, regardless of their location or economic background. To accomplish this goal, ITC invests in research and development and partnerships with other organizations to ensure that transportation planning and implementation are integrated with other urban planning and development initiatives (Kwon et al., 2021). In doing so, the ITC aims to make transportation a core part of a sustainable and inclusive urban environment.

1.2.3 Values of ITC

The values of ITC in Abu Dhabi and Al Ain are anchored in its commitment to excellence, innovation, safety, and sustainability (Alameri & Kanaan, 2022). ITC values the importance of excellence and aims to provide world-class transportation systems that meet the highest quality and safety standards. It also values innovation, recognizing that the development and integration of new technologies are essential for improving transportation systems.

Moreover, the safety of the public is of utmost importance to ITC. The agency prioritizes safety in all aspects of transportation, from designing infrastructure to enforcing traffic laws (Alameri & Kanaan, 2022). The ITC has implemented several

initiatives to improve safety, such as developing a comprehensive road safety plan and improving pedestrian and cycling infrastructure.

Finally, ITC values sustainability, recognizing that transportation plays a critical role in the environment's overall health. The agency seeks to reduce the carbon footprint of transportation and promote the use of alternative modes of transportation, such as cycling and walking, to improve air quality and reduce traffic congestion.

The Integrated Transport Centre (ITC) in Abu Dhabi and Al Ain has a clear vision, mission, and values guiding its work toward creating safe, sustainable, and accessible transportation systems (Lupi et al., 2022). ITC aims to develop an integrated transportation system that meets the needs of all residents, regardless of their location or economic background. It invests in research and development, as well as in partnerships with other organizations, to ensure that transportation planning and implementation are integrated with other urban planning and development initiatives.

The ITC values excellence, innovation, safety, and sustainability, recognizing that these values are critical to improving transportation systems (Lupi et al. 2022). As such, ITC has implemented several initiatives to improve safety, reduce the carbon footprint of transportation, and promote the use of alternative modes of transportation, such as cycling and walking, to enhance air quality and reduce traffic congestion.

1.3 Problem Statement

As technology advances, local governments progressively adopt digital transformation creativities to improve services and operational efficiency and better serve their citizens. However, the execution of these initiatives is not always forthright and can present considerable challenges, particularly for departments accountable for critical public services such as transportation. Digital transformation can positively affect the lifestyle of people. Although digitization has several benefits, it has several negative impacts too such as job displacement, unemployment, cybersecurity issue or improper use can lead to data breach Furthermore, different aspects such as economic, regulatory, and technical factors in the UAE encourage digital shifts. Despite of these, different factors has also creates an concern related to the efficiency of the digital transformation

in the local government mainly in the transportation such as cybersecurity issue and automation lead to the job displacement.

The Abu Dhabi Municipality Transport Department has recently endured a digital transformation to modernize its services and operations. The department's transition from traditional manual processes to digital systems has raised several questions concerning the efficiency of digital transformation in local governments, particularly within transportation. This case study scrutinizes the impact of digital transformation on the department's service delivery, operational efficiency, and customer experience. It explores the encounters faced by the department during the enactment process and how they were overcome.

1.4 Research Objectives and Questions

The main objectives of the research work are stated as follows:

- To analyze digital transformation and its impact on developing smart cities.
- To identify the positive and negative impacts of digital transformation.
- To conduct a survey about the digital transformation of the Abu Dhabi Municipality transport department.
- To Identify digital transformation framework that incorporates latest technologies.
- To recommend strategies, tips and guidelines for seamless adoption, development and integration of digital transformation.

In this research work, we will answer the following questions:

- What would be the positive and negative impacts of adopting digital transformation in the local municipality and transportation of Abu Dhabi?
- What is the recommendation that could be proposed to leverage digital transformation in ITC?

1.5 Literature Review

Digital transportation is an advanced implementation to offer innovative services related to the different models of traffic management and mode of transportation. It refers to different transportation scenarios, which include traditional road-based transport systems. It refers to the application of communication and information technologies to

the vehicle, road infrastructure, and users to enhance their safety and facilitate the transition toad the incoming future populated via automated and connected vehicles (Mashkina et al. 2021). In-flight transportation refers to a connectivity solution that allows advanced information systems. Congestion, climate change, changing customer preferences, security, and COVID-19, as well as employee retention, are some issues facing the transportation industry (Mashkina et al. 2021). The transportation sector works toward mitigating these issues with the help of digital transportation, which will allow the next generation of mobility to be sustainably accomplished.

Digital transportation assists in creating a more sustainable, efficient, reliable, and safe transport system. The concept of digital transportation enhances operational efficiency, creating business opportunities and changing passenger experiences for the benefit of the passengers, operators, team, and maintenance. Digital transportation services increase cost efficiency and revenue. In addition, it also enhances the reliability and efficiency of security in the transport network and boosts sustainability (Mashkina et al., 2021).

According to Anthony (2021) the recent developments in digital technologies are transforming cities to move to smart services and deal with novel products. Digitization has altered how stakeholders and citizens communicate, live, collaborate and work. This disruptive transformation interconnects with all processes and information systems that are crucial for offering services. However, digital transformation provides prospects for achieving smart cities. It is evident that municipalities still face issues while managing the complexity and data integration.

Number of municipalities is raising their development of smart city efforts. This movement has resulted in policy innovation and global investment in data utilization and technology implementations to identify urban growth and social issues. The smart city allows processing, generating, and collecting data to facilitate decision analysis and intelligent prediction for urban development and planning. Smart city development is based on digital transformation, which offers smart services to enhance the life of the people (Anthony et al., 2020).

Digital transformation has brought together technology, business, social and developed a social structure termed as a smart city. These digitally allowed cities are assisted by ICT as digital technology continuously promises higher prospects for development. Digital transformation is one of the current developments driven by advanced technology, which has disrupted different sectors. Digital transformation includes applying advanced technology to enhance city functioning, scale operations, organizational structure, and services (Al Marzouqi et al. 2021).

Digital transformation trends are increasing, and people are becoming more familiar with the use of technology. Digital transformation ensures work completion and enhanced work quality. Today, along with people, cities are also becoming smarter. People use different types of smart technology regularly on a larger scale. Simultaneously using various payment methods is also one of the impacts of the digital transformation toward developing smart cities. Along with the people, the local government is also presently focusing on digital transformation to enhance their transportation system (Anthony, Petersen & Helfert, 2020).

There are different negative and positive impacts of digital transformation. The positive impact of digital information is that it enhances employee productivity in the local government. In addition, integrating digital transformation helps local government employees offer compelling customer experiences. This has helped to save the time of the local government employee and helps in becoming more efficient. The automatic workflow saves the employee time and helps them focus more on the priority tasks. Earlier, the local government used multiple digital tools, leading to duplicated data, human error, and missed information, mainly when employees transferred from one department to another. With the higher usage of cloud-based software, records are securely stored and backed up at different times of the day. This reduced the security and maintenance costs and the risk of fines because of cyber-attacks and data breaches.

Although digital transformation has benefits, it has also some negative impacts, which need to be identified. Some of these negative issues, digital transformation is a never-ending procedure, and the rapid alteration in the technologies would create

difficulties for the local government to adapt to the continuous transformation, therefore an efficient adoption of the novel technology may take time.

Adopting emerging technologies (e.g., AI, Blokchain) can seem problematic for some local government employees who might not be able to adapt to the adoption of the new changes. The government needs to reach out more in order to identify effective tools for the employees of the government. In order to make the employee familiar with the novel changes, the local government needs to offer training and conduct sessions and workshops so that they become familiar with and accustomed to the new process (Leão & da Silva, 2021).The government should adopt effective tool for the government employees, and in order to makes them familiar with the new transformation, local government should conduct training session along with workshops. This will increase their efficiency and helps them adapting to the novel digital transformation.

According to Sairete et al. (2021) the UAE has excellent transport infrastructure. The UAE infrastructure is recognized internationally and it is developed and maintained regularly. The Ministry of Road Transport and Highways of the UAE always focuses on transforming and enhancing its transport department. The Abu Dhabi municipality has taken different practical steps for developing the transportation system of Abu Dhabi. The digital transformation in the transportation system become more convenient for the people of the UAE. According to Al Marzouqi, Bueti & Menon (2021), the UAE assists local start-ups and private companies in this innovative and digital transformation. Technical development in UAE gained greater attention in the last few years. The truck drivers are now equipped with an application for real-time tracking which allow easy navigation throughout the UAE.

The aspect of digital transformation has helped the government in tracking the road operations. Using digital equipment’s the government today is able to track the safety rules and its implementation as well. Effective traffic technology changed the nation's transportation. It is also evident that the logistical aspects of local government have also changed in the last few years.

According to Sajwani (2021) Abu Dhabi municipality has built a process to handle transport operations by implementing information technology. It helps identify

violations automatically and transparently, enhancing management efficiency in traffic and transport safety. On the other hand, Daya (2022) stated that digital transformation strategy has been adopted by the transport department to provide a road map for combining the 4th industrial revolution technologies into the transportation sector. The approach aims to strengthen the leadership of the ITC in the advanced technologies and serve the transportation sector by offering customers effective services.

In this research work, we study the digital transformation of the ITC of Abu-Dhabi government. ITC adopted digital transformation in 2007 by developing a digital business strategy and identifying the business processes for transformation. The current literature discusses digital transformation for different cities with different cultures. In our case, we discuss DT based on the Abu-Dhabi culture and environment.

Chapter 2: Research Methodology

For the progress of this research work, I have decided to conduct two surveys: one for the employees of the Integrated Transport Center and other one for the customers of the Integrated Transport Center. I have first described the Integrated Transport Centre and then proceed with the research development. The aim of this research study is to examine the digital transformation in the Abu Dhabi Municipal Transport Department and analyze their impact on the performance and operation of the department. The research methodology helps in analyzing the topic effectively and to gain accurate and relevant information to meet the research objective. In this research primary quantitative method has been used to gather the information. The primary quantitative method allows for gathering numerical information that can be studied using statistical techniques and tools. The research has conducted a survey with the employee and customer to collect information related to their perception and experience of the digital transformation efforts. The quantitative research methodology offers a comprehensive and strong analysis of the information allowing for evidenced based suggestion to enhance the digital transformation initiatives of the Abu Dhabi Municipality (ADM).

The main goal of this research is to conduct a study at the Integrated Transport Center (ITC) of Abu Dhabi's local government about the adoption and benefits of Digital Transformation (DT). To achieve this goal, we designed two surveys, one for the employees and the other for the customers. We used a quantitative method to gather information from both surveys.

Before writing the surveys, I interviewed the director of integrated transport system to get permission to distribute the surveys and what kind of questions can be included in the surveys. After writing the surveys, we used face and content validations to check the surveys. The thesis supervisor checked and validated the surveys against the content and language of the surveys. We ought to make the surveys simple and short to attract more responses and get accurate results. The surveys were also compared with other surveys from the literature. Moreover, both surveys were approved by the Social Sciences Research Ethics Committee. The results of the two surveys will be analyzed

and discussed based on the primary goal of the research. Finally, the research outcome will be mapped to a DT framework and provide general recommendations.

2.1 Research Philosophy

Research philosophy deals with the nature of the study, the source, and the knowledge (Madden, 2022). There are four research philosophy types: positivism, interpretivism, realism, and post-positivism. As mentioned above, to carry out this research study, I have decided to conduct surveys among employees and customers of the Integrated Transport Center. Therefore, the positivism philosophy was appropriately used here. Positivism philosophy provides genuine knowledge and data for factual data and truth. Besides, positivism enables researchers to observe and collect data beyond boundaries.

2.2 Research Design

Research design involve the framework of a research method, for instance, the techniques and procedures chosen by the researchers for completing a research job (Bloomfield & Fisher, 2019). There are three types of research designs, namely, explanatory, descriptive, and exploratory (Casula et al., 2021). In a research project, research design plays a significant role. It helps the researchers to find out answers to the research question in a more effective manner. For this research project, the Likert scale method is used for this study. Since two types of surveys were conducted, different opinions, behavior, and attitudes of every participant were collected. In the Likert scale, participants are given five options from which they select one answer based on their perspectives.

We also apply descriptive research design to observe participants or respondents of the research in a real environment. Apart from this, the descriptive research design is considered the precursor of future research, which helps identify variables. In addition to this, researchers can collect information in depth; therefore, it can be considered a multi-faceted process both for data analysis and collection.

2.3 Research Approach

The research approach consists of processes for collecting, analyzing, and interpreting data. A quantitative approach is selected for this research project, as described in Table 1. However, in a broader sense, there are two types of research approaches: deductive and inductive (Wardani & Kusuma, 2020). I have used the inductive approach to perform this research study.

Table 1: Levels and justifications of quantitative research design

Design	**Levels of Research Questions**
Descriptive	**Level 1**: • Descriptive-type questions in nature • Descriptive types of questions include what, how long, and others? • Little knowledge about the phenomenon Example: To what extent change management is essential for digital transformation?

Table 2: Selection and justification of research approach

Selection of Research Approach	**Justification for choosing Inductive Research Approach**
Inductive Approach	• The inductive approach of this research has helped in considering the predetermined data in this research. • It has enabled observing the participants and respondents of the research in a very effective manner. • The inductive research approach has helped me in gathering effective data from observations. It has helped in the formation of a proper conclusion that is achieved with the support of this research approach.

2.4 Data Collection Method

Data collection is considered as another vital part of a research study. It includes the processes adopted for collecting data or information (Feng et al., 2021). There are primarily three types of research methods: primary, secondary and hybrid. The primary method of research and quantitative research approach was used for this research work. In the primary quantitative research process, data collected by conducting surveys among the population. Since the entire work is entirely with the Integrated Transport Center due to this reason, two surveys are performed, one distributed to employees of the company and another survey is distributed to customers of the company. Therefore, two different questionnaires were prepared for the surveys.

2.5 Employees and Customer Data Collection

2.5.1 Employees Data

The total number of population or employees of the Integrated transport center is 175 in Al Ain center. The survey was conducted among 108 employees of the integrated transport center so that all required information related to the purpose of the survey could be obtained. The survey was collected by human resources, administration, and finance departments. The survey was shared among employees by links created via google form and attached images sample of both employee and customer surveys at the end of the thesis.

2.5.2 Customers Data

The total number of respawned or customers of the Integrated transport center that covered the survey was 100. To carry out the survey 100 customers were given various questions to get the relevant answers for my research work. The survey was delivered by iPad tablets after they finish their service and how they are satisfied with digitalization services in the customer care section of the Integrated transport center.

2.6 Data Analysis Method

Data analysis refers as process of studying information to extract effective insight as well as draw an effective conclusion. It includes utilizing different methods and

techniques to determine relationships, patterns and trends in the information. This research used primary quantitative method in this research and gathered information by conducting surveys. As this is a quantitative research, this work used statistical data analysis technique. This technique has helped in interpreting and summarizing information. The research focuses on examining the digital transformation in the local government of the Abu Dhabi Municipal Transport Department and this technique can also offers valuable insight related to the efficiency of the digital transformation and influence on the performance of the department.

Chapter 3: Results Analysis and Discussion

The survey was sent by email to the Integrated Transport Centre (ITC) employees and customers. The responses of survey questions were received from 108 employees and 100 customers. Respondents took part in the survey according to their own will and interest. In this section, we discuss the result of the two survey categories.

3.1 Employee Survey

Figure 3.1 shows the distribution of the employees' age and gender. The majority of the employees were aged 36-43. The distribution of the age is fair enough to give us diverse responses and opinions. The distribution of the gender among the respondents shows that female accounts for 60% and 40% for males.

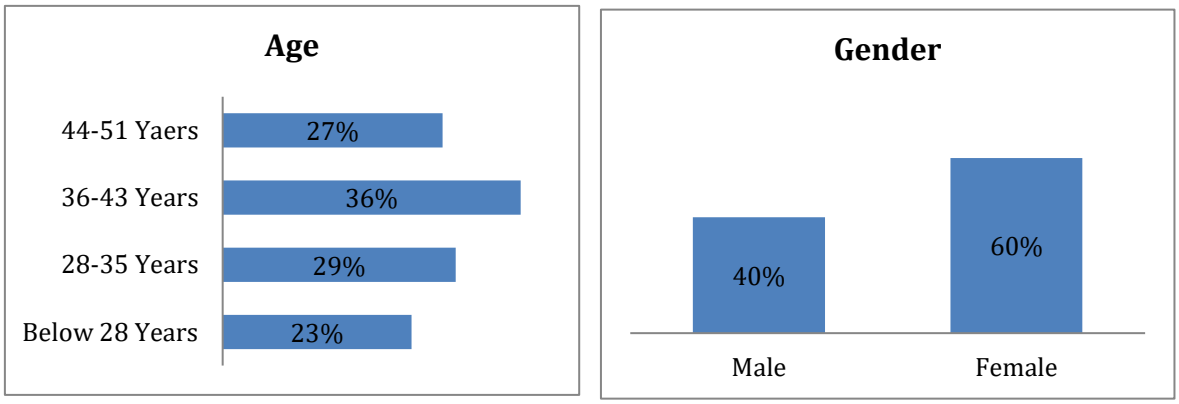

Figure 3.1: Division of employees age and gender in Integrated Transport Center

Figure 3.2 shows the working experiences of employees in the Integrated Transport Center. The number of working years each employee spent in ITC was important for diversifying the answers. The time an employee spends in ITC reflects his opinion and how the center moves to digital transformation. Around 40% of the employees spent 2-5 years in the company. While around 30% of the employees has been employed by the company for 6 to 10 years. These two categories of experiences are important in our survey as they witness the transformation of the company from paper-based to paperless-based company. Around 17% of the employees spent less than one year and the last experience category was for employees who spent more than 10 years in the company.

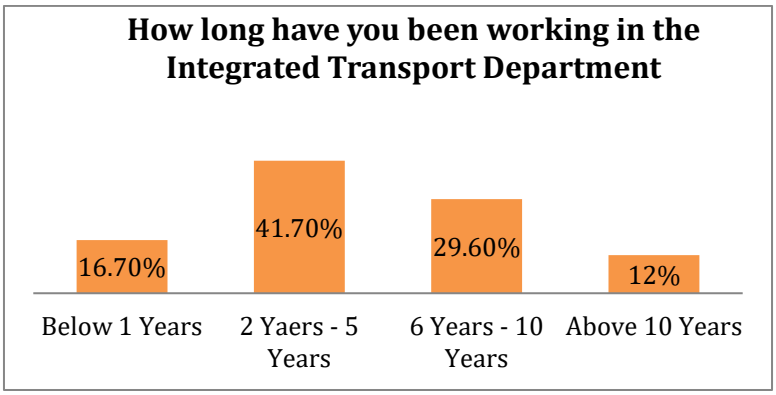

Figure 3.2: Working experiences of employees in the Integrated Transport Center

Figure 3.3 shows the importance of digital transformation in the economic growth of the country. The majority of the respondents accounting for around 80% who agree to the proposition that digital transformation has improved the overall economic growth of the UAE. However, few participants have been found to disagree with the proposition. Digital transformation has significantly improved the ability of the country to boost its economy. This is the reason behind the huge support for digital transformation. However, the reason behind disagreement may be different types of issues and challenges related to digital transformation.

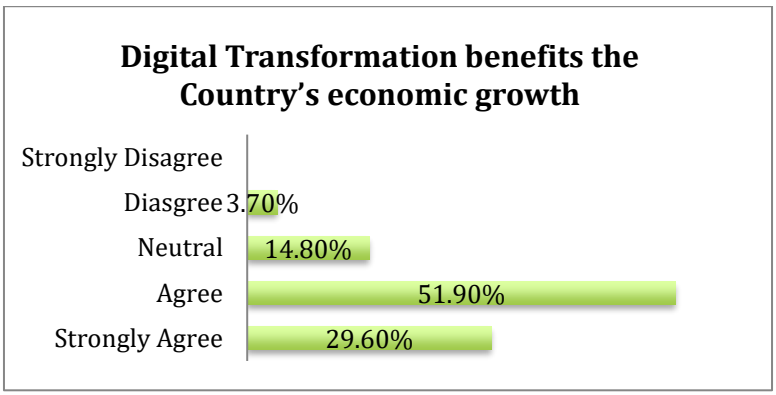

Figure 3.3: Digital transformation benefits in the economic growth of the country

The influence of digital transformation in the development of relationship with customers is shown in figure 3.4. It was analyzed that around 42% of the respondents strongly agreed to the fact that the communication between the company and the customers has improved through the improvisation of digital transformation. This has also been supported by around 41% of the respondents that agreed to the statement indicating the improved productivity of the digital transformation within Abu Dhabi.

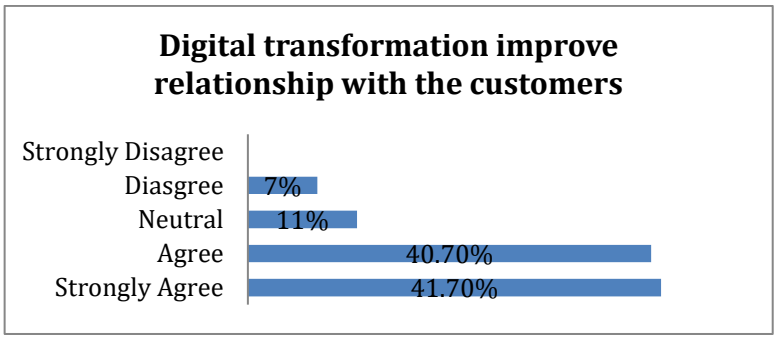

Figure 3.4: Role of digital transformation to develop relation with customers

Figure 3.5 shows the ability of digital transformation to improve the productivity of the municipal and transport department of Abu Dhabi. It was analyzed that the majority of the respondents (90%) have strongly agreed to the fact that digital transformation may significantly provide the ability to the government of Abu Dhabi, municipal and transport departments to improve their overall productivity. Only 10 percent of respondents neither agree nor disagree with this statement.

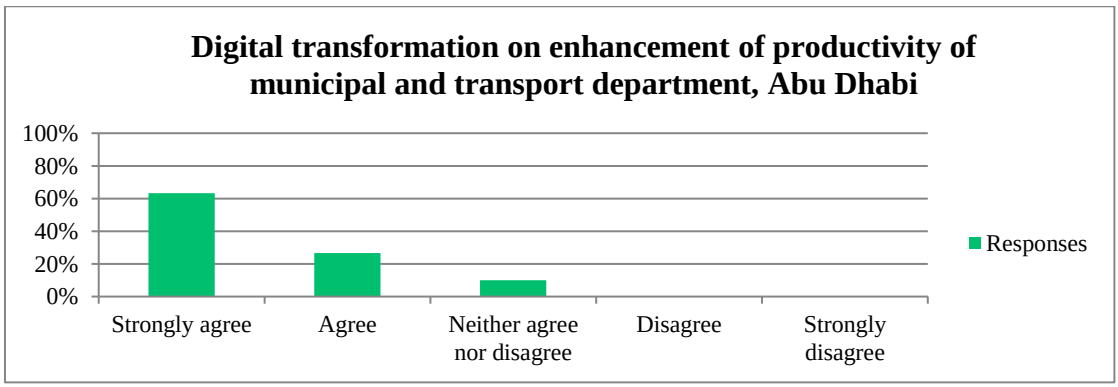

Figure 3.5: Improvement in the productivity of the municipal and transport department of Abu Dhabi through digital transformation

The significance of digital transformation in combatting the COVID-19 pandemic is shown in figure 3.6. Digital transformation has provided the ability to ensure that remote communication was established through implementing advanced technological manifestations. Consequently, during the COVID-19 pandemic, communication was established using the medium of Cloud technologies and advanced communication techniques using digital transformation tools due to the lack of personal contact. Seventy percent of the total survey respondents agreed that the digital transformation helped during the pandemic, and the rest did not agree with that.

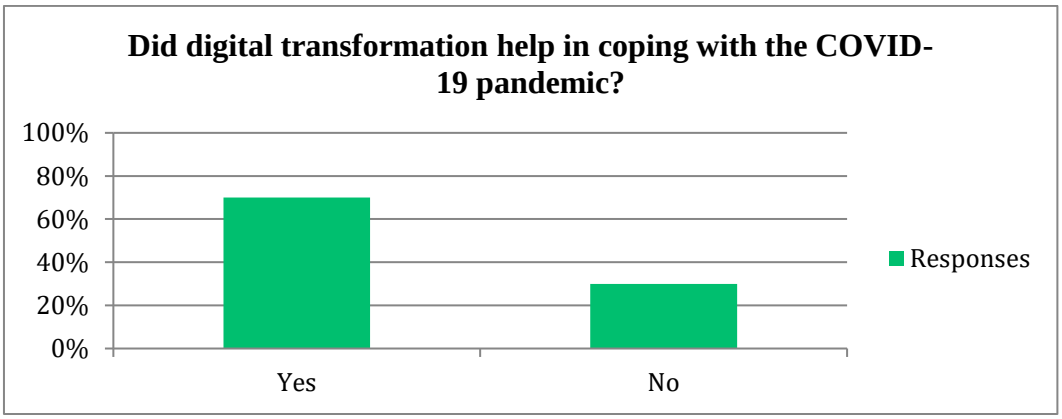

Figure 3.6: The role of digital transformation in combatting the COVID-19 pandemic

Figure 3.7 shows how much advantageous digital transformation is for providing a flexible work environment. It has improved the ability of the government to ensure that communication established is completed within a short time and has been agreed by about 30% of the respondents strongly agreed by 60% of the respondents. In this context, high percentage of employees asserted that digital technologies helped them to develop their knowledge regarding the work. Digital transformation has significantly reduced the time to travel longer distances to establish physical contact with customers.

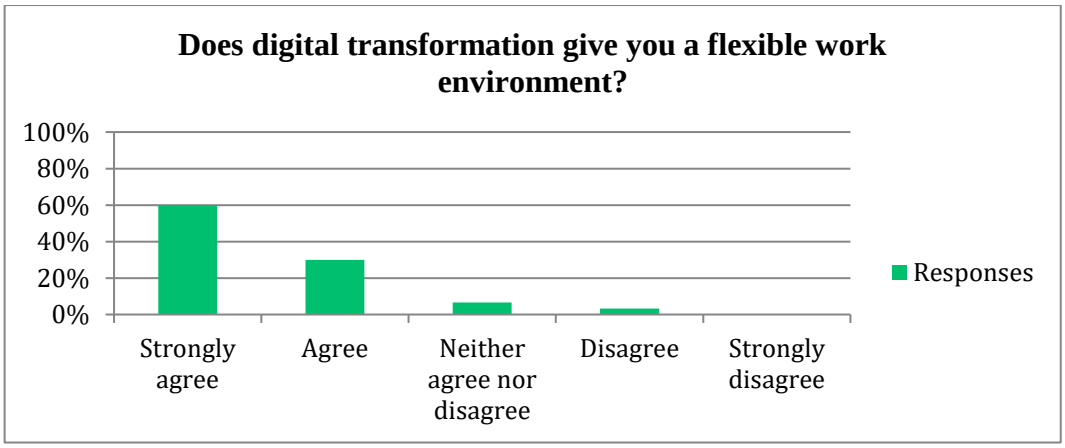

Figure 3.7: Digital transformation provide a flexible work environment

Figure 3.8 shows the statistics of training received by the employees on digital technologies. About 36.6% of respondents have agreed to the proposition that the provision of training services was sufficient regarding the use of digital transformation tools. This has been strongly agreed upon by 46.6% of the respondents. About 6.6% remained neutral, and a very small proportion of about 3.3 percent of the respondents disagreed with this proposition. This indicates the superior ability of the management

authorities that they provide sufficient training to equip them with the latest skills in communication and handling digital transformation tools.

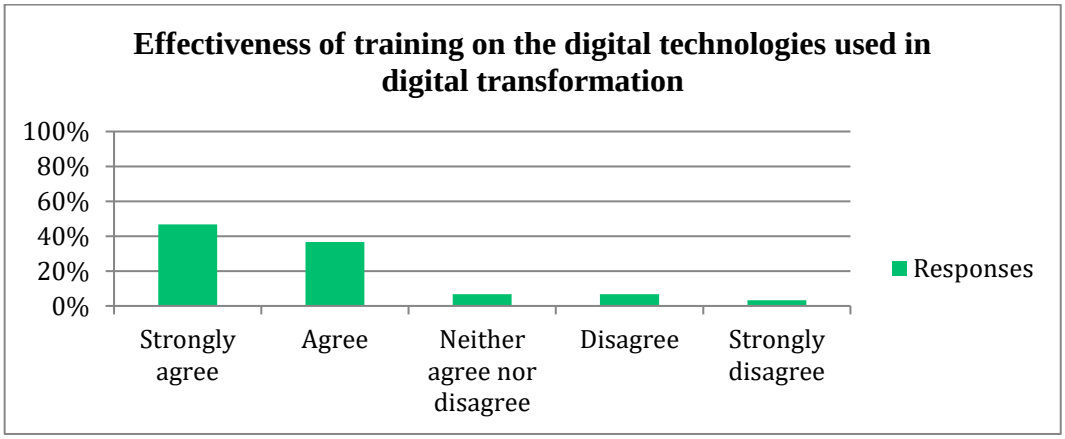

Figure 3.8: Effectiveness of training attended by the employees on digital technologies

Figure 3.9 shows the feedback about service of digital transformation from the employees. More than 50% of the respondents have been found to be satisfied with the digital transformation services after its implementation by the government of Abu Dhabi. About 29% of the respondents or the customers were highly satisfied. This significantly established the fact that customers have been found to be benefited from using digital transformation tools within the context of Abu Dhabi.

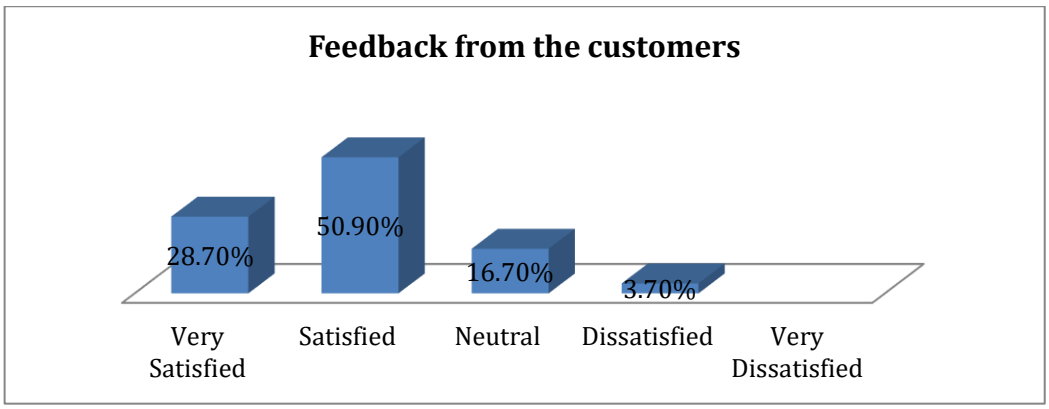

Figure 3.9: Customers feedback on service of digital transformation

Figure 3.10 shows the potential of digital transformation to provide a better environment for innovation. Around 93.3% of the respondents supported the fact that digital transformation has provided a better environment for innovation. Moreover, these digital tools and their evidence and less time consumption have provided the ability for employees to manifest innovation in a more proper way. Therefore, based on the survey

response, it can be said that most of the customers and employees have a better experience regarding digital transformation.

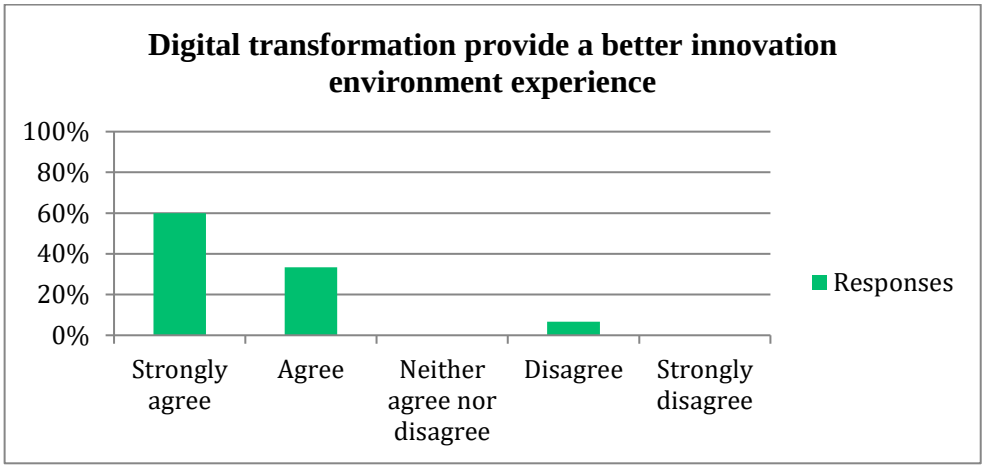

Figure 3.10: The potential of digital transformation to provide a better environment for innovation

The ability of digital transformation to provide a better cultural environment for collaboration among colleagues is shown in figure 3.11. As a result of digital transformation, non-verbal communication is established between colleagues in the workplace. This significantly increases the overall levels of collaboration for better cultural diversity within the workplace environment. This has been supported and agreed by about 90% of the respondents who have agreed to the proposition. The rest neither agreed nor disagreed. The majority of the employees stated that collaboration in the workplace is very helpful in reducing conflicts. They also asserted that healthy communication with colleagues is useful to prevent confusion and help to develop better knowledge.

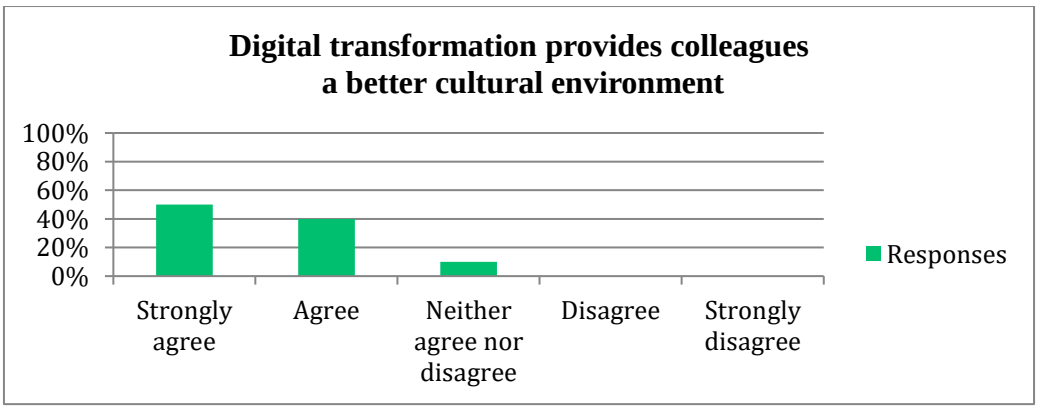

Figure 3.11: Ability of digital transformation to provide better cultural environment for collaboration among colleagues

3.1.1 Discussion of Employee Survey Analysis

Digital Transformation has been found to be more effective in improving the overall instances of the workplace environment. The digital tools have not only helped the customers or the citizens to establish communication with the authorities but also, at the same time, they have assisted the Integrated Transport Authority to ensure that workplace communication was significantly improved. This has provided them with the ability to improve their departmental communication to be enhanced, and as a result, the flow of information across the departments is significantly high (El Khatib et al., 2022).

This has allowed the departments within the organization to share the information in such a way that they are able to boost innovation within the workplace. Due to the ability of improved collaboration and communication, the flow of ideas is also sufficiently enhanced. This improves their overall ability to develop creativity and innovation within the workplace. As a result, establishment of creativity and innovation is fostered within the workplace. It is evident that about 33% of the innovative environment has been a result of the different forms of digitalization within the context of the UAE. The same has been evidenced in the context of the Integrated Transport Center of Abu Dhabi.

It is proved that the different people within the context of the UAE, as well as the employees within the Integrated Transport Center of Abu Dhabi, do not have the proper skill to implement and use the digital infrastructure that has been developed as a part of the digital transformation process. Therefore, proper levels of training programs are required to be implemented in this regard. It is evident that the government of Abu Dhabi has implemented sufficient infrastructure in order to train the employees to develop their skills and competencies in order to use the digital infrastructure (Campos Diez Canseco, 2018). Furthermore, the mobile-based application has also been very lucid so that people are able to use the application sufficiently for their desired purposes. Therefore, the use of the digital transformation tool has been found to be significantly successful within the context of the Integrated Transport Center of Abu Dhabi.

3.2 Customer Survey

From Figure 3.12, it is evident that the majority of customers of different age groups benefit from the different services offered by the authorities.

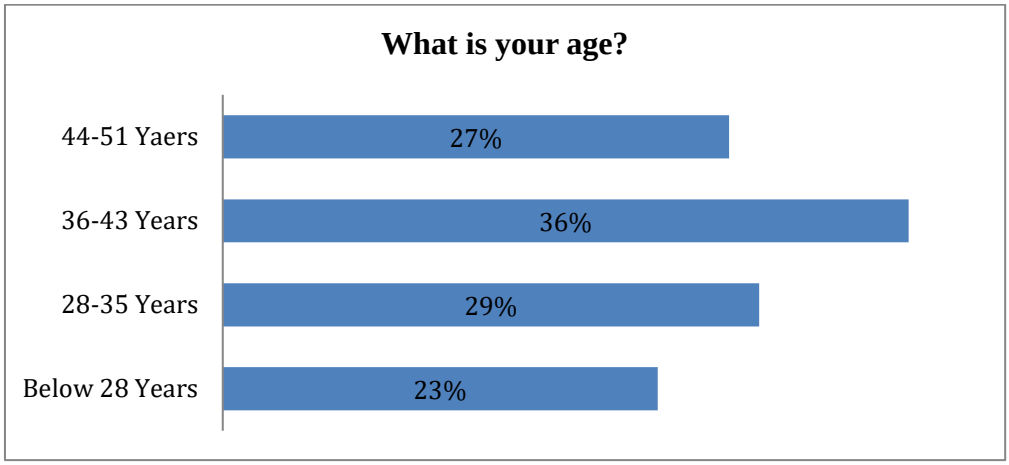

Figure 3.12: Respondents age according to their referred services

Diversity in the customers' gender has been found to be evident within the company, where males account to around 48% and the females account to around 52% of the total respondents. (Figure 3.13).

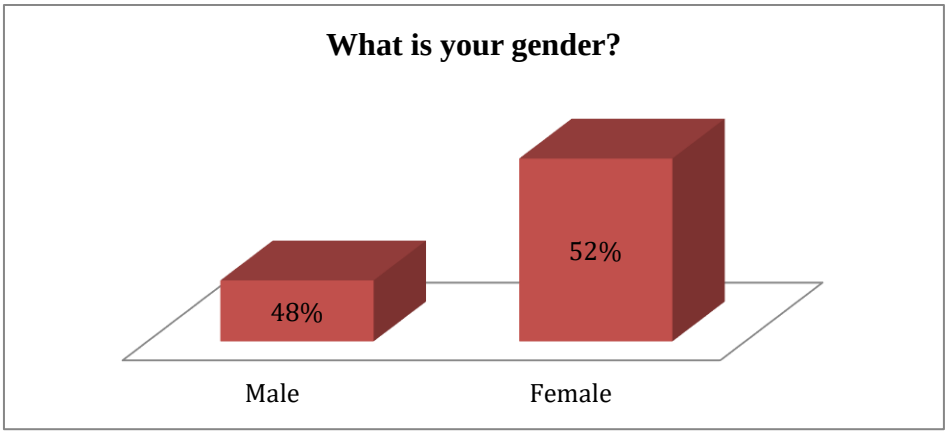

Figure 3.13: Diversity of gender among customers

Figure 3.14 shows the importance of the concept of service population (digital transformations) for the customers. Around 46% of the respondents agreed to the proposition that the concept of digital transformation is significant for them. This has been equally agreed by around 34% of the respondents. A very small proportion of the respondents have been found to strongly disagree and around 13% of the respondents remained neutral to the proposition.

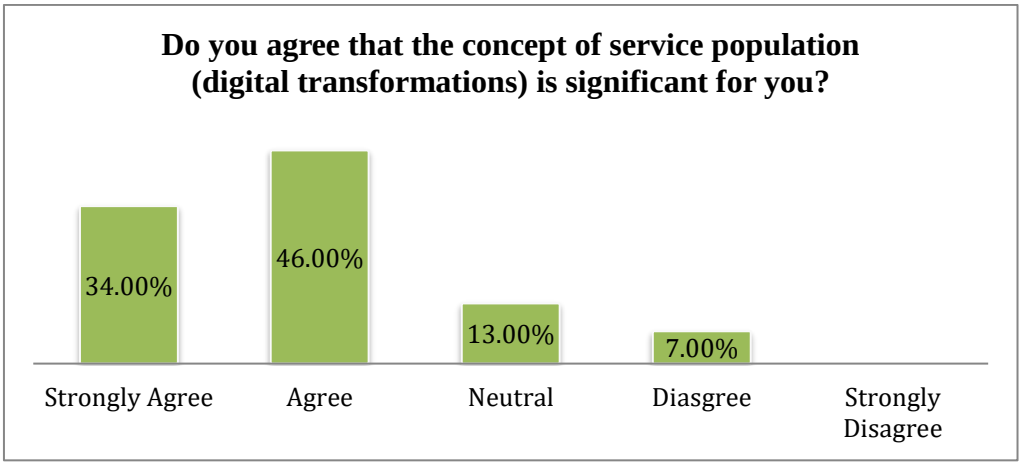

Figure 3.14: Significant of service population concept

Figure 3.15 shows the developments in service delivery. The most of the respondents, supported by about 53 percent strongly agreed and 40 percent agreed with the fact that concept of service populace is important for them and have stated that a significant improvement in the service delivery have been noted as a result of the implementation of the digital transformation.

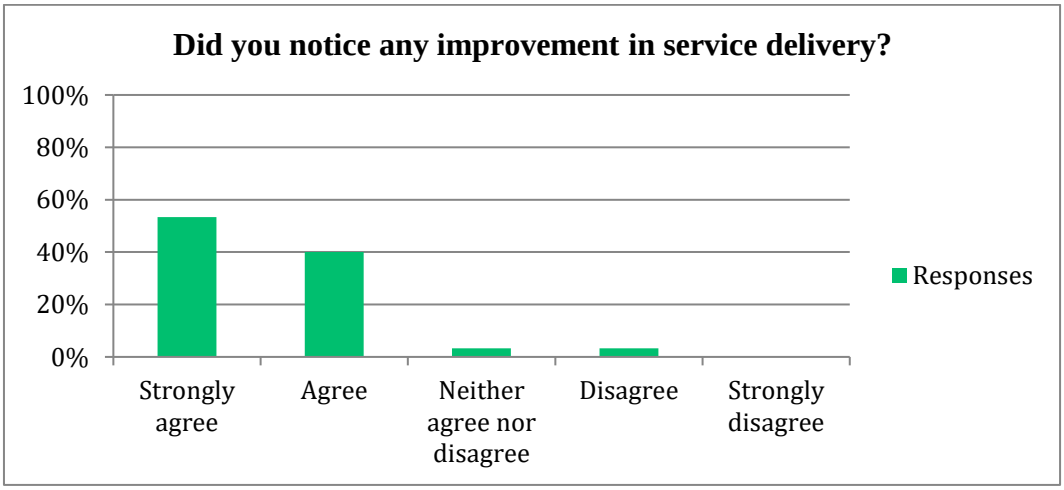

Figure 3.15: Improvement in service delivery of digital transformation

The possibility of reducing the long service delivery time has been shown in Figure 3.16. The fact that service delivery time has been significantly reduced as a result of the implementation of Digital Transformation has been agreed upon by around 93% of the participants in this proposition.

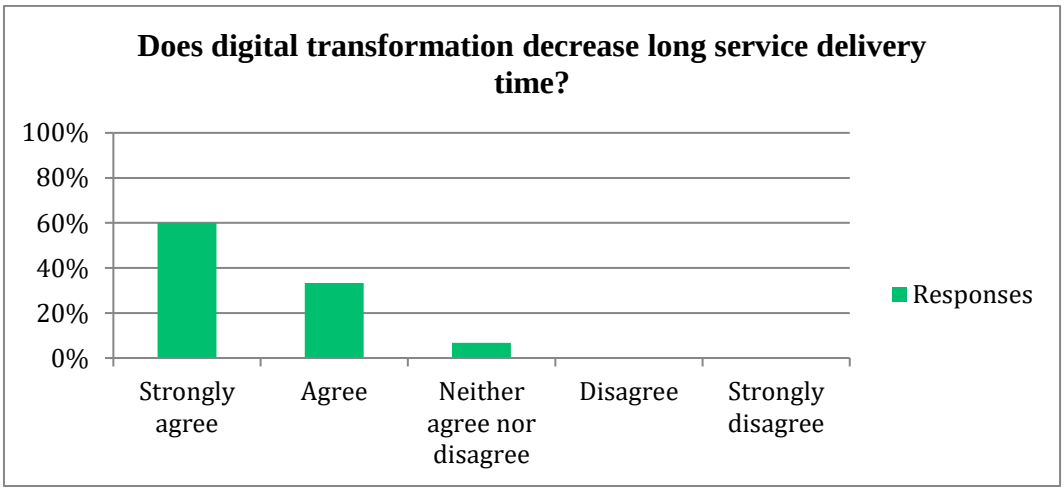

Figure 3.16: Reduction in long service delivery time due to digital transformation

Figure 3.17 shows the necessity of digital transformation. About 96% of the participants have stated the fact that digital transformation has been found to be essential for their daily activities in order to establish connectivity with the authorities.

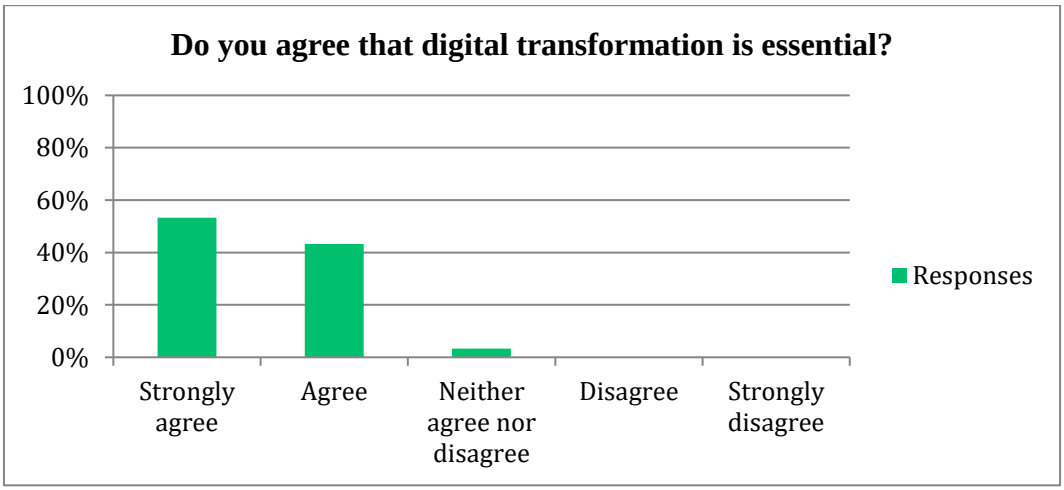

Figure 3.17: Statistics of how digital transformation is essential

The necessity of change management for digital transformation is shown in figure 3.18. About 33.33% of the respondents agreed to the fact that it is important to develop a change management strategy in order to implement the digital transformation. This has also been supported by around 86% of the respondents, who also shared similar views about digital transformation.

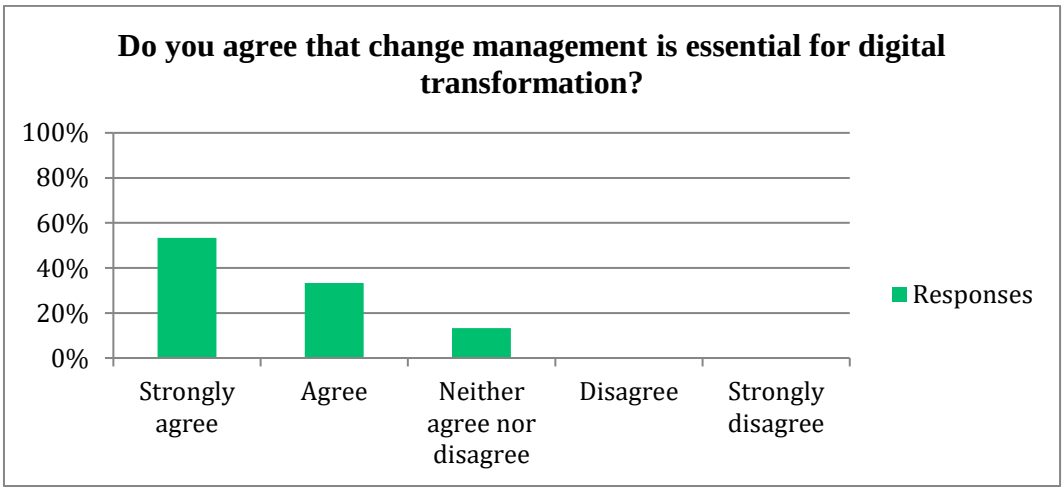

Figure 3.18: Importance of change management for digital transformation

Figure 3.19 shows the potential of digital transformation to positively impact on service delivery. About 86% of the respondents have stated the fact that service delivery gets improved as a result of implementing digital transformation. This has also been agreed by about 86% of the respondents in this case.

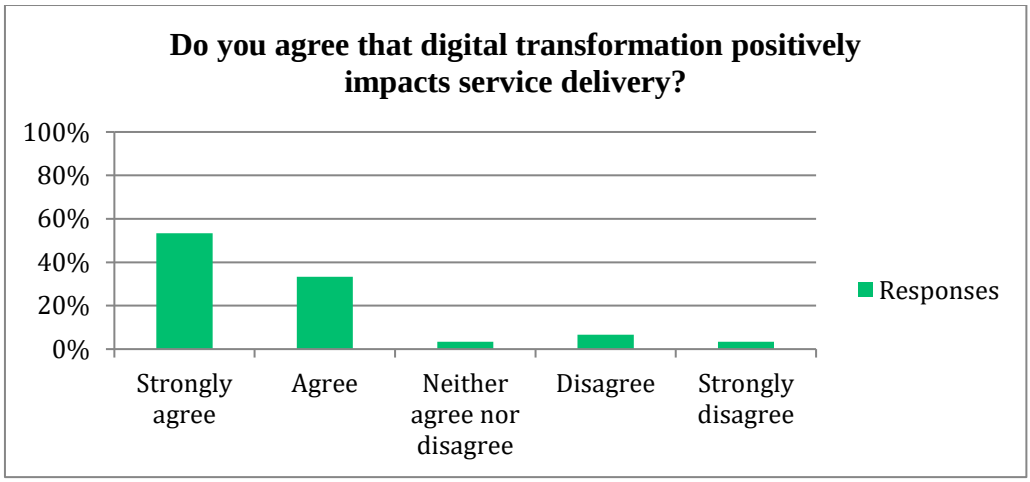

Figure 3.19: Positive impacts of digital transformation on service delivery

The importance of digital transformation for future generations is shown in Figure 3.20. Digital transformation may provide the ability to future generations to improve their skills and, at the same time, enjoy the benefits of digital services and improved connectivity. This has been supported by around 36.67% of the respondents who agreed with the proposition and by 56.6% of the respondents who strongly agreed with the proposition.

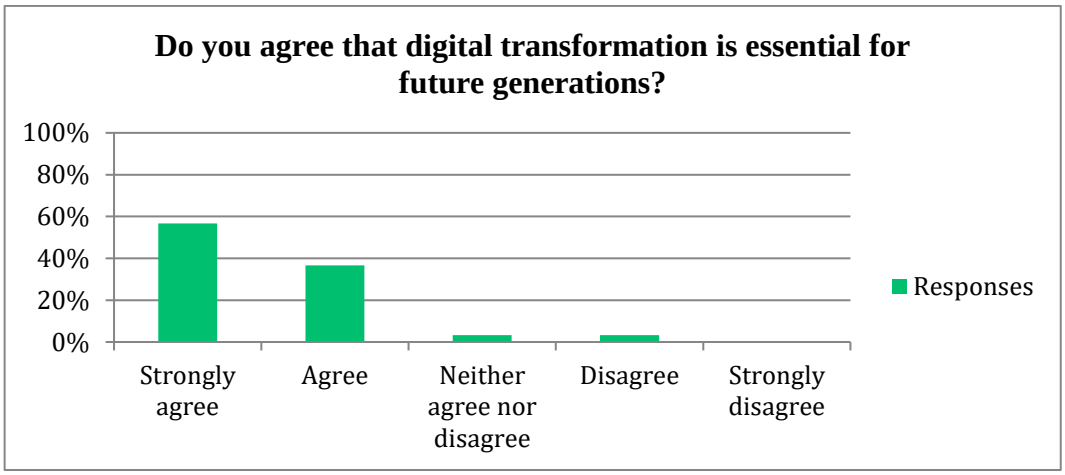

Figure 3.20: Importance of digital transformation for future generation

Figure 3.21 shows whether customer satisfaction is totally dependent on online service development. Using online services, it becomes easier for the authorities to solve the queries and issues associated with the customers. As a result of this, customer satisfaction is dependent on the development of online services. This has been supported by around 53.3% of the respondents, and around 40% of the respondents strongly agreed with the proposition.

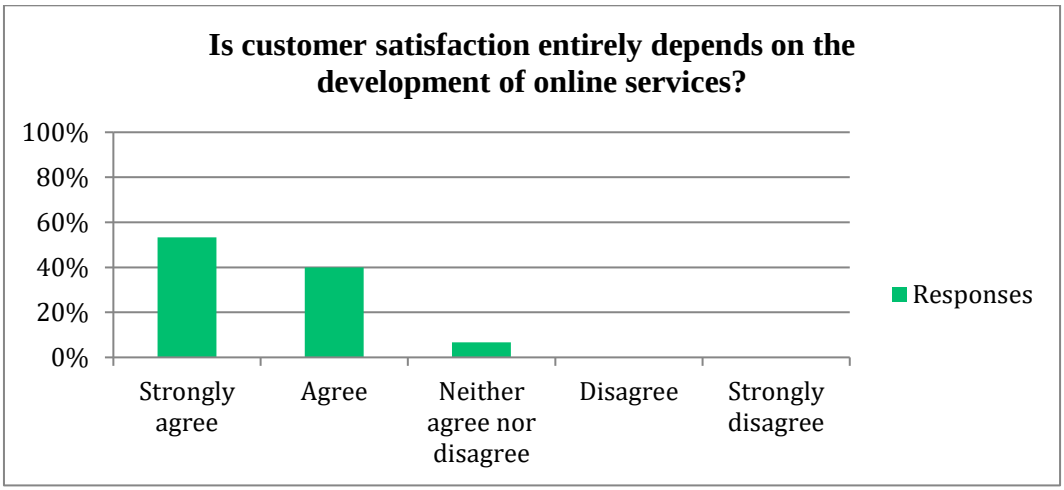

Figure 3.21: Effects of online service development on customer satisfaction

3.2.1 Discussion of Customer Survey Analysis

It is evident that the digital transformation initiative has provided a way for the department authorities to ensure that the advanced tools for communication are implemented within their infrastructure. These advanced technologies and tools have

provided the ability for authorities to manifest advanced techniques for communication enhancement.

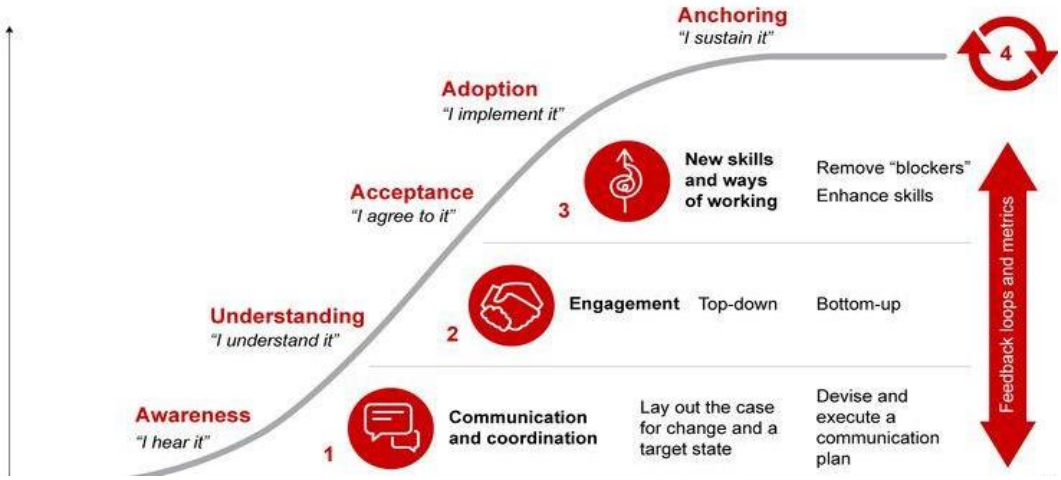

Figure 3.22: Communication, engagement and new skills learnt through digital transformation (Source: Salem, 2016)

Previously, communication that required physical presence for its development has nowadays been established using these advanced forms of technologies as a part of the digital transformation tools. Consequently, this advanced communication was established through implementing technologies, including Blockchain and the Internet of Things or the IoT. This has been practically very important and advantageous for the Transport Center of Abu Dhabi in terms of improving the relationship with the customers. As a result of the digital transformation and manifestation, customers with their desired queries or issues are able to communicate with the desired authorities significantly in a short period of time. Consequently, it provides the ability for the transport authorities to resolve their queries easily involving a significantly reduced amount of time.

Consequently, these advanced forms of communications have allowed the customers to ensure that the desired support and technical assistance are easily provided by the transport authorities. They are also assured of the ethical implementation of the quality of services offered and that their information is safe and secured as a result of digital transformation.

The digital transformation in Abu Dhabi, especially within the Integrated Transport Center, has provided them with the ability to develop an application-based

infrastructure in order to communicate with the customers. As a result of the application-based conversation and communication with the customers, it becomes important for them to ensure that the interface of the application is developed in such a way that seamless services may be offered by the integrated transport center to the customers (Sairete et al. 2021).

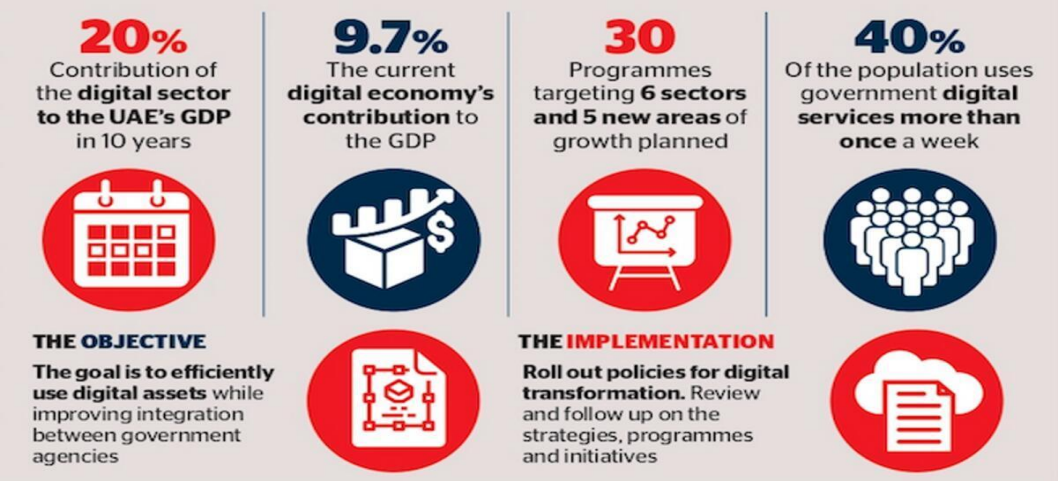

Figure 3.23: Objective and implementation of digital transformation in the uae. (Source: Sairete et al. 2021)

Consequently, it is evident that different services apart from communication were originally provided by the Integrated Transport Center of Abu Dhabi to its citizens. The services have been found to be easily perceived by the customers using the application-based infrastructure brought by the digital transformation within the Integrated Transport Center of Abu Dhabi. In previous times, the services have been established through different levels of intermediaries. However, with the development of digital transformation systems and the implementation of mobile-based applications, service requests and issues are directly reported by the customers to the transport department. Consequently, relevant actions in a short period of time are being implemented by the organization in this regard.

The digital infrastructure has provided the ability of the Integrated Transport Center of Abu Dhabi to develop its future objectives of its implementation. This has consequently been supported through the development of the digital infrastructure for revenue generation in Abu Dhabi. As a result of the increased services being offered digitally. So, the overall levels of activities of the Integrated Transport Center of Abu

Dhabi have been found to be significantly improved (Al-Okaily et al. 2022). This has been reflected in the 8.3% rise in the GDP after 2 years of its implementation. Furthermore, the advent of globalization also ensures the further development of businesses within the country. Therefore, having an online or digital infrastructure may significantly allow the country to achieve advanced levels of development in revenue.

Chapter 4: Digital Transformation Framework and Recommendations

In this chapter, we discuss the digital transformation process according to the framework shown in Figure 4.1. The literature presents different DT frameworks. We formulated our framework based on those frameworks and incorporated some emerging technologies. We will discuss the maturity of the Integrated Transport Center (ITC) based on this framework.

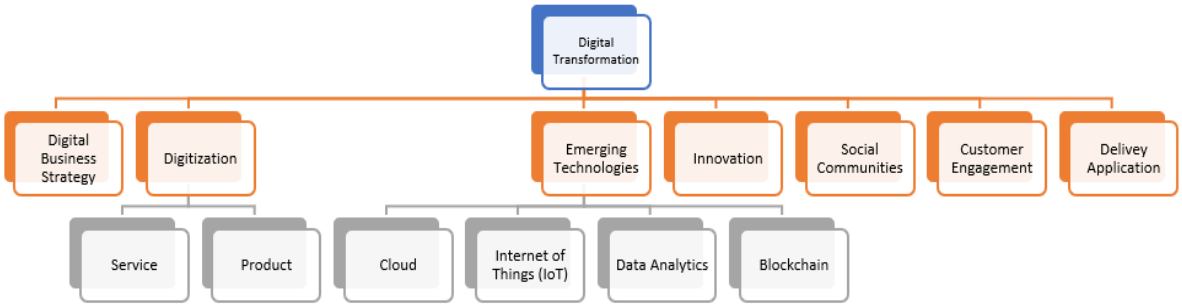

Figure 4.1: Digital transformation framework

4.1 Digital Business Strategy

Digital Transformation should start with a compelling digital business strategy to identify the services and business processes involved in the transformation. Digital business strategy entitles using digital technologies, such as mobile devices, social media, edge and cloud computing, IoT, blockchain, and big data, to develop or modify business models, processes, procedures, and services. A digital business strategy defines a roadmap outlining how an organization might use technology to accomplish its business goals, such as boosting revenue, cutting costs, improving customer experience, and obtaining a competitive edge. To construct a successful digital business plan, it is necessary to find opportunities for innovation and expansion, improve current processes, and create new digital capabilities. Additionally, a thorough comprehension of client requirements and behaviors and the capacity to adjust to emerging technologies and market environments is necessary.

The establishment of a robust online presence, the use of data analytics to learn more about customer behavior and preferences, the development of digital goods and services, and the use of agile development methodologies to speed the release of new features and functionality are some of the essential components of a digital business strategy. Risks related to data privacy and cybersecurity should also be considered, and appropriate mitigation measures should be taken. (Bharadwaj et al., 2013; Ismail, et al., 2007).

The Abu Dhabi government supports ITC's vision by providing a world-class transportation system that is safe, sustainable, and accessible to everyone in the UAE. They also incorporate the newest and latest advancements in transportation technology. In this study, I collected a list of integrated transport systems and customer care e-services to support my thesis about digital transformation in ITC. ITC has 61 customer care services, most of which were transformed to digital format and published on the ITC portal and through applications for example, Mawaqif Parking Services in the TAMM portal or SMS for parking reservations, taxi service online reservations application, and Toll Gate DARB services. In the survey result, I found customers are satisfied with ITC e-services. Digitalization is essential for organizations in the work environment because it increases efficiency, productivity, and accessibility. By utilizing digital tools and platforms, employees can easily collaborate and communicate with one another, access important information and data, and complete tasks more quickly and accurately. ITC also has 59 business processes and systems for back-office management. These are linked to ITC sectors and departments, such as the Archiving System, Customer Relationship Management (CRM) System, Enterprise Asset Management System (Maximo), and Traffic Lights Management System. In the survey, I found that employees are very satisfied with the effect of digitalization.

4.2 Digitization

Digitization is converting text, images, audio, and video into digital formats that computers can process. Digitization could be done by scanning documents, capturing physical objects, direct entry to the computer, analog to digital conversion, etc. Physical objects such as vehicles, buildings, and assets can be represented with digital information

and saved in the computer for further processing and screen rendering. Once the digital business strategy is formulated, the organization must decide on the services and products that should be transformed into digital format for further processing and use in the workflow of the business process (Bloomberg, 2019).

Abu-Dhabi government supports digitization by urging all organizations to archive their forms from paper to digital forms to improve their operations, reduce paper waste, and be an eco-friendly environment. Integrated Transport Centers started digitization six years ago. ITC uses Project management software to enhance collaboration and communication between team members and track project progress and deadlines for employees.

4.3 Emerging Technologies

Emerging technologies are technologies that are in early development or are about to become disruptive. They have the potential to impact governmental and private organizations and society. They suggest new ways of doing things and solutions to problems. Several emerging technologies have recently been accepted by governmental organizations, such as cloud computing, IoT, blockchain, and data analytics. These technologies complement the current digital transformation process and provide better services in terms of efficiency and reliability. To discuss the impact of these technologies on the digital transformations of government, we provide a brief overview of each technology (Kricka, 2016).

Cloud Computing: Refers to the delivery of computing services over the Internet, which is the Cloud in this context, instead of using on-premises servers. Cloud computing changed how organizations and individuals consume and deliver computing resources, enabling greater flexibility, scalability, and cost efficiency (Berman et al., 2013). Cloud computing providers offer servers, storage, applications, and services. Currently, there are different models for cloud computing, namely, Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

Cloud computing can help ITC store and process large amounts of data efficiently and securely. I recommend using cloud-based solutions like fleet management software,

transportation management systems, and route optimization tools. These solutions can help ITC manage their vehicles, drivers, and routes more effectively while providing real-time visibility into operations.

Internet of Things (IoT): IoT is an extension of the existing Internet by connecting the physical world to the cyber world. IoT paved the way for developing new intelligent applications in agriculture, healthcare, transportation, etc. IoT enables large-scale monitoring, control, and automation and impacts the digital transformation of organizations across various industries (Hyseni, 2022).

IoT refers to the connection of devices to the internet, allowing them to communicate and collaborate with each other and share information and data. In the context of transportation, IoT can be used to optimize vehicle performance, traffic management, and weather monitoring. By implementing IoT devices like GPS trackers, sensors, and cameras, ITC can monitor their fleet in real-time, allowing them to quickly identify problems and make necessary changes. For example, if a vehicle is experiencing mechanical issues, IoT data can alert the company, allowing them to take action before the problem becomes more serious. Additionally, IoT data can be used to improve safety by identifying risky driving behaviors, such as speeding or harsh braking. This data can be used to provide training to drivers and improve overall safety. IoT data can also be used to enhance the customer experience by providing real-time data and information on vehicle location and estimated arrival times. This can help customers plan their journeys more effectively and reduce frustration caused by delays. Overall, IoT has the potential to revolutionize transportation by providing real-time data and insights that can be used to improve safety, optimize performance, and enhance the customer experience.

Data Analytics (DA): The emergence of powerful cloud computing processing and IoT encourages many organizations and individuals to connect to the cloud and develop new smart applications using IoT. This increase in computing demand has resulted in the generation of big data. New companies have emerged that build their business model on big data and provide services to private and governmental organizations (De Mauro et al., 2015).

Data analytics can support ITC to route optimization and reduce travel times, fuel usage, and emissions. Data analytics can be used to monitor drivers' performance and identify areas for improvement, such as fuel efficiency, safety, and compliance. Another recommendation is to use DA to track customer satisfaction and identify areas for improvement, such as on-time delivery and communication for ITC services. Moreover, by continuously monitoring and analyzing data, ITC can stay ahead of the curve and remain competitive in an increasingly data-driven industry.

Blockchain, a distributed ledger system enables the transmission of secure transactions between entities. It has been developed to provide trust, immutability, and verifiability in a digital environment without a central authority or intermediary. Blockchain has been widely accepted in the private and government sectors. Government sectors can use it to keep track of their assets and secure documents transferred between departments (Sun et al., 2016).

Blockchain technology can be used in ITC to improve supply chain management by creating a secure and transparent supply chain management system, allowing all stakeholders to track the movement of goods and verify their authenticity. Another recommendation is to track the location and status of assets in real-time, enabling transportation providers to optimize their operations and reduce costs. It can be used for payments between transportation providers and customers to minimize fraud risk and increase transparency. Moreover, I recommend a digital identity system to create a secure and decentralized digital identity system for drivers, reducing the risk of identity theft and improving security. These applications can help transportation providers increase efficiency, reduce costs, and enhance the customer experience.

4.4 Innovation

Innovation has the researchers' attention, especially in the business sectors (Chen & Kim, 2023). Innovation is defined as developing new practices, creating new plans and recourses, or creatively updating an existing practice (Setzke et al., 2021). It is an essential factor that plays a vast role in the fourth-revolution industry with networked, intelligent technologies and digital transformation.

The Abu-Dhabi government aims to make UAE the world's most intelligent country. A major force behind this transition process is innovation. ITC is dedicated to becoming the innovation leader among regional and global transportation entities by integrating innovation as a catalyst for change across the organization's services, products, processes, and business models.

Abu-Dhabi government has been investing in various sectors to support innovation and entrepreneurship also ITC follows the direction of our government. ITC can invest innovation and the creation of project program strategies in departments. This strategy will encourage employees to whom they are interested in the creation and innovation. Moreover, the ITC can apply the Innovation talent project to an employee who can expand to an organization by attending innovation events and being involved in programs. Another recommendation is to implement digital training and development programs to help employees build new innovative skills and stay up to date with the latest industry trends and best practices.

4.5 Social Communication

Social communication is essential in building strong relationships within and outside an organization. It allows interaction and communication between employees and customers. Due to society's increasing demands and needs, governments are implementing digital transformation platforms to meet customer expectations. This has resulted in deep and strong relationships between organizations and customers, leading to a new level of interaction and co-creation. Additionally, digital transformation has improved customer communication and enhanced technologies and services that deliver attractive benefits. E-commerce is one of the examples of digital transformation that encourages a higher level of engagement (Poisson, 2018).

ITC can use social media platforms to interact and collaborate with customers and respond to their queries during services. Also, to implement an efficient feedback mechanism to understand customer expectations, improve service delivery and encourage employees to communicate effectively with customers by providing excellent customer service in ITC. From the employee side, ITC can organize regular training programs to improve employee communication skills.

4.6 Customer Engagement

The development of digitalization helps customer engagement in organizations. Digital transformation highlighted the customer's relationship with digital firms. The digital transformation offered a variety of channels to engage customers in the digital community one of the implements of digital transformation is E-consultation it is for gathering client feedback and effectively engaging them in a discussion regarding services and overarching policy of the organization. Discussion boards, tools for collaborative work, voting tools, voting tools, and online petitions all help with customer engagement (Borisova & Pyataeva, 2020).

ITC focuses on customer engagement by providing the best level of services as survey results show most customers are satisfied with e-service. ITC need to update Customer Relationship Management (CRM) software because it is one of the important systems that can manage customer interaction and provide personalized services. Also, implement a mobile application that provides real-time updates on ITC services and allows customers to rate service, and including chatbots provide customers with quick answers to frequently asked questions for the services.

4.7 Delivery Application

These are the applications that deliver digital services to customers through all available channels. Examples may include smartphones, social media, and e-portal. Delivery applications are a great way for organization to interface with customers by provide platform for customers to interact with organization like make purchases, access information, customer support and address customer queries. Organization can use data collected through applications to gain insights into customer behavior and preferences. Overall, delivery application can build stronger relationship between workers and customers and provide better customer engagement for organization. (Li, 2018)

One of the most important recommendations on the delivery application is to implement a new official application for smartphones that serve all needs of the internal and external environment called Integrated Transport Center. This application will help both customers and employees of ITC e-services. On the Customer, side will provide the most needed services application that is already digitalized and automated. On the other

hand, employee side will serve all employees' requirements such as their absence management, human resource, finance, and administration services by one application. On the same recommend application they can add features for announcements, a free discussion environment and benefits can be uploaded like Mazaya, Essad, and Fazza discounts for workers only.

Chapter 5: Conclusion

The research developed in this thesis focused on the digital transformation in local government in the context of a case study of the Abu Dhabi Municipality Transport department. Digitization has helped people in various ways. It has made the life of people easier and simpler. In addition, it has boosted the city development and helped in developing the city into a technologically developed, smarter city. The adaptation of digital technology has enabled a huge transformation from conventional methods to non-conventional methods. Technology has made the flow of work faster with this efficiency and accuracy of work have been increased. Along with the private sectors of the country, the government sectors of the UAE also have accepted the approaches of digitization. However, the local government of the UAE has focused on the transformation of convention methods and shifting towards non-conventional methods. In 1962, the first municipal board of Abu Dhabi was appointed, and the Department of the Municipalities and Transport was formed in 2019 by law no. 30. The responsibility of this department is to manage the planning of urbanism and transport sectors. One of the major visions of the Abu Dhabi municipal department is to fulfil the task or vision of the President of the United Arab Emirates and the Ruler of Abu Dhabi. Further in the research, the researcher has started the positive and negative effects of digital transformation. Digital technology has helped in the growth of several sectors and industries.

The researcher has chosen the primary research method and positivism research philosophy to conduct the research. The researcher has chosen the descriptive research design, which helped them to collect information in depth. Moreover, the researcher has selected an inductive research approach as it provides flexibility to consider any kind of predetermined data. For the purpose of data collection, a quantitative research approach has been adopted. The study further shows the surveys and analysis of the results as per the sampling method.

5.1 Research Implications

Research implications of a research thesis suggest the importance of the key findings which are gained from conducting the research. It helps the researchers or few

subgroups to understand the findings of the research beyond any basic data and interpretation of results. The researchers have provided authentic and true results of the surveys and properly analyzed them to make them more understandable. From the survey analysis of employees, it can be understood that the digital tools have not only helped the customers or the citizens to establish communication with the authorities but also assisted the Integrated Transport Authority in ensuring that workplace communication is significantly improved. Furthermore, the mobile-based application has also been very lucid so that people are able to use the application sufficiently for their desired purposes. The analysis of customer surveys stated that the digital transformation initiative has provided a way for the department authorities to ensure that advanced tools for communication are implemented within their infrastructure.

5.2 Challenges

The main challenge faced during the conduction of my research course started during the COVID-19 pandemic caused a lack of face-to-face discussions and revisions which hard to deliver the correct information and data also took time to understand the clear idea about my research. Moreover, survey approval took 3 months of time to get approval which work has been paused for a long time. Also, the methodology chapter as it takes a lot of effort and time to collect data, information and to get correct results. All these challenges polished and developed my research skills.

5.3 Limitations and Future Work

The lack of information about Abu-Dhabi government's digital transformation especially the transportation department there was very limited access to journals and articles related to the topic. Future work related to this research topic will focus on getting or gathering more information and data about digital transformation. Digital transformation evaluation and recommendation model will be valuable to implement in ITC development. Also, to suggest developing a maturity model for digital transformation and following up with all levels of maturity for Integrated Transport Centers (ITC).

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Appendices

Appendix A

Digital Transformation of Integrated Transport Department at Abu-Dhabi

This survey collects preliminary data from customers and employees of the Integrated Transport Department, Abu Dhabi Municipality, regarding services automation (digital transformation). The collected data measures customers' and employees' experiences in using digital transformation. This is an anonymous survey and collects general information. The UAEU Research Ethics Committee has approved the survey.

Digital transformation in governments is the process of using digital technologies to create new or modify existing business processes, cultures, and citizen experiences. Governments at all levels are undergoing digital transformation to deliver government services and programs more efficiently, transparently, and cost-effectively. Today, digital government transformation has become critical for meeting the expectations of modern citizens. Governments undertake digital transformation to engage better, serve their workforce, and provide a competitive work environment. Digital transformation in governments may include developing mobile applications (Apps), business process automation (workflow), and online service delivery.

التحول الرقمي في الحكومات هو عملية استخدام التقنيات الرقمية لإنشاء أو تعديل عمليات الأعمال الحالية والثقافات وتجارب المواطنين. تشهد الحكومات على جميع المستويات تحولًا رقميًا لتقديم الخدمات والبرامج الحكومية بشكل أكثر كفاءة وشفافية وفعالية من حيث التكلفة. اليوم، أصبح التحول الحكومي الرقمي أمرًا بالغ الأهمية لتلبية توقعات المواطنين المعاصرين. تقوم الحكومات بإجراء تحول رقمي للمشاركة بشكل أفضل وخدمة القوى العاملة لديها وتوفير بيئة عمل تنافسية.قد يشمل التحول الرقمي في الحكومات تطوير تطبيقات الهاتف المحمول (البرامج) ، وأتمتة عمليات الأعمال (سير العمل) ، وتقديم الخدمة عبر الإنترنت.

* Required

1. What is your age? *

Mark only one oval.

- ◯ Below 28 years
- ◯ 28-35 years
- ◯ 36-43 years
- ◯ 44-51 years

2. What is your gender? *

Mark only one oval.

- ◯ Male
- ◯ Female

3. Do you agree that the concept of service automation (digital transformations) is significant for you? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

4. Do you agree that the Integrated Transport department is transforming to digital online services? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

5. Did you notice any improvement in service delivery? *

Mark only one oval.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

6. Do you agree that the service delivery time to has decreased with digital transformation? *

Mark only one oval.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

7. Do you agree that digital transformation is essential? *

Mark only one oval.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

8. Do you agree that change management is essential for digital transformation? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

9. Do you agree that digital transformation positively impacts service delivery? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

10. Do you agree that digital transformation is essential for the future generation? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

11. Do you agree that customer satisfaction entirely depends on the development of online services? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Appendix B

Digital Transformation of Integrated Transport Department at Abu-Dhabi

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* Required

1. What is your Age? *

Mark only one oval.

- ◯ Bellow 28 Years
- ◯ 28-35 Years
- ◯ 36-43 Years
- ◯ 44-51 Years

2. What is your gender? *

Mark only one oval.

- ◯ Male
- ◯ Female

3. How long have you been working in the Integrated Transport Department? *

Mark only one oval.

- ◯ below 1 years
- ◯ 2 years-5 years
- ◯ 6 years-10 years
- ◯ Above 10 years

4. Do you agree that digital transformation benefits the country's economic growth? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

5. Do you think digital transformation improved your relationship with the citizens (customers)? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

6. Do you agree digital transformation will enhance the productivity of the Abu Dhabi Municipal and transport department? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

7. Did digital transformation help in coping with the COVID-19 pandemic? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

8. Does digital transformation give you a flexible work environment? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

9. Do you receive enough training on the digital technologies used in digital transformation? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

10. What is the feedback from the customers? *

Mark only one oval.

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neutral
- ◯ Dissatisfied
- ◯ Very dissatisfied

11. Does digital transformation provide a better environment for innovation? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

12. Does digital transformation provide a better cultural environment for collaboration between Colleagues? *

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

UAE UNIVERSITY MASTER THESIS NO. 2023:36

Digitalization is transforming government and private services into electronic services called E-services. The study investigates the benefits of digital transformation in different departments of local municipalities and transportation, and the results indicate that service delivery has improved due to digital transformation. Finally, the study presents a reference framework for digital transformation.

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