



Stockholm
University

DSV Report Series No. 23-003

Information Technology Alignment in Public Organisations

Towards Successful Digital Transformation

Gideon Mekonnen Jonathan



Information Technology Alignment in Public Organisations

Towards Successful Digital Transformation

Gideon Mekonnen Jonathan

Academic dissertation for the Degree of Doctor of Philosophy in Computer and Systems Sciences at Stockholm University to be publicly defended on Thursday 11 May 2023 at 13.00 in L50, NOD-huset, Borgarfjordsgatan 12.

Abstract

The widespread acceptance of digital transformation has brought the topic to the top of researchers' and practitioners' agendas. However, despite the anticipated benefits and opportunities, evidence suggests that many organisations still struggle to realise the results of successful digital transformation. The recent data from academic literature, consultancy firms and media reports indicate that, on average, between 70 and 80 per cent of digital transformation projects fail. According to the Boston Consulting Group, the figure for organisations in the public sector stands at 78 per cent. Among others, one of the reasons cited for this challenge is a phenomenon referred to as '*IT alignment*'—the appropriate and timely application of information technology (IT) in congruence with the overall organisational goals, internal organisational settings, and external environments.

The recognition of the critical role IT alignment plays in digital transformation has triggered calls for studies investigating the relationship between the two constructs, in various organisational contexts. However, a closer look at the extant literature reveals that public organisations were not the focus of studies exploring IT alignment's role in successful digital transformation. This paucity of knowledge needs to be addressed since the differences between private and public organisations influence the adoption of emerging technologies. Thus, scholars argue that our comprehension of the relationship between the two constructs, based on studies conducted in private organisations, might not apply to public organisations. To address this gap and respond to the calls for further research, this study investigated the role of IT alignment in the digital transformation of public organisations. In addition to two systematic literature reviews, the thesis presents the results of two case studies with two follow-up confirmatory surveys.

The research question answered in this thesis is: "How can public organisations pursue IT alignment to enable successful digital transformation?" The main results of the study presented are the following. First, three roles of IT alignment for digital transformation in a public organisation are identified, i.e., *enabling organisational agility*, *improving the value derived from IT investments*, and *enabling integration of digital technologies*. Second, the organisational and managerial factors that influence IT alignment are revealed: i.e., *organisational agility*, *organisational structure*, *organisational culture*, *leadership skills*, *digital metrics*, *HR management*, *stakeholder relationships*, and *external domain alignment*. The study also ranked the relative degree of influence of the identified factors on IT alignment. Third, based on two systematic literature reviews and the analysis of interviews and survey data, the thesis proposed a framework with 19 actions that decision-makers could take to improve IT alignment, thereby enabling successful digital transformation. These 19 actions are linked to six IT alignment dimensions, which, in turn, are used for improving the degree of IT alignment.

The findings of the study presented in this thesis have various research and practical implications. First, the study contributes to research on the relationships between various organisational and managerial factors, the six dimensions of IT alignment, and the success of digital transformation in public organisations. Second, the study contributes to practice, as leaders in the public sector can use the findings, especially the 19 actions, as they make the necessary organisation-wide adjustments to improve IT alignment. As the finds of the studies presented in the thesis indicate, public organisations can succeed in their digital transformation endeavours when they improve the degree of IT alignment. To this end, understanding the relative degree of influence of the identified factors and the order of priority of the proposed actions will be invaluable.

Keywords: *Digital Transformation, IT Alignment, Organisational Structure, Public Organisations, Public Value.*

Stockholm 2023

<http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-215038>

ISBN 978-91-8014-236-6

ISBN 978-91-8014-237-3

ISSN 1101-8526



Stockholm
University

Department of Computer and Systems Sciences

Stockholm University, 164 07 Kista

INFORMATION TECHNOLOGY ALIGNMENT IN PUBLIC
ORGANISATIONS

Gideon Mekonnen Jonathan



Information Technology Alignment in Public Organisations

Towards Successful Digital Transformation

Gideon Mekonnen Jonathan

©Gideon Mekonnen Jonathan, Stockholm University 2023

ISBN print 978-91-8014-236-6

ISBN PDF 978-91-8014-237-3

ISSN 1101-8526

DSV Report Series No. 23-003

MIT Doctoral Dissertation No. 152

Typeset by the author using L^A_T E_X

Cover image: Bayfront Avenue, Future World @ ArtScience Museum, Singapore, by Robynne Hu (Unsplash).

Printed in Sweden by Universitetsservice US-AB, Stockholm 2023

Distributed by the Department of Computer and Systems Sciences (DSV), Stockholm University

It always seems impossible until it's done!

Nelson Mandela

If I have seen further, it is by standing on the shoulders of giants!

Isaac Newton

A computer can never be held accountable; therefore, a computer must never make a management decision!

IBM training slide, the 1970s

*To my parents
Awaye and Mekontaw,
and
To my children
Mathias and Oriana!*

Abstract

The widespread acceptance of digital transformation has brought the topic to the top of researchers' and practitioners' agendas. However, despite the anticipated benefits and opportunities, evidence suggests that many organisations still struggle to realise the results of successful digital transformation. The recent data from academic literature, consultancy firms and media reports indicate that, on average, between 70 and 80 per cent of digital transformation projects fail. According to the Boston Consulting Group, the figure for organisations in the public sector stands at 78 per cent. Among others, one of the reasons cited for this challenge is a phenomenon referred to as '*IT alignment*'—the appropriate and timely application of information technology (IT) in congruence with the overall organisational goals, internal organisational settings, and external environments.

The recognition of the critical role IT alignment plays in digital transformation has triggered calls for studies investigating the relationship between the two constructs, in various organisational contexts. However, a closer look at the extant literature reveals that public organisations were not the focus of studies exploring IT alignment's role in successful digital transformation. This paucity of knowledge needs to be addressed since the differences between private and public organisations influence the adoption of emerging technologies. Thus, scholars argue that our comprehension of the relationship between the two constructs, based on studies conducted in private organisations, might not apply to public organisations. To address this gap and respond to the calls for further research, this study investigated the role of IT alignment in the digital transformation of public organisations. In addition to two systematic literature reviews, the thesis presents the results of two case studies with two follow-up confirmatory surveys.

The research question answered in this thesis is: "*How can public organisations pursue IT alignment to enable successful digital transformation?*" The main results of the study presented are the following: First, three roles of IT alignment for digital transformation in a public organisation are identified, i.e., *enabling organisational agility*, *improving the value derived from IT investments*, and *enabling integration of digital technologies*. Second, the organisational and managerial factors that influence IT alignment are revealed: i.e., *organisational agility*, *organisational structure*, *organisational culture*, *leadership skills*, *digital metrics*, *HR management*, *stakeholder relationships*, and *external domain alignment*. The study also ranked the relative degree of influence of the identified factors on IT alignment. Third, based on two systematic literature reviews and the analysis of interviews and survey data, the thesis proposes a framework with 19 actions that decision-

makers could take to improve IT alignment, thereby enabling successful digital transformation. These 19 actions are linked to six IT alignment dimensions, which, in turn, are used for improving the degree of IT alignment.

The findings of the study presented in this thesis have various research and practical implications. First, the study contributes to research on the relationships between various organisational and managerial factors, the six dimensions of IT alignment, and the success of digital transformation in public organisations. Second, the study contributes to practice, as leaders in the public sector can use the findings, especially the 19 actions, as they make the necessary organisation-wide adjustments to improve IT alignment. As the finds of the studies presented in the thesis indicate, public organisations can succeed in their digital transformation endeavours when they improve the degree of IT alignment. To this end, understanding the relative degree of influence of the identified factors and the order of priority of the proposed actions will be invaluable.

Sammanfattning

Det utbredda intresset för digital transformation har fört ämnet till toppen av både forskares och praktikers agendor. Men trots de förväntade fördelarna och möjligheterna finns evidens för att organisationer fortfarande brottas med att förverkliga framgångsrik digital transformation. De senaste uppgifterna från akademisk litteratur, konsultföretag och medierapporter tyder på att i genomsnitt mellan 70 och 80 procent av digitala transformationsprojekt misslyckas. Siffran för organisationer inom den offentliga sektorn, enligt Boston Consulting Group ligger på 78 procent. Ett av skälen som anges för den här utmaningen är ett fenomen som kallas IT-anpassning—adekvat och snabb tillämpning av informationsteknologi (IT) i överensstämmelse med övergripande organisatoriska mål, interna organisatoriska egenskaper och externa miljöer.

Erkännandet av den avgörande roll IT-anpassning spelar i digital transformation följdes av uppmaningar till studier som undersöker förhållandet mellan dessa två konstruktioner i olika organisatoriska sammanhang. Men en närmare titt på den befintliga litteraturen avslöjar att offentliga organisationer inte var i fokus för studier som undersökte IT-anpassningens roll i framgångsrik digital transformation. Detta kunskapsgap måste åtgärdas eftersom skillnaderna mellan privata och offentliga organisationer påverkar införandet av ny teknik. Forskare menar att vår förståelse av förhållandet mellan de två konstruktionerna, baserat på studier i privata organisationer, kanske inte gäller offentliga organisationer. För att ta itu med denna kunskapslucka och svara på ropen på ytterligare forskning, undersöker denna studie den kritiska roll som IT-anpassning spelar i digital transformation. Utöver två systematiska litteraturöversikter består denna avhandling av två fallstudier med och två uppföljande bekräftande kartläggningar.

Forskningsfrågan som besvaras i denna uppsats är: *“Hur kan offentliga organisationer sträva efter IT-anpassning för att möjliggöra framgångsrik digital transformation?”*. De huvudsakliga resultaten är följande: För det första identifierar studien de tre roller som IT-anpassning spelar för digital transformation i en offentlig organisation, med andra ord att möjliggöra organisatorisk smidighet, att förbättra värdet från IT-investeringar, och att möjliggöra integration av digital teknik. För det andra påvisar studien de faktorer inom organisation och ledarskap som påverkar IT-anpassning, det vill säga organisatorisk smidighet, organisationsstruktur, organisationskultur, ledarskapsförmåga, digital statistik, HR-ledning, intressentrelationer och extern domänjustering. Dessutom rankade studien den relativa graden av de identifierade faktorernas inverkan på IT-anpassningen. För det tredje, baserat på resultaten av de två systematiska litteraturöversiktterna och analys av intervjuer och enkäter, utvecklade studien ett ramverk med 19 åtgärder som kan vidtas av beslutsfattare för att förbättra IT-anpassningen

med syfte att möjliggöra framgångsrik digital transformation. Dessa 19 åtgärder länkas till sex dimensioner som starkt påverkar IT-anpassningen, och som i sin tur används till att förbättra graden av IT-anpassning..

Resultaten av denna studie har ett antal praktiska och forskningsmässiga implikationer. Avhandlingen bidrar till litteraturen genom att belysa organisatoriska och ledningsrelaterade faktorer, de sex dimensionerna av IT-anpassning och framgångsrik digital transformation. Vidare kan ledare inom offentlig sektor använda studiens resultat, särskilt de 19 åtgärderna, när de gör nödvändiga organisationsövergripande justeringar för att förbättra IT-anpassningen och därmed lyckas i sina digitala transformationssträvanden. För detta kommer den relativa vikten av identifierade faktorer, och prioritetsordningen för föreslagna åtgärder, att vara ovärderliga.

Acknowledgements

No one who achieves success does so without acknowledging the help of others. The wise and confident acknowledge this help with gratitude!

Alfred North Whitehead

This thesis marks the culmination of my five-year journey as a PhD student. As the saying goes, no work of scholarship is a solitary endeavour but a collaboration of many. Indeed, this thesis is no different. Therefore, I have many whom I would like to thank and whose support throughout the course of my study I would like to acknowledge.

First and foremost, my deepest gratitude goes to my principal supervisor, Professor Lazar Rusu, for his tutelage, invaluable guidance, and unwavering support. Thank you so much, for I have greatly benefited from your immense knowledge and expertise. I truly believe that I made tremendous progress towards becoming an independent researcher and academic under your mentorship. I am also indebted to my second supervisor, Associate Professor Erik Perjons, not only for his support and encouragement, but also for providing me with the space and freedom to pursue my research in the fashion of my choosing. Your endless optimism and jovial manner buoyed me up during the most stressful periods, thank you.

I am immensely grateful to the Department of Computer and Systems Sciences (DSV) and the Swedish Research School of Management and Information Technology (MIT) for financing my study. I have been proud to call DSV my home for the last five years. The department welcomed me warmly and provided me with everything I needed to carry out my research. The stimulating work and research environment made my days shorter, fruitful, and rewarding. I have also had the pleasure of working with fellow PhD students and scholars at the department, more closely though with those at the Information Systems (IS) unit. Thank you for your support and the discussions related to my research and career, and the occasional laughter we shared. Special thanks go to the IS unit head Professor Janis Stirna, Professor Jelena Zdravkovic, Associate Professor Martin Henkel, and Jöran Lindeberg. I am also indebted to the administrative and technical staff at DSV for helping me with things both large and small. Particularly, I would like to express my heartfelt appreciation to Michael Norén who helped me with matters related to conference and course registrations, and other administrative issues. I could not have done this without the support of all of you; for that I owe you a debt of gratitude.

I was also privileged to have been part of the close-knit MIT community where I met seasoned researchers, fellow PhD candidates and alumni. The can-

did and lively discussions we had, especially at the beginning of my PhD studies, were invaluable to help me prepare myself for research in IS. My special gratitude goes to Professor Christina Keller, Professor Pär Ågerfalk, Professor Fredrik Tell, Professor James Sallis, and Professor Anita Mirijamdotter. The feedback I received on my work at the biannual MIT conferences and seminars shaped my thoughts about research and publications.

I am truly indebted to Associate Professor Björn Johansson, my opponent at the public defence of my Licentiate thesis and at my predoc seminar. Thank you for the meticulous and detailed assessment of the previous version of this thesis and the suggestions you made for improvement. Professor Henrik Hansson, the examiner at my predoc seminar, and Associate Professor Thashmee Karunaratne also deserve my gratitude for their invaluable inputs to improve this thesis.

In the last five years, I have had the opportunity to travel around the world and attend premier IS conferences, workshops, and Doctoral Consortiums. These events were the reasons I met prominent international researchers in the field and fellow PhD students, which informed my view on academia and research. I thank all of you whom I met at these academic events for the inspiring conversations, shared experiences, and fruitful collaborations that resulted in a number of publications. I look forward to continuing our work even beyond the completion of this chapter of my academic endeavour. All of these trips were made possible thanks to generous travel funding from MIT and DSV.

The two public organisations, one in Sweden and another in Ethiopia, where I conducted my empirical studies, deserve my heartfelt gratitude for opening up their doors for me. I am also immensely grateful to those who participated in the interviews and responded to the two surveys. Among the participants, my deepest appreciation goes to Peter Bergehamn for facilitating the data collection of my first empirical study at the beginning of my research. For the remaining research participants, thank you so much for sharing your experiences and being generous with your time. Without you, I would not have anything to write about.

Last but not least, I would like to thank my family. My beloved parents, Avaye and Mekontaw, deserve my utmost gratitude for their unconditional love, support and encouragement. I am also blessed to have the most loving, caring and supportive siblings one can only wish for—Habti, Thirteen, Tesh, Mimmi, Yibe, Chuchu and Mammuye. Knowing that you always have my back gives me comfort and peace of mind. I also thank you for encouraging me to pursue my academic aspirations. Without your support, I would not be where I am today. My children, Mathi and Ori, thank you for being the source of the utmost joy and happiness in my life. You always put a smile on my face even when I feel the universe is conspiring against me. My wife, Bemenet, thank you for your love, support and encouragement. I am very lucky to have all of you in my life.

Stockholm, May 2023



Gideon Mekonnen Jonathan

List of Papers

This thesis is a compilation of papers presented at five conferences, and one article published in a journal. The following six papers, referred to in the text by their Roman numerals, are included in this thesis. As the first author, I was responsible for the research design, data collection and analysis, and for writing up the drafts of manuscripts. This amounted to an overall contribution of 80 per cent. All co-authors participated in the research idea development and revision of the final manuscripts.

PAPER I: **Business-IT Alignment and Digital Transformation: Setting a Research Agenda**

Gideon Mekonnen Jonathan, Lazar Rusu & Wim Van Grembergen (2021). In E. Insfran, F. González, S. Abrahão, M. Fernández, C. Barry, H. Linger, M. Lang, & C. Schneider (Eds.), *Information Systems Development: Crossing Boundaries between Development and Operations (DevOps) in Information Systems. Proceedings of the 29th International Conference on Information Systems Development (ISD)*, Valencia, Spain. Association for Information Systems (AIS).

PAPER II: **Organisational Structure's Influence on Business-IT Alignment: Looking Back to Look Forward**

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2018). *International Journal of Business/IT Alignment and Governance (IJITBAG)*. 9(2), 15-29.
DOI: 10.4018/IJITBAG.2018070102

PAPER III: **Organisational Structure's Influence on IT Alignment: The Case of a Public Organisation**

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2019). In: Themistocleous, M., Papadaki, M. (eds) *Information Systems. Proceedings of the 16th European and Mediterranean Conference on Information Systems (EMCIS)*, Dubai, UAE. Lecture Notes in Business Information Processing (LNBIP), Vol. 381, pp. 426-437. Springer.

PAPER IV: **Organisational Structure's Influence on IT Alignment in a Public Organisation: A Confirmatory Case Study Analysis**

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2020). In *Proceedings of the UK Academy for Information Systems Conference*

(UKAIS), Virtual Conference, p. 5. Association for Information Systems (AIS).

PAPER V: **Digital Transformation in Public Organisations: IT Alignment-Related Success Factors**

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2022). In R. A. Buchmann, G. C. Silaghi, D. Bufnea, V. Niculescu, G. Czibula, C. Barry, M. Lang, H. Linger, & C. Schneider (Eds.), *Information Systems Development: Artificial Intelligence for Information Systems Development and Operations. Proceedings of the 30th International Conference on Information Systems Development (ISD)*. Cluj-Napoca, Romania. Association for Information Systems (AIS).

PAPER VI: **IT Alignment and its Influence on Digital Transformation Success**

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2022). In *Proceedings of the 33rd Australasian Conference on Information Systems (ACIS)*, Melbourne, Australia, p. 27. Association for Information Systems (AIS).

Related Papers

During the course of the PhD programme, I have participated in various research collaborations related to the topic of this thesis (i.e., IT alignment and digital transformation), which resulted in a number of publications. The following is a list of selected papers which are not included in the thesis.

PAPER VII: **IT Alignment: A Path Towards Digital Transformation Success**

Gideon Mekonnen Jonathan, Sileshi Demesie Yalew, Bemenet Kasahun Gebremeskel, Lazar Rusu, & Erik Perjons (2022). *Procedia Computer Science*. 219C, pp. 471-478.

PAPER VIII: **IT Alignment: A Management Paradigm for Digital Transformation in Public Organisations**

Gideon Mekonnen Jonathan (2022). In *Proceedings of the BIR Workshops and Doctoral Consortium, co-located with the 21st International Conference on Perspectives in Business Informatics Research (BIR)*, Rostock, Germany, pp. 189-208. CEUR-WS.org.

PAPER IX: **The Relationship Between Organisational Agility and IT Alignment in Public Organisations**

Gideon Mekonnen Jonathan, Lazar Rusu, Erik Perjons & Josue Kuika Watat (2021). In *Proceedings of the 32nd Australasian Conference on Information Systems (ACIS)*, Sydney, Australia, p. 28. Association for Information Systems (AIS).

- PAPER X: **Strategic Alignment for Digital Transformation: Insights from the Public sector**
Gideon Mekonnen Jonathan (2021). In *Proceedings of the BIR Short Papers, Workshops and Doctoral Consortium co-located with the 20th International Conference on Perspectives in Business Informatics Research (BIR)*, Vienna, Austria, pp. 165-171. CEUR-WS.org.
- PAPER XI: **Public Sector Digital Transformation: Challenges for Information Technology Leaders**
Gideon Mekonnen Jonathan, King Solomon Hailemariam, Bemenet Kasahun Gebremeskel & Sileshi Demesie Yalew (2021). In *Proceedings of the 12th IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, Vancouver, Canada, pp. 1027-1033. IEEE.
- PAPER XII: **Digital Transformation in the Public Sector: IT Alignment as a Moderator**
Gideon Mekonnen Jonathan (2020). In *Proceedings of the 31st Australasian Conference on Information Systems (ACIS)*, Wellington, New Zealand, p. 95. Association for Information Systems (AIS).
- PAPER XIII: **Strategic Alignment During Digital Transformation**
Gideon Mekonnen Jonathan & Josue Kuika Watat (2020). In Themistocleous, M., Papadaki, M., Kamal, M.M. (eds) *Information Systems. Proceedings of the 17th European and Mediterranean Conference on Information Systems (EMCIS)*, Virtual Conference. Lecture Notes in Business Information Processing (LNBIP) Vol. 437, pp. 657-670. Springer.
- PAPER XIV: **Information Security and Organisational Agility in the Digital Era: Exploring the Role of IT Alignment**
Gideon Mekonnen Jonathan & Bemenet Kasahun Gebremeskel (2020). In *Proceedings of the 11th IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, Vancouver, Canada, pp. 0831-0836. IEEE.
- PAPER XV: **Intra-organisational Barriers to Business-IT Alignment**
Gideon Mekonnen Jonathan & King Solomon Hailemariam (2020). *International Journal of Innovation in the Digital Economy (IJIDE)*. 11(3), 22-36.
DOI: 10.4018/IJIDE.2020070102
- PAPER XVI: **Organisational Agility and IT Alignment in Public Organisations**
Gideon Mekonnen Jonathan & Josue Kuika Watat (2020). In *Proceedings of the 26th Americas Conference on Information Systems (AM-*

CIS), Virtual Conference, p. 13. Association for Information Systems (AIS).

- PAPER XVII: **Business-IT Alignment in the Era of Digital Transformation: Quo Vadis?**
Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2020). In *Proceedings of the 53rd Hawaii International Conference on System Sciences (HICSS)*, Maui, HI, USA, pp. 5563-5572. Association for Information Systems (AIS).
- PAPER XVIII: **Digitalisation in the Public Sector: Determinant Factors**
Leonardo Maxwell, Ezgi Taner & **Gideon Mekonnen Jonathan** (2019). *International Journal of IT/Business Alignment and Governance (IJITBAG)*. 10(2), 35-52.
DOI: 10.4018/IJITBAG.2019070103
- PAPER XIX: **Business-IT Alignment in the Banking Sector: A Case from a Developing Country**
Gideon Mekonnen Jonathan, King Solomon Hailemariam & Workshet Lameneu Debai (2020). In *Proceedings of the 13th Mediterranean Conference on Information Systems (MCIS)*, Naples, Italy, p. 25. Association for Information Systems (AIS).
- PAPER XX: **IT Governance in Public Organisations: A Systematic Literature Review**
Gideon Mekonnen Jonathan & Lazar Rusu (2018). *International Journal of IT/Business Alignment and Governance (IJITBAG)*. 9(2), 35-52.
DOI: 10.4018/IJITBAG.2018070103
- PAPER XXI: **Business-IT Alignment Barriers in a Public Organisation: The Case of Federal Inland Revenue Service of Nigeria**
Gideon Mekonnen Jonathan, Aminat Abdul-Salaam, Omogunloye Oluwasanmi, & Lazar Rusu (2018). *International Journal of Innovation in the Digital Economy (IJIDE)*. 9(1), 1-13.
DOI: 10.4018/IJIDE.2018010101
- PAPER XXII: **Influence of Organisational Structure on Business-IT Alignment: What We Do (Not) Know**
Gideon Mekonnen Jonathan (2018). In *Proceedings of the BIR Short Papers, Workshops and Doctoral Consortium co-located with the 17th International Conference on Perspectives in Business Informatics Research (BIR)*, Stockholm, Sweden, pp. 375-386. CEUR-WS.org.

Contents

Abstract	i
Sammanfattning	iii
Acknowledgements	v
List of Papers	vii
List of Figures	xv
List of Tables	xvii
1 Introduction	1
1.1 Background	1
1.2 Research Problem	2
1.3 Research Aim	3
1.4 Research Questions	3
1.5 Overview of Papers Included in the Thesis	6
1.5.1 Paper I	6
1.5.2 Paper II	6
1.5.3 Paper III	7
1.5.4 Paper IV	8
1.5.5 Paper V	9
1.5.6 Paper VI	9
1.6 Definition of Key Concepts	10
1.7 Delimitations	14
1.8 Disposition	14
2 Extended Background	17
2.1 Public versus Private Organisations	17
2.1.1 Environmental Factors	18
2.1.2 Processes and Organisational Structures	20

2.1.3	Organisational Goals	21
2.2	IT Alignment	22
2.2.1	Conceptualisation	23
2.2.2	Models and Frameworks	25
2.3	Digital Transformation	29
2.4	IT Alignment’s Role in Digital Transformation	30
2.4.1	Improving the Value from IT investments	31
2.4.2	Enabling Organisational Agility	31
2.4.3	Enabling Integration of Digital Technologies	32
2.5	IT Alignment and Digital Transformation in Public Organisations	33
2.6	IT Alignment-Related Factors Influencing Digital Transformation Success	34
2.6.1	Organisational Structure	34
2.6.2	Organisational Culture	39
2.6.3	External Domain Alignment	39
2.6.4	Leadership Skills	40
2.7	Theoretical Underpinnings	41
2.7.1	Technology Enactment Theory	41
2.7.2	Public Value Theory	42
2.7.3	Stakeholder Theory	43
2.8	Chapter Summary	44

3 Research Methodology 47

3.1	Philosophical Assumptions	47
3.2	The Research Process	48
3.3	Research Activity 1—Literature Review	50
3.3.1	The Literature Search Procedure	51
3.3.2	Data Extraction and Analysis Method	53
3.4	Research Activity 2—Case Studies	53
3.4.1	Case Organisations	54
3.4.2	Data Collection Method	58
3.4.3	Data Analysis Method	62
3.5	Research Activity 3—Surveys	64
3.5.1	Data Collection Method	65
3.5.2	Data Analysis Method	69
3.6	Research Quality	72
3.6.1	Construct Validity	72
3.6.2	Internal Validity	74
3.6.3	External Validity	75
3.6.4	Reliability	76

3.7	Ethical Considerations	77
4	Results and Discussion	79
4.1	IT Alignment-Related Factors Influencing Digital Trans- formation Success	79
4.1.1	Organisational Factors	81
4.1.2	Managerial Factors	85
4.1.3	Confirmatory Analysis	89
4.2	Influence of Organisational Structure on IT Alignment . .	92
4.2.1	Formal Organisational Structure	93
4.2.2	Informal Organisational Structure	95
4.2.3	Confirmatory Analysis	99
4.3	Discussion	103
5	Conclusions	111
5.1	Contributions	111
5.2	Limitations and Future Research	113
	References	cxvii
	Appendix A: Articles Included in the Literature Reviews	cxxxix
	Appendix B: Interview Guides and Informed Consent Forms	cxlvii
	Appendix C: Survey Instruments	cliii
	Appendix D: Case Study Protocols	clix
	Appendix E: Papers Included in the Thesis	clxv

List of Figures

1.1	The research question and sub-questions with the corresponding papers.	5
2.1	Strategic Alignment Maturity Model (Adapted from [7; 19]).	27
2.2	Research Conceptual Framework of the thesis.	33
2.3	Research Conceptual Framework, the influence of organisational structure on IT alignment [50, p. 21; Paper III, p. 6].	38
3.1	The research activities and philosophical assumptions. . .	49
3.2	The research process.	50
3.3	The literature search and selection process [50, p. 25; Paper I, p. 4; Paper II, p. 20].	52
3.4	The municipality’s organisational structure and corresponding leaders’ titles in case study 1 (Paper III) [50, p. 45]. . . .	55
3.5	The organisational structure of the city with leaders’ titles in case study 2 (Paper V).	57
3.6	Thematic analysis procedure followed in qualitative studies (Paper III and Paper V) [273].	63
3.7	A sample question used to assess IT alignment in case study 1 (Paper III) [50, p. 33], adapted from the SAMM instrument [19].	64
3.8	Theoretical model [50, p. 31; Paper IV, p. 10].	66
3.9	Theoretical model [Paper VI, p. 5].	68
3.10	Measurement model evaluation steps for survey 1 (Paper IV) [286; 288].	70
3.11	Measurement model evaluation steps for survey 2 (Paper VI) [284; 285].	71
3.12	Structural model evaluation steps for surveys 1 and 2 (Paper IV and Paper VI) [283; 285; 290; 291].	72

4.1	Thematic map depicting the factors influencing IT alignment and the digital transformation success indicators. . .	80
4.2	PLS-SEM analysis results [Paper VI, p. 8].	90
4.3	Inter-construct correlation and square roots of AVEs [50, p. 52; Paper IV, p. 14].	99
4.4	PLS-SEM analysis results [50, p. 54; Paper IV, p. 15]. . . .	100
4.5	Framework for actions to improve the degree of IT alignment enabling digital transformation success in public organisations.	109
5.1	Informed Consent Form used in case study 1 (Paper III). . .	cxlix
5.2	Informed Consent Form used in case study 2 (Paper V). . .	clii
5.3	Google Online Survey Form used in survey 1 (Paper IV). . .	cliv
5.4	Google Online Survey Form used in survey 2 (Paper VI). . .	clvii
5.5	Case Study Protocol used for case study 1 (Paper III). . .	clxi
5.6	Case Study Protocol used for case study 2 (Paper V). . . .	clxiv

List of Tables

2.1	Differences between public and private organisations. . . .	18
2.2	Selection of IT alignment models and frameworks.	26
2.3	Formal organisational structure forms [50, p. 17-18].	36
2.4	Informal organisational structure forms [50, p. 19].	37
3.1	Data sources for the two case studies in Paper III and Paper V.	58
3.2	List of respondents with their roles and departments at the municipality [50, p. 27; Paper III, p. 7].	59
3.3	List of internal organisational documents obtained for case study 1 presented in Paper III [50, p. 28].	60
3.4	List of participants, their positions and domains in case study 2 (Paper V).	61
3.5	List of internal organisational documents used in case study 2 (Paper V).	62
3.6	Coding examples showing the development of themes. . .	63
3.7	Demography of survey 1 respondents, their roles, and departments (Paper IV).	65
3.8	Operationalisation of constructs [50, p. 29-30; Paper IV, p. 7-8].	66
3.9	Demography of survey 2 respondents, their roles, and organisations [Paper VI, p. 6].	67
3.10	Operationalisation of constructs [Paper VI, p. 6].	69
4.1	IT alignment-related factors in a public organisation undertaking digital transformation.	80
4.2	Outcomes of the structural equation modelling analysis [Paper VI, p. 8].	91
4.3	Influence of organisational structure on IT alignment dimensions [50, p. 51].	96
4.4	Outcomes of the structural equation modelling analysis of survey 1 (Paper IV).	101

1. Introduction

This chapter introduces the thesis, outlining the background of the whole study and the research problem addressed with the collection of studies included in the thesis. The justification and aim of the study as well as the main research question and sub-questions are also presented, along with the summaries of papers included in the thesis.

1.1 Background

The current business environment is characterised by a multitude of changes and has not only provided opportunities, but has also brought challenges to organisations. Among others, digital transformation is one of the developments that has attracted the attention of many. In recent years, digital transformation—defined as “*a fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an entity [i.e., an organisation, a business network, an industry, or society] and redefine its value proposition for its stakeholders*” [1, p. 12]—has surfaced in the academic literature within strategic Information Systems (IS) research as a phenomenon related to technological and organisational changes in the business environment [2; 3]. Today, organisations across sectors and industries have also recognised that this technology-enabled overhaul is an appropriate way of driving new business models. Thus, opinion pieces and reports from practitioner outlets place digital transformation at the forefront of significant strategic issues that determine the realisation of the goals of today’s organisations [4; 5]. The availability of emerging technologies—social media, mobile, cloud, and smart technologies—has made it possible for many organisations to improve their business processes through the automation and integration of products and services. Despite the anticipated benefits of digital transformation, the main challenge for today’s organisations, however, is appropriately introducing new technologies into the existing business processes in response to the dynamic business, political, and technological landscapes. To this end, the significance of a phenomenon referred to as “*business-IT alignment*” is recognised among researchers and practitioners [6].

Business-IT alignment (referred to as ‘*IT alignment*’ in this study) is defined as “*the application of IT in an appropriate and timely way, in harmony with business strategies, goals and needs*” [7, p. 3]. Even though prior studies until most recently viewed IT alignment as a state, there is a growing consensus among scholars that it should be considered a continuous process [8]. Thus, this study takes the position that organisations need to pursue IT alignment by continuously

monitoring and making appropriate adjustments according to changes within an organisation and external environments.

Although the phenomenon has been around since the proliferation of IT began in businesses, a recent survey among leaders across industries also indicated that IT alignment remains one of the main concerns of many leaders [6]. Beyond practice, the issue of IT alignment has also attracted the attention of many researchers in IS and cognate disciplines [8]. Scholars justify the attention paid to IT alignment by recognising the positive influence it has on organisational performance, as demonstrated in many empirical studies across industries [9–11].

On the other hand, the current era of digital transformation has brought the importance of IT alignment to the fore. According to Kahre [12] and Jonathan [13], leaders spend considerable resources attempting to maintain IT alignment while managing organisation-wide changes related to digital transformation. In fact, there are a growing number of studies that suggest exploring the relationship between IT alignment and digital transformation is a timely issue [12–17]. According to these studies, digital transformation initiatives can be fruitful in enabling value creation only when various organisational changes are on a par with the introduction of new technologies [18–20] and the fit between IT and the overall organisational business strategies [9; 21]. Indeed, we have seen a rise in the number of such studies suggesting that there is a recognition of the positive association between IT alignment and digital transformation [22; 23].

Although IT alignment is a topic that has attracted the attention of many researchers, which has resulted in a rich body of literature [8; 11; 24; 25], there are still calls for further exploratory studies in diverse organisational contexts to investigate IT alignment. The focus of previous studies was mainly on addressing IT alignment issues at the conceptual level, while practical challenges in different organisational contexts have rarely been pursued [8; 13].

1.2 Research Problem

Given the significance of continuous IT alignment during the digitalisation era, scholars call for further studies investigating the relationship between IT alignment and digital transformation recognising the contextual differences between various organisations (e.g., [12–17]). Thus, it is no surprise that there seems to be an increase in the number of studies, suggesting a growing interest among researchers exploring this relationship [13; 22]. However, a closer look into the extant literature reveals that public organisations have not been adequately represented in these studies. The observation holds true for both IT alignment and digital transformation research [26–29]. This paucity of knowledge needs to be addressed since managing digital transformation and maintaining IT alignment seem to be more challenging in highly pluralistic organisational settings, such as organisations in the public sector [25; 30; 31]. The rationale for this assertion is founded on IS and organisational literature. The argument is that public organisations are complex due to the presence of multiple stakeholders with varying interests, as well as arrangements that have inherent administrative and political

tensions [32]. For instance, administrative leaders in the public sector need to navigate their way through complex and bureaucratic processes while they initiate, plan and implement major IT investment decisions by elected politicians [33]. This complexity, in turn, has implications for how public organisations plan their journey to digital transformation and formulate their organisational and IT strategies in order to satisfy the interests of diverse stakeholders [29–31]. In addition to organisational settings, the findings of recent case studies (e.g., [34; 35]) indicate that the introduction of digital technologies to solve complex public administrative tasks often fails, raising many unanswered questions.

On the other hand, the focus of previous IT alignment studies on conceptual aspects has been criticised. For instance, researchers [8; 19; 36] argue that empirical studies need to be undertaken to further our understanding of the different organisational factors that affect IT alignment. Among others, the influence of both formal and informal organisational structure on alignment is one of the research topics found to be relevant and timely, but it is less explored [24; 37–39]. According to Chan [37] and Jonathan [13], the significance of an appropriate organisational structure in facilitating the introduction and appropriate use of IT is recognised in the literature. Thus, exploring the various organisational forms in today’s organisations is paramount given the numerous possible adjustments that need to be made in response to the current dynamic environment. A thorough understanding of the various forms of organisational structure is also vital as leaders attempt to improve IT alignment [40; 41] to enable successful digital transformation. Particularly, the lack of IT alignment and digital transformation studies is acknowledged with appreciation for specific types of organisational structure in public organisations [29; 42]. The overall problem addressed in this thesis is the lack of theoretical and empirical knowledge about the relationship between IT alignment and digital transformation in public organisations.

1.3 Research Aim

In response to the calls for further studies and to address the gap in the literature, the aim of this study is threefold. First, the study explores the role of IT alignment for successful digital transformation in public organisations. Second, the study identifies the various factors that influence IT alignment in public organisations as they undertake digital transformation. Once the important organisational and managerial factors are identified, I will also establish the degree of influence of these factors on IT alignment. Finally, the study proposes a framework with a list of actions to improve the degree of IT alignment in public organisations, thereby enabling successful digital transformation.

1.4 Research Questions

The research problem discussed above is addressed by answering one main research question, focussing on exploring how public organisations can reach and maintain IT alignment, enabling successful digital transformation.

As indicated in the IS literature, managing IT alignment in today's organisations has become challenging due to the current dynamic technological, political, and business landscapes [12] and the pace of necessary organisation-wide changes [43; 44]. Organisations in the public sector have also to navigate through this turbulent environment while maintaining stability and accountability. National, regional, and transnational governments have made digital transformation a priority in their reform agenda to improve communication with their citizens, improve transparency, and reduce high expenditure [29]. Yet, there is little agreement among researchers on how digital transformation in public organisations should be pursued [28]. However, the premise of this study is that public organisations that manage to reach and maintain IT alignment are also in a better position to succeed in their digital transformation endeavours [28; 45–49]. Thus, I argue that identifying and appropriately managing the various organisational and managerial factors (i.e., IT alignment related factors) will ultimately result in successful digital transformation. One main research question (**RQ**) and four research sub-questions (**RSQs**) are formulated to guide the study.

Research Question

How can public organisations pursue IT alignment to enable digital transformation success?

The answer to this research question provides insights into how public organisations plan and execute their activities to reach and maintain IT alignment while undertaking digital transformation. To this end, the study was carried out in three steps—(1) exploring the role of IT alignment in digital transformation success, (2) identifying the various organisational and managerial factors affecting IT alignment in public organisations undertaking digital transformation, and (3) establishing the degree of influence of the identified factors on IT alignment and proposing a framework for actions to manage these factors appropriately. However, prior to the four empirical studies, two systematic literature reviews were conducted. The following four research sub-questions (**RSQs**) were also formulated.

RSQ1: What is the role of IT alignment in digital transformation in public organisations?

RSQ2: Which organisational and managerial factors influence IT alignment in public organisations undertaking digital transformation?

RSQ3: How does organisational structure influence IT alignment in public organisations?

RSQ4: How can public organisations manage IT alignment-related factors to enable successful digital transformation?

Figure 1.1 illustrates the relationship between the **RQ** and **RSQs** along with the corresponding papers included in the thesis.

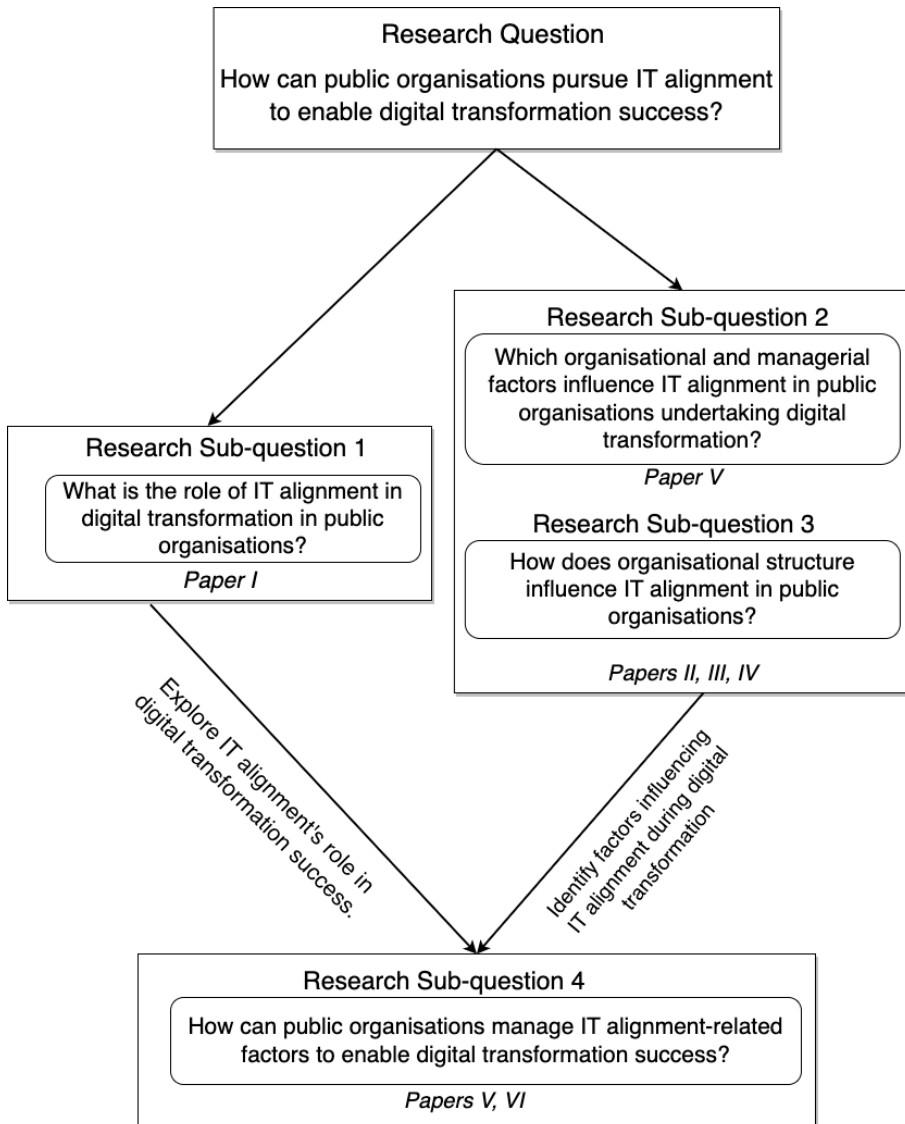


Figure 1.1: The research question and sub-questions with the corresponding papers.

1.5 Overview of Papers Included in the Thesis

This thesis marks the culmination of a series of studies, conducted in the last five years, and published in six papers. A brief summary of the papers is presented below. It is worth noting that the findings of studies published in Papers II-IV also appear in my Licentiate thesis [50] which explored the relationship between various organisational structure forms (i.e., formal and informal) and their influence on IT alignment, within the context of public organisations.

1.5.1 Paper I

Gideon Mekonnen Jonathan, Lazar Rusu & Wim Van Grembergen (2021). Business -IT Alignment and Digital Transformation: Setting a Research Agenda. In: E. Insfran, F. González, S. Abrahão, M. Fernández, C. Barry, H. Linger, M. Lang, & C. Schneider (Eds.), *Information Systems Development: Crossing Boundaries between Development and Operations (DevOps) in Information Systems. Proceedings of the 29th International Conference on Information Systems Development (ISD)*, Valencia, Spain. Association for Information Systems (AIS).

This paper presented a systematic literature review exploring the significance of IT alignment for organisations as they embark on their digital transformation journey. The synthesis of 61 articles published in 26 journals and 20 conference proceedings revealed how IT alignment contributes to the success of digital transformation. The review also revealed organisational and managerial factors influencing IT alignment in organisations undertaking digital transformation. In addition, the study provided explanations for why IT alignment has become more challenging for today's organisations. For instance, the fact that IT is increasingly embedded in all aspects of organisations has made it difficult to formulate IT and business strategies. This development, coupled with the rapid emergence of digital technologies and a dynamic external environment, has made IT alignment challenging for leaders. The findings suggest that organisations undertaking digital transformation benefit from IT alignment in three ways. First, aligning organisational strategy with the application of new digital technologies improves the value derived from IT and digital technologies. Second, IT alignment fosters organisational agility which is essential for digital transformation. Third, the study found that organisations that have achieved IT alignment are in a better position to integrate new digital technologies into existing business processes better. Moreover, the study revealed IT alignment-related organisational and managerial factors that need to be further investigated to improve digital transformation success, namely: organisational structure, organisational culture, external domain alignment, and leadership skills.

1.5.2 Paper II

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2018). Organisational Structure's Influence on Business-IT Alignment: Looking Back to Look Forward. *International Journal of Business/IT Alignment and Governance (IJITBAG)*, 9(2),

Despite the findings of empirical and conceptual studies acknowledging the significance of organisational structure in IT alignment, the relationship between organisational structure and IT alignment did not attract sufficient attention of researchers. To lay the ground work for the subsequent empirical studies, the second literature review synthesised the findings of prior studies exploring the relationship between organisational structure and IT alignment. The analysis of 31 articles published in 19 journals and 3 conference proceedings revealed the different goals of IS studies investigating the role of organisational structure in IT alignment. Accordingly, prior exploratory studies attempted to (1) establish prevalent organisational structure forms, and (2) determine which of these organisational structure forms are appropriate to improve IT alignment. In addition, the review also revealed various models and frameworks proposed to help organisations design favourable organisational structures. Even though the studies fall short of identifying specific organisational structures, there are strong arguments suggesting the informal organisational structure influences IT alignment more than the formal one. However, the main finding of the study is that the interplay between the formal and informal organisational structure forms and the influence on IT alignment needs to be investigated in different sectors and industries.

1.5.3 Paper III

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2019). Organisational Structure's Influence on IT Alignment: The Case of a Public Organisation. In: Themistocleous, M., Papadaki, M. (eds) *Information Systems. Proceedings of the 16th European and Mediterranean Conference on Information Systems (EM-CIS)*, Dubai, UAE. Lecture Notes in Business Information Processing (LNBIP), Vol. 381, pp. 426-437. Springer.

Based on the findings of the two literature reviews, the first case study aimed to address the literature gap by exploring the effects of different forms of organisational structure on IT alignment in a public organisation. The findings resulted in the identification of various formal and informal organisational structures in a public organisation at the municipality level. Consistent with the literature on public administration, the formal structure identified in the case organisation (Swedish Municipality, referred to as "the municipality" hereafter) was found to be a centralised organisational structure. Three forms of informal organisational structure (interpersonal relationships, cross-departmental relationships, and professional networks) were also identified. The analysis of the interview data and internal documents suggests that the various organisational forms influenced different dimensions of IT alignment and related attributes in the municipality. For instance, the results suggest that the centralised organisational structure has implications for organisational learning, IT prioritisation, IT budgeting, and the formulation of administration strategy. Furthermore, the

study also revealed that the three forms of informal organisational structure have implications for IT alignment IT dimensions and related attributes. For instance, interpersonal relationships were found to have implications for flexibility of protocols, speed of IT reporting procedures, and the creation of a social and trusting environment. Although professional networks influence liaison effectiveness, IT investment decisions, and championing for IT projects, the results suggest that cross-departmental relationships influence attributes related to the dimensions of IT alignment, including knowledge sharing, IT infrastructure flexibility and partnership relationship between IT and the remaining units of the organisation.

1.5.4 Paper IV

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2020). Organisational Structure's Influence on IT Alignment in a Public Organisation: A Confirmatory Case Study Analysis. In: *Proceedings of the UK Academy for Information Systems Conference (UKAIS)*, Virtual Conference, p. 5. Association for Information Systems (AIS).

This survey study was designed to test whether the findings of the first case study—the effects of different organisational structure forms on IT alignment dimensions—could be confirmed. To the best of my knowledge, this is the first empirical study to investigate the simultaneous influence of formal and informal organisational structure on IT alignment. The hypotheses posited were based on the extant IS and organisational literature together with the findings of the case study conducted at the municipality. As organisations make adjustments to their organisational structure in response to the dynamic environment, recognising how this change affects IT alignment is necessary. I argue that leaders who are informed about the different forms of organisational structures are in a position to make an appropriate appraisal to explore whether informal organisational structures support or undermine the formal structure. The results of this study suggest that in a public organisation with a central organisational structure, such informal organisational structures as cross-departmental relationships and interpersonal relationships have a favourable influence on IT alignment. However, the centralised formal organisational structure was also found to be important for some dimensions of IT alignment (e.g., IT governance). In addition to the contribution to the current IS literature, the study also has implications for practice, as it assigns relative importance to the different forms of organisational structure according to the strength of their influence on IT alignment. For instance, the PLS-SEM analysis suggests that cross-departmental relationships have the strongest influence on IT alignment, and particularly on the three dimensions—communications, partnering, and dynamic IT scope. Leaders could make use of these findings as they prioritise the adjustments they make in pursuit of improved IT alignment that enables a successful digital transformation.

1.5.5 Paper V

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2022). Digital Transformation in Public Organisations: IT Alignment-Related Success Factors. In: R. A. Buchmann, G. C. Silaghi, D. Bufnea, V. Niculescu, G. Czibula, C. Barry, M. Lang, H. Linger, & C. Schneider (Eds.), *Information Systems Development: Artificial Intelligence for Information Systems Development and Operations. Proceedings of the 30th International Conference on Information Systems Development (ISD)*. Cluj-Napoca, Romania. Association for Information Systems (AIS).

Based on three theories (i.e., technology enactment theory, public value theory, and stakeholder theory), the aim of the second case study was to further our understanding of the role IT alignment plays in the success of digital transformation in the public sector. The results of the study indicate that attempts to improve IT alignment, with due attention to organisational and managerial factors (i.e., organisational structure, organisational culture, organisational agility, leadership skills, external domain alignment, digital metrics, HR management, and stakeholder relationships), enables successful digital transformation. In addition to what the extant literature suggests, the main finding of the study is the recognition that managing the various organisational and managerial factors that influence IT alignment seems to be even more challenging than in organisations in the private sector. The synthesis of the results with literature on the topic provides an explanation for the sectoral difference. For instance, the rigid organisational structure, firm decision-making processes bounded with legal statutes, and cautious risk taking and innovation arrangements in public organisations constrain the leadership discretion. However, the analysis of qualitative data suggests that recognising the significance of continuous monitoring of the organisational culture and informal organisational structure to improve IT alignment is of paramount importance. Moreover, collaboration and cooperation between internal and external stakeholders determine whether a public organisation can reach an IT-aligned position to support a successful digital transformation.

1.5.6 Paper VI

Gideon Mekonnen Jonathan, Lazar Rusu & Erik Perjons (2022). IT Alignment in the Public Sector and its Influence on Digital Transformation Success. In *Proceedings of the 33rd Australasian Conference on Information Systems (ACIS)*, Melbourne, Australia, p. 27. Association for Information Systems (AIS).

Although both IT alignment and digital transformation have attracted the attention of researchers and practitioners, the lack of studies within the context of public organisations is revealed in the literature reviews. Thus, the aim of this study was to test the findings of the qualitative study recognising (1) the influence of IT alignment on the success of digital transformation, and (2) the significance of the various organisational and managerial factors in IT alignment as public organisations undertake digital transformation. The results of

the study indicate a strong causal relationship between IT alignment and digital transformation in public organisations. Furthermore, the analysis of the quantitative data collected from 402 public sector leaders resulted in the determination of different degrees of influence of the identified organisational and managerial factors on alignment in public organisations undertaking digital transformation. For instance, organisational culture, organisational structure, stakeholder relationships, and human resource management were found to have a strong influence on IT alignment. Although the influence of organisational agility was moderate, the results suggest that the significance of external domain alignment and the use of digital metrics were small. Besides contributing to the extant literature by establishing the role of different organisational and managerial factors' effect on IT alignment, the study has also practical implications. I argue that it is in the public organisations' best interest to make priorities. For instance, the level of strengths of established influences can be informative to support decision-making that focusses on specific dimensions of IT alignment.

1.6 Definition of Key Concepts

The following are the definitions and a brief introduction of the key concepts referred to in the thesis.

Digitisation, digitalisation, and digital transformation

A review of the IS literature indicates that researchers use *digitisation*, *digitalisation*, and *digital transformation* interchangeably. However, I concur with Brennen and Kreiss [51] and Fischer et al. [18] who argue that the three terms describe three different phenomena. In this thesis, I use the term *digitisation* as a technical process of converting information from analogue form into digital (i.e., digital bits of 1s and 0s). *Digitalisation* is used to refer to the new paradigm where the application of emerging technologies is recognised as the ultimate source of competitiveness and customer satisfaction [18; 51; 52]. On the other hand, *digital transformation* encompasses both digitisation and digitalisation, as well as the necessary organisation-wide changes reshaping existing processes, interactions, and business models [18; 53].

Digital technologies

Even though the extant literature does not provide a unified definition, digital technologies are considered as a variety of emerging technologies incorporating information gathering, storing, computing and transferring capabilities [1]. In this thesis, the term is used to refer to technologies adopted by public organisations to improve the provision of public service delivery by enabling innovation, collaboration and coordination as well as improving processes and procedures [21; 28]. These technologies include: blockchain, bigdata, Internet of things, machine learning, cloud computing, automated robot processing, social media and mobile computing.

Integration of digital technologies

The term ‘integration of digital technologies’ refers to one of the challenges during digital transformation where emerging technologies are introduced into an already existing processes and structures [4]. In this thesis, the term is used to illustrate how improved IT alignment could facilitate the adaptation of existing organisational settings—e.g., IT and overall organisational strategies, organisational structure, IT infrastructure, and human resources—to gain the best from the new digital technologies introduced [5].

Value from IT investments

The term ‘value from IT investments’ refers to the benefits realised or the value created as a result of financial expenditures related to digital transformation. The literature on digital transformation and IT alignment justify the cost of acquiring and using digital technologies as this expenditure improves organisational performance [1; 3; 8]. In this thesis, the term is used to illustrate the extent public organisations create public value as they improve the degree of IT alignment [19], thereby enabling digital transformation success [12].

Digital transformation success

The extant literature indicates that there is a consensus among researchers and practitioners about the goal of digital transformation—improving organisational efficiency and creating added value. However, articulating what successful digital transformation entails has not been straightforward. Barthel [54] attributes this confusion to the fact that organisations across industries often operate according to distinctive business models when undertaking digital transformation to redefine their processes, products and services. In this thesis, I view digital transformation success (i.e., in the public sector setting) as the extent to which the IT-enabled and organisation-wide change resulted in improved internal efficiency of administration, improved cooperation among stakeholders, better quality of public service delivery, and the creation of added value [28; 47; 55]. I also argue that digital transformation success should be measured continuously in such a way that decision-makers in the public sector can make appropriate adjustments. Thus, I have adopted three measures—outputs, outcomes, and impacts—used in prior studies [56; 57] to assess whether IT alignment has contributed to digital transformation success.

Output

The first (immediate) results of digital transformation in the public sector are referred to as output. Outputs are primarily concerned with the new processes and services that are made available due to digital transformation. These might be the quantity or quality of the services that public organisations could measure in concrete terms. Examples of outputs might be service delivery speed, and accessibility of the public services offered to citizens (in terms of availability according to geographical area or service hours) [56].

Outcome

The term ‘outcome’ is used in the thesis to refer to the medium-term effects of digital transformation. In other words, outcomes are the second level of the changes in a public organisation representing the tangible changes to the existing service offerings, use of resources or quality of relationships with its stakeholders. Examples of outcomes could be the changes in services or processes including simplicity of access to public services, responsiveness to the demands of citizens, or inclusiveness (i.e., the extent to which citizens are able to participate in the design and production of public services) [28].

Impact

I view impact as the highest-level change that can be reasonably attributed to a public organisation’s digital transformation journey—within and beyond the organisation’s boundary. Within a public organisation, the impact of digital transformation might be the provision of better environment for its employees through improved communications or seamless operation [47]. Moreover, digital transformation in public organisations is also intended to result in favourable impacts on the society. These might come in the form of the contribution to the whole digital economy, improved accountability and transparency, or better democratic processes [28; 49; 55].

Public and private organisations

The seminal works of Rainey et al. [58] and Bozeman [59] are credited to have provided a set of criteria used to distinguish between private and public organisations—ownership, control, and funding. Thus, this study defines public organisations as organisations owned by governments to serve their constituents who also fund their operations through taxation [56]. In contrast to public organisations, organisations in the private sector are owned and operated by entrepreneurs or stockholders. While political forces predominantly control public organisations, the market (economical systems) constrain private organisations [60; 61].

State/municipality-owned enterprises

As the name indicates, states and municipalities own autonomous organisations with the aim of producing and delivering services to the public, with little interference from politicians. Even though financial targets are often set, the primary goal of these enterprises is to meet the public policy targets as stipulated by their owners—the state or municipalities [62]. Compared to private organisations, state/municipality-owned enterprises mimic the organisational structure of public organisations and exhibit more bureaucracy and formalisation (i.e., less managerial autonomy). On the other hand, while public organisations are limited by strict laws that safeguard public finances, state / municipal owned companies are regulated by private commercial law [62].

Non-government organisations (NGOs)

In addition to the types of organisations defined above, IS studies also recognise organisations that do not fit the public-private divide (e.g., [63]). Such or-

organisations engage in issues considered to be important for the society. I adopt Marten's definition of NGOs, i.e., "*formal (professionalised) independent societal organisations whose primary aim is to promote common goals at the national or the international level*" [64, p. 282].

Public administration

Public administration is often viewed as a formal process of planning, organising, coordinating, and controlling public organisations to achieve organisational objectives. In the literature, the philosophical underpinnings of public administration are founded on the principles of democracy and constitutional rule, as well as organisation theory and the concept of management [65]. Thus, I consider public administration to be the management of a public organisation constrained by public policies and controlled by arrangements put in place to maintain transparency and accountability [56; 66].

New public management

The new public management (NPM) is a public administration approach that was introduced in the late 1970s to mitigate economic recession and tax revolts. Unlike classical public administration, which focusses on constitutional rule and creating public value, the main driver of NPM is improving efficiency as measured in line with the objectives of typical market economics [67; 68]. Thus, in this thesis, I present NPM as a management approach in public organisations where leaders' interest is maximising profit and making choices to that end. Proponents of NPM encourage management approaches often associated with downsizing, less formalisation, and decentralisation of the organisational structure, as well as result-driven culture [65].

Public value

The seminal work of Moore [69] is often referred to in the IS and public administration literature to describe the ultimate goal of a public organisation, i.e., the creation of public value (e.g., [28; 70; 71]). In the same vein, I subscribe to the view that public value is what a public organisation offers to its citizens and society at large. Thus, for a public value to be created, three key objectives must be met—the provision of high quality services, realisation of anticipated favourable results, and establishment and maintenance of a good quality relationship with citizens based on trust and mutual understanding [69].

Stakeholder

The thesis adopts Freeman's definition of a stakeholder—"*any group or individual who can affect or is affected by the achievement of the organisation's objectives*" [72, p. 46]. Thus, I use the term 'stakeholder' to refer to individuals within and outside the case organisations, including suppliers, agencies, groups, and NGOs.

City administration

The 'city administration' referred to in the thesis is the executive government body of the capital city of Ethiopia where one of the case studies was conducted.

The city administration has a federal structure governed by a mayor together with elected council members.

Sub-city

A sub-city is a division of a city administration that is mandated to provide public services to residents within the geographic area. The ten sub-cities referred to in the thesis are expected to formulate and implement their own operation plans to run the delivery of services in accordance with the standards and controls set by the city administration.

1.7 Delimitations

Public organisations are known to have complex power-sharing structures where political, administrative, and IT leaders play different roles that shape the way IT and digital transformation are managed. I also concur with prior studies that recognise the important role of political as well as external environmental forces in how digital transformation is pursued in public organisations. However, this study only involved participants from IT and administration departments of the case organisations. Thus, the implications of organisational structures and decision-making arrangements, related to IT and digital transformation, from the political wings of the case organisations are beyond the scope of this study. Moreover, the studies included in the thesis did not explore the implications of external environments (e.g., national culture, national government regulations, regional and supranational guidelines and arrangements, etc...) and the inter-organisational collaborations (i.e., between the case organisations and others) on IT alignment or the success of digital transformation.

1.8 Disposition

This thesis is structured and presented in five chapters. The first chapter presented an overview of the research background along with a description of the research problem, the research question and sub-questions, an overview of the included papers, the definition of key terms, and the delimitations of the study.

The second chapter presents the state-of-the-art which forms the basis for the empirical studies I conducted. However, the point of departure is to explore the differences between organisations in the public and private sectors that justify the context of the study. The chapter also presents the results of two systematic reviews of the literature exploring IT alignment and its role in digital transformation success. Among the various organisational and managerial factors that influence IT alignment during digital transformation, considerable attention was given to investigating organisational structure and its influence on IT alignment. I argue that, in addition to being one of the critical factors influencing both IT alignment and digital transformation, organisational structure is the main attribute separating public and private organisations. A brief

description of the three underpinning theories (i.e., public value theory, stakeholder theory, and technology enactment theory) also appears in this chapter.

In the third chapter, I discuss the research methodology—the adopted research strategy, as well as the data collection and analysis methods. First, the two public organisations selected for the case studies are introduced. In addition to the description of the municipality (Paper III) and the city administration (Paper V) where the two case studies were conducted, justifications are provided for the choices. I also discuss and justify the sampling strategy and the multiple sources of data collected (internal organisational documents, interviews). For the survey studies (Paper IV and Paper VI), the demography of the respondents and information on their respective organisations are presented. Besides, the chapter discusses the data analysis methods applied—thematic analysis for the qualitative data (Paper III and Paper V) and Partial Least Square Equation Modelling (PLS-SEM) for the quantitative data (Paper IV and Paper VI). Finally, I present the research quality criteria and ethical considerations that informed the research design and how I conducted myself during the entire research process.

The fourth chapter presents the results of qualitative and quantitative empirical studies. First, the various factors that were found to influence IT alignment and determine digital transformation success in public organisations will be discussed. The results of the tests of the hypotheses posited and the two theoretical models proposed are also presented (i.e., based on the findings of case studies and the literature reviews). Moreover, I recapitulate the study findings according to the research question and research sub-questions. Based on the findings of the empirical study and the syntheses of the extant literature, I also present and describe a framework containing 19 actions to improve IT alignment enabling successful digital transformation in a public organisation.

Finally, the last chapter concludes the thesis by discussing the theoretical contributions, practical implications, limitations of the study, and potential future research directions.

2. Extended Background

This chapter presents the state-of-the-art IT alignment and digital transformation research within the context of public organisations. First, the extended background outlines the difference between private and public organisations, which justifies the study context. The premise of the study is that organisations in the public and private sectors exhibit distinct characteristics that call for nuanced approaches towards IT alignment and digital transformation. The theoretical underpinnings subsection briefly presents the three theories used as lenses to analyse and interpret the empirical data. The findings of the two systematic literature reviews (Paper I and Paper II) are also presented as a point of departure for the four empirical studies included in the thesis.

2.1 Public versus Private Organisations

The difference between public and private organisations has historically been a point of contentions among researchers within the disciplines of public administration and organisational studies [70; 73]. Researchers provide several antecedents for this debate. For instance, the emergence of such approaches as New Public Management (NPM)—i.e., the management approach where public organisations are expected to perform and be run as business-like enterprises—mostly relying on economic concepts, was popular in the 1990s and early 2000s. NPM was embraced by governments around the world, bringing the management, accounting approaches, and organisational structure designs into the public sector [67; 68]. The approach, for sometime, seemed to suggest some degree of convergence. However, the organisational and sectoral differences between public and private organisations remain a topic of debate in the public administration and general management literature [70; 73].

The motivation for these debates is the significance of the similarities and differences between the two organisations. According to Lapsley [68], the distinction between the private vs public organisations has implications on the choices concerning *management processes* (transparency and accountability, attitudes towards innovation and entrepreneurship), *mechanisms of change* (organisational structure, performance measurement, resources allocation and controlling), and *constraints* (professional boundaries). Moreover, Rainey [58, p. 210] also argues that while the government owns and finances the operations of public organisations, organisations in the private sector are, for the most part, funded by their private owners.

Despite the ongoing debate among scholars in the two disciplines, practitioners and researchers in cognate domains seem to recognise the “inherent”

characteristic distinctness between public and private organisations [45; 49; 74]. The extant literature also indicates that there are consistent theoretical arguments and empirical evidence explaining the difference between the two types of organisations [49; 61].

Table 2.1: Differences between public and private organisations.

Attributes	Public organisations	Private organisations	Sources
Goals	Public value	Shareholder value (profit)	[48; 61; 75; 76]
Environment	Highly regulated More cooperation	Less regulated More competition	[29; 31; 47; 61]
Stakeholders	Many Diverse interests	Few Common interest	[31; 45; 77; 78]
Customer selection	Legislation Political processes	Market	[29; 48; 61; 79]
Processes	Highly structured Fragmented	Integrated	[48; 61; 77]
HR Practices	Highly regulated	Flexible Merit-based incentives	[46; 48; 61; 80]
Management power	Less autonomy Less control	More autonomy More control	[46; 49; 75; 77]
Organisational structure	More hierarchy Less flexibility	Less hierarchy More flexibility	[29; 49; 80; 81]
Organisational culture	Risk-averse Propensity to stability	Risk-taking Propensity to change	[28; 45; 48; 61]
IT resources	Shared	Proprietary	[31; 82]

As shown in **Table 2.1**, the distinctive organisational setting and the conditions under which public organisations operate, and the implications this has on IT alignment and digital transformation are recognised in the plethora of previous IS studies [25; 28; 29; 31; 45; 47–49; 61; 74; 76–81; 83–85]. Furthermore, researchers caution against making generalisations based on the findings of previous studies conducted in the private sector (e.g., [29; 31; 76; 78; 80; 83; 86]). However, a closer look into these studies reveals that the seminal works of Rainey et al. [58] and Bretschneider [66] are often used to categorise the fundamental differences between the private and public organisations. Accordingly, three contextual settings of public organisations (i.e., *environmental factors*, *organisational-environmental transactions*, and *processes* and *organisational structures*) are found to determine how IT alignment and digital transformation are pursued.

2.1.1 Environmental Factors

Contrary to the view of NPM proponents on the similarity of public and private organisations, critics argue that the effects of the external environment on the management of these organisations are different. Boyne [56] argues that there are at least four effects of the influence of the external environment on public organisations—*complexity*, *permeability*, *instability*, and *absence of competitive pressure*.

Complexity of Public Organisations: The complexity of public organisations emanates from the long list of stakeholders [87]. This complexity calls for approaches that are necessary to negotiate the diverse interests. For instance, an important decision regarding a major digital transformation initiatives might be challenging if the interests of stakeholders are conflicting or diverging. Given that many IT projects tend to make a considerable impact at a societal level, the decisions of managers in public organisations often needs to be scrutinised by those holding socio-economic, political, and administrative powers [83; 88; 89]. Thus, strategic planning of digital transformation initiatives in public organisations can be influenced by, for instance, politicians with short-term interests, executives and long-term career employees, technology vendors, special interest groups, and individual citizens with conflicting objectives and interests. Moreover, public organisations need to embrace a democratic process where the interests of such diverse groups should be taken into account when major IT investment decisions are made. Previous studies on digital transformation (e.g. [18; 90]) and IT alignment (e.g. [13; 31]) found that stakeholder relationship is an important factor facilitating amicable IT strategic planning process where emerging digital technologies are introduced in a timely manner to create public value. Therefore, IT management practice within public organisations is more complex than in organisations in the private sector [31; 48; 74; 77].

Permeability: Public organisations are known to have what scholars refer to as “*open systems*” where the collaboration between a public organisation and others beyond the boundary is blurred [45; 61; 75]. This blurred boundary, in turn, makes them more sensitive to what happens in the external environment. This is a challenge that needs to be tackled since one of the primary expected outcome of the introduction of emerging technologies in public organisations is the creation of added value in collaboration with other agencies [91]. In other words, the responsibility of public organisations to provide integrated services to their citizens in collaboration with others makes them susceptible to the changes that affect other organisations they work with. However, public organisation leaders are expected to protect this permeability even when operations are not economically sound [29; 48; 78; 82].

Instability: Compared to private organisations, public sector organisations are known to be influenced by what happens outside the boundaries of their organisations. For example, several major IT investment decisions are considerably affected by the economic or fiscal changes in a country. Previous studies indicate that policy changes, economic crises, public financing arrangements, and the adoption of new regulations from local, regional, or central governments could abruptly change the direction of digital transformation [74; 92]. In addition, realising the demands of public officials to deliver quick results that correspond to the aspirations or expectations of politicians might be challenging.

Absence of Competitive Power: The prime objective of public organisations is to create public value through the collaboration of many actors (i.e., stake-

holders). As such, scholars (e.g., Bretschneider [66]) argue that interdependence between public organisations is of paramount importance. Thus, in contrast with private organisations, public organisations do not have to contend with competition pressure. According to Ward and Mitchell [61], the reason for the lack of competitive pressure is that political processes rather than the market determine the customers. This has resulted in many public organisations often offering relatively similar services [93; 94]. On the other hand, the collaborative mindset between various public organisations could be an opportunity for innovative solutions that could create added value for citizens. In particular, many digital transformation initiatives could benefit from the collaborations of public agencies in the delivery of integrated services [23; 28; 90].

2.1.2 Processes and Organisational Structures

Researchers on digital transformation and IT alignment that focus on the public sector (e.g., Plesner et al. [29], Rusu and Jonathan [25], Winkler [31]) argue that organisations in the public sector are distinct from organisations in the private sector in the way they are structured. Citing seminal organisational studies (e.g., Weber [95]), the authors suggest that bureaucratic organisational structures are related to accountability and professionalism, which are connected to the office ethos in the sector. This distinct organisational structure in the public sector, in turn, has implications for how the decision making and other processes within the organisation take place. For instance, a phenomenon known as “red tape”, which refers to the rules and regulations that dictate how work is done in a public organisation, was found to have unfavourable consequences. Among others, IS researchers found that strict compliance with procedures and hierarchy [59] delayed communication between various units of the organisation, which was reflected, for example, in slow decision-making as well as inefficient skills development [19; 74].

On the other hand, even though formal organisational structures are common to both private and public organisations, Plesner et al. [29] argue that this formality is strictly enforced in the public sector. Thus, the allocation of resources and decisions on the priority of, for instance, major IT projects need to be carried out in the interests of transparency and accountability. In other words, leaders of public organisations are expected to exercise their leadership activities according to the strategic vision and politically set agenda of elected leaders [77; 96; 97]. Therefore, it is no surprise that previous IS studies view the structure and characteristics of leadership roles in public organisations through the lens of administration and bureaucracy [31; 80; 83]. Reviews of the public administration literature also suggest that the public sector exhibits *centralised, formal, rigid, and risk-averse decision-making arrangements* [59; 77; 81]. The need for greater interdependence among public organisations than organisations in the private sector is cited as a motivation for centralised organisational structures with various checks and balances in place [66; 70]. However, it should be noted that such organisational structures in public organisations are often seen as the reason for the unfavourable attitude and behaviour of employees towards public

service delivery, negatively affecting organisation performance [98].

IS researchers recognise that public organisations undertake the largest and most complex digital transformation and IT projects compared to the private sector [46; 77; 80]. However, leaders have relatively lower autonomy than their counterparts in the private sector to make decisions on alterations of organisational structures and work processes. Although strict accountability and regulatory checks make it difficult, Borins [77] argues that IT management in public organisations requires a less formal and more flexible organisational structure and work arrangements. For example, the success of digital transformation is influenced by process flexibility (the possibility of altering business processes), functional flexibility (the possibility of making adjustments and selecting decision-making paths), labour flexibility (the ability to hire or fire employees according to needs), and network flexibility (the ability to alter inter-organisational relationships), all of which were found to be different between public and private organisations [80; 99].

2.1.3 Organisational Goals

The third important aspect of public organisations that contrasts with private organisations is how the organisational goal is articulated and measured. According to the public administration literature, public organisations are established to serve their constituents and businesses operating within their jurisdictions. Moreover, customers of public organisations have very few or no alternatives for obtaining public services [61], which puts less competitive pressure on public organisations [56]. However, strict rules and scrutiny are often put in place to ensure that public organisations operate according to established standards of fairness, accountability, and trustworthiness [61].

On the other hand, researchers from both IS and public administration agree that public organisations have intangible, multiple, and conflicting goals [31; 56; 74; 100] while private organisations operate towards meeting clearly articulated goals with specific measures [56; 66]. The reason behind this difference is often associated with the type of ownership. For instance, Boyne [56] argues that since tax payers own public organisations, stakeholders of a public organisation have their say on which goals of these organisations should be prioritised or pursued. As such, organisational goals are often set by elected political leaders—to maximise public value, which benefits the collective. This arrangement, in turn, leads to a situation where leaders of public organisations are expected to contend with vaguely formulated organisational goals [66; 70]. In contrast, private organisations are established with the sole objective of maximising profit for their shareholders. As such, leaders in the private sector are mandated to operate in a market environment overcoming competition and demonstrating economic efficiency, which results in profit [101].

Given the differences between private and public organisations related to organisational goal setting and assessment, the IS literature calls for approaches towards different views of IT management based on contextual differences. For instance, IT alignment and digital transformation studies in public organisa-

tions (e.g., [28; 31; 34; 61; 79]) point out the significance of identifying and appropriately managing stakeholder relationships to enable the formulation of organisational goals that create public value.

2.2 IT Alignment

The current digital transformation undertaken by organisations across sectors and industries has brought the issue of IT alignment to the fore. As the adoption of emerging technologies has brought many challenges to organisations, the development is no surprise to researchers [12; 13]. The main challenge facing today's organisations, as they adopt emerging technologies, is the integration of these technologies so that their IT and business strategies, as well as their organisational structure, IT infrastructure, and processes, are aligned [102] with the proper consideration of the mission, objectives, and plans contained in the overall business strategy of the organisation [103].

Annual surveys conducted between 2011 and 2021 reveal that the phenomenon of IT alignment has consistently been ranked as the top concern of IT executives, although recently overtaken by cybersecurity and privacy [11; 104]. This finding is a recognition of the results of several empirical studies that reported an association between IT alignment and organisational performance. For instance, empirical studies conducted over the years (e.g., [24; 105; 106]) have shown that organisations that managed to align their IT and business strategies outperform those that fail in IT alignment. The explanation from a resource-view perspective is that the adoption of IT often requires significant capital expenditures and operating costs for an organisation. If this organisation fails to appropriately use its IT resources in line with its current organisational settings and overall goals, it fails to realise the value of the investments in IT. Furthermore, failure to achieve and maintain IT alignment results in missed opportunities [11] and reduced ability to achieve organisational objectives [107]. Thus, regardless of the investments in IT, organisations with poor IT alignment are more likely to report suboptimal organisational performance [19; 19; 37; 108].

Given the importance of IT alignment for improving organisational performance and its role in the success of digital transformation [12], the continued interest among researchers has resulted in a rich body of literature [10; 11; 13]. A closer look at recent IS literature reviews [8–10; 13; 24] reveals three categories of IT alignment studies worth mentioning here. The first set of studies is conceptual in nature, in which researchers debated various definitions and dimensions. These studies attempted to explain the construct of IT alignment from various perspectives, including strategic, intellectual, structural, social, and cultural [11]. The second category of studies was preoccupied with testing the causal relationship between IT alignment and organisational performance. To this end, researchers have conducted empirical studies that evaluated the influence of IT alignment on organisational performance measured in financial metrics, productivity, and customer satisfaction (e.g., [109; 110]). Although some studies present contradictory results (e.g., [111–113]), according to Benbya et al. [9] and Jonathan et al. [13], there is a growing consensus among scholars in

recognising the role of IT alignment in improving organisational performance (e.g. [14; 36; 43; 114–118]). The last category of studies identifies enablers and inhibitors (i.e., contextual variables) that can determine the degree of IT alignment in various industries and sectors [10; 13]. In other words, the aim of these studies is twofold—to assess the degree of IT alignment and to identify the various factors that might have contributed to the current IT alignment. In this thesis, my aim is in line with the last set of studies, identifying the factors that influence IT alignment in public organisations undertaking digital transformation.

2.2.1 Conceptualisation

The continuous debate surrounding how IT alignment should be conceptualised has been a source of confusion among researchers and practitioners and perhaps the reason for many of the contradictory findings of empirical studies [13; 111; 112; 119]. However, the seminal work by Henderson and Venkatraman [120] has been widely recognised as the foundation of most subsequent studies that attempted to improve our understanding of the construct [10]. Although there seems to be a lack of consensus on one definition capturing the essence of what IT alignment entails, Luftman et al. [19] argue that it has now evolved as a phenomenon viewed as an optimised position that an organisation has to reach and successfully maintain to be able to maximise the business value of IT. Therefore, the literature indicates that researchers and practitioners agree that the purpose of IT alignment is to allow organisations not only to plan and execute an appropriate use of resources, but also to put organisational arrangements in place that can enable the implementation of IT strategies in line with the overall organisational strategy [11].

Based on reviews of previous IT alignment studies in the IS domain (e.g., [8; 10; 13; 24]), I categorise conceptual debates among researchers into three groups. The first set of studies focusses mainly on describing and defining IT alignment. As a starting point for empirical studies, previous researchers attempted to present IT alignment as a phenomenon with multiple dimensions, and showed how these dimensions help us better conceptualise the construct. The findings of such studies were invaluable, as proposals were made to help organisations assess and improve the degree of IT alignment [7; 38; 121]. For instance, according to Reich and Benbasat [122], IT alignment is best understood from a two-dimensional perspective (i.e., social, and intellectual). The social dimension is concerned with the understanding between the IT and the leaders of the remaining departments within an organisation. In addition, the social dimension of IT alignment also helps us to illustrate the important role of leaders' commitment to see through the realisation of their organisation's mission together with plans and objectives set by various units. Intellectual alignment, on the other hand, describes to what extent the plans of the IT and the remaining units of the organisations match. Moreover, two other dimensions (i.e., strategic and structural) have also been discussed in the literature. While the strategic dimension of IT alignment deals with the fit between IT and the overall organisational strategy, the structural element of IT alignment is concerned with the

structural fit between IT and the configuration of the remaining units [11; 123].

The second set of conceptual IT alignment studies investigated at which levels within an organisation (i.e., strategic, tactical, or operational) [123–125] the construct should be studied. The rationale of these studies is that the formulation of IT strategies that are in line with the overall organisational strategy is not sufficient to achieve IT alignment unless it is supported by a series of activities at the tactical and operational levels. Thus, Gutierrez and Lycett [125] argue that organisations need to perform continuous assessments at all three levels to see whether the approaches in place are appropriate to achieve and maintain IT alignment. Similarly, other studies have also suggested approaches to measure IT alignment and manage related activities in different parts of an organisation (e.g., business units, functions, or departments) based on the expected business value of IT at the units / departments, or organisation levels [19; 36].

The last set of conceptual debates among IS researchers is whether IT alignment is a dynamic or a static construct. Earlier studies conceptualisation of IT alignment as a static phenomenon, within the reach of organisations through the formulation of appropriate strategies and the adjustment of organisational settings was criticised [8; 126]. According to Fink and Sukenik [127] the theoretical approaches and organisational factors that were considered to study IT alignment have implications for how IT alignment is perceived—as static or dynamic. One theory commonly referred to among those subscribing to the static view is contingency theory. These researchers argue that it is up to leaders to identify the list of factors that influence IT alignment and take the appropriate measures for improvement. Thus, the assumption is that a few sets of alterations and schemes can be used to model the effect of organisational factors to improve the degree of IT alignment [8]. Although the contingency perspective recognises the importance of alternative contexts that provide us with an integrative view of the construct, such a static representation only shows a degree of IT alignment at one point and its implications on short-term organisational performance [128].

On the other hand, there seems to be a growing consensus among researchers that IT alignment should be viewed as a dynamic process that requires constant evaluation and adjustments [13]. According to Fink and Sukenik [127], this shift in position is a testament to the growing appreciation of the three dominant theoretical approaches that were adopted from a multitude of theories within organisational studies—universalistic, contingency, and configurational. First, according to the universalistic perspective, IT alignment is independently affected by the choices of IT management approaches and organisational settings. Second, from a contingency perspective, IT alignment is the function of the bivariate interactions between IT management choices and organisational factors. Third, the configurational perspective states that IT alignment is the result of a multivariate interaction between IT management approaches and organisational factors. In today's dynamic business environment, where organisations respond rapidly to changes in technological and business landscapes, researchers argue that IT alignment studies need to take three perspectives in combination [8; 128]. Furthermore, previous studies had a disproportional fo-

cus on IT-related factors, while other organisational contextual factors (e.g., organisational culture, organisational structure) were overlooked, and thus do not provide a holistic comprehension of IT alignment [8; 23].

Based on the above discussion, I conceptualise IT alignment not as a static end result of IT management exercises and organisational configuration choices, but as a process that requires continuous assessment and adjustment in various dimensions within the unit and organisational level where a range of organisational and managerial factors are investigated. Thus, I view IT alignment as a multidimensional construct that is contingent on contextual factors within and outside the organisation, in line with previous studies (e.g. [8; 126–128]).

2.2.2 Models and Frameworks

As one of the most researched topics in the IS and cognate disciplines, the literature on IT alignment is rich with several conceptual and process models [8; 10]. A closer look at the models and frameworks indicates that the continuous conceptual debate on the construct over the years has shaped how researchers pursued IT alignment—normatively or descriptively. According to Luftman et al. [19], some of the previous studies were normative in their approach, as their aim was to investigate whether IT alignment should be pursued to further the objectives of organisations and how this should be achieved. These studies have primarily explored the role of IT alignment in value creation. However, researchers have also suggested that descriptive approaches are equally important. To this end, models and frameworks have been proposed to help us pose questions about the various degrees of IT alignment, the antecedents that influence IT alignment, and the result of the various levels of IT alignment for organisations [19; 27; 129; 130]. Some of these models and frameworks developed over the past three decades are presented in **Table 2.2** with brief descriptions.

IT alignment Models and frameworks are invaluable to further our understanding of the IT alignment construct (e.g., [120; 129–132]), help organisations to assess the degree of IT alignment (e.g., [19; 27; 122]) or identify enablers and inhibitors (e.g., [122; 130–133]). This is even more important in this era of dynamic business and technological landscape. Researchers argue that organisations need not only to reach, but also to maintain an IT-aligned position to achieve optimal and sustainable organisational performance [8; 10; 24; 37]. Researchers also argue that it is in organisations' best interest to perform a continuous assessment of the organisational context and IT alignment maturity to ensure that enablers are maximised while inhibitors are minimised. Thus, the models and frameworks in the extant literature are invaluable.

Among the list of models and frameworks, the thesis adopts the **Strategic Alignment Maturity Modell (SAMM)** (shown in **Figure 2.1**) developed by Luftman et al. [7; 19]. This model views IT alignment as a continuous process influenced by contextual factors within and outside the organisation, and adjustments made to various activities. Accordingly, Luftman [7] argues that organisations pursue IT alignment but pass through five process stages: (1) initial, ad hoc; (2) committed; (3) established, focused; (4) improved, managed; and finally,

(5) optimised. Since the greatest value from IT investments is achieved when the process is optimised (i.e., stage 5), the model prescribes not only reaching a stage but an ongoing IT alignment maturity. In other words, SAMM is designed to conceptualise and develop processes and identify activities that will enable ongoing IT alignment, based on six dimensions.

Table 2.2: Selection of IT alignment models and frameworks.

Model/Framework	Operationalisation	Authors
Model	Four domains of strategic alignment:(1) business strategy, (2) IT strategy, (3) organisational infrastructure, (4) IT infrastructure and processes	Henderson & Venkatraman [120]
Framework	IS organisation design decision for centralised, decentralised or hybrid structures	Brown & Magill [134]
Model	IT alignment and critical success factors: (1) environmental uncertainty, (2) organisational (3) integration, (4) IT management sophistication	Sabherwal & Kirs [135]
Framework	Conceptualising and identifying short and long term aspects of social dimension of linkage (i.e., IT alignment)	Reich & Benbasat [132]
Framework	Aligning (1) management (strategy, structure, operations), (2) areas of concern (business, information and communication, technology systems infrastructure, (3) design	Maes et al. [130]
Model	Four potential factors influencing the social dimension of IT alignment: (1) shared domain knowledge between business and IT executives (2) IT implementation success, (3) connections between business and IT planning processes, (4) Communication between business and IT executives	Reich & Benbasat [122]
Model	Six fit (i.e., IT alignment) perspectives: (1) moderation, (2) mediation, (3) matching, (4) covariation, (5) profile deviation, (6) gestalts	Bergeron et al. [129]
Model	Impact of IT alignment on organisational performance based on the Miles and Snow's [136] three business strategies: (1) defender, (2) analyser, (3) prospector	Sabherwal & Chan [128]
Model	IT alignment influencing factors: (1) CEO commitment to IT, (2) IT sophistication, (3) external IT expertise	Hussin et al. [133]
Model	Four factors influencing IT alignment: (1) a CIO, (2) an executive team informed about IT-enabled enterprise, (3) clear IT governance, (4) Adoption of portfolio management practice	Broadbent & Kitzis [131]
Model	Expanding Hendersen & Venkatraman's model [120] by adding relationship management as an antecedent of alignment and the balanced scorecard as a tool for achieving, managing and sustaining IT alignment.	Hu & Huang [27]
Model	Identifies six IT alignment dimensions: (1) Communications, (2) value analytics, (3) IT governance, (4) partnering, (5) dynamic IT scope, (6) skills development.	Luftman et al. [19]

SAMM was chosen for this study for three reasons. First, Luftman et al. [19] conceptualise IT alignment as a continuous process that seeks to improve the optimal use of IT, which is in line with the position I adopt in this thesis. Second, unlike the various conceptual and specific models designed for specific organisations or sectors, the model is generic and extensive with the six distinct activity-based dimensions. These dimensions could easily be applied to the public organisations that I investigated. Third, the model is validated with empirical data which was collected over 13 years from 16 different industries, located in 18 countries in 5 regions [19]. Additionally, SAMM is among the most widely used models among IT alignment studies in the IS and cognate research domains [121].

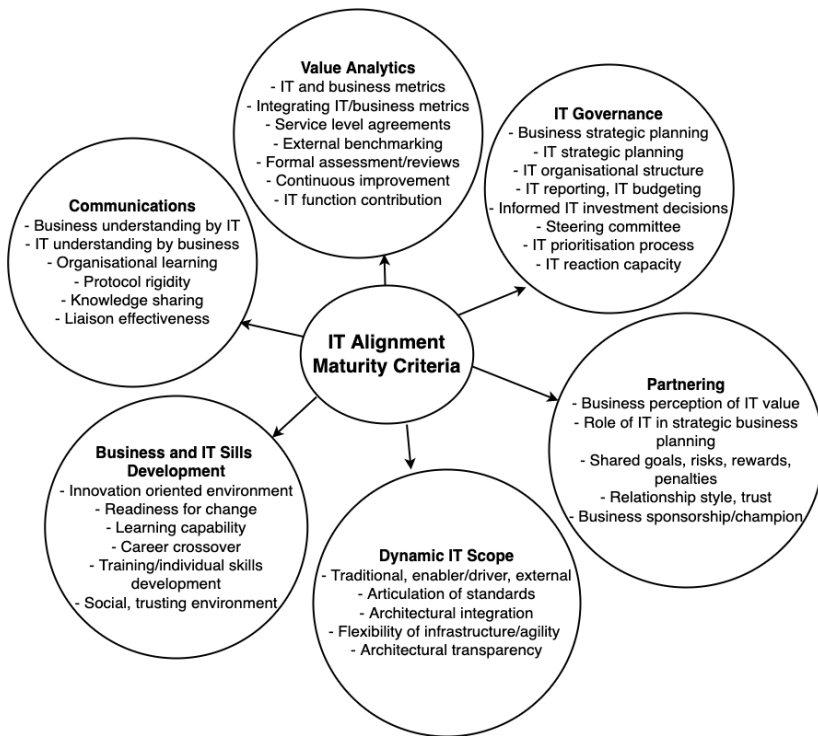


Figure 2.1: Strategic Alignment Maturity Model (Adapted from [7; 19]).

The six dimensions of SAMM are extensive and cover various activities to which they are individually related (see **Figure 2.1**). The dimensions are **communications**, **value analytics** (how metrics can be used to measure the contribution of IT in a language that would be understood by the business and IT organisation), **IT governance** (how organisations allocate decision-making authority in relation to IT), **partnering**, **dynamic IT scope** (adaptability or flexibility in terms of emerging technologies and provision of tailored solutions) and **Business and IT Skills Development**. The idea is that analysis of the six di-

mensions results in an IT alignment maturity level on a scale of 1 to 5. Firms at level 4 are considered to have reached an IT aligned position, and level 5 indicates a sustained IT alignment state [19]. In the following paragraphs, I briefly discuss how SAMM's six dimensions are relevant to IT alignment.

1. Communications is the most important dimension of SAMM and is also included in most IT alignment models (e.g., [27; 120; 130; 132]). Communications refers to the system in place that is aimed at facilitating the accurate and quick flow of information between the IT and remaining units of an organisation. Such communications determine whether employees on both sides understand IT and business strategies, plans, potential risks and opportunities, priorities, and how the organisation pursues overall organisational goals [19]. This dimension is also concerned with procedures for knowledge sharing and organisational learning. According to Reich and Benbasat [122], appropriate communication mechanisms are necessary to enable the integration of IT and business plans, which in turn improve IT alignment. Besides, favourable communications also influence the other dimensions of IT alignment including partnering, and skills development. Reynolds and Yetton [36] also argue that communications are critical in large and complex organisations, since IT alignment calls for a clear understanding, trust, and integration throughout the enterprise, and with external partners.

2. Value Analytics refers to the extent to which an organisation uses digital metrics that satisfy both IT and the rest of an organisation. Such metrics are invaluable as they indicate, for instance, the contribution of IT to the business. As IT expenditure increases, there is a demand to account for the value of IT justifying the investment value [19]. The existing literature provides various approaches including service level agreements, protocols, or bench-marking with other comparable organisations to appraise the contribution of IT. According to Jedynak et al. [137], the use of IT metrics and measuring value is one of the most important activities for organisations in the current digital transformation era.

3. IT Governance, which refers to IT decision-making arrangements, is one of the most important dimensions determining the value we derive from IT. In fact, IT governance is one of the most studied dimensions of IT alignment [138]. De Haes and Van Grembergen [139] also argue that appropriately chosen and implemented IT governance could be invaluable to enable IT alignment which, in turn, improves organisational performance. Given its important role, SAMM provides a list of activities to improve IT alignment including strategic IT and business planning, IT budgeting, prioritisation, and reaction capacity [19].

4. Partnering describes the strength and type of relationship between IT and the remaining units of an organisation. The rationale of this dimension is that organisations need to cultivate partnership relationships rather than 'customer-client relationships'. According to Rathnam et al. [140], an organisation will get the most out of IT when an equal and strong partnership is established and when the contribution of IT is recognised by both parties involved. Reich and Ben-

basat [122] characterise the partnership relationship as a working arrangement in which IT and other units agree on their expectations about each other's contributions. Leadership's attempts to recognise the work of IT, or championing IT projects, might improve partnering in an organisation [19].

5. Dynamic IT Scope is one of the most important dimensions of SAMM as it is related to the ability of an organisation's IT to be flexible in response to the internal and external forces. The organisational agility phenomenon that refers to the ability to be adaptive and flexible is a timely issue [141]. Thus, dynamic IT scoping measures how prepared an organisation is to foresee and meet the need for emerging technologies as required by the continuously changing needs of an organisation. According to Panda and Rath [142], the current volatile environment makes dynamic IT scope an important IT alignment dimension.

6. Business and IT Skills Development is an important dimension of IT alignment, as the appropriate use of IT is only possible when the IT and other units of organisations possess the right set of skills. According to Luftman [19], organisations with optimised processes are likely to put in place an arrangement in which feedback and training opportunities are provided and employees are encouraged to acquire new skill sets. Besides, the results of empirical studies also suggest that skills development programmes are indicators of the state of other dimensions of the model—communication, value analytics and partnering [19; 143].

2.3 Digital Transformation

In recent years, the phenomenon of digital transformation has surfaced in the academic literature, within the area of strategic IS research in response to changes in the business environment [2; 3; 144]. Digital transformation refers to “*a fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an entity [i.e., an organisation, a business network, an industry, or society] and redefine its value proposition for its stakeholders*” [1, p. 12]. Opinion pieces and reports from practitioners' outlets have also recognised digital transformation as a timely issue related to strategic decisions to further the goals of today's organisations [4; 5]. This development is stimulated by the convergence of emerging trends—social media, mobile, cloud, and smart technologies—and the need for organisations to automate and integrate their products and services.

Although digital transformation is a timely topic that has attracted the interest of researchers and practitioners, it was found that articulating what digital transformation entails and how to manage it to fruition was challenging. According to the literature, digital transformation is still a protean concept [145]. One possible reason for this confusion might be the result of the common assumption that digital transformation is merely a technological phenomenon [146]. However, more recently, there has been a growing consensus among scholars that digital transformation is a multifaceted phenomenon that needs to be

further explored. For instance, Jedynak et al. [137] argue that technology itself is just one piece of the complex digital transformation puzzle that must be solved to realise the anticipated benefits. To this end, the roadmap to a successful digital transformation involves a proper formulation of the strategy [2; 147] and the management of the necessary organisational changes [29; 144].

The benefits and management of digital transformation are often topics of discussion across sectors and industries. For instance, at a higher level, digital transformation is viewed as the application of new and emerging technologies to further the interests of societies at large. Therefore, it is assumed that the use of new digital technologies improves communication between various stakeholders with the expected impact on economic, social, and political environments [18; 90]. However, to implement these changes, the digital transformation requires a long list of changes [148; 149].

At various levels (i.e., organisational, industry, or social), digital transformation is viewed as the introduction of new technologies and taking advantage of these technologies to tap opportunities and improve value creation. Using emerging technologies, organisations will also be able to respond to the necessary changes, improving the capability of maintaining stability. Similarly, realising these benefits requires an appropriate formulation of a strategy that facilitates the integration of new technologies into existing technologies and business processes [53]. Furthermore, as Gobble [150] puts it, only organisations that view digital transformation as a journey can formulate a robust strategy that supports successful digital transformation. Scholars argue that a robust strategy must outline the appropriate organisational conditions. This includes the organisational structure [151], business processes [152], and the organisational culture [153]. In other words, the benefits of digital transformation to enable value creation can only be realised when the various organisational settings are on par with the introduction of new technologies [18–20] and their is alignment between IT and the overall organisational strategies [9; 21]. This is what scholars refer to as IT alignment.

2.4 IT Alignment’s Role in Digital Transformation

As already acknowledged in the extant literature, the benefits of IT alignment in improving organisational performance are not new. However, the current era of digital transformation, characterised by the dynamic business and technological landscape and the complex structural changes organisations undergo, have pushed the issue of IT alignment to the fore. Within the context of digital transformation, researchers argue that IT alignment’s role is threefold—improving the value from IT investments (primarily the acquisition of emerging digital technologies), enabling organisational agility, and facilitating the integration of emerging digital technologies. I discuss these benefits further in the following subsections.

2.4.1 Improving the Value from IT investments

Even though IT alignment has been an important phenomenon for more than three decades, researchers and practitioners acknowledge that its role has become even more pronounced in this era of digital transformation. This follows the development that IT has become an integral part of the business processes of organisations [19]. Thus, it is no secret that leaders in today's organisations spend a considerable amount of resources attempting to reach and maintain IT alignment [12]. The prominence of the phenomenon is not surprising given the rate of organisation-wide changes necessary to improve the utilisation of IT to further organisational goals. For instance, the application of pervasive digital technologies (e.g., the Internet of things, cyber-physical systems) across industries calls for continuous IT alignment [116; 118; 154; 155].

According to the digital transformation literature, the adoption of new tools and methods to exploit data (e.g., using business analytics and machine learning) needs to be appropriately managed with the existing IT infrastructure, organisational structure, and overall business strategies while navigating the fast-paced business environment. However, improving the value derived from IT requires making the necessary arrangements to facilitate the utilisation of new digital technologies according to the fluid organisational objectives. Prior studies show that aligning business and IT strategies improves the value of investments during digital transformation. The argument is that IT alignment helps organisations to appropriately manage their IT resources according to the current and anticipated organisational settings [23; 156; 157]. Empirical studies indicate that organisations that managed to achieve and maintain the IT-aligned position consider digital transformation as a phenomenon influenced by organisational factors such as organisational structure [30; 158–161], organisational politics [162], social value [114], network management [163], decision-making arrangements [164; 165], and organisational culture [156; 159; 166].

2.4.2 Enabling Organisational Agility

The emergence of digital technologies coupled with hyper-competition and volatile business environments has radically changed how organisations pursue their business operations. This development has created a scenario where organisations have to use new technologies and adopt business models in which they must strive to produce and deliver the right products and services at the right time, by making adjustments to their IT and overall organisational strategies [15]. Heilig et al. [167] and Vial [168] argue that finding the right fit between new digital technologies and organisational adaptations becomes complex as organisations climb to the next generation of digital transformation.

Contrary to previous assumptions in the early 1980s and 1990s, IT alignment is now considered a dynamic position that calls for constant monitoring and adjustments [91]. This is the result of environmental uncertainty, which requires organisations to respond swiftly and appropriately. The increase in environmental uncertainty in the current market brings the need for the ability to detect and respond to changes—a phenomenon referred to as organisational

agility in the IS discipline [119]. Researchers and practitioners argue that organisational agility, for today's organisations is not just desirable but an essential capability that determines whether an organisation can achieve its goals and remain in business [169; 170]. Although the relationship between IT alignment and organisational agility has garnered the attention of researchers, there seems to be a lack of studies integrating the research topics. However, the few IS studies that have investigated the relationship between the constructs argue that IT alignment plays an important role in digital transformation, facilitating organisational agility [8; 12; 17; 157; 158; 165; 166; 171].

As digital transformation is a continuous and organisation-wide change, organisations pass through several phases to realise the anticipated benefits. In the extant literature, the list of phases an organisation passes through includes localised exploitation, internal integration, business process redesign, business network redesign, and business scope redefinition [158]. Given the inevitable changes necessary to succeed in their digital transformation endeavours, leaders have to plan and execute activities that enable them to be agile. According to Vial [168], tapping opportunities enabled by emerging digital technologies (big data, analytics, cloud services, mobile and social media platforms), as well as constantly adjusting organisational configurations (i.e., in response to changing business landscape), calls for a well-managed bi-directional relationship between IT and the rest of the organisation, also referred to as IT alignment [12; 158; 159; 164; 166].

2.4.3 Enabling Integration of Digital Technologies

The current digitalisation era is characterised by the abundance of emerging technologies that could be introduced in an organisation in support/instead of the existing ones. However, one of the challenges for many organisations is how to integrate the new technology with the organisational structure, business processes, as well as human- and other resources. Researchers argue that the integration of emerging technologies into the current operational and strategic model [158] is a daunting task, given the necessary changes and adaptations required.

Fortunately, researchers have found that IT alignment plays an important role in smoothly integrating new technologies [8; 161; 172; 173]. At the strategic level, aligning IT and overall business strategies allows organisations to anticipate current and future IT needs and the necessary organisational adjustments [8]. In recent days, researchers have proposed a fusion of IT and business strategies into what is referred to as digital strategies [12]. Since this strategy is embraced by both the IT and administration/business side, this creates a common language that could be understood by the IT and the remaining units [17; 155; 172; 174]. On the other hand, a closer look at prior IS studies confirms the necessary paradigmatic change in terms of the configuration of various organisational and external factors to achieve IT alignment in the current era of digital transformation [118; 175].

2.5 IT Alignment and Digital Transformation in Public Organisations

Digital transformation has been one of the top agendas for the public sector given the role it plays in defining not only the day-to-day practises but also the results of organisations. According to Mergel [28], the use of emerging technologies has brought about several opportunities to meet the expectations of citizens by improving the ability of public organisations to create added value. However, it is also important to acknowledge the various challenges facing leaders as they attempt to plan and execute their digital transformation initiatives. Researchers argue that the growing adoption of emerging technologies across industries often fails, regardless of the intended outcome. The McKinsey report suggests that about 70 % of digital transformation initiatives have been found to be complex and risky [176]. Although the list of factors contributing to the failure of such initiatives is long, there are common issues pointed out in the literature. For instance, resistance from employees to accepting new technologies, lack of support from leaders, inflexible decision-making arrangements, poor communication between IT leaders and other units, lack of clearly articulated organisational objectives, and shortcomings related to knowledge management appear to limit the opportunities gained from digital transformation [177; 178].

Researchers studying the application of information technology in the public sector suggest that the introduction of new technologies needs to be complemented with investments in work processes and human capital [21]. Thus, I argue that the challenge for public organisations undertaking digital transformation is the management of organisation-wide adaptations as new digital technologies are used to further organisational objectives. However, despite having a good understanding of the impact of digital transformation [179], many public organisations still struggle to realise the intended outcomes.

On the other hand, researchers argue that organisations that fail in their digital transformation initiatives are also those that fail in their attempts to reach and maintain IT alignment. For instance, a review of prior studies (e.g., [9; 12; 13]) revealed that it is in organisations' best interest to maintain an IT aligned position to capitalise on the opportunities of digital transformation. The extant literature also suggests that IT alignment is, in fact, an essential prerequisite for a successful digital transformation [17; 166].

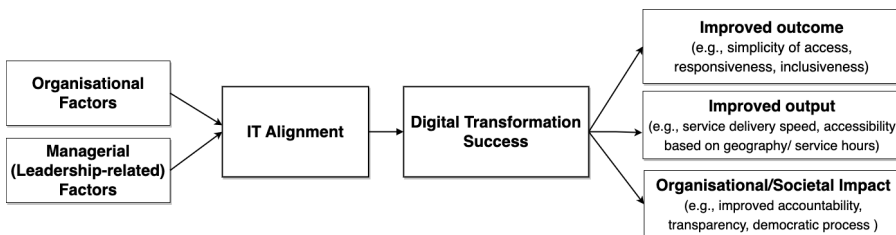


Figure 2.2: Research Conceptual Framework of the thesis.

As shown in **Figure 2.2**, the findings of previous studies indicate that managing the organisational and managerial factors (i.e., leadership-related) related to IT alignment results in a successful digital transformation that allows better organisational performance [23]. Therefore, I also argue that exploring the factors that influence IT alignment in relation to digital transformation is a timely enquiry.

Even though the significance of IT alignment for successful digital transformation is already established in the literature (e.g., [17; 166]), there are only a few studies that focus on IT alignment within the context of public organisations [26; 31]. As discussed above, IT alignment and digital transformation were found to be challenging [34; 35; 83; 180] in public organisations. Furthermore, the current dynamic IT and market landscape make IT alignment a timely but challenging issue for leaders [13]. On the other hand, there is a growing consensus among researchers that IT alignment in the era of digital transformation is the function of various internal and external factors [9; 13]. Therefore, it is necessary to identify internal and external organisational factors related to IT alignment is necessary to support organisations on their digital transformation journey. In other words, organisations in the public sector need to appreciate the significance of paying attention to such factors as organisational structure, stakeholder relationships, and organisational agility to reach the IT-aligned position [9; 13; 19] which, in turn, supports their digital transformation efforts.

2.6 IT Alignment-Related Factors Influencing Digital Transformation Success

As Kahre et al. [12] pointed out, leaders spend considerable time trying to align their operations in an attempt to support their digital transformation journey. Surveys among IT executives also indicate that IT alignment is the second-highest concern during this era of digitalisation. In line with IS scholars [8; 19], I argue that researchers have a duty to help leaders identify factors that determine the degree of IT alignment (i.e., to minimise inhibitors and maximise enablers). To this end, a review of digital transformation and IT alignment reveals four main factors—organisational structure, organisational culture, external domain alignment, and leadership skills—which will be discussed in the following subsections. More coverage will be on the findings of the study on organisational structure, which was also published in my Licentiate thesis.

2.6.1 Organisational Structure

Digital transformation is a continuous process, and the success and benefits it brings depend on a well-articulated and executed strategy that involves the participation of all (i.e., leaders, employees, and other stakeholders). According to the extant literature, for instance [17; 154; 166; 181–185], a digital transformation endeavours mean little unless a conducive structure is in place to facilitate knowledge sharing, skills development, effective decision making, and overall

communication between IT and the remaining units. Thus, Verhoes et al. [144] argue that the organisational structure is one of the strategic imperatives for digital transformation.

Prior studies reveal that organisations that have reached an IT-aligned position exhibit an appropriate organisational structure that makes the introduction of emerging technologies [17; 171]. However, these organisations have also faced challenges as they grow in size and complexity. Thus, the need for a new paradigmatic shift in designing a flexible, reconfigurable, and adaptive organisational structure is proposed by scholars [142; 157; 171]. Given the dynamic business, political, and technological landscape, the success of organisations in appropriately configuring their structure determines whether their transformation initiatives can result in the anticipated benefits [157–161; 186]. The results of empirical IT alignment studies also corroborate the assertion that, together with other organisational factors, the organisational structure has an important implication for digital transformation. For instance, the decision-making arrangements related to the introduction of new technologies and changes in business processes are affected by the organisational structure, which is also reflected in the realisation of added value from investments in new digital technologies [43; 164; 187].

Formal Organisational Structure

The literature on organisational theory defines organisational structure as a conscious, rational, and deliberate arrangement which is sanctioned by leaders to facilitate the smooth running of a business [188; 189]. Dalton et al. [190] provide various ways of structuring. For instance, the level of hierarchy, administrative intensity, specialisation, formalisation, or centralisation can be used to determine organisational structures. Centralisation, or the extent to which decision-making is concentrated in the head office, is commonly discussed in the literature.

The image most of us have of organisational structures resembles what Weber [95] describes as a bureaucratic organisation, as depicted in the organisational charts of many management textbooks [191]. This structure, which is also commonly referred to as a “formal organisational structure”, is intended to ensure that the division of labour is carried out so that the functional divisions do not overlap, to guarantee favourable coordination and control. Scott and Davis [192, p. 82] describe formal organisational structures as “*the normative system designed by management or the blueprint for behaviour*”. The three forms of formal organisational structure (centralised, decentralised, and federated) shown in (Table 2.3) are widely referred to in the literature [191; 193; 194].

According to Krackhardt and Hanson [195] and Mintzberg [188], organisations with a centralised organisation structure choose hierarchical decision-making processes where different units are interdependent. The right to make decisions comes from a headquarters or central administration where formalised authority and central planning take place. On the other hand, organisations with decentralised structure allow structural autonomy to their various units or

departments. The motivation here is to assign areas of responsibility through lateral coordination and local decision-making. Federal organisation structures aim to combine some of the characteristics of centralised and decentralised organisational structures.

Table 2.3: Formal organisational structure forms [50, p. 17-18].

Forms of formal organisational Structure	Definition	Source
Centralised	Organisational arrangement characterised by inter-dependence between units resulting from close vertical control, formal authority, standardisation and centralised planning.	[188; 195]
Decentralised	Organisational arrangement characterised by autonomy and coordination with decision-making taking place locally	[188; 195]
Federated	Organisational arrangement where interdependence between units, autonomy and decision-making is set flexibly.	[188; 195]

Informal Organisational Structure

The informal organisational structure is another form of organisational arrangement that exists in addition to the formal organisational structure discussed above. The simultaneous existence of both forms of organisational structure within an organisation is acknowledged in the literature [194; 196; 197]. According to Simon and March [193, p. 148] “*it would probably be fair to say that no formal organisational structure will operate effectively without an accompanying informal organisational structure*”. Informal organisational structures manifest themselves in a variety of forms in many organisations. A closer look at the literature shows that there is a lack of consistency in describing what constitutes informal organisations [37; 194–196; 198]. Chan [37] and Tushman and Nadler [198] characterise informal organisational structures as connections and procedures used by employees to get their work done.

Scott and Davis [192] argued that informal organisational structures reflect the actual behaviour of those who work within an organisation. According to Selznick [199], informal organisations come into existence because formal structures reflecting the rational rules emerging from formal administration do not accommodate the ‘non-rational’ dimensions of organisational behaviour. Scholars recognise the importance of understanding not only the formal and informal organisational structures independently, but also the relationship between them. Zenger et al. [194] argue that leaders who are well informed about the relationship between the two organisational structures can make evaluations of whether informal organisational structures support, complement, substitute or undermine the contributions of formal organisational structures. Research in organisational theory [200–203] and IT alignment studies in IS [11; 37; 204]

show that informal organisational structures play a significant role in many organisations, as they define how employees perform their work and discharge their responsibilities. For instance, the decision-making process in many organisations is not just a function of the formal rule or line of hierarchy, but is also affected by political processes and the informal relationships and shared languages [197]. A firm’s attempt to establish effective organisational learning, facilitating the transfer of tacit knowledge between employees, is found to be dependent on organisational routines rather than officially sanctioned practices and training [37; 205; 206].

As shown in **Table 2.4**, informal organisations can take the form of “*interpersonal relationships*”, “*social networks*”, “*professional networks*”, “*cross-departmental relationships*”, “*informal working arrangements*”, or “*flexible division of labour*” [37; 195; 196; 198; 207; 208].

Table 2.4: Informal organisational structure forms [50, p. 19].

Forms of informal organisational Structure	Definition	Source
Interpersonal	A relationship between individuals that is built based on benevolence and trust.	[209]
Cross-departmental relationships	A voluntary relationship between departments based on trust and benefits in the relationship.	[210]
Professional	An alliance or series of connections between individuals sharing a profession and areas of expertise.	[211]
Social networks	A network composed of the multiple ties of individuals based on trust, shared language, or friendship.	[212]
Informal working arrangements	Agreed working arrangement transcending the formal division of labour and tasks.	[37; 213]

Organisational routines, together with norms and networks of influence, develop gradually over time to overcome obstacles resulting from rigid formal organisational structures. According to Lincoln [214], informal organisational structures are invaluable for the seamless functioning of firms. Therefore, it is in an organisation’s best interest to learn about and manipulate informal organisational structures. However, informal organisational structures are not easily altered and formal organisational structures need to be manipulated gradually in order to do so [194]. For instance, the informal networks and relationships between employees are affected by the positions of the individuals in the formal position in the hierarchy. Adjustments made to the formal hierarchy (centralising or decentralising functions) and to formal reporting relationships may play a vital role in altering an informal organisational structure when it is deemed to be dysfunctional and counterproductive [194; 215].

Organisational Structure and its Influence on IT Alignment

The era of digitalisation which resulted in an increasing dependency of organisations on IT has sparked a substantial amount of interest in the relationship

between IT and its impact on organisations. Another equally important topic of interest is the significance of organisational settings and its effect on the adoption of IT. Particularly, the role of the organisational structure has attracted the attention of researchers over the last three decades [138]. Among others, IS researchers have attempted to identify an appropriate organisational structure to improve IT alignment [37; 216–218]. However, a review of prior studies indicates that there are still areas that need to be explored further [138]. For instance, previous studies have contradictory findings about which organisational structure forms are appropriate for IT alignment.

Prior IT alignment studies were also criticised for ignoring the simultaneous existence of different forms of organisational structure. In other words, the interplay between the formal and informal organisational structures has not attracted sufficient attention. While research on informal structures and social networks behind the chart overlook the role of formalised structures, the remaining studies have minimised the significance of informal organisational structures. However, the findings of empirical studies on IT alignment, such as Chan [37], reveal that the effect of the informal structure of the organisation is more pronounced than recognised in previous studies. As conceptualised in **Figure 2.3**, both informal and formal organisational structures need to be investigated together in terms of their mutual interplay. Such studies provide a comprehensive view to warranty how organisations function, but also because the two forms of structures and their interrelationship has an influence on IT alignment [37; 217; 219; 220]. The findings from these studies indicate that identifying appropriate organisational structures helps organisations to implement strategies that foster IT alignment.

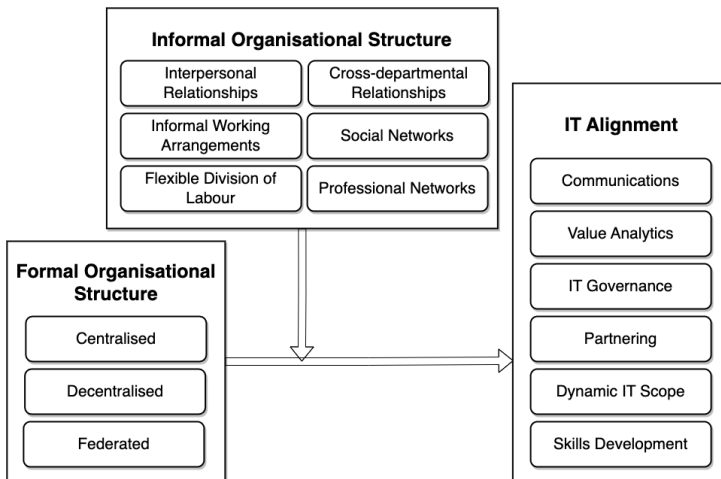


Figure 2.3: Research Conceptual Framework, the influence of organisational structure on IT alignment [50, p. 21; Paper III, p. 6].

Recent IS studies recognise the influence of both formal and informal forms of organisational structure on IT alignment (e.g., [37; 143; 221; 222]). However,

literature in the organisational studies research domain (e.g., [193; 196; 197]), suggests that different forms of informal organisational structure arise to remedy the shortcomings of formal organisational structure. For instance, Zenger and Lawrence [197] argue that organisational learning is a function of different forms of formal and informal organisational structure. In other words, when a formal organisational structure is not efficient enough to facilitate organisational learning, the informal organisational structure kicks in. By the same logic, as depicted in **Figure 2.3**, forms of informal organisational structure are used when the formal organisational structure is not enough to improve, for instance, one or more dimensions of IT alignment. The different dimensions of IT alignment help us to assess the level of IT alignment. [219].

2.6.2 Organisational Culture

In addition to a conducive organisational structure and resources to make the most of digital transformation initiatives, scholars argue that organisational norms and how people do their job play an important role. Thus, the literature indicates that there is a consensus among scholars that organisational culture shapes the mindset of employees and decision makers towards organisational change. In fact, studies on digital transformation and IT alignment have found that organisational culture could be one of the most critical organisational factors that influences the appropriate use of IT resources [23; 156; 159; 166].

As Luftman et al. [19] put it, organisations with a culture recognising IT as a driver of the overall business strategy are likely to exhibit relational leadership where the business and IT units consider themselves as partners. Furthermore, organisations that are likely to succeed in their digital transformation efforts are those that exhibit an organisational culture that supports the alignment of IT with the overall goals of the organisation [41; 117; 123; 184]. However, managing organisational change is a challenging task that requires leadership skills that can mobilise the whole organisation. Thus, recent IT alignment studies found that organisational culture that encourages conversational competencies and emotional intelligence is invaluable [118; 223]. Moreover, organisations known to succeed in their digital transformation and IT alignment appear to have an organisational culture that rewards employees with digital affinity and digital commitment [41; 123; 154]. Such favourable organisational cultures encourage employees and leaders to engage in entrepreneurial behaviour that fosters flexibility and takes responsibility for digital transformation [159; 168; 224; 224; 225].

2.6.3 External Domain Alignment

In addition to the internal organisational factors that influence IT alignment within the context of digital transformation discussed above, researchers argue that due consideration needs to be given to external factors as well. Since digital transformation involves the application of new technologies and making adaptations in response to the outside world, leaders must be vigilant about what is referred to as “*external domain alignment*” [161; 226]. As pointed out in

the extant literature, the significance of the fit between the various internal organisational variables is recognised. However, the relevance of striving for IT alignment through '*the fit between the internal context and the external environmental or organisational contingencies of collaborative firms*' is paramount during digital transformation [226; 227]. Although both business- and IT-related environmental factors collectively form the external environmental, Avila et al. [43] and Schmidt et al. [161] argue that previous studies focused on exploring only emerging technologies and how they could be integrated with current technologies within an organisation. However, according to the authors, the digital transformation success, however, is realised only when technologies are applied and adopted in collaboration with external actors (related organisations) and customers. Therefore, organisations embarking on the digital transformation journey should assess the resources available to them (including what they can access through their collaborators) with the aim of exploiting opportunities for synergy. In other words, the degree of IT alignment depends not only on the congruence between one's own IT strategy with the internal organisational contingencies, but also with the business processes, organisational culture, and structure of partner organisations [227].

Laszlo et al. [186] argue that IT alignment has become challenging without a holistic approach incorporating the constantly changing complex ecosystems of technology, regulations, and legislation. The development is not surprising given the close collaboration between many organisations in this digitalisation era. My analysis indicates that organisations preoccupied with internal organisational factors that overlook emerging technologies and market landscape are likely to miss the opportunities that digital transformation brings [163; 228; 229]. In addition, such organisations are the least likely to exhibit flexible infrastructure and organisational agility [14; 124; 141; 171; 230–232].

2.6.4 Leadership Skills

The current business environment mired with continuous technological, political, and legislative turmoils has created a situation where leaders are expected to be versatile in managing their organisations. Digital technologies are often presented as a source of competitive advantage and a solution to many of the challenges today's organisations face. However, the role of leaders in championing the acceptance of changes in organisations and the adoption of digital technologies has become challenging [233]. To succeed in their attempt to align their IT and business strategies during digital transformation, leaders are expected to possess multiple sets of skills related to the management of emerging technologies and the need to respond proactively to changes. As Schiuma et al. [234] put it, leaders in today's organisations, presented with unclear and unpredictable scenarios, are expected not only to survive, but also to thrive.

In connection with IT alignment and digital transformation, researchers in the past have identified several sets of skills that are necessary to meet the challenges of today's organisations. For instance, the embeddedness of digital technologies with all aspects of organisations and the pervasive use of information

have presented a challenge to safeguarding the integrity of IS resources. This has turned the issue of privacy and information security into a strategic issue that has implications for the success of the digital transformation. Thus, awareness of IT security and information governance are two of the crucial skills necessary for a leader to participate in informed strategy-making processes [116; 225; 235].

On the other hand, this era of digital transformation has primarily brought the issue of organisational change and transformation of business processes to the fore. As such, the skills that organisations need to make the best out of their investments in IT and create value are related to the management of technology and digital innovation [234]. The literature presents a holistic approach to a new paradigmatic shift in leadership that uses new technologies and solutions to improve organisational performance. However, the work towards this goal requires an approach to managing technology, people, and existing internal as well as external organisational variables [12; 13; 19]. Thus, a long list of leadership skills is sought including transformative leadership skills, ethical leadership, stakeholder management, digital competence, diversity management, and innovation management skills. Moreover, the dynamic environment also makes it necessary to attract and retain skilled people who are willing and able to develop themselves. In this regard, skills such as emotional intelligence, conversational competency, and skill development are crucial [117; 154; 155; 223].

2.7 Theoretical Underpinnings

Recognising the differences between organisations in the public and private sectors, prior IS studies have used various seminal theories to investigate the use of IT in the public sector. In particular, studies in IT alignment and digital transformation have adopted the three theories—*technology enactment theory*, *public value theory*, and *stakeholder theory*. Theories are used as lenses to explore the application of emerging technologies in line with the overall objective of public organisations.

2.7.1 Technology Enactment Theory

Prior IS studies exploring the use of emerging technologies to further the objectives of public organisations have recognised the contextual differences between public and private organisations [66; 82; 236]. Particularly, digital transformation is viewed as a phenomenon pursued differently in the two sectors with contrasting results. Although the public sector has been in a technology-driven transformation mode for a long time, the anticipated success rate of digital transformation falls behind organisations in the private sector [81]. IS studies investigating digital transformation have applied different theories to propose appropriate approaches to enable successful digital transformation in the public sector. However, a closer look at the literature indicates that the focus of these studies has been on mimicking the approaches of successful private organisations with little consideration of contextual differences. For instance, the technological determinism views (e.g., [237]) fail to appreciate the various antecedents that are

important to enable successful digital transformation. Organisational structure, organisational culture, and the breadth of stakeholder interests are important determinants of successful digital transformation. Thus, the specific organisational setting of public organisations, in contrast to private organisations, determines how emerging technologies are introduced and aligned with existing business processes, and the organisational structure to achieve organisational objectives [81]. This is a view consistent with Fountain's [238] technology enactment theory.

Even though an explicit definition was not provided in the literature, technology enactment theory refers to the view that contextual factors determine the specific meaning of technology and its enactment is the function of organisational conditions [238]. The theory is gaining popularity among IS researchers [28; 47; 81]. The merit of the theory is that it provides a lens for furthering our understanding of how various organisational and sectoral differences alter the way technology is implemented [74]. According to Faro et al. [81], the literature provides two propositions that are worth mentioning here. First, only prior to their adoption, technologies are objective, which can result in distinct outcomes based on the organisational arrangements and processes. Second, organisational arrangements are often dynamic depending on, for instance, legal elements that can influence or be influenced by enacted technologies. For this study, technology enactment theory is used to illustrate how specific organisational arrangements in the public sector influence the outcome of digital transformation. The theory has also been used in prior IT alignment and digital transformation studies (e.g., [28; 47; 74; 81; 85; 239]).

2.7.2 Public Value Theory

Scholars have long argued that the reason public organisations embarked on their journey of digital transformation was to grasp the opportunities that were made available to them [28]. However, there is a growing acceptance that the application of IT in general and current digital transformation initiatives in the sector tends to reflect the acceptance of the current view in public management approaches [90; 240]. To this end, the original work of Moore [69] on public value theory is gaining traction among scholars and practitioners. Even though a single definition is not available in the literature, public value is described as an offering provided by a public organisation to its citizens and society at large. According to Moore [69], a public value can only be created when the following three elements are met: (1) the provision of high quality services, (2) realisation of anticipated favourable results, and (3) establishment and maintenance of good quality relationships with citizens based on trust and mutual understanding.

Even though there is a recognition that the theory is not specific to digital transformation, public value theory presents the overall objective of a public organisation which is viewed together with the justifications of many digital transformation initiatives. Accordingly, public value is considered as meeting the expectations of citizens that could be viewed from various perspectives [76]. Thus, the creation of public value may entail the use of digital technolo-

gies and an overhaul of the processes and structures of public organisations, resulting in multifaceted benefits. For instance, according to the theory, public value creation may mean the creation of improved interaction between various stakeholders that is reflected in improved administrative efficiency as well as enhanced transparency through improved access to information or public decision-making [90; 240]. This contrasts with the narratives of New Public Management (NPM) where the application of emerging technologies in public organisations is expected to result in economic benefits [241]. In other words, the findings of prior studies in IS and public administration suggest that information technology was used primarily as a tool to improve administrative efficiency that is reflected in monetary savings [90]. The last few decades have revealed that NPM has lost its acceptance as the citizen demand for public services shifted towards improved public value [90; 240]. Thus, I argue that the digital transformation journey within the public sector needs to be formulated based on the alignment of the introduction of new technologies with the overall organisation objectives (i.e., meeting the expectations of citizens creating public value).

2.7.3 Stakeholder Theory

The digital transformation journey in the public sector has been associated with the necessary changes as demanded by citizens and elected leaders as enshrined in the theory of public value [69]. To this end, the adoption of emerging technologies that embrace the digitalisation paradigm calls for identifying and managing factors that influence the success of digital transformation [242]. So far, researchers have focused their attention on the success and enabling factors of digital transformation, including the role of various organisational factors, including the organisational culture, the organisational structure, the leadership capabilities and how these factors are managed to align the introduction of emerging technologies with the overall organisational objectives [17; 26; 138; 242]. However, a second set of enablers—external partnerships and collaborations—have emerged in recent IS literature (e.g., [78; 243]) as antecedents that determine whether organisations succeed in getting the best out of their investments in IT. This development is consistent with the recognition of the significance of stakeholders in strategy formulation and implementation of measures to improve the appropriate use of IT.

In line with the stakeholder theory as conceptualised by Freeman [72], the success of the digital transformation of public organisations in creating public value is judged based on whether the interests of various stakeholders are met [28; 31; 90]. Despite the lack of a commonly agreed definition, stakeholder theory is described as the view that public organisations need to recognise the various stakeholders and their interests and perform their operations to create public value [72]. Although it was developed as an alternative lens to shareholder logic in the private sector, stakeholder theory has been applied in IS research to further our understanding of IT usage along with complex operational settings [243]. However, it is worth noting that stakeholder theory and the three interre-

lated elements—normative, descriptive and instrumental—have been adopted to fit the context of public organisations [34; 90]. According to Donaldson and Preston [244], the *normative assumption* of the theory acknowledges not only the existence of various stakeholders but also the expectation that leaders will act ethically respecting the interests of their stakeholders. The *descriptive assumption* of the theory recognises the significance of the competitive interest of various stakeholders in the shaping of organisations and organisational behaviour [78; 243]. Finally, *instrumental assumption* is concerned with the development of stakeholder management practices that can be instrumental in achieving organisational objectives [243; 245]. Thus, I argue that stakeholder theory could be applied in this study to illustrate the role of stakeholders and how leaders approach the management of stakeholders to improve the degree of IT alignment as public organisations undertake digital transformation. The adoption of stakeholder theory in the IS domain is justified, since articulating what is acceptable public value can be notoriously contentious [31; 243]. Accordingly, the theory supports the significance of identifying the variety of stakeholders along with their intentions, interests, and the roles they play in planning and implementing digital transformation initiatives that create public value [47; 48; 78; 242].

2.8 Chapter Summary

Digital transformation has been recognised as a path towards meeting the challenges faced by organisations across sectors and industries. Among others, digital transformation is viewed as a means of enabling today's organisations to become agile, innovative, and resilient while maintaining stability and competitiveness. However, realising the anticipated benefits of digital transformation requires the alignment between the introduction of emerging technologies, organisational settings, as well as IT and overall organisational strategy. This has made IT alignment one of the important issues in the current era of digital transformation.

Even though the IS literature on IT alignment and digital transformation seems to be rich, the review of prior studies indicates that there are few areas that have not been sufficiently explored. Among others, the public organisations' internal organisational settings and the environment they operate in, and how these contexts determine the degree of IT alignment and digital transformation success are topics that have not been sufficiently explored. Thus, researchers argue that studies need to be carried out with support from seminal studies recognising the sectoral differences, i.e., public and private organisations. To this end, technology enactment theory, public value theory, and stakeholder theory could be used as a lens to investigate how organisational and managerial factors within public organisations could be approached to improve IT alignment, resulting in successful digital transformation.

Among the various models and frameworks in the IS literature, SAMM [7; 19] has been used in prior studies investigating IT alignment. The model stands out from others due to its generic nature, making it appropriate for organisations across industries. Furthermore, SAMM is the most applied model as it provides

opportunities to identify various activities related to IT alignment that could be adjusted according to the organisation's context [121]. SAMM's six dimensions and the corresponding attributes are in line with the view that IT alignment is a dynamic process that is contingent upon both internal and external environments [13].

Taking the specific context of public organisations, prior studies suggest that there is a strong relationship between IT alignment and digital transformation success (e.g., [12; 13; 17]). However, the results of these studies also suggest that various organisational and managerial factors determine the degree of IT alignment, which in turn affects the success of digital transformation. These factors include formal and informal organisational structure, organisational culture, external domain alignment, and leadership skills. Thus, I argue that these factors need to be explored to further our understanding in such a way that we can improve the degree of IT alignment, enabling successful digital transformation.

3. Research Methodology

This chapter presents the adopted research philosophy guiding the research strategy, data collection and analysis methods employed to conduct the six studies included in the thesis. The procedures and motivations for the choice of strategy as well as the data collection and analysis methods are also outlined for the three research activities. Finally, the chapter discusses the steps followed to ensure research quality while conforming to the established ethical guidelines for scientific research.

3.1 Philosophical Assumptions

One of the most important tasks a researcher does prior to conducting a scientific study is to choose activities and processes according to their anticipated contributions to research and practice. However, such attempts to further the body of knowledge need to be scrutinised through the lens of one or various philosophical assumptions. In other words, the philosophical position of a researcher forms a system of thought with the aim of producing new knowledge about a phenomenon under investigation [246]. Philosophical assumptions are also invaluable to help us assess the rigour of a study—the appropriateness of the choice of research strategy, problem formulation, and data collection and analysis methods [247; 248].

The literature provides a variety of categorisations of the various dimensions of philosophical assumptions. For instance, Burell and Morgan [249] conceptualise social sciences based on four sets of assumptions, namely (1) *ontology*—the nature of ‘reality’, i.e., whether a reality constitutes an objective existence beyond our cognition, or if it is just a product of our subjective consciousness, (2) *epistemology*—how we understand the world and transmit this knowledge to others, (3) *human nature*—the relationship we have with the outside environment, and (4) *methodology*—the various techniques we adopt to obtain knowledge. Based on these dimensions, four main philosophical assumptions—positivism, interpretism, pragmatism, and realism—are recognised among scholars in the social sciences [249–251]. Besides, the diverse schools of thought within these disciplines have also resulted in diverse metatheoretic assumptions and research methodologies. However, the literature indicates that extreme philosophical stances might be limiting [246].

Information systems research, similar to other disciplines dealing with complex social phenomena, is known to be influenced by a wide range of research paradigms and philosophical stances that operate concurrently [251]. However, according to Mingers [252], despite the wide range of philosophical positions

held within the discipline, the positivist and interpretivist stances seem to be dominant. In addition to the aim of a study and the researchers' own approach to research itself, Orlikowski and Baroudi [251] argue that dominant philosophical assumptions within a discipline inform a philosophical stance. According to the authors, the consistent world views and philosophical assumptions among researchers in the IS research domain come despite little theoretical consensus. Thus, philosophical assumptions of both positivism and interpretivism guided the studies included in this thesis.

Interpretivism is a philosophical assumption that guides research based on the belief that reality and our knowledge are the result of social interactions [251] that need to be interpreted subjectively [246]. As such a researcher needs to make sense of a reality as “*an emergent social process*” [249]. In other words, interpretive research is mainly dependent on what the researcher is interested in exploring, taking a specific role of observing and sense-making. Since interpretivists are interested in exploring a phenomenon focussing on meaning in a given context, no dependent and independent variables are established [253]. The interpretivism philosophical assumption was mainly applied in this study (Papers I, II, III, and V) as the primary aims of these studies were to explore (1) the role of IT alignment in digital transformation, (2) the public organisations' settings (i.e., organisational structure, organisational culture, and organisational agility, etc.), and (3) how the choices and actions of IT and administrative leaders influence IT alignment and digital transformation.

Positivism is another dominant philosophical assumption in the IS research domain, which is founded on the belief that our social world can be “*apprehended, characterised and measured*” objectively [251]. Since positivist studies are premised on the presence of predictable relationships between the phenomena under investigation, their objective is to test theoretical models. Thus, the rationale of a study for a positivist is often to further our understanding of a phenomenon. Accordingly, research guided by this assumption involves formulating dependent and independent variables, establishing measurement items, testing the hypotheses, and drawing inferences with the ultimate goal of increasing our predictive understanding of a given phenomenon. Within the studies included in this thesis, the assumption was applied as it allowed the validation of the proposed theoretical models. For instance, the relationship between the various organisational and managerial factors in IT alignment and digital transformation was tested using quantitative analysis of data collected from different public organisations in Ethiopia and Sweden (Paper IV and Paper VI).

In summary, the exploratory and confirmatory nature of the studies included in the thesis justifies the adoption of both interpretive and positivism philosophical assumptions.

3.2 The Research Process

The thesis is the result of six studies conducted one after another, organised and presented in the three research activities. As noted in the problem statement, there is a dearth of studies investigating the relationship between digital trans-

formation and IT alignment within the public sector context. More specifically, I recognise the lack of knowledge about the various factors that could determine the degree of IT alignment in public organisations undertaking digital transformation. Thus, literature reviews were deemed appropriate to establish what is known and what needs to be investigated in the interest of laying the foundation for empirical studies. Accordingly, the findings of the two systematic literature reviews (*Research Activity 1*) were invaluable in designing the four empirical studies that followed (*Research Activity 2* and *Research Activity 3*). **Figure 3.1** outlines the three research activities, together with the corresponding philosophical assumptions, research strategies, data collection and analysis methods, and the corresponding research objectives.

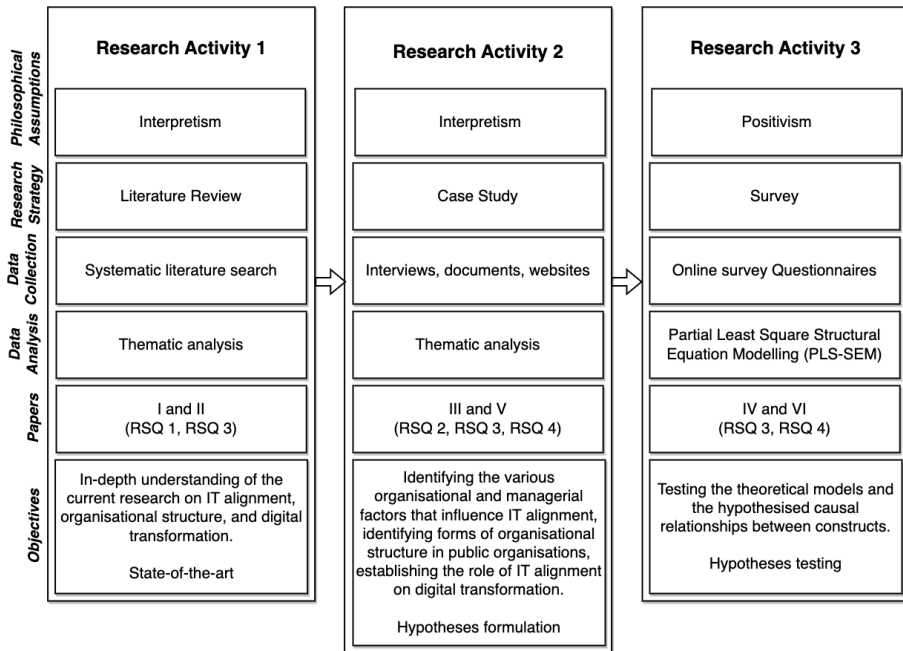


Figure 3.1: The research activities and philosophical assumptions.

The results of systematic literature reviews in the first Research Activity were important for the studies included in the thesis, for two main reasons. First, the reviews were invaluable for establishing the literature gap and justifying the relevance of the study for research and practise. Second, synthesising the results of empirical studies with the results of literature reviews was also helpful in forming the hypothesised relationships between the identified factors and IT alignment. This synthesis was the basis for the two proposed theoretical models (Paper IV and Paper VI). Moreover, as depicted in **Figure 3.2**, the data collection instruments (i.e., interview guides in Paper III and Paper V, as well as measurement items for the various constructs in Paper IV and Paper VI) were also informed by the results of the literature reviews.

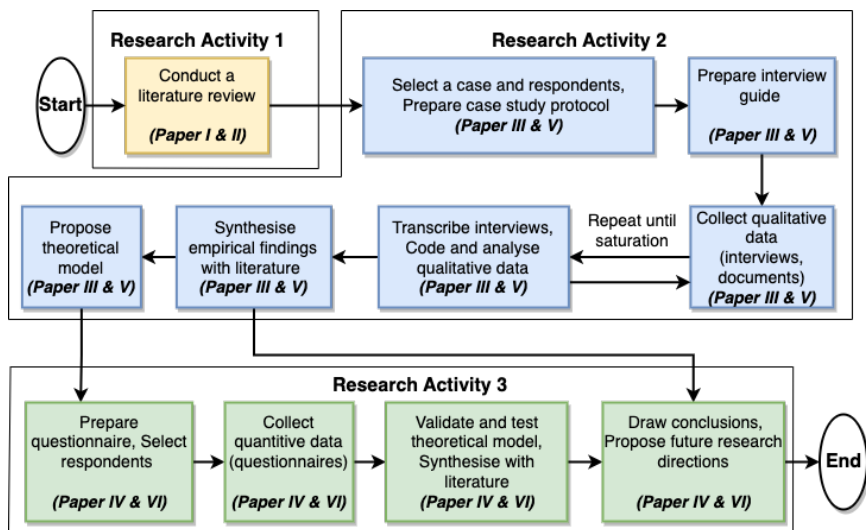


Figure 3.2: The research process.

To meet the aim of the study, both exploratory and confirmatory studies were deemed appropriate. Research Activity 2 was designed to explore how IT alignment is pursued in public organisations and how this plays in relation to the digital transformation success. The two qualitative studies were conducted in a municipality and in four sub-cities within a city administration. The results of these qualitative studies appear in Paper III and Paper V. Once the empirical findings from these studies were synthesised with the extant literature, two theoretical models were proposed (see **Figure 3.8** and **Figure 3.9**). In other words, the results of the qualitative studies were the foundation for the two studies in Research Activity 3. As reported in Paper IV and Paper VI, the confirmatory quantitative studies were invaluable to extend and validate the findings of the studies in the Research Activity 2. Respondents for the online survey questionnaires were selected from a municipality (Paper IV) and multiple public organisations at local, regional, and federal government institutions (Paper VI).

3.3 Research Activity 1—Literature Review

The first point of departure for this study was to explore what is already known and what is missing in the extant literature. According to Webster and Watson [254], systematic literature reviews provide a firm foundation for empirical and theoretical studies that further our understanding on a phenomena.

The first literature review (Paper I) attempted to explore not only the role of IT alignment in the current digitalisation era, but also how organisations pursue it to realise the anticipated benefits of successful digital transformation. In line with the new digital transformation trend, IS researchers call for a paradigmatic

shift to meet the IT management challenges that are brought to the fore. Even though prior literature reviews on IT alignment have provided us with invaluable insights, I argue that there is a need to explore the various factors related to IT alignment that are important for digital transformation. The justification for studies that further our understanding of the role of IT alignment for digital transformation is also supported in the literature [12; 15]

The second literature review (Paper II) focused on one of the factors that influence IT alignment—formal and informal organisational structure. Despite the rich and mature body of literature on IT alignment, only a few studies have investigated how the organisational structure of different organisations impacts the degree of IT alignment. Besides, organisational structure is one of the elements related to IT alignment that separates organisations in the private and public sectors. This is consistent with what prior studies have suggested (for instance, [24; 29; 37]). Thus, a literature review was necessary to assess the current status of the relationship between organisational structure and IT alignment in public organisations.

3.3.1 The Literature Search Procedure

Established literature review guidelines in the IS domain [254; 255] were followed to search relevant literature for the review. Articles were searched from a list of reputable peer-reviewed journals and conference proceedings. To this end, the initial literature search targeted all databases indexing the eight IS Senior Scholars' basket of journals. As Webster and Watson [254] reputable journals in a specific domain are invaluable in contributing to a research area. Thus, my choice of the eight IS journals for the literature search was justified. Moreover, following the recommendation of Vom Brocke et al. [256], premier conferences in the IS research domain (AMCIS, ECIS, HICSS, ICIS, and PACIS) were also searched. The conference proceedings selection was done by evaluating their ranks through the Australian Computer Research and Education portal (CORE). Papers published in conference proceedings of conferences ranked 'A' were considered. I recognise that conferences are the best venues for the most recent findings and debates surrounding current and emerging topics [256].

Once the literature search had been carried out in the selected databases, a last attempt was made to ensure all relevant sources had been found and exhausted. As suggested by Okoli and Schabram [255], backward and forward search techniques were applied. A backward search was conducted in two ways. First, the most recent IT alignment literature reviews (e.g., [8; 10; 24; 257]) were consulted to find relevant articles that were not caught through the database search. Second, a manual search of literature was also conducted by scanning the lists of references in the articles already identified [254]. A forward search was also conducted by searching through Google Scholar to assess whether articles citing the previously identified articles were relevant to the study.

Since the phenomenon was introduced in the IS literature, IT alignment has been conceptualised and defined in various ways [8]. Thus, the use of a combination of different variations of keywords was deemed necessary to capture the

maximum number of relevant articles. For both papers (Paper I and Paper II), the search for literature was carried out using combinations of the following keywords in the titles, abstracts, and author provided keywords: “IT business”, “IS business”, “IT”, “IS”, “strategic”, “information technology”, “information systems”, “IT strategy”, “digital strategy”, “business strategy”, “information technology strategy”, “information systems strategy” and “alignment” or “fit” or “harmony” or “linkage” or “congruence” and “structure”. The spelling variations of the term “organisation” were also used in the search for literature. Additional keywords were introduced in the search for relevant literature in Paper I—i.e., “digital transformation” and “digitalisation” or “digitalization” or “digital business transformation”.

The selection process of relevant literature in Research Activity 1 (Paper I and Paper II) was conducted in several steps, as shown in **Figure 3.3**.

	Keyword and Database Selection	Database, Backward/forward search	Duplicates Removed	Articles screened	Full-text Assessed	Articles selected for review
Paper I		n = 776	n = 164	n = 612	n = 280	n = 62
Paper II		n = 648	n = 341	n = 226	n = 74	n = 31
		Identification		Screening	Eligibility	Included

Figure 3.3: The literature search and selection process [50, p. 25; Paper I, p. 4; Paper II, p. 20].

In the first literature review (Paper I), the search for relevant articles resulted in the identification of 62 articles published in 26 journals and 20 conference proceedings. After 162 duplicates had been removed from a total of 776 articles, 612 of the the abstracts of the remaining papers were screened which resulted in 280 relevant articles. The assessment of the full-text of the 280 documents resulted in the identification of 62 relevant articles that focused on IT alignment and digital transformation. The appraisal of the final papers for the review was conducted according to the inclusion and exclusion criteria set at the beginning of the search. Articles in languages other than English, studies that had not been peer-reviewed, incomplete articles, book chapters, research-in-progress articles, and duplicate articles were excluded. Complete and peer-reviewed articles, published between 2016 and 2020, on the topics of IT alignment and digital transformation were included in the review.

The final number of relevant articles for Paper II stands at 31 spread across 3 conferences and 19 journals. From a total of 648 articles identified in the initial search, the abstracts of the 341 articles were screened. Then, 307 duplicates were excluded before the abstract screening. The 226 articles selected after the abstract assessment were further evaluated according to the inclusion and exclusion criteria. All complete articles with a focus on IT alignment and organisational structure meet the inclusion criteria. The exclusion criteria excluded research-in-progress articles, non-peer-reviewed articles, book chapters and literature reviews. In the last stage, the full texts of the 74 articles meeting the inclusion criteria were assessed for eligibility. The complete list of articles se-

lected for the systematic literature reviews (Paper I and Paper II) is included as **Appendix A**.

3.3.2 Data Extraction and Analysis Method

To facilitate the analysis of the articles identified for the review, the following data was manually extracted and exported to an Excel file: publication type (journal or conference proceeding); authors, theories and frameworks used, research approaches, main research topics, research question/hypotheses, objectives, findings and conclusions.

Thematic analysis of the literature review was conducted according to the procedures by Webster and Watson [254]. I adopted a concept matrix approach to systematically categorise and analyse the state-of-the-art of the research topic. In comparison with the author-centric approach, the concept matrix was deemed more appropriate to analyse and synthesise the literature to further our understanding of the research topic [254]. Thus, the research questions were used to prepare the concept-matrix. Once the identified articles had been thoroughly read and concepts extracted, the literature was synthesised according to the concept-matrix prepared.

3.4 Research Activity 2—Case Studies

The primary objective of this study is to explore the relationship between IT alignment and digital transformation in the public sector. In order to investigate how the various elements of IT alignment contribute to the success of digital transformation, the case study research strategy is deemed appropriate. In the extant IS literature, case studies are shown to be the most preferred research strategies among researchers [258]. IT alignment studies in general [9] and those focussing on public organisations have also been conducted using this research strategy [25].

Case studies are best suited when researchers are interested in exploring a complex phenomenon in a natural setting [259]. As discussed above, managing IT alignment and digital transformation is a challenging endeavour for leaders in public organisations. The argument is that aligning the IT and overall organisational strategies is cumbersome within an organisational context where multiple or conflicting goals exist [31; 32]. Given the complex organisational structure, the long list of stakeholders with varying interests, and the delivery of diverse information intensive services within the public sector, I argue that case studies provide the opportunity to further our understanding of the relationships between IT alignment and digital transformation. According to Yin [259], one of the merits of case studies is that they provide researchers with the opportunity to apply one or multiple data collection methods. The analysis of data, triangulated with multiple sources of evidence (various forms of complementary data), will enable researchers to better understand the phenomena under investigation.

Consistent with the aim of the research, two case studies were planned to be undertaken consecutively. First, an in-depth investigation of the role of organisational structure on IT alignment in a public organisation was carried out. Second, an exploratory study was conducted to identify the various organisational and managerial factors influencing IT alignment. During the course of these studies, an assessment was also made to decide whether a single case or multiple cases should be conducted to meet the research aim. Following the critical research appraisal guidelines [260], a single case rather than multiple case studies was deemed appropriate to achieve rich insights during both studies. While multiple case studies are popular among researchers interested in comparisons between cases testing the replicability of empirical findings and theoretical applications, single cases provide rich insights [259; 260].

3.4.1 Case Organisations

The selection of the two public organisations where the studies were conducted was based on the primary justification of the choice of case study as a research strategy. According to Denscombe [261], case studies are best suited to exploring and explaining relationships or causes of events in a particular real-life setting. For this study, case studies were found to be invaluable for exploring the key issues surrounding digital transformation success and IT alignment within the context of public organisations. However, I also recognise that the selection of appropriate cases that could reveal insights into the phenomenon under investigation is of paramount importance [259]. Thus, the following two public organisations were selected based on what the organisations could reveal about IT alignment and its association with digital transformation success. It is also worth noting that my interest was not in findings that could be generalisable to a wider population; rather, I wanted to make a detailed exploration of IT alignment-related factors and digital transformation success..

The Municipality

The organisation chosen for the first case study investigating the influence of organisational structure on IT alignment, hereafter referred to as “*the municipality*”, is one of the 290 municipalities in Sweden. With about 100,000 residents, this is one of the mid-sized municipalities in the country. In recent years, the municipality has been recognised as one of the public institutions that has dedicated a considerable amount of resources to digitalising the public service delivery. In addition, the digital transformation journey that the municipality embarked upon had attracted national media attention just before the start of this study. In addition to modernising its organisational operations and reducing costs, the ambition has been to significantly improve the number and quality of digital services offered to citizens as well as businesses operating within the municipality’s geographic area. According to the participants, the number of IT systems supporting the digital transformation efforts within the municipality is over 200.

Even though political leaders elected to run the municipality are responsible only for drafting the grand plan, vision and direction of the municipality, digital

transformation was top of the agenda in the past political discourse. According to the response from participants of the study, the municipality sees the use of emerging technologies as a strategic asset that can improve the living standards within the municipality. Thus, the IT unit is mandated to make digital transformation a key strategic asset that could be used to improve public service delivery and encourage people to move to the municipality. The pressure from elected leaders, and increased demands from residents and businesses are considered to be push factors for many of the changes made in the IT unit. For instance, a new IT governance model was adopted to ensure IT solutions are in accordance with the municipality's overall strategic plan. The pace of digital transformation and the success reported so far together with the changes towards aligning the application of IT into the municipality's strategic goals make the organisation appropriate for this study.

The organisational structure indicates that the municipality has two distinct arrangements where the responsibility for the direction and strategic vision falls under the politicians' control. Civil servants in various departments administer the core services in line with the control system in place to ensure congruence with the overall vision of the municipality. The central administration which is headed by the administrative head (similar to a CEO position in private firms), is responsible for overseeing the planning and implementation of the departments according to the decisions of the municipalities' elected leaders. The administrative head is also the chair of the steering committee selected from the seven departments and enterprises owned by the municipalities. **Figure 3.4** depicts the organisational structure (as shown in the municipality's chart) which includes the titles of leaders in the respective departments and municipality owned enterprises.

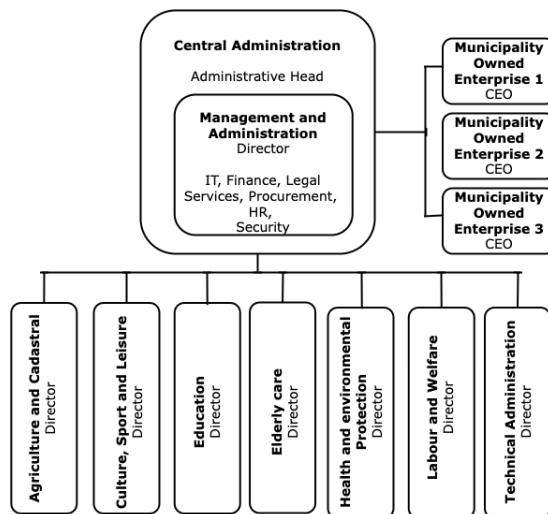


Figure 3.4: The municipality's organisational structure and corresponding leaders' titles in case study 1 (Paper III) [50, p. 45].

The seven departments at the municipality are headed by directors (forvaltningsschef) and have responsibilities within specific types of public services offered to residents—agriculture and cadastral; culture, sport and leisure; education; elderly care; health and environmental protection; labour and welfare; and technical administration. In addition to the organisation’s structure and the services provided, the division of responsibilities within the municipality is also dependent on whether processes are common or core. For instance, while running the core service provisions is the responsibility of each department, the municipality’s Management and Administration Department provides common services, support and expertise to all departments. This includes HR, IT, research and development, legal services, budget and finance, registry, security and readiness, procurement, and sustainability. The directors of the seven departments and the CEOs of the three municipality-held enterprises report directly to the administrative head.

The City Administration

The second case study was conducted in the Addis Ababa City Administration (referred to as “*the city*” hereafter). With a population of over five million and a size of over 520 square kilometres, Addis Ababa is the capital and largest city of Ethiopia and is also an industrial, commercial, and retail hub for businesses in east Africa. Recently, however, the capital city has been known as one of the public organisations in the country embarking on an ambitious digital transformation journey. Moreover, the Ethiopian government recognises the city as an important player facilitating collaborative digital transformation work between public organisations, private firms, NGOs, and citizens. Learning from the experiences of countries such as China and Singapore, Ethiopia is establishing Information and Communication Technology (ICT) parks to support its journey of digital transformation. To that end, the city has secured huge financial backing from the federal government to run an ICT park with the prospect of attracting IT manufacturers and service providers.

As one of the cities with special administrative status in the country, Addis Ababa enjoys a close relationship with the Ethiopian federal government. However, it should be noted that the city is not alone in implementing the recommendation of the federal government’s digital transformation plan “*Digital Ethiopia 2025: A digital strategy for Ethiopia’s inclusive prosperity*”. According to Jonathan et al. [262], public organisations in the country are expected to be at the forefront in making digital transformation a priority in their undertakings. The city is selected for this study, as it provides an opportunity to investigate one of the major digital transformation undertakings in the country. Besides the major digital transformation initiatives (for instance, digital ID cards for residents, electronic payment services, public service networks), the city’s collaboration with government agencies, private businesses and other stakeholders is worth exploring. I also argue that the case presents an excellent research setting to explore how leaders manage IT alignment—the fit between (1) the introduction of emerging technologies, (2) meeting the overall organisational objectives of the city, and (3) making the necessary organisational and managerial adjustments to enable successful digital transformation.

Organisation structure-wise, Addis Ababa city administration is one of the largest public organisations in the country, with two separate wings—political and administrative. The mayor (a political appointed position with a term limit of five years) is the highest ranking official, and is the chair of the city council and the chief executive officer. In other words, the mayor leads both the administrative and political wings of the city. The secretariat of the council, and the public relations and consulting offices support the mayor in overseeing the administration side of the city.

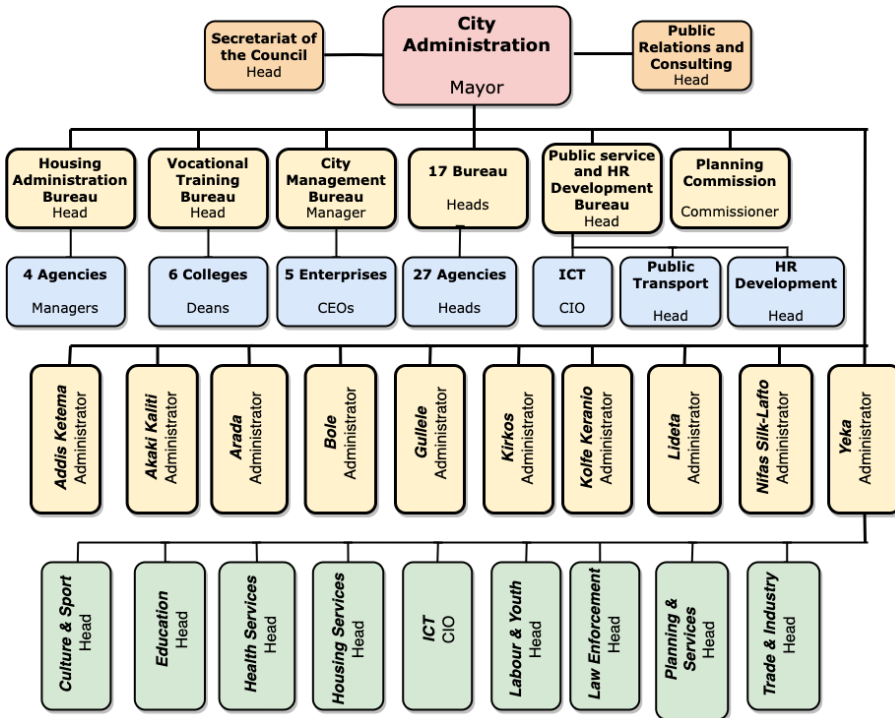


Figure 3.5: The organisational structure of the city with leaders’ titles in case study 2 (Paper V).

As shown in the organisational chart in **Figure 3.5**, the city is organised into sub-cities, bureaus, offices, commissions, administrations, and agencies. It is worth noting that the terms “bureau”, “administration” and “agency” are used at times interchangeably according to the organisation chart I obtained. Overall, the city is composed of ten sub-cities, seventeen bureaus, one agency, one commission, one office, one administration, and a public service and HR unit. Similar to other public organisations in the country [262; 263], digital transformation is the responsibility of the IT unit and considered to be one of the shared services. However, sub-cities are responsible for maintaining their own IT departments that closely collaborate with the city’s ICT unit placed under the public services and HR bureau.

3.4.2 Data Collection Method

In order to investigate the role of IT alignment in digital transformation within a public organisation, an interpretative approach was adopted. This approach is in line with the aim of my study focussing on gathering data as provided by participants in order to capture the holistic view and unique situation in the natural environment [264; 265]. One of the advantages of case studies is that they provide multiple ways of data collection methods that fit the line of enquiry. However, [259; 264] also suggest the practice of triangulating data sources to improve the credibility of case study findings. A case study protocol was developed to guide the data collection and data analysis procedures [259].

Data collection was carried out through interviews and analysis of internal documents, as well as publicly available information from websites. **Table 3.1** shows the data sources of the two case studies (i.e., those in Paper III and Paper V).

Table 3.1: Data sources for the two case studies in Paper III and Paper V.

	Paper III	Paper V
Case organisation	Municipality	City administration (four sub-cities)
Country	Sweden	Ethiopia
Internal documents obtained	5	5
Number of interviews	10	21
Interview dates	April 2018	March - July 2021
Number of interview questions	39	44
Total interview time	751 minutes	1165 minutes

Researchers argue that interviews are the most useful data collection method when the aim is to gain a comprehensive and thorough insight into people's opinions and experiences [259; 261]. Thus, semi-structured interviews were carried out as the primary method of enquiry. Sampling strategies for interview participants followed the recommendations of prior IT alignment studies (e.g., [19; 37]). Accordingly, leaders from the IT and administration side expected to possess the information relevant to the aim of the studies were approached. Probability sampling was deemed inappropriate for the studies, since my objective was to provide in-depth insight, not generalisation, of a phenomenon in the wider population [266]. Thus, as a starting point for a purposive sampling, I adopted a criterion of selection of what Bogner et al. [267] defined as "*experts*". According to Denscombe [261] and Ritchie et al. [266], the non-probability sampling strategy ensures only respondents with the experience and position to have relevant information were selected for the study.

The following sections present the detailed data collection procedures for the two case studies (Paper III and Paper V).

Case Study 1 - Paper III

The aim of the study was to explore the various forms of organisational structures and how they are related to the degree of alignment. Thus, the starting point of the data collection procedure was interviewing participants. As dis-

cussed above, interviewees from the IT and administration sides were selected at the strategic, tactical, and operational levels. The objective was to gain a better understanding of the formal and informal organisational structures throughout the case organisation. The interviews reveal how the municipality’s employees understand and interpret the formal organisational structure in place.

The literature on research methodology suggests that the rigour of a research based on interviews is a function of the quality and number of interviews conducted. For example, Glaser and Strauss [268] suggest a minimum of ten interviews to adequately capture the insights of respondents. However, there is a growing consensus among researchers that not only the number of interviews, but the point of data saturation should be the criteria for deciding whether the collected data are adequate or not [269]. Consequently, no more than 10 interviews were necessary for this study, since no new themes emerged, indicating the point of data saturation. **Table 3.2** shows the complete list of the interview participants at the municipality.

Table 3.2: List of respondents with their roles and departments at the municipality [50, p. 27; Paper III, p. 7].

Position	Level	Department	Duration
Administrative Manager	Strategic	Central Administration	50 min
CEO	Strategic	Municipality-owned enterprise	79 min
CIO	Strategic	IT Unit	68 min
Director	Strategic	Elderly Care	65 min
Business Developer	Tactical	Central Administration	56 min
Business Developer	Tactical	Culture, Sport & Leisure	63 min
Business Developer	Tactical	Labour & Welfare	59 min
IT Architect	Tactical	IT Unit	86 min
Development Manager	Operational	Education	75 min
Administrative Manager	Operational	IT Unit	75 min

All of the interviews were conducted face-to-face in the vicinity of the municipality in April 2018. Even though the interviews were scheduled for an hour, the actual interviews lasted on average between 50 and 86 minutes. The respondents were provided with a copy of the transcriptions of their interviews. The purpose was to ensure that the transcriptions had captured what the participants intended to communicate during the interviews. Some revisions were made after the feedback from the participants.

As a method of data triangulation, examining the internal documents obtained was appropriate. Thus, the list of internal organisational documents shown in **Table 3.3** were analysed and compared with what the participants in case study 2 described. These documents provided invaluable information related to the various IT alignment dimensions at the municipality. For instance, the IT governance model and IT organisational structure reveals how IT investment decisions and priorities are made. The municipality’s and IT unit’s strategic plans were also important to assess congruence. Besides, the documents were also helpful to improve the validity and reliability of the findings from the anal-

ysis of the primary data—i.e., the semi-structured interviews.

Table 3.3: List of internal organisational documents obtained for case study 1 presented in Paper III [50, p. 28].

Document	Contents
Organisational chart	The document shows the whole organisational structure of the municipality, its departments and the municipality-owned enterprises. The steering committees overseeing the various areas of the municipalities and leaders participating in these committees are shown.
Organisational chart (departments and enterprises)	The documents show the various units in each department and municipality-owned enterprises. The reporting structure and the relationships with the central administration are also shown in these documents.
IT organisational structure	In addition to showing the different units within the municipality’s IT department and the reporting structure, this document presents the goals, responsibilities and key performance indicators for each unit (Service Management, Operations, Service Desk, and IT Architecture and IT Projects).
IT Governance Model	The IT Governance Model, which is grounded in the concept of “Responsibility, Accountability, Consulted, and Informed” (RICI), is concerned with the decision-making structure of the IT unit. The document also categorises the different roles and responsibilities of employees into three—strategic, tactical, and operational. The list of customers within the municipality, common services, tailored services, and the frequency of meetings and length of plans at strategic, tactical and operational levels are also stipulated.
The municipality and its IT unit’s strategic plan	This document outlines the municipality’s vision and strategic plan. The IT plan is also described in relation to the overall vision of the municipality. The goals of the IT unit are decomposed from the overall strategy of the municipality. Various activities and key performance indicators are also included in this document.

Case Study 2 - Paper V

In line with the aim of the study, the data collection targeted participants with a particularly deep understanding of IT alignment and digital transformation, resulting from their experience and functional status within their respective organisations. To ensure that participants that could provide the richest information were selected, the organisational structure of the case organisations was

consulted. In the second stage of selection, the HR head as well as IT and administrative leaders were consulted to establish the involvement of potential participants in decisions pertaining to IT alignment and digital transformation initiatives. This sampling strategy was instrumental in compiling the multiple points of view on strategy formulation, as well as the decision-making processes related to IT alignment and digital transformation. **Table 3.4** shows the list of research participants and their profiles at the city in case study 2 (Paper V).

Table 3.4: List of participants, their positions and domains in case study 2 (Paper V).

Code	Position	Domain	Work Experience	Interview length
ITL1	Chief Information Officer	IT	12 years	55 min.
ITL2	Chief Information Officer	IT	7 years	60 min.
ITL3	Deputy Chief Information Officer	IT	11 years	60 min.
ITL4	Chief Digitalisation Officer	IT	9 years	50 min.
ITL5	Chief Digitalisation Officer	IT	12 years	50 min.
ITL6	IT Infrastructure Lead	IT	4 years	55 min.
ITL7	IT Infrastructure Lead	IT	3 years	65 min.
ITL8	Lead Network Administrator	IT	5 years	55 min.
ITL9	Information Security Lead	IT	2 years	55 min.
ITL10	Information Security Lead	IT	3 years	60 min.
ITL11	System Administration Lead	IT	4 years	45 min.
Adm1	Development Planning Head	Admin.	8 years	55 min.
Adm2	Housing Administration Head	Admin.	5 years	50 min.
Adm3	Health Services Head	Admin.	10 years	65 min.
Adm4	Health Services Head	Admin.	13 years	55 min.
Adm5	Local Law Enforcement Head	Admin.	7 years	55 min.
Adm6	Local Law Enforcement Head	Admin.	12 years	60 min.
Adm7	Education Bureau Head	Admin.	11 years	55 min.
Adm8	Economic Planning Head	Admin.	12 years	50 min.
Adm9	Population Register Head	Admin.	6 years	65 min.
Adm10	Population Register Head	Admin.	9 years	55 min.

Similar to the first case study (Paper III), the concept of data saturation [269] was applied to determine a sufficient number of interviews for the study. Accordingly, no more than 21 interviews were found necessary for the study. All except six of the participants were interviewed using an online video tool (Zoom), the remaining interviews were conducted face-to-face at the participants' place of work. The interviews, conducted between March and July 2021, were transcribed verbatim for ease of analysis. The copies of transcriptions were sent to the interviewees to ensure accuracy.

In addition to the data collected through interviews, internal organisational documents provided by the case organisation were used in the study (see the list in **Table 3.5**). These documents provided invaluable information related to the various IT alignment dimensions and the digital transformation work at the city. For instance, the organisational chart and IT organisational structure revealed

how communications pertaining to IT investment decisions are made. The city’s digital strategic plan was also important to learn how emerging technologies can be used to meet the organisation’s objectives. On the other hand, the documents were also used to triangulate the data collected through the semi-structured interviews.

Table 3.5: List of internal organisational documents used in case study 2 (Paper V).

Document	Contents
Organisational chart	The chart depicts the whole organisational structure of the city administration, the ten sub-cities and the respective neighbourhoods. The permanent committees overseeing the various areas of the city administration are also shown in the document.
Administrative structure, Sub-cities	The documents show the various units in the four sub-city administrations. The reporting structure and the relationships with the central city administration are also shown in these documents.
IT organisational structure	The IT organisational structure shows how the various responsibilities are shared between the department at the city level and the local IT units in the four sub-cities.
Core and supporting processes	This document obtained from the city administration lists the core and supporting processes. The core processes shared by the document also outlines how much sub-cities can modify services offered to citizens in their geographic boundaries.
Digital transformation strategic plan	This document outlines the city’s digital strategic plan which is the reference for all ten sub-cities. The digital transformation plan is drafted from the country’s ten-year digitalisation plan.

3.4.3 Data Analysis Method

The study presented in Paper III and Paper V involved the thematic analysis of the interview transcriptions and the internal organisational documents obtained from the two case organisations (i.e., the municipality, and the city). Thematic analysis is deemed appropriate since it meets the aim of the study—categorising the various formal and informal organisational structure forms found at the first case organisation (the municipality) and relating them to the six IT alignment dimensions. In the second case study, thematic analysis was used to identify and categorise various organisational and managerial factors influencing the degree of IT alignment enabling successful digital transformation. Moreover, the thematic analysis approach is agnostic to theory or epistemology [270]. For both case studies, the analysis was performed following the the six-phase thematic analysis guide proposed by Braun and Clarke [271](see **Figure 3.6**).

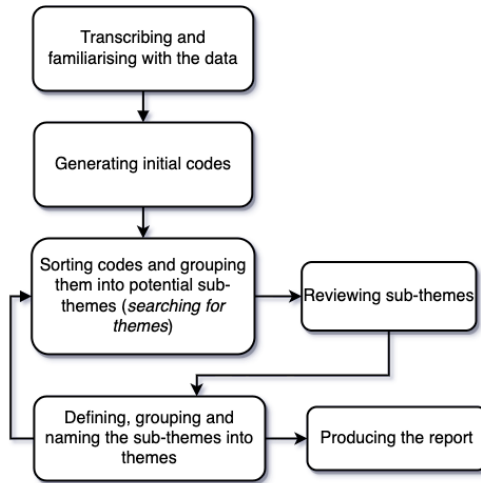


Figure 3.6: Thematic analysis procedure followed in qualitative studies (Paper III and Paper V) [273].

As recommended by Fereday and Muir-Cochrane [272], a hybrid approach, i.e., incorporating both inductive and deductive theme generation, was applied. According to the author [272], the approach is instrumental in demonstrating the rigour of the thematic analysis process in qualitative studies. Thus, the initial codes and sub-themes were developed following the inductive approach from the analysis of the qualitative data (transcript of the interviews). Once the inductive coding was complete, the sub-themes were mapped and grouped into themes deductively using what Crabtree [273] referred to as an a priori template. The template was prepared based on the research question as well as the findings of the two systematic literature reviews. For instance, in the study exploring organisational structure and IT alignment, the conceptual research framework shown in **Figure 2.3**, the various forms of organisational structure and the six dimensions of IT alignment were used as an a priori template. Moreover, as suggested by Walsham [265], the thematic analysis was carried out iteratively.

Table 3.6: Coding examples showing the development of themes.

Excerpt from interviews	Initial code(s)	Sub-theme(s)	Themes
“...many of us have been involved in the planning of the major IT systems to improve the services we deliver to our citizens...”	Planning IT system, Improving service	IT planning, Organisational- goal	IT strategy, Organisational- strategy
		Decision making	IT Governance
“We have several interest groups asking for the allocation of IT resources. We need to make choices since we can’t do all at once”	Interest groups, Make choices, stakeholders	Stakeholders	Stakeholder- relations,
		Prioritisation	IT Governance

Table 3.6 illustrates how the initial codes, sub-themes, and themes were generated in the qualitative studies included in the thesis (Paper III and Paper V). The thematic analysis procedure revealed various formal and informal organisational structure types and their influence on dimensions of IT alignment (Paper III); and various organisational and management factors related to IT alignment enabling digital transformation success (Paper V). In addition to the analysis of the data collected through interviews and internal document analysis, the IT alignment maturity of the case organisation was assessed. For this assessment, a questionnaire developed by [19] (see **Figure 3.7**) was applied. Accordingly, the IT alignment maturity level was calculated as the average of the sum of the score of the six dimensions, which were assessed using a 1 to 5 Likert scale.

1	Communications																		
	1	To what extent does IT understand the administrations's environment processes, customers and partners																	
		1. Senior and mid-level managers do not understand administration																	
		2. Senior and mid-level managers have limited understanding of administration																	
		3. Senior and mid-level managers have a good understanding of administration																	
		4. Understanding of administration by all IT members is encouraged and promoted																	
		5. Understanding of administration is required through the IT function																	
		6. I do not know																	

Figure 3.7: A sample question used to assess IT alignment in case study 1 (Paper III) [50, p. 33], adapted from the SAMM instrument [19].

To ensure the questionnaire instrument was appropriate for the case organisation’s context, the questions were modified. Respondents were provided with 39 questions with 6 alternative choices. Similar to the original instrument, the scores were assigned to the number of attributes corresponding to the six IT alignment dimensions according to SAMM [7; 19]. For instance, for the first dimension (communications), the respondents from the IT unit were asked the extent to which they understood the municipality’s customers, processes, and partners. Participants from the remaining departments were asked to give their opinions on the extent to which they understood the IT environment, its capabilities, and so on.

3.5 Research Activity 3—Surveys

For Research Activity 3, a survey research strategy was deemed appropriate to meet the aim of the two studies (Paper IV and Paper VI)—establishing the relationships between constructs and testing the theoretical models proposed [261; 274]. In contrast to other research strategies with the objective of exploring a phenomenon in-depth (for instance, case studies), surveys are best suited to investigating specific issues where researchers are informed about various factors and relationships [261]. Thus, surveys are used to test hypothesised relationships. Prior IT alignment and digital transformation studies (e.g., [119; 161; 223]) have been conducted using a survey research strategy.

The quantitative studies included in the thesis tested (1) the influence of various organisational structure forms on IT alignment (Paper IV); and (2) the influence organisational factors on IT alignment in public organisations undertaking digital transformation (paper VI). Thus, the objectives of the two surveys were to test the two theoretical models (**Figure 3.8** and **Figure 3.9**) proposed based on the result of the literature reviews (Paper I and Paper II) and case studies (Paper III and Paper V).

3.5.1 Data Collection Method

Data for the survey studies was collected using Google Forms from respondents at selected public organisations. To measure the items, respondents were asked to score on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). A non-probability sampling strategy was adopted to recruit potential respondents who could provide relevant insights according to the aim of the respective studies [261]. The following subsections briefly present the data collection procedures in the two quantitative studies included in the thesis.

Survey 1 - Paper IV

This study (Paper IV) is a continuation of the qualitative study conducted at the municipality (Paper III). Thus, the respondents were selected from the IT and various administration departments in the same organisation (see **Table 3.7**).

Table 3.7: Demography of survey 1 respondents, their roles, and departments (Paper IV).

Department	n	%	Level	n	%
Central Administration	13	7.9	Strategic	9	5.5
Education	37	22.7	Tactical	45	27.6
Elderly Care	39	23.9	Operational	109	66.9
IT	31	19			
Labour and Welfare	26	15.9			
Municipality Owned Enterprises	17	10.4			
Experience					
(Number of years)	n	%	Age	n	%
1-5	57	35	20-30	48	29.4
6-10	74	45.4	31-40	32	19.6
11-15	23	14.1	41-50	71	43.5
>11	9	5.5	>51	12	7.4
Sex					
	n	%			
Male	89	54.6			
Female	74	45.4			

A purposive sampling strategy was applied to search for respondents with the knowledge about and responsibility for decision-making related to IT alignment. The head of IT and directors of departments that were interviewed in the previous study (Paper III) were approached to distribute the online survey link. The online survey, which was active for two months, was completed by

163 participants. The study was set out to test the effect of different forms of organisational structure on IT alignment in a public organisation. Based on the findings of the literature review (Paper II) and the qualitative case study conducted at the municipality (Paper III), the theoretical model shown in **Figure 3.8** was proposed.

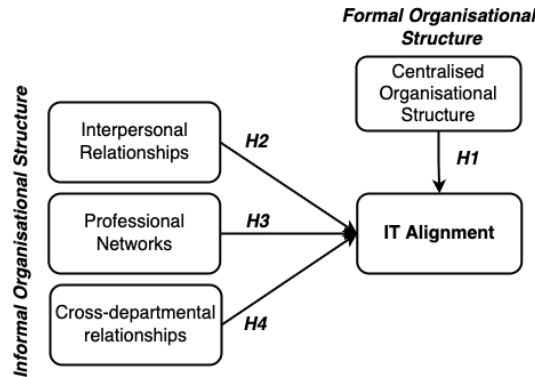


Figure 3.8: Theoretical model [50, p. 31; Paper IV, p. 10].

The data collection procedure was aimed at generating relevant data to test the theoretical model and the following four hypotheses were posited.

- H1:** A centralised organisational structure is positively related to IT alignment.
- H2:** Interpersonal relationships are positively related to IT alignment.
- H3:** A professional network is positively related to IT alignment.
- H4:** A cross-departmental relationship is positively related to IT alignment.

The result of the review of the extant literature was the starting point in the operationalisation of the theoretical model. Based on public organisations' context and the result of the qualitative study (Paper III), appropriate measurement items were selected for each of the constructs shown in the theoretical model. The survey instrument used for the data collection (see **Appendix C**) contained 19 questions corresponding to the five constructs shown in **Table 3.8**.

Table 3.8: Operationalisation of constructs [50, p. 29-30; Paper IV, p. 7-8].

Constructs	Measurement Items (sources)
IT alignment	Communications, Dynamic IT scope, IT Governance, Partnering, Skills development, Value analytics [7; 19]
Centralised organisational structure	Decision-making authority, hierarchy, autonomy, specialisation [193; 207; 275]
Cross-departmental relations	Formalised relationships, knowledge sharing, trust [276]
Interpersonal relations	Conflict, openness, trust [277; 278].
Professional networks	Individual centrality, network density, alter-based resources [215; 279]

While *central organisational structure* is measured by four items, all informal organisational structure forms (*cross-departmental relationships, interpersonal re-*

relationships, and professional networks) were measured by three items each. The SAMM's six- dimension criteria [7; 19] was used to measure the IT alignment construct.

Survey 2 - Paper VI

In contrast with the first quantitative study (Paper IV), the unit of analysis for this study was organisations in the Ethiopian public sector. Thus, respondents in public organisations from the IT and administration sides were selected (see **Table 3.9**). Even though the same purposive sampling strategy was applied searching for respondents with the knowledge and responsibility of decision-making related to IT alignment and digital transformation. Experience and functional status within their respective organisations was used as indicators. As a minimum criterion, I selected local, regional and federal government bodies with 100 or more full-time employees.

Table 3.9: Demography of survey 2 respondents, their roles, and organisations [Paper VI, p. 6].

Organisation Type	n	%	Role	n	%
Regional government	75	18.7	Executive	58	14.4
City administration	82	20.4	Middle management	191	47.5
Ministry	149	37.1	Team leader	110	27.4
Public University	46	11.5	Specialist	43	10.7
Justice	27	6.7			
Other	23	5.7			
Organisational Size					
(Number of employees)	n	%	Age	n	%
100-250	42	10.4	20-30	56	13.9
251-1000	217	54.1	31-40	129	32.1
1001-5000	61	15.2	41-50	145	36.1
>5000	82	20.4	>51	72	17.9
Sex	n	%			
Male	266	66.2			
Female	136	33.8			

The second quantitative study attempted to determine the influence of the identified organisational and managerial factors on IT alignment during digital transformation. The argument is that public organisations' attempt to reach and maintain IT-aligned position will result in the anticipated benefits of successful digital transformation. Thus, the result of the two literature reviews and empirical studies (Papers I - V) were the foundation of the theoretical model shown in **Figure 3.9**.

In addition to the result of the preceding studies included in the thesis, the three theories—*technology enactment theory*, *stakeholder theory*, and *public value theory*—were also used to illustrate how the various organisational and managerial factors influence IT alignment in public organisations during digital transformation. The theories were also invaluable for adapting the measurement items corresponding to the ten constructs shown in **Table 3.10**, according to

the public organisation context. Therefore, the focus of the study was on the appropriate and timely application of IT in public organisations to create public value. This is a departure from the resource-based view approaches in the prior IT alignment literature. Those who subscribe to the resource-based view argue that the benefit of IT alignment must be assessed as to whether it creates a strategic advantage, creating unique capabilities that are difficult to imitate [11].

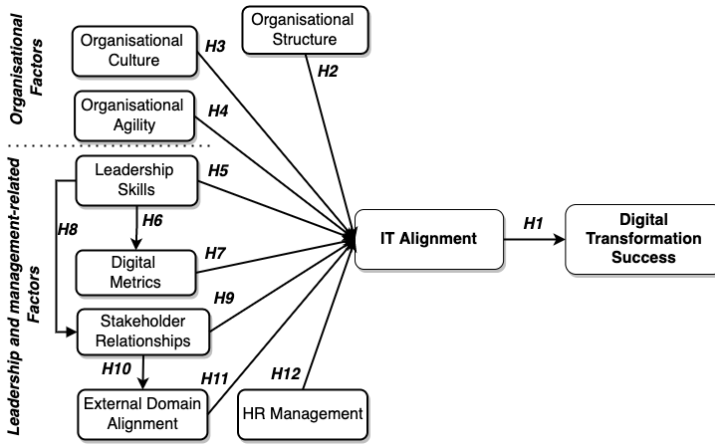


Figure 3.9: Theoretical model [Paper VI, p. 5].

Based on the findings of the two literature reviews and the empirical case studies conducted (Papers I-V), the following hypotheses were posited (also illustrated in **Figure 3.9**).

- H1:** IT alignment is positively associated with digital transformation success.
- H2:** Organisational structure is positively associated with IT alignment.
- H3:** Organisational culture is positively associated with IT alignment.
- H4:** Organisational agility is positively associated with IT alignment.
- H5:** Leadership skills are positively associated with IT alignment.
- H6:** Leadership skills are positively associated with the use of digital metrics.
- H7:** The use of digital metrics is positively associated with IT alignment.
- H8:** Leadership skills are positively associated with stakeholder relationships.
- H9:** Stakeholder relationships are positively associated with IT alignment.
- H10:** Stakeholder relationships are positively associated with external domain alignment.
- H11:** External domain alignment is positively associated with IT alignment.
- H12:** HR management practices influence the degree of IT alignment.

To test the theoretical model and hypothesised relationships, a survey instrument (see **Appendix C**) with 33 questions corresponding to the ten constructs shown in **Table 3.10** was used to collect data for the study. The online survey questionnaire was pre-tested with a sample of 25 leaders randomly se-

lected from three public organisations in the capital of Ethiopia, Addis Ababa. Minor revisions were made to address identified issues with the questionnaire before the active link of the survey was sent to 589 experts. A control question was included in the questionnaire to ensure that the respondents indicated whether they held positions with responsibilities that touch on issues related to IT alignment and digital transformation. In addition to the demographic questions, I included a dummy question to exclude non-serious responses. The on-line survey, which was active for 45 days, resulted in 402 complete questionnaires with a response rate of 68%.

Table 3.10: Operationalisation of constructs [Paper VI, p. 6].

Constructs	Measurement Items (sources)
Digital Metrics	Outputs, outcomes, impact [28; 280]
Digital Transformation success	Operational efficiency, value creation, improved relations [28; 99; 280]
External Domain Alignment	IT infrastructure and processes, organisational culture, and Legislations [43; 161]
HR Management	Hiring, incentive structure, knowledge management [19; 44; 54]
IT Alignment	Communications, Dynamic IT scope, IT Governance, Partnering, Skills development, and Value analytics [19]
Leadership Skills	Digital leadership, transformative leadership, conversational competencies [223; 234]
Organisational Agility	Flexible IT infrastructure, scalable workforce, rapid organisational learning [119; 169; 170]
Organisational Culture	Openness to change, acceptance of failure, innovative behaviour [18; 54]
Organisational Structure	Centralisation, formalisation, and hierarchy [18; 37; 281]
Stakeholder Relationships	Citizens' involvement, collaboration with suppliers, and inter-governmental relations [28; 31; 33; 99]

As shown in **Table 3.10**, only three measurement items were used for each of the ten constructs. However, IT alignment was assessed based on SAMM's six dimensions criteria which are widely used among IS researchers. Instead of using more items for the other nine constructs, I used the items already established in the literature, consulting multiple sources.

3.5.2 Data Analysis Method

Partial Least Structural Equation Modelling (PLS-SEM), a second-generation multivariate data analysis method, was adopted to analyse the quantitative data collected from the online surveys. PLS-SEM is a quantitative data analysis techniques that has gained popularity among IS researchers in recent years.

For this study, however, the method was deemed appropriate since the aim of the study was to assess the influence (i.e., casual prediction) of various organisational and managerial factors on IT alignment. For the first quantitative study (Paper IV), the objective was to determine the influence of the various forms of organisational structure on IT alignment in a public organisation. On the other hand, given the purposive sampling strategy, the number of potential

respondents at the case company was relatively small ($n=163$). Thus, PLS-SEM was found to be a better choice among comparable SEM techniques. According to Hwang and Malhotra [282] and Wong [283], PLS-SEM is better suited for studies where a large sample size is not available. Hair et al. [284] also suggest a sample size of not less than ten times the number of independent variables, a requirement which was met by the two quantitative studies included in the thesis.

In addition to the small sample size (Paper IV), the dearth of IT alignment studies theorising the relationship between various organisational structure forms and IT alignment justifies the use of PLS-SEM. Authors argue that PLS is a better choice when established theories pertaining to the relationship between constructs under investigation are not available [282; 283; 285]. The choice of PLS-SEM, in the last quantitative study (Paper VI), was justified given the complexity of the hypothesised relationships between the constructs. As shown in **Figure 3.9**, the theoretical model comprises various causal relationships between 10 constructs, which formed 12 hypotheses. As the extant literature indicates, the main reason for PLS method's wide application is that it supports the estimation of complex models with a large number of constructs, without the need to assume normal data distribution [284–286].

As suggested by Hair et al. [285], the PLS-SEM analysis was conducted in two stages—(1) evaluation of the measurement model, and (2) evaluation of the structural model. Versions 3.2.8 (Paper IV) and 3.3.9 (Paper VI) of SmartPLS software were used to run the analysis [287].

Evaluation of Measurement Models

The first step of PLS-SEM is to evaluate the measurement models, i.e., the quality of the constructs in the model to determine reliability and validity [285]. The evaluation of the measurement model in survey 1 (Paper IV) was carried out in three steps—assessing internal consistency reliability, convergent validity, and discriminant validity (see **Figure 3.10**).

	<i>Step 1</i>	<i>Step 2</i>	<i>Step 3</i>
Assessment	Internal consistency reliability	Convergent validity	Discriminant validity
Criteria	Composite reliability Cronbach's alpha	Average Variance Extracted (AVE)	Square root of AVE ($\sqrt{\text{AVE}}$)
Reference Values	0.60 - 0.9 > 0.6	> 0.5	Higher than the coefficient of the correlation between factors

Figure 3.10: Measurement model evaluation steps for survey 1 (Paper IV) [286; 288].

To start with, the Cronbach's alpha coefficient and composite reliability were calculated to assess the internal consistency reliability of the five constructs. In the second step, the average variance extracted was checked against the recommended reference value. Third, the discriminant validity of the five constructs were assessed to estimate whether the causal relationships under investigation are truly distinct from each other. Comparisons were made between the coefficients of the correlation between factors.

Evaluation of the measurement model for the second quantitative study (Paper VI) as shown in **Figure 3.11**, started by computing collinearity statistics.

	Step 1	Step 2	Step 3
Assessment	Indicator collinearity	Statistical significance	Relevance of indicators
Criteria	Variance inflation factor (VIF)	t-values of indicator weights	With a significant weight/ non significant weights
Reference Values	< 5	> 2.576 ($\alpha=0.01$) > 1.960 ($\alpha=0.05$) > 1.645 ($\alpha=0.10$)	Larger significant indicator weight = higher contribution/Indicators with loadings of ≥ 0.50 = relevant

Figure 3.11: Measurement model evaluation steps for survey 2 (Paper VI) [284; 285].

As suggested in the literature [285], the variance inflation factor (VIF) was used as a measure of collinearity. The aim was to determine whether the other formative indicators related to the same construct may affect any formative indicator. In the second step, the analysis examined the statistical significance and relevance of the indicator weights. This involved examining the t-values for the indicator weights. In the third step, the relevance of indicators was assessed by looking into the outer loadings of the indicators.

Evaluation of Structural Models

After the measurements of the constructs were determined to be valid, the second stage in PLS-SEM analysis was to assess the structural model. The procedure applied for both studies (Paper IV and Paper VI) involved three assessments—collinearity, explanatory power and predictive power (see **Figure 3.12**).

The first step in the structural model evaluation was to assess collinearity. The assessment was done by looking into the VIF values against the reference value of 5. Second, the explanatory power of the model was estimated based on the coefficient of determination (R^2) as substantial, moderate or weak. In the third step, as suggested by Cohen [288], the predictive power of the models was measured by path coefficients as strong, moderate, or small according to the

reference values in the literature.

	Step 1	Step 2	Step 3
Assessment	Collinearity issues	Explanatory power	Predictive power
Criteria	Variance inflation factor (VIF)	Coefficient of determination (R^2)	Path coefficients
Reference Values	< 5	> 0.75 (substantial) > 0.50 (moderate) > 0.25 (weak)	≥ 0.5 (strong) 0.3 - 0.49 (moderate) 0.1 - 0.29 (weak)

Figure 3.12: Structural model evaluation steps for surveys 1 and 2 (Paper IV and Paper VI) [283; 285; 290; 291].

3.6 Research Quality

The dynamic nature of the IS research field requires a continuously updated evaluation of the quality of research with appreciation for the changes that influence the research we conduct. According to Boudrea [289], many technologies we considered novel have come and gone, organisations have evolved, and leaders are now facing new challenges. Thus, our quest for knowledge that serves to solve today's societal problems must be supported by studies that demonstrate rigour and credibility [261]. Establishing good quality research entails providing a logical test which demonstrates the acceptability of a result in a study according to the scientific research methodology norms. To this end, the extant literature provides a list of propositions to improve research quality and rigour across research domains in the field of social sciences (e.g., [290–293]). The two common recommendations in these propositions are the emphasis on the data collection and analysis methods and the rigor of the interpretations. The most widely applied tests include *construct validity*, *internal validity*, *external validity*, and *reliability* [259; 261; 291–293]. Since the three research activities apply positivist and interpretivist approaches, the discussion is primarily based on the set of principles proposed by Klein and Myers [294] and the guidelines of Straub et al. [295].

3.6.1 Construct Validity

Construct validity refers to the extent to which the operationalisation of the concept or construct measures as intended [259]. In other words, assessing con-

struct validity informs us of the extent to which the constructs in the study are linked to the observations and measurements, i.e. the appropriateness of the research tools used. As such, construct validity is also conceptualised by Klein and Myer's [294] as a principle. The authors argue that a critical reflection of data collection instruments or data analysis methods is paramount. This criterion is applied during the three research activities as described below.

Research Activity 1: The literature search, data extraction and analysis methods of the literature reviews followed the guidelines for the accepted methodology in the research domain of information systems [254; 255; 296]. For instance, to improve the construct validity of the study, combinations of keywords and multiple databases were used to search for relevant literature, and monitoring was conducted of the review process from the literature search until the final reports were written [254].

Research Activity 2: Among the various measures available, Yin [259] argues that triangulation, maintaining a chain of evidence, and the validation of the respondents improve the construct validity of case studies. This study used multiple sources of evidence to triangulate the validity of the data collected. Besides, respondents were also asked to validate the transcript of the interviews. To further complement and validate the interview data, internal organisational documents and publicly available information from websites of the case organisations were used. In addition, the chain of evidence also helped me to appraise the research process, starting from the research design and formulation of the research questions until the conclusion was written [259].

Research Activity 3: Although IS as a discipline is dynamic, positivist researchers seem to enjoy a relatively well established construct validity assessment criteria, in contrast to interpretivists [295]. However, the authors also argue that there were calls for validation guidelines in the context of the IS research domain. To ensure the construct validity of the studies in Research Activity 3, I consulted previous studies on IT alignment and digital transformation for two reasons (e.g., [19; 31; 103]). First, these studies provided me with a set of competing theoretical foundations to build upon, and to justify and select appropriate constructs. Second, the studies were also invaluable in informing the operationalisation of my constructs. However, the operationalisation of the theoretical models and the list of survey questions were also evaluated by randomly selected experts. Thus, I argue that this procedure has improved the construct validity of my quantitative studies. In addition, the validity of the constructs was tested by evaluating the convergent validity and the discriminant validity as recommended by Fornell et al. [297] and Hair et al. [297].

3.6.2 Internal Validity

Internal validity is a research quality criterion that evaluates the extent to which a study is trustworthy. According to [290] and Golafshani [293], the internal validity assessment is invaluable as it tells the readers whether the correct inferences have been drawn from the collected data. In other words, internal validity reveals the appropriateness, accuracy, and precision of the interpretation of the collected data according to the research objectives [261]. Thus, internal validity is concerned with how well a researcher designs, describes, and applies data collection and analysis methods. Creswell [290] and Johnson [298] suggest a number of measures to address internal validity threats, e.g., data triangulation, theory triangulation, low-inference descriptions, participant feedback, and peer examination. To improve the internal validity of the studies included in the thesis, the following steps were taken.

Research Activity 1: Although evaluation criteria for systematic literature reviews are scarce, Zhou et al. [299] found that internal validity is an important element in judging the rigour of systematic literature reviews. The authors also found that internal validity threats including inadequate details, inappropriate keywords, inclusion of duplicate articles, and subjective interpretation should be avoided. In addition to following the established procedures in the IS research domain [254; 255; 296], I have used the extant literature to select appropriate keywords. Appropriate exclusion criteria were used to exclude duplicates that could have been included in the reviews. Besides, I have also presented dominant and alternative perspectives from the extant literature to demonstrate as objective an interpretation as possible. However, I recognise that absolute interpretation is not possible. Thus, I argue that the internal validity of the studies in this research activity is established.

Research Activity 2: To demonstrate the internal validity of the case studies, the third, fifth and sixth principles of Klein and Myers [294] were consulted. For instance, according to the principle of interaction between researchers and subjects, I recognise that my preconceptions could affect the result of the study. However, I have provided detailed information on the participants and how I justify their selection. Data and theory triangulation, low-inference descriptions, and participant feedback were applied to help readers make judgements on the objectivity of the inferences made [259; 265]. By communicating the three theoretical lenses and presumptions of the study, I have addressed the principle of dialogical reasoning. In relation to the principle of multiple interpretation, I have analysed the various view points of my respondents in consultation with the literature iteratively. Thus, I argue that the internal validity of the case studies is confirmed.

Research Activity 3: The internal validity of the studies in this research activity could be evaluated based on the guidelines of Straub et al. [295]. The authors emphasise the importance of appreciating alternative explanations of the strength of the connections between constructs in the theoretical model. In

the two surveys, I used the extant literature to formulate the theoretical models. In addition, the survey instruments were operationalised based on the findings of previous studies, which were also tested by selected experts in Research Activity 2. Furthermore, theoretical triangulation was applied to ensure that rival explanations informed the conclusions drawn. It is also worth mentioning that all of the studies included in this thesis benefited from revisions made after peer review by scholars in the IS discipline.

3.6.3 External Validity

External validity, also known as generalisability, is one of the criteria used to test whether a study finding could be replicated, with results that can be generalised beyond the immediate study sample and the research setting [300]. As noted by scholars [261], generalisation from small-scale research might be possible, however, the findings of this study should be seen as a starting point for further study. This criterion is applied in the three research activities.

Research Activity 1: As stand-alone research, systematic literature reviews are expected to produce findings that could be generalisable for the particular domain [299]. However, the authors list four threats to external validity in systematic literature reviews: restriction of time-span, access to articles / databases, generalisability of primary studies, and incomplete information in the reviewed articles. During the reviews, none of the articles that were found to be relevant nor the databases were inaccessible to me. Furthermore, the inclusion and exclusion criteria were formulated so that only complete research articles were included. The time span of the literature was also chosen to coincide with the most recent and comprehensive reviews of the literature in the domain of knowledge and research. Thus, I argue that the external validity of the studies in this research activity is confirmed.

Research Activity 2: Each case study offers the opportunity to reveal a unique insight that might not be found in other settings. Yin [259] makes a distinction between statistical generalisation and analytical generalisation. As described in Klein and Myer's [294] second and fourth principles, a researcher needs to provide a case study in detail along the underlying theoretical underpinnings to improve the analytical generalisability of a study. Detailed case study settings including the selection of organisations, informants, interview guides, and discussions about the three theories—public value theory, technology enactment theory, and stakeholder theory—were provided. Furthermore, the insights obtained from both IT and administration employees who had knowledge relevant to IT alignment and digital transformation are also clearly described [7; 19; 37]. Therefore, the analytical external validity of the findings is established for the reader.

Research Activity 3: In contrast with other Structural Equation modelling techniques, PLS-SEM has a better prediction power (better generalisability as a result) with small data samples [284]. However, both quantitative studies included in the thesis were based on samples that exceeded the minimum recommended number of respondents to claim generalisability, that is, 100 [301]. Another advantage of the PLS-SEM is that it does not require a normal data distribution to improve the generalisability of a study. However, the predictive power of a model needs to be evaluated to judge whether the results of a PLS-SEM analysis could be generalised in similar study contexts [285]. Thus, I have shown that the predictive power of the theoretical models in the two quantitative studies, according to Hair et al. [285], was above the 0.5 threshold, suggesting that the study meets the external validity criterion.

3.6.4 Reliability

Reliability, also referred to as replicability, describes the extent to which the results of a study could be replicated under similar circumstances [293]. An adopted research methodology is considered to have produced a reliable result if these results can be reproduced applying the same methodology [261]. Although representative sampling selection is found to improve the reliability of a study in quantitative research approaches [293], providing a detailed and accurate description of data collection and analysis methods will enhance the likelihood of replicating a qualitative study that results in similar findings [261]. I relate this criterion to what Klein and Myers refer to as the principle of contextualisation [294]. The different data collection and analysis methods used in the six studies included in theses were described to ensure reliability.

Research Activity 1: According to Zhou et al. [299], the reliability of systematic literature, also referred to as conclusion validity, is established when researchers demonstrate transparent and coherent data collection procedures that can be repeated with similar results. I have also described and justified choices I took to address reliability-related validity threats, including duplication and misclassification of articles and subjective interpretation of the extracted data [299]. The methodology chapter describes how the two systematic reviews were conducted according to established procedures within the IS research domain (e.g., [254; 255; 296]). This was done by clearly stating (1) the complete list of keywords, (2) searched databases, (3) the step-by-step literature search and evaluation procedures, and (4) the data analysis methods.

Research Activity 2: To ensure the reliability of the qualitative case studies, three steps were followed. First, case study databases were created at the beginning of each study to easily access data collection instruments and evidence for iteration purposes. Second, interview protocols were also used to provide evidence of data collection. Third, justifications for the choices made during the data collection and analysis procedures were provided in detail. Thus, the studies included in the thesis meet the reliability criterion. I also argue that

the procedures followed to ensure reliability have also implications for the two of Klein and Myer's principles, i.e., the principle of contextualisation and the principle of abstraction and generalisation [294]. I argue that by providing detailed and clear information on the cases, the data collection procedures, and data analysis methods, the readers are properly informed and be able to assess the quality of the study in terms of its reliability.

Research Activity 3: Similar to the qualitative studies included in the thesis, the same detailed description of the quantitative studies is provided. This includes the methods used to select informants and collect quantitative data. Demographic information, organisational affiliation, and the roles of participants are also included in the thesis. In addition, a step-by-step procedure of the quantitative data analysis method is presented with justifications. The interview guide used to collect data for the case study and the survey questionnaire are attached in the appendices at the end of this study.

3.7 Ethical Considerations

This study was designed to conform to established scientific research process in accordance with the ethical guidelines and procedures of the countries where the studies were conducted.

Creswell [290] and Denscombe [261] point out three principles of ethical considerations for studies within the social sciences research disciplines. The first principle is related to **voluntary participation** and harmfulness. According to [261], researchers are expected to respect and protect the dignity of their respondents. Researchers must also make assessments that enable them to foresee potential consequences to their respondents and to take appropriate steps to make sure no harm will come to them. This principle also states that adequate information about the study, and the option of withdrawing from participation should be provided to participants. Myers [302] recommends the use of detailed informed consent, outlining the description and purpose of the study and the respondent's right to withdraw from participation. The first principle is not relevant to Research Activity 1 since it did not involve the participation of human subjects. However, this principle guided the data collection method of Research Activities 2 and 3. For Research Activity 2, all participants were asked to sign the consent form before the interview attached in as **Appendix B (Figure 5.1** for case study 1 and **Figure 5.2** for case study 2). In addition to the consent form, the interviewees were encouraged to ask questions about the study and any concerns they might have. For Research Activity 3, the email sent to potential respondents provided them with information about the study and their rights to withdraw from participation at any time. As shown in **Appendix C**, only respondents who consented to participate in the study were directed to the online form containing the questionnaires (**Figure 5.3** for survey 1, and **Figure 5.4** for survey 2).

To comply with the second principle, the **anonymity and confidentiality** of the respondents, any information that could be used to identify the respondents

has been excluded from the publications. The second principle is not relevant to Research Activity 1 as it did not involve human subjects. Anonymity could not be maintained for Research Activity 2, since the interviews were conducted face-to-face; however, respondents were guaranteed confidentiality. Only the researcher conducting the study knew the identity of the respondents. The recorded audio files were stored in a safe place until the transcription was completed. Respondents were also given the opportunity to read the transcripts and make changes if they wished to do so. The names of the participants were anonymised in the transcripts. The case company's name, and other information that could be used to identify the organisation, is not disclosed for one of the organisations where the data was collected (Paper III and Paper IV). None of the internal organisational documents were published nor disclosed.

The third ethical consideration relates to the **honesty and scientific integrity** of researchers when collecting and analysing the data used for the study. Denscombe [261] argues that researchers should exhibit the utmost professionalism and honesty while conducting their study, and when they interact with their fellow researchers. To start with, researchers should meet their scientific obligation by disclosing accurate results. According to Bhattacharjee [291], the findings of a study, including those which might attract suspicion or generate questions from the research community, need to be reported. This also applies when researchers by chance find a result which might look unfavourable. None of the studies included in the thesis made findings that were negative or unexpected. The complete summary of results was reported for each of the studies.

The recommended guidelines for conducting rigorous literature reviews in the information systems domain [254; 255; 296] were followed for Research Activity 1. According to McGowan and Sampson [303], conducting a literature review is an important undertaking that requires a demonstration of transparency and reproducibility, and this was demonstrated throughout the whole research process. The databases used, the literature selection and appraisal, and the data analysis methods, were included in Paper I and Paper II. As discussed in the research quality section, Research Activity 2 was conducted as suggested by Yin [259]. Case study protocols and the three principles of data collection were followed to improve reliability and transparency. The contents of the case study protocols shown in **Appendix D**, present the research questions, data collection and analysis methods, how permission was obtained, ethical considerations, interpretation process and criteria for assessment as outlined by Rashid et al. [304]. Screenshots of parts of the actual case study protocols are also presented in the same appendix (**Figure 5.5** for case study 1 and **Figure 5.6** for case study 2).

Finally, the third principle also states that researchers are expected to acknowledge the work of others [261]. Thus, all sources of primary and secondary data used in all studies included in the thesis are appropriately acknowledged. Moreover, references are also made and credit given for those who took part in the empirical data collection.

4. Results and Discussion

This chapter presents a summary of the results of the four empirical studies included in the thesis. The results are summarised and presented in three sections. Section 4.1 presents a case study carried out in a city exploring the organisational and managerial factors that influence IT alignment, which, in turn are reflected in the success of digital transformation. This will be followed by a confirmatory PLS-SEM analysis based on quantitative data collected from leaders of various public organisations through online surveys. Section 4.2 discusses the result of a case study exploring the influence of organisational structure on IT alignment. A confirmatory PLS-SEM analysis was also conducted in the same organisation. The influence of organisational structure (i.e., formal and informal) on IT alignment is presented in more depth here for two reasons. First, organisational structure is one of the three important aspects that separate public organisations from their private counterparts [25; 29; 59; 61; 77; 81]. Second, organisational structure is one of the four factors found to strongly determine the degree of IT alignment in public organisations undertaking digital transformation [37; 80; 83; 149; 168; 263]. Finally, Section 4.3 discusses the answers to the four research sub-questions and presents a framework outlining 19 actions to improve IT alignment in public organisations enabling successful digital transformation.

4.1 IT Alignment-Related Factors Influencing Digital Transformation Success

This section discusses the results of the exploratory and confirmatory study on IT alignment and digital transformation in public organisations. The first two subsections present the various organisational and managerial factors influencing IT alignment in a public organisation based on the qualitative data collected at the case organisation (i.e., Addis Ababa City Administration). The last subsection discusses the summary of the result of the confirmatory study based on data collected from various public organisations in Ethiopia.

The analysis of the interviews and internal organisational documents revealed 30 different factors that determine IT alignment. These are presented in two categories—organisational and managerial. While the organisational factors are related to the organisational settings which are relatively stable over time, the managerial factors are those connected with the leaders' management approach and leadership style. The result of my interview analysis indicates that the city has strict procedures for making changes to organisational structures and other working arrangements. On the other hand, leaders have more leeway when it comes to making choices about management practice, at least

informally. The thematic map shown in **Figure 4.1** lists the various factors that influence IT alignment in public organisations undertaking digital transformation.

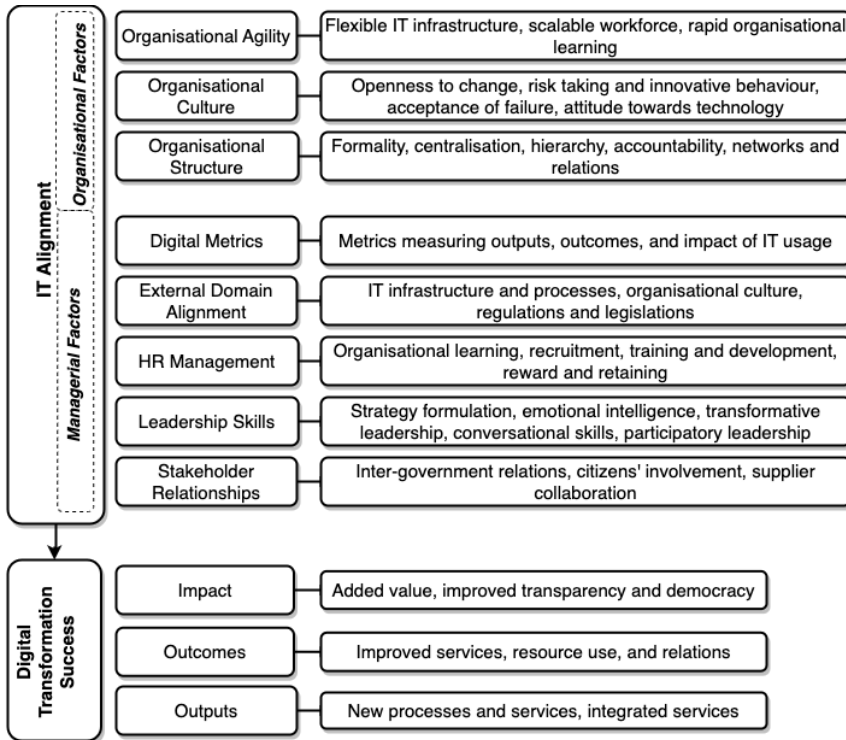


Figure 4.1: Thematic map depicting the factors influencing IT alignment and the digital transformation success indicators.

As shown in **Table 4.1**, the IT alignment-related factors identified in the case study were mapped to factors identified in the IS literature.

Table 4.1: IT alignment-related factors in a public organisation undertaking digital transformation.

Factors	Factors	Sources
Organisational	Organisational structure	[13; 28; 29; 37; 44]
	Organisational culture	[13; 18; 44; 164]
	Organisational agility	[13; 18; 44; 99; 178]
Managerial	Leadership skills	[44; 178; 305; 306]
	Stakeholder relationships	[28; 31; 34; 90; 91]
	External domain alignment	[28; 31; 90; 91]
	Digital metrics	[13; 18; 19; 28; 44; 90]
	Human resources management	[19; 43; 47; 137; 307]

4.1.1 Organisational Factors

In relation to the degree of IT alignment, the existing literature indicates that the context of an organisation is an important determinant. Within the public sector, three important organisational factors—organisational agility, organisational structure, and organisational culture—were found to influence IT alignment, which in turn was reflected in the success of digital transformation. These factors are described below.

1. Organisational Agility: One of the topics that is gaining the attention of researchers and practitioners alike is the ability of organisations to be agile in response to the dynamic environment. The interviewees brought up this ability while explaining the organisational structure in the case organisation. Since IT alignment is a continuous process to maintain the congruence the application of IT and alteration of organisational strategies in response to changes, the issue of organisational flexibility was found to be important.

Similar to the debates in the extant literature (e.g., [18; 44]) there was a discussion among some of the respondents about the relationship between organisational agility and degree of IT alignment. According to the respondents from the IT side (ITL1, ITL2, ITL5, ITL6), organisational agility (flexibility in organisational structure and work processes) is necessary to achieve IT alignment and improve the likelihood of digital transformation success. For instance, According to ITL1, flexibility “...is not something we take lightly, rather it is important for us. Even in the past three years, we needed to change our processes and the systems that support them. Unless we succeed, I do not see how we can realise the strategic vision of the city”. Some of the interviewees however go further to unpack what this flexibility entails and how it is proving to be difficult. ITL6 in his own words says “...almost everyone knows we need to be versatile, but only us leaders appreciate what it takes. We are expected to operate under a cumbersome and rigid structure where people are scared of leaving their comfort zone.” However, most of the participants agree that it was the flexibility of the “informal” organisational structure that created an “agile-like” arrangement that was helpful for speeding up some of the digital transformation work. The results of recent literature reviews [8; 13] also suggest that organisational agility is also one of the requirements for IT alignment and successful digital transformation.

On the other hand, the respondents from the administration side seem to have a mixed view on the effectiveness of organisational agility for IT alignment in general and digital transformation in particular. For instance, while the development planning head (Adm1) supports some form of flexibility in work processes, others (e.g., Adm5, Adm 8, Adm9) preferred a relatively consistent structure and processes. For instance, Adm8 argues that “*the fact that we are expected to uphold a very strict administration to the largest city in the country, flexibility could be at times challenging. Not because we do not want it, but most of the services that we provide need to be done ‘properly’ with much accountability. So, the system works relatively well, as it is*”.

The participants’ assessment of the IT alignment dimension measuring IT scope (e.g., IT infrastructure flexibility) indicates that the city is not adaptive to

the changes made to the delivery of services. This view might be an indication that the case organisation does not have an IT infrastructure flexible enough to support innovative solutions [19]. However, we note that public organisations are expected to deliver innovative public services to even under extreme uncertainties. For instance, during political turmoils, natural and man-made catastrophes, and sudden changes to the economical landscape put pressure on public organisations to address complex issues. For this, digital transformation is considered to be invaluable. However, responding to the scenarios listed and exploiting digital technologies calls for the ability to sense changes and make swift adjustments (e.g., to IT infrastructure, organisational structure, and adaptive human resource use). Thus, in line with the extant literature, I argue that the city needs to promote less formal and more flexible arrangements to support its digital transformation journey [44].

2. Organisational Culture: Among the important issues that were mentioned by the participants in the study was the lack of appreciation for the new IT solutions being launched at the case organisation. When asked about the reasons, the critical role of organisational culture in digital transformation was brought up by almost all of my participants. Specifically, the existence of sub-cultures within the city was a concern shared. Leaders from the IT side argue that organisational culture at the organisation has become so dire that many of the new systems launched at the city were not being used by administrative employees. For instance, the two IT infrastructure leads (ITL6, ITL7) and one of the Chief Digital Transformation Officers (ITL4) appear to be frustrated with the resistance they encounter as they propose measures towards digitalising services at the city. In his own words, ITL4 says *“even though we spent several hours in training and a huge amount of money implementing systems that could save us a lot of hours and money, most of the administrative employees still do the ‘paper and pen’ thing”*. What is surprising, according to ITL2 is the fact that this culture is not seen as an obstacle to the digital transformation agenda being advocated at a country level.

One interesting finding in relation to organisation culture and its influence on IT alignment was that it was misunderstood by many. For instance, some of the respondents attributed the lack of use of existing IT solutions to other reasons than organisational culture. When asked to reflect on resistance to change attitudes towards technology, some of the respondents agreed that skills and training were often incorrectly cited as factors affecting the use of technology in the city. However, the majority of these responses came from the administration side (e.g., Adm3, Adm4, Adm5, Adm8). In relation to the participation of top management, IT leaders are hesitant about whether the city is ready to promote, for instance, data-driven decision-making and technology-supported changes to existing work process. Administrative leaders also admit that their organisation has much red tape, many rigid procedures, a relatively rigid organisational structure, and a formal division of labour. In their opinion, this has resulted in a perpetuation of conservative organisational culture that might be a reason for scepticism towards the adoption of new technologies and embracing change.

The analysis also indicates that the organisational culture of the city has implications for IT alignment and the success of digital transformation. When the responses to the interview questions were analysed in relation to the various dimensions of IT alignment, the results suggested that the organisational culture has influenced communications and partnering [19]. In particular, participants blamed the organisational culture for the rigidity of protocol and the lack of sponsorship from administrative leaders on new IT project initiatives. Another area of concern mentioned was the environment that does not promote innovative / risk-taking approaches. As suggested in the literature on IT alignment and digital transformation [19; 23; 178], I argue that city needs to work toward an organisational culture that promotes the development of new digital skills sets, embracing open communication, risk-taking behaviour, and a positive attitude towards digital transformation. The findings are on par with the IS literature on IT alignment and digital transformation supporting organisational cultures that promote organisational change [19; 164; 308].

3. Organisational Structure: As one of the determinant factors that influence IT alignment [13; 37], the organisational structure of the case organisation was investigated. The organisational chart and the interviews suggest that there is an appreciation for the important role of organisation in the digital transformation work among leaders. In the interest of facilitating the many digital transformation initiatives in the city, the accounts from my interviewees indicate that the structure of the city has been changed several times. For instance, the IT and administration sides were adamant that several of the IT roles and the respective responsibilities (e.g., the office of Chief Digitalisation Officer) were created or changed to facilitate the digital transformation initiatives at the city. Other changes introduced recently include the reporting structure, where the Information Security Leads are now under the direct supervision of the CIO at the central city rather than the CIOs at the sub-city level. Similar changes were also made in the administrative departments to facilitate the execution of many digitalisation projects.

Although making changes to the organisational structure is desirable and not uncommon [13; 44], I found the statements of the participants interesting for two reasons. First, the internal documents I was provided with (formal organisational chart) did not reflect the changes pointed out during the interviews. According to the two chief information officers and the deputy digital transformation officer, the city has gone through a lot of restructuring to facilitate swift digitalisation of services. Unfortunately, ITL1 states "*these new positions and roles created were not formalised as we would like. But there are some procedures that need to be followed to ensure accountability and responsibility is within the framework of public service laws.*" However, ITL2 and ITL3 also acknowledged that even though the new positions were not fully formalised and put in the organisational chart, the allocation of some 'experts in the area' to take some responsibility has helped to make digital transformation a priority. The extant literature provides an explanation for the contradiction in the existence of such arrangements. According to Plesner et al. [29], the formal organisational structure in the public organisation is less likely to remain unchanged to maintain public legitimacy and ac-

countability. However, people will find various alternative “informal” ways of getting around the rigid bureaucratic structure to get their work done. Previous IT alignment studies (e.g., Chan [37]) have also confirmed the presence of informal organisational structures with favourable implications for the application of IT. The analysis of the interviews also suggests that the informal arrangements have contributed to some of the success of implementations of new systems at the city. For instance, three of the IT leaders revealed that they have often skipped hierarchy and used their personal connections to approach top leaders, either to speed up their work or to seek support for their projects.

On the other hand, I also noted that the changes in the “informal” reporting structure have been accepted differently by the participants of the study. For instance, the leaders in the administration side, question the need for these forms of arrangements. As they see it, the best system for a public organisation is to maintain stability and accountability. However, the consultation between IT and administration heads is changing the attitudes of many. According to another interviewee (Adm8), there is an ongoing discussion among IT leaders and other heads of departments to decide which form of arrangements should be maintained or altered according to the political and technological landscapes. According to the Health Services head, the “...*spectrum from formal to informal organisational structure should be seen from the need of the particular section of the city*”. His argument is that there are some services that could benefit from stringent procedures and responsibilities.

The IT leaders for their part agree that the constant changes could be better managed but are necessary given the dynamic environment. For instance, there is an ongoing discussion to minimise the level of hierarchy and formality to speed up IT-decision making. Again, there are mixed views within the administration departments. For instance, Heads of departments (Adm1-4, Adm 10) argue that the ‘new flexible’ arrangements, where various committees and work groups are formed from various departments, are making it difficult to monitor and supervise their employees. On the other hand, those responsible for digitalisation projects argue that it is the only way of speeding up the introduction and integration of new digitalised services. However, ITL2 understands the confusion and frustration that result from lack of consistency and perhaps oversight.

According to the extant literature, organisational structure forms affect the various dimensions of IT alignment. For instance, the communication and IT governance efficiency were found to suffer when decision-making power is centrally held [33; 44; 99]. In addition, previous studies also recognise the importance of an appropriate organisational structure for IT alignment [37] and digital transformation [144]. Therefore, I argue that organisations must acknowledge the relevance of continuous evaluation of existing organisational structures in relation to their journey of digital transformation. Jöhnk et al. [308] also argue that leaders are expected to make a continuous assessment and adaptation in response to environmental changes while maintaining stability and accountability.

4.1.2 Managerial Factors

As public organisations attempt to succeed in their digital transformation efforts, managing IT alignment is a function of many managerial and leadership-related factors, notably: leadership skills, stakeholder relationships, external domain alignment, the use of digital metrics, and human resources management. These managerial and leadership-related factors are described below.

1. Leadership Skills: 1. Leadership Skills: The analysis of the interview data indicates that the skills of leaders were found to be associated with many of the factors recognised to influence IT alignment and eventually the success of digital transformation. For instance, my interviewees underscore the criticality of a robust IT strategy to support the digital transformation journey. As indicated in the extant literature, leaders are expected not only to possess the acumen to draft appropriate strategy but also to appreciate the challenges involved in the process. A well-formulated IT strategy enables the use of new digital technologies to improve the value derived from IT investments. The involvement of stakeholders is regarded as an essential part of the IT strategy formulation processes in an organisation undergoing digital transformation. This is even more significant for organisations in the public sector [30; 90; 178]. Thus, one of the necessary skill sets is the ability to forge a good working relationship with stakeholders [177] to formulate robust IT strategy.

On the other hand, the participants agree that the greatest challenge they have during this digital transformation journey is to make informed decisions on IT investments. Interviewees who happen to be in the committee mandated to make high-level IT decisions admit that their selection is not based on their expertise related to digital transformation. Instead of members with administration and IT acumen, the committee comprises highly placed bureaucrats representing most of the administration. This had implications for the IT governance arrangement for two reasons. First, many IT teams have been waiting for decisions to be made for a long time. Second, the final say on IT priorities is almost always influenced by those who do not possess the right knowledge which means non optimal choices have been made. However, the two are not mutually exclusive.

The findings confirm what researchers have been saying about the significance of leadership skills. First, to support the formulation of a robust IT strategy enabling successful digital transformation, few leadership skill sets are expected from the IT and the remaining units. Among others, emotional intelligence and conversational competency are essential to support the forging of a favourable relationship between leaders in different units. The top leaders' relationship was found to be invaluable for the formulation of an IT strategy acceptable by the entire organisation [19]. Second, the decision-making process in relation to the adoption of new technologies within the public organisations is dependent on the existing rules and regulations, which are stricter in bureaucratic settings [305; 306]. Thus, it behoves leaders of such organisations not only to be aware of the leeways but also to possess skills that support the forging

of working relationships with those mandated to oversee the applicable regulations.

2. Stakeholder Relationships: In contrast with the private sector organisations, the public sector digital transformation is aimed at creating added value for citizens [28; 90]. Thus, it is in the best interest of public organisations to forge a conducive working relationship with internal and external stakeholders, thereby enabling enhanced service delivery. As the interviewees put it, aligning IT with the public service delivery calls for the participation of citizens, suppliers and other agencies.

In the past information systems studies, the concept of stakeholders was limited to include individuals and groups within the organisation [309]. However, recent studies exploring the management of information systems, particularly in the public sector, consider stakeholders as all individuals and groups with varying levels of interest and power to influence the design, implementation and management of information systems [31; 91]. The participants agree that identifying the relevant stakeholders and involving them in IT and related projects is one of the critical success factors for digital transformation initiatives. The involvement of stakeholders was also found to be important among the participants as they can contribute to IT strategy formulation, the elicitation of application needs, and can comment on process improvements and investment decisions. Researchers have also provided justifications for the significance of good stakeholder relationship management. The complexity of systems and the number of stakeholders involved in public organisations is a management issue that needs the attention of public organisation leaders [245]. Thus, I argue that the management of stakeholder relationships is critical as it promotes necessary organisational changes and innovation to align the introduction of new information systems with the overall organisational objective. The ability of organisations to respond to the dynamic business environment is also a function of the compatibility of stakeholders' perceptions and expectations and of the support given to IT investment decisions [232; 310].

In the case organisation, the relationship with other public organisations has brought about the possibility of delivery of integrated services to citizens. On the other hand, the smooth relationships with external service providers have also helped the organisation better understand and adapt to changes in the external environment. In addition to responding to political and legal developments, the external service providers have provided the city with invaluable information on current and emerging technologies. This assertion is consistent with what prior studies on digital transformation (e.g., [18; 34; 90]) and IT alignment (e.g., [31; 91]) have found. Thus, it is important to put arrangements in place to support stakeholder relationships that may result in collaboration [18] or partnership [19]. According to the authors, organisations scoring high for two of the IT alignment dimensions (communications, and partnering) are also likely to have managed their stakeholder relationships.

3. External Domain Alignment: In the past, IT alignment was considered to be a state where the internal organisational variables are put in congruence to

appropriately utilise IT and further organisations' objectives. Nowadays, as most organisations embark on the digital transformation journey, the dependence of organisations on others to create value has become a norm [12; 13]. Thus, besides managing the internal organisational factors, IT alignment endeavours also involve identifying both threats and opportunities and reacting accordingly [164]. This is more true for organisations in the public sector as the creation of public value depends on collaborations between various agencies, suppliers and other collaborators [28; 33; 90]. In this regard, a phenomenon referred to as "external domain alignment" has appeared in the IS literature. The argument is that it is in two or more collaborating organisations' best interest to maintain compatibility (congruence) to get the best out of their collaboration.

The participants in the study also recognise that digital transformation in their organisation is, by default, aimed at solving complex problems beyond the boundaries of the city. Thus, the IT leaders and those in the administration argue that the success of the transformation initiatives requires inter-organisational collaboration and information-sharing with other public agencies. Accordingly, the relationship between these organisations is important because the ultimate objective of digital transformation is to support the provision of integrated services that make the lives of citizens easier. However, for that to happen, the responses suggest that several IT infrastructure and compatibility issues need to be solved. Among other things, the compatibility of software, hardware and communication networks between the city and partner organisations are necessary. On the other hand, conflicting organisational goals, divergent political attitudes, lack of trust, legal issues, and diversity of organisational culture have been found to be challenging as the city attempted to align the new technologies with its overall organisational goal. Thus, I concur with prior studies underscoring the significance of external domain alignment for IT alignment which eventually affects the success of digital transformation in organisations [14; 311].

4. Digital Metrics: As one of the IT alignment dimensions [19], the use of mutually agreed metrics is vital to assess and make adjustments to support the appropriate use of IT. According to one head of department, while favourable outcomes are expected from digital transformation, the IT leaders did not do their homework when making a case for most of the initiatives. As a public institution under greater scrutiny than most, investment decisions on new technologies need to be tied to outcomes that can be "observed or measured". However, the IT leaders for their part do not agree that it is the sole responsibility of their units to account for the value of investments from IT. The major issue, according to the other respondents, is that the organisation itself does not have a set of outcomes that can be assessed objectively. Thus, accounting for the improvement of services produced and delivered needs to be a shared responsibility. In their review of digital transformation studies, Jedynak et al. [137] argue that measuring the outcomes of digital transformation is a grey area that needs to be explored further.

On the other hand, IT alignment frameworks (such as SAMM) could be used to estimate whether the proposed and implemented technology use has improved organisational objectives. Based on the contradictory views on the

digital metrics measurement of outcomes of the ongoing digital transformation initiatives, the city has a long way. However, the challenge of measuring the results of digital transformation in the context of public organisations is also acknowledged in the extant literature. For instance, Mergel [28, p. 9] lists several measures in three categories including “*outputs (e.g., new services, products), outcomes (e.g., improved services, processes), and impacts (e.g., organisational change, value creation)*”. However, I argue that it is in organisations’ best interest to encourage the participation of various stakeholders in developing metrics to measure the added value resulting from digital transformation. Accounting for the value gained from digital transformation initiatives is critical as public organisations make continuous adjustments to improve IT alignment and succeed in their digital transformation [90; 137]. After all, neither IT alignment nor digital transformation is a state but a process that needs to be monitored and adjusted to realise its benefits [13; 18; 19; 44].

5. Human Resources Management: Prior studies indicate that organisations with appropriate human resources management are in a better position to succeed in reaching and maintaining an IT-aligned position, enabling successful digital transformation [19; 47]. However, the responses from the interviewees (mainly from the IT leaders’ side) seem to suggest there is a lack of appreciation for the relevance of investments related to human resources acquisitions as well as skills development. The views from the administration and IT sides are that the lack of skills from both sides is unfavourably affecting the utilisation of new digital technologies at the city. According to respondents involved in IT, the city has a problem when it comes to attracting those with skills in some of the emerging technologies. According to the two CIOs the city is struggling to recruit employees that are essential to improve the use of new technologies in the work processes of the city. For instance, it was found that there is a lack of people with expertise in the areas of robotic process automation (RPA), information security, cloud computing and network administration.

The responses from the participants are consistent with what prior studies have found. For instance, according to Jedynak et al. [137], the issue of human resource management in relation to digital transformation is not a topic that attracted appropriate attention from researchers and practitioners. The observation is not surprising given the continuous attention given to the technological aspects of digital transformation. I argue that this lack of appreciation for human resource issues undermines the essential role of individuals as well as teams in enabling the adoption and exploitation of new technologies. In this regard, my analysis of the case indicates that human resource management activities—hiring and retaining, and career-crossover are essential to improve IT alignment [19].

According to the responses from the participants, the public administration bureaucracy does not provide leeway to make adjustments to the pay scale and other related benefits. However, there are planned measures in the form of training and development, and reward programmes based on performance. In one of the sub-cities, one department has taken a new approach of providing an informal skills development programme to improve morale. Leaders have

also found ways of motivating their staff by organising informal arrangements where employees are allowed to share their skills and knowledge. However, my analysis indicates that the organisation at the moment does not seem to have a consistent and formalised skills development arrangement to support digital transformation. As researchers put it, public organisations undertaking digital transformation need to design clear remuneration, as well as training and development programmes, to improve IT alignment [19; 43; 307].

4.1.3 Confirmatory Analysis

The aim of the confirmatory analysis of IT-alignment related factors is twofold. First, to test the influence of eight organisational and managerial factors (**Table 4.1**) on IT alignment in public organisations undertaking digital transformation. Second, to establish the degree of influence of the identified factors on IT alignment in the same organisational setting. After proposing a theoretical model with 12 hypotheses (**Figure 3.9**), PLS-SEM analysis was performed on the causal relationships (1) *between the eight factors and IT alignment*, (2) *between the factors themselves*, and (3) *between IT alignment and digital transformation success*. The findings of the case study in the city and the result of the systematic literature reviews (Papers I, II, V) were the basis for the theoretical model proposed and hypotheses posited. The PLS-SEM analysis results will be presented in two steps, i.e., evaluation of the measurement model and evaluation of the structural model.

Measurement Model

As depicted in the theoretical model in **Figure 3.9**, the study assesses the causal relationship between ten constructs. The aim was to test the (degree of) influence of various organisational and managerial factors on IT alignment. The evaluation also assesses whether a causal relationship between IT alignment and digital transformation could be established within the context of public organisations.

The first step in the evaluation of the measurement models was to calculate the collinearity statistics of the items. As suggested in the literature [285], the variance inflation factor (VIF) was used to measure collinearity. The purpose of this assessment was to determine whether the other formative indicators related to the same construct may affect any formative indicator. The VIF value was calculated for each of the indicators per formative measurement model. I note that a VIF value of 5 and higher indicates a potential collinearity issue. When VIF values are higher, measures are needed to eliminate or merge indicators or create high-order-construct to reduce the level of collinearity. However, collinearity issues might also arise even when VIF values are between 3 and 5. If the analysis results in an expected change in sign, Heir et al. (2019) suggest revising the measurement model and taking measures to deal with potential collinearity issues. Since none of the VIF values of the indicators is higher than 5, I am satisfied that there is no collinearity issue.

Next, the analysis examined the statistical significance and relevance of the indicator weights. This was done by examining the t-values for the indicator

weights. The study showed that the weight in 27 of the 33 items appeared to be significant at 1%, above the 2.576 threshold. Hair et al. [285] suggest that a weight indicator that is not significant should not necessarily be considered to show evidence of poor quality. Consequently, I evaluated the absolute contribution of the six formative indicators to their respective constructs. Since the outer loadings of these indicators were above .50, I was satisfied that they contributed sufficiently to the construct. Thus, I retained all the indicators, and no collinearity issues were encountered.

Structural Model

Since no issues were found during the evaluation of the measurement model indicating construct validity, the assessment of the structural model evaluation was carried out. Again, the first order of analysis was to check for collinearity by looking at the computed VIF values. VIF values of the predictor constructs over 5 indicate collinearity issues. All values were lower than the threshold of 5. Thus, I was satisfied that no further measures were necessary. In the second step, I tested the predictive power of the model. Unlike other structural modelling techniques, PLS estimates are based on explained variance [283]. Therefore, I assessed R^2 to test the hypothesised relationships of the theoretical model (see **Figure 3.9**). The literature (for instance, Hair et al. [285]) provide R^2 values that could be used to judge the degree of variance explained (0.75 = substantial, 0.5 = moderate, and 0.25 = weak).

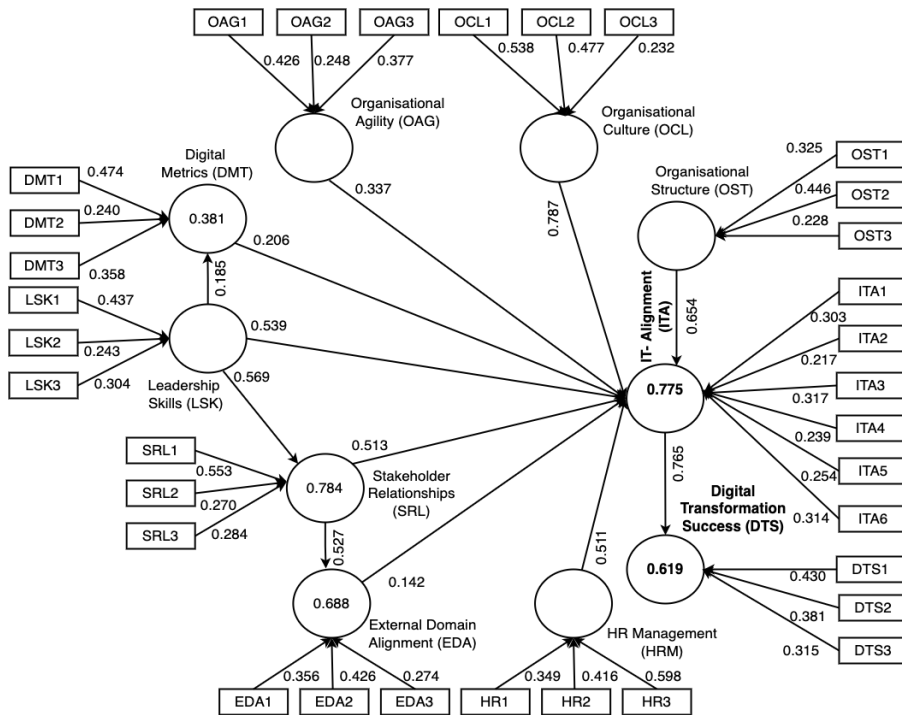


Figure 4.2: PLS-SEM analysis results [Paper VI, p. 8].

As shown in **Figure 4.2**, the model appears to substantially explain the variances of two constructs (i.e., stakeholder relationships = 78.4%, IT alignment = 77.5%). The variance for external domain alignment and digital transformation success (i.e., 68.8% and 61.9%) seem to be moderate. On the other hand, the model accounted for 38.1% of the variance for digital metrics which is weak. In the third step, the statistical significance and relevance of the path coefficients were evaluated. Path relationships explain the strength of the effect one variable has on another. According to Cohen [288], the strength of the prediction as measured by path coefficients might be strong (0.5 or higher), moderate (higher than 0.3, but less than 0.5), or small (higher than 0.1 but less than 0.3).

Since all paths in the theoretical model are significant, the theoretical model is supported (see **Table 4.2**). However, the degree of influence seems to vary. For instance, organisational culture has the strongest influence on IT alignment, followed by organisational structure, leadership skills, stakeholder relationships, and HR management. On the other hand, the influence of organisational agility, the use of digital metrics, and external domain alignment seems to be small. In addition to the hypothesised path relationship it has with IT alignment, leadership skills seem to have a strong influence on stakeholder relationships. However, its association with digital metric use is small. The analysis also indicates the strong influence of stakeholder relationships on external domain alignment.

Table 4.2: Outcomes of the structural equation modelling analysis [Paper VI, p. 8].

Path	Hypotheses	Path Coefficient (β)	Decision
ITA→DTS	H1	0.765	Supported
OST→ITA	H2	0.664	Supported
OCL→ITA	H3	0.787	Supported
OAG→ITA	H4	0.337	Supported
LSK→ITA	H5	0.539	Supported
LSK→DMT	H6	0.185	Supported
DMT→ITA	H7	0.206	Supported
LSK→STR	H8	0.569	Supported
STR→ITA	H9	0.513	Supported
STR→EDA	H10	0.527	Supported
EDA→ITA	H11	0.142	Supported
HRM→ITA	H12	0.511	Supported

This study set out to contribute to the scant literature on digital transformation and IT alignment. Even though the two topics have garnered the attention of many, there seems to be a lack of appreciation for the sectoral and various organisational differences in prior studies [29]. On the other hand, a close look into the extant literature indicates a lack of overlap of studies on the two related phenomena. For instance, even though IT alignment and digital transformation have been recognised as related topics, to the best of my knowledge, no studies have explored how public organisations should approach IT alignment while

undertaking digital transformation. To address this gap in the literature, I used three theories (public value theory, stakeholder theory, and technology enactment theory) that justify how organisational and managerial factors in public organisations warrant a fresh investigation.

Based on the findings of the literature reviews and the result of the case study, I have identified factors that influence IT alignment. The PLS-SEM analysis also indicates that a strong influence on IT alignment was found to come from organisational culture ($\beta=0.787$), organisational structure ($\beta=0.664$), leadership skills ($\beta=0.539$), stakeholder relationships ($\beta=0.513$), and HR management practices ($\beta=0.511$). The effect of the remaining three factors on IT alignment was moderate (i.e., organisational agility with $\beta=0.337$) and small (i.e., digital metrics use with $\beta=0.513$ and external domain alignment with $\beta=0.513$). Nevertheless, the results show that all hypotheses are supported. Moreover, I have also established the relationship between some of the constructs. Leadership skills are related to stakeholder relationships, which, in turn, affects external domain alignment. The study has also revealed interesting findings that contradict prior research. For instance, in prior research, the influence of external domain alignment on IT alignment was found to be strong in public organisations [34; 35; 161]. However, the confirmatory PLS-SEM analysis suggests that it has the least influence on IT alignment. Moreover, prior research on the relationship between organisational agility and IT alignment provides contradictory findings [119]. However, the result of the PLS-SEM analysis indicates that organisational agility moderately influences IT alignment. This is consistent with another study investigating IT alignment and organisational agility in a public sector [91]. I have also found that the influence of IT alignment on digital transformation success is strong ($\beta=0.765$) with the model explaining 61.9% of the variance.

In the following section, I discuss the influence of various organisational structure forms on IT alignment in a public organisation undergoing digital transformation. The attention to organisational structure, of all the factors influencing the degree of IT alignment, was justified for two reasons. First, organisational structure is one of the most important aspects that separates public organisations from their private counterparts [25; 29; 59; 61; 77; 81]. Second, the significance of organisational factors on IT alignment and digital transformation is recognised in the literature [37; 80; 83; 149; 168; 263].

4.2 Influence of Organisational Structure on IT Alignment

As discussed in the second chapter, the simultaneous existence of both formal and informal organisational structures is confirmed in the literature. The interview data and analysis of the documents at the second case organisation, i.e., the municipality, exhibited the characteristics of formal and informal organisational structure forms. The influence of each organisational structure form on IT alignment is presented in the following subsections. The summary of these

findings (i.e., published in Papers II-IV) also appears in my Licentiate thesis [50].

4.2.1 Formal Organisational Structure

Management scholars argue that categorising organisations according to a commonly recognised organisational structure has become debatable, given the various alternative arrangements from which organisations can choose [191]. The organisational chart and interviews responses reveal that the case organisation, the municipality, seems to have most of the characteristics of a centralised organisation. Particularly when looking at what the leaders of departments considered important functions (i.e., IT, finance, and legal services), the municipality seems to be managed by the central administration. A closer look at IT at the municipality shows that the responsibility and decision-making authority on IT-related matters is held by the IT unit, which is placed within the central Management and Administration Department. Although the steering committee is mandated to make strategic IT decisions at the central steering committee level, this committee is chaired by the administrative head. The internal documents reviewed outline a clear formal hierarchy, showing a division of responsibility between the different departments and the Central Administration Management. The municipality's governance model requires all departments and enterprises to plan regular meetings at three different levels: strategic meetings (1-4 times a year), tactical meetings (4-12 times a year) and operational meetings (1-4 times a month). The municipality has also adopted the RACI governance model, which requires employees to be responsible, accountable, consulted, and informed.

The results of the study indicate that the municipality relies on having a formal organisational structure in the interest of reducing redundancy, improved efficiency, and accountability to the taxpayers. The literature on organisational theory is clear about the rationale for formal organisational structures [188; 195]. The importance of appropriate formal organisational structures is also recognised among scholars in the IS domain [207]. According to the authors, a formal organisational structure has been found to adequately support capability, reduce redundancy, and resolve anticipated issues that might arise in the course of IT implementation and use. Respondents from the IT department, particularly the CIO, argue that the central organisational structure in the municipality has helped to get things in order and keep costs down. According to him, *"...the municipality is in a good situation since we have the expertise in IT and make the strategic decisions that support the strategic vision. You have no idea how messy it could get if we let departments take this responsibility"*. There also seems to be a consensus among most department heads that centralisation has made it easier to keep IT aligned with the overall strategy of the municipality, without compromising accountability and transparency. According to the development manager at the education department, *"...my expertise is not in IT, I am an educator at heart. So, the IT unit taking the responsibility is good for us and has worked better recently. Of course, I would not mind being consulted"*. This statement is consistent with what the researchers consider to be one of the benefits of the centralised organisa-

tional structure [95; 188; 198]. Although the need for order and structure in a public organisation was mentioned several times during the interviews, the responses also revealed contrasting views on the implications of the centralised organisational structure for IT alignment.

At the strategic level, for instance, the CIO and the department director appear to be of the opinion that a centralised organisation structure has a favourable effect on **IT governance** practices and clarity of strategy throughout the municipality. For example, the steering committee, central IT strategic planning, and a transparent IT prioritisation process were indicated as strengths. The CEO of the municipality-owned enterprise, however, while acknowledging shared understanding and an effective IT governance arrangement, argues that the formal organisational structure, conversely, has created what seems to be a one-fits-all kind of rigid protocol. This does not seem to be not appropriate for departments or enterprises with services that are very unique. In her own words, *“I am aware that we are one organisation serving the same community. We have overall the same objective and vision... However, each of us has a unique responsibility that could be met with a unique organisational approach. If given the opportunity, I would go for decentralised decision-making about what we need and when we need it...”*. The director of the Elderly Care Department has also expressed hesitation about the centralised organisational structure. *“You may know that we are the largest employer in the municipality with the extensive need for IT support. Can you imagine if we had our own IT unit? I am pushing for at least more decision-making power when it comes to things like... installation and acquisition of new technology”*.

Another issue raised in relation to the formal organisational structure is how it has influenced the way people resolve issues and find solutions when employees face unanticipated problems. According to the respondents, the centralised organisational structure has fostered a counterproductive organisational norm. This is related to the **skills development** practices in the municipality. For instance, the inflexible division of labour and a working environment where employees are not encouraged to explore alternative ways of solving their problems are reflections of the current centralised organisational structure. The most critical of the centralised skills development arrangement was the head of the municipality-owned enterprise. She argues that *“...as an enterprise we are expected to make profits and be efficient while we could not do things the way our competitors do.”*

A closer look at the implications of centralised organisational structure for the different dimensions of IT alignment, for instance, **communications** between the IT and remaining departments, seems to offer mixed views. The CIO believes that the municipality has an efficient system capable of facilitating the flow of accurate and timely information. Department heads also seem to agree that the formal organisational structure works well. There are various formal arrangements to facilitate communication between IT and other departments of the municipality. For instance, the steering committee at the top; and the regular meetings at the strategic, tactical, and operational levels, are considered to have helped the municipality maintain good communications.

Although the responses from those at the strategic level appeared to suggest

that the formal organisational structure had improved the shared strategic understanding between IT and the remaining departments, the participants at the tactical and operational levels report something different. For instance, three business developers at the central administration, culture, leisure and sport, and labour and welfare, and the IT architect at the IT unit argued that the centralised organisation structure has contributed to slowing the information flow. The respondents also claimed that unnecessary checks and protocols have also resulted in delays in making decisions. As the IT architect puts it, “...it can be a little frustrating at times. You need to make sure you follow the procedures and inform the right people. Sometimes, time is of the essence”.

Another point discussed during the interviews was the effect of a formal organisational structure on **value analytics**. Most of the respondents argued that the IT metrics formulated in the central IT unit are only understood by the IT staff. According to the CEO of the Enterprise, the metrics are not in congruence with the realities in each department and enterprise, meaning that they are not appropriate for making reasonable assessments. Business developers are also hesitant about whether it is possible to measure the contribution of IT to the services they provide to residents. This argument is related to the intangibility of services delivered by the municipality. This is one of the issues recognised in the literature [66; 70]. Respondents at the IT unit (for instance, the IT manager and the IT architect), on the other hand, argue that the key performance indicators distributed to each department and enterprise clearly describe how appraisals can be made. However, none of the respondents outside the IT unit were convinced. Another related issue revealed during the interviews was the use of service level agreements. In the same fashion, no respondent outside IT seemed to recall consulting the agreement, even when things were not functioning as they should. According to the IT unit, service level agreements are prepared according to the IT needs of all departments and enterprises in the municipality.

In summary, the findings of the study suggest that the centralised organisational structure in the municipality has affected the four dimensions of IT alignment—*communication, value analytics, IT governance, and business and IT skills development*. A closer look also suggests that the centralised organisational structure favourably affects IT governance. However, the formal structure seems to have a negative influence on value analytics and skills development. The effect of the centralised organisation structure on communications, on the other hand, seems to be mixed. Although the formal organisational structure has improved shared understanding at the strategic level, it has also negatively affected the speed of communication and the flexibility of the protocol.

4.2.2 Informal Organisational Structure

The results of the study also indicate that the respondents, even though they acknowledge doing their jobs without following the officially sanctioned way, are not familiar with the formal organisational structure at the municipality. This was demonstrated by the various accounts of employees describing the responsi-

bilities of their respective units. According to Farris [196], employees might lack an awareness of the informal organisational structures at their workplace. Of the various informal organisational structure forms mentioned in the literature (for instance, [37; 195; 198; 207; 208]) the results of the study suggest that there are three informal organisational structures at the case company—*interpersonal relationships*, *professional networks*, and *cross-departmental relationships*.

When asked about the existence of informal organisational structures or informal working arrangements, respondents with senior positions were adamant that the formal organisational structure, rules, and regulations dictate how things get done in the municipality. For instance, both the CIO and the director of the Elderly Care Department repeatedly mentioned how the accountability and responsibility they have given them little space for flexibility. The director says, “*once you start to let people skip procedures and make their own decisions, it will get very tricky. Who will take a responsibility when things do not go as planned. We have the mandate from our politicians to keep our house in order*”. Both respondents justify their position, citing greater scrutiny and accountability as with any other public organisations. According to the CIO, rules and regulations are important when managing such a complex organisation. This conviction is also shared by the CEO of the municipality-owned enterprise. These respondents attribute what they call a ‘clean house’ to the consistency of the structure they have in the municipality. Some of the business developers, even though they recognise that there might be some form of informal organisational structure, also acknowledge that standardised processes and routines have helped them avoid wasting many man-hours every year. However, reflecting on the day-to-day activities in their departments, respondents acknowledge the different practices that deviate from the formally stipulated routines.

Table 4.3: Influence of organisational structure on IT alignment dimensions [50, p. 51].

Organisational Structure	IT Alignment Dimensions	Attributes
<i>Formal</i>		
Centralised	Communications IT Governance	Organisational learning IT prioritisation IT budgeting Administration strategic planning
<i>Informal</i>		
Interpersonal relationships	Communications IT Governance Skills development	Protocol rigidity IT reporting procedures Social and trusting environment
Cross-departmental relationships	Communications partnering Dynamic IT scope	Knowledge sharing Relationship style, trust Flexibility of infrastructure
Professional networks	Communications IT Governance Partnering	Liaison effectiveness IT investment decisions Championing IT initiatives

As shown in **Table 4.3**, the results of the study indicate that the three forms of informal organisational structure appear to have effects on the various dimensions of IT alignment in the municipality, as discussed in the following paragraphs.

Looking at the first dimensions of IT alignment, **communications**, respondents recall reaching out to some people not in line with the hierarchy to which they belong in the organisational chart. For instance, the use of interpersonal relationships to get work done promptly or gather information was acknowledged by the respondents. Both IT and other department employees seem to agree on the importance of interpersonal relationships. When asked to give an example of instances where these relationships were found to be useful, stories differ between relatively new employees and those who have been around a long time. For instance, the business developer in the central administration who has been in the municipality for seven years says, *“one of the first things you learn when you come to this municipality is that there are certain ways of doing things. As you stay here longer and longer, you will have many people who could support you. I no longer have to wait for my boss to know what has been said at the meetings”*. On the other hand, a newly recruited administrative manager is not happy that it takes longer to enter the system. According to her, *“...those who have been here do get all the help and information so easily, all the formal channels are not being updated as necessary”*. However, she admits that new employees get a mentor, which helps them develop interpersonal relationships that are useful for learning more about their newly assumed roles. More veteran employees are making connections to get new information or do things quickly. The development manager in the education department says, *“it is obvious that the relationships we have with our colleagues...especially with those in the central administration speed up communication and help us become good at what we do.”*

In relation to the **skills development** dimension, the CIO and the business developer in the central administration confirmed the role of interpersonal relationships in improving the development of IT skills and creating a social and trusting environment that improved learning. Consistent with the findings of Zolper et al. [208], the CIO recognised interpersonal relationships between IT and other departments at the top level as the critical aspect of IT alignment. The IT architect and the director of the Elderly Care Department also argued that interpersonal relationships between the CIO and department leaders are the determining factor in harmonising IT with the rest of the organisation. Further analysis of responses suggests that interpersonal relationships at the strategic level are instrumental in fostering effective **IT governance**, particularly in IT and overall strategic planning. On the other hand, the responses from those at the tactical level suggest that interpersonal relationships have brought their departments closer. According to the IT architect, in departments where a one-on-one relationship is established, IT is considered a partner rather than a service provider. This type of relationship, also referred to as **partnering** [19] is an important prerequisite for other dimensions of IT alignment.

Scholars argue that regardless of the function or hierarchy of the organisation chart, different departments with close physical proximity could develop

a relationship referred to as a cross-departmental relationships [196; 208]. According to Zacarias and Martins [276], cross-departmental relationships might also be the result of formalisation of interpersonal relationships between employees in different departments. The findings of the study, and especially the responses from the tactical and operational levels, reveal the existence of cross-departmental relationships. The IT architect suggested that the reason for the promotion of interpersonal relationships in cross-departmental relationships is the fact that some problems are too big to be solved only through the collaboration of individuals. Two of the dimensions that were found to be affected by cross-departmental relationships were **communications** (sharing of knowledge) and **dynamic IT scope** (the provision of flexible IT solutions that match departments' needs). According to the administrative manager at the IT unit, departments that have successfully established a relationship consider themselves partners, which facilitates accurate elicitation of IT needs, enabling the delivery of appropriate IT solutions.

The last type of informal organisational structure, professional networks, was also identified in the municipality. According to the extant literature, employees in complex organisational environments often rely on their professional networks to get information and access to other resources [196; 211; 279]. The results of our study also indicate that people sharing professional networks and backgrounds seem to have formed alliances at the municipality. For instance, two of the respondents acknowledge the ease of communication and collaboration with not only individuals holding similar positions in other departments, but also those with similar backgrounds and positioned differently in other departments. One of the respondents with long experience from the private sector (i.e., the CIO and the business developer at the education department) confirms his associations and collaborative work with others joining the municipality from the private sector. Others with similar inclinations (e.g., the IT architect, administrative manager at the IT unit, and the business developer in the central administration) agree that professional networks are used to advance career prospects within the municipality, and to improve **partnering** relationships. Respondents from departments other than IT also stated that they had used their professional networks to get messages across (**communications**) and speed up IT decision making (**IT governance**). The interviewees also seem to be comfortable in forging relationships since they already believe that there are common interests that could be explored to help them do their job better. For instance, according to the business developer at the central administration, "*...once you are in a certain position playing a particular role, you seem to appreciate the challenges and responsibilities you have. I take the initiative to reach out to other business developers and ask if there are new things I could learn, we speak the same language*".

In summary, the results of the study indicate that the three forms of informal organisational structure seem to have effects on the various dimensions of IT alignment in the municipality. Except for one of the dimensions (i.e., value analytics), the influence of the informal organisational structure at the case organisation could be linked to the attributes of the IT alignment dimensions according to SAMM [7; 19].

4.2.3 Confirmatory Analysis

Once the formal and informal organisational structure forms were identified and their influence on IT alignment was established, the next step in the study was to perform a confirmatory analysis. Thus, the analysis was to statistically test the influence of organisational structure on the various dimensions of IT alignment as identified in prior studies. For instance, the findings of Paper III were also the basis for formulating the four hypotheses posited (see Section 3.5.1). The analysis of the qualitative data and the test performed is presented in two steps (i.e., assessment of the measurement model and evaluation of the structural model).

Measurement Model

Since the aim of this study was to confirm the relationship between the various forms of organisational structure on the different dimensions of IT alignment, the theoretical model in **Figure 3.8**, was constructed based on the findings of the literature reviews and the case study conducted in the municipality. Thus, the aim of this confirmatory study was to establish the influence of the formal (centralised) and informal (cross-departmental relationships, interpersonal relationships, and professional networks) organisational structure forms on the six IT alignment dimensions according to SAMM [7; 19]. The first step in running PLS-SEM was to make an assessment of the reliability and validity of items.

According to Wong [283], reliability and validity tests are indicators of rigour as they inform us the degree to which the items measure the constructs under investigation. **Average variance extracted (AVE)** and **Cronbach's alpha coefficient** were used to assess the reliability and validity of the five constructs [297] as shown in **Figure 4.3**. The AVE is a measure of the variance captured by the construct (a latent variable) in relation to the amount of variance attributed to the measurement error. According to the PLS-SEM literature, the cut-off value for AVE is 0.5, which translates as a variance of more than half of the indicators that are attributed to the latent variables [312].

Construct	Composite Reliability	Cronbach's Alpha	AVE	COS	CDR	ITA	IPR	PRN
COS	0.769	0.600	0.663	0.680				
CDR	0.812	0.652	0.652	0.474	0.770			
ITA	0.751	0.618	0.618	0.562	0.551	0.589		
IPR	0.746	0.529	0.529	0.482	0.706	0.529	0.713	
PRN	0.668	0.467	0.467	0.516	0.662	0.467	0.668	0.699

Figure 4.3: Inter-construct correlation and square roots of AVEs [50, p. 52; Paper IV, p. 14].

The Cronbach's alpha of the three constructs (i.e., centralised organisational structure, cross-departmental relationships, and IT alignment) meets the acceptable level of .60 [297], but the figures for interpersonal relationships (.52) and professional networks (.47) fall under the cut-off value. The composite reliability of all constructs except professional networks is greater than the accepted value of .7 [297]. While the composite reliability of professional networks falls slightly under the acceptable value, the remaining constructs range from .74 to .81. The AVE indicates that except for the professional networks, the values for the remaining constructs range between .59 and .66 which is above the recommended level of .5. According to Fornell and Larcker [297], the average variance extracted may be a more conservative estimate of the validity of the measurement model. However, the values of composite reliability alone may be sufficient to declare the validity of a construct. Composite reliability is also preferred in PLS-SEM [286; 313]. Since the composite reliability for all the constructs exceeds 0.6, the validity of the constructs is considered to be satisfactory for exploratory research [286].

Structural Model

Model fit is assessed and maximised in an attempt to test hypotheses in other SEM techniques. PLS-SEM estimates, on the other hand, are based on the variances explained. As shown in **Figure 4.4**, the hypotheses of the theoretical model were tested based on multiple measures for each of the constructs and evaluating the significance of hypothesised relationships.

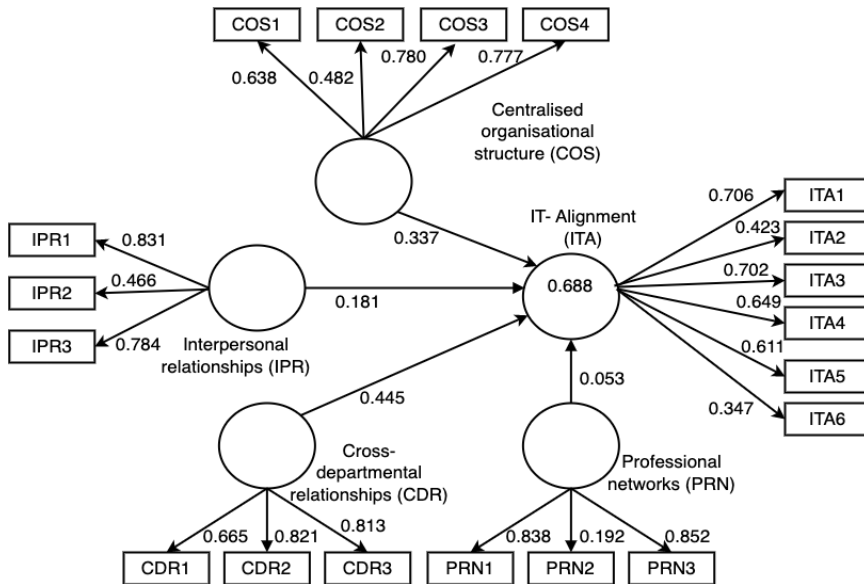


Figure 4.4: PLS-SEM analysis results [50, p. 54; Paper IV, p. 15].

Four items were used to measure the effect of centralised organisational structure (COS1, COS2, COS3, and COS4) on IT alignment. IT alignment was

measured using six items—ITA1 (communications), ITA2 (value analytics), ITA3 (IT governance), ITA4 (partnering), ITA5 (dynamic IT scope), and ITA6 (skills development). **Appendix C**, shows the measurement instrument used to assess the hypothesised relationship between centralised organisational structure on IT alignment by looking into organisational learning (COS1), IT prioritisation (COS2), administration strategy (COS3), and IT budgeting (COS4). The value of R^2 (coefficient of determination) was assessed to test the extent of the predictive power of the theoretical model. According to Chin [314], R^2 values higher than 0.19 but less than 0.33 are considered *weak*. R^2 higher than 0.33 but less than 0.67 are *moderate*, or *substantial* if the value is higher than 0.67. As shown in **Figure 4.4**, the R^2 value of 0.688 indicates that the theoretical model accounted for 68.8% of the variance in IT alignment. In other words, the four variables—centralised organisational structure, interpersonal relationships, cross-departmental relationships, and professional networks—substantially explain the variance in IT alignment. Thus, the structural model results suggest that the proposed theoretical model is supported.

In the next step, the strength of the path coefficients was evaluated. The path relationships, or the path coefficients, tell us the strength of the influence of one variable on the other [283]. According to Cohen [288], the strength of predictors, as measured by path coefficients, may be *strong* (0.5 or higher); *moderate* (higher than 0.3 but less than 0.5); or *small* (higher than 0.1 but less than 0.3). As hypothesised in **Figure 3.8**, the construct of IT alignment is found to be influenced by three of the four forms of organisational structure—**cross-departmental relationships**, **central organisational structures** and **interpersonal relationships**. However, looking at the path coefficients, the model suggests that the strongest influence on IT alignment seems to be from cross-departmental relationships. The strongest effect of cross-departmental relationships on IT alignment (0.445), is followed by centralised organisational structure (0.337) and interpersonal relationships (0.181). The findings of the study thus confirm that the hypothesised path relationships between Centralised Organisational Structure and IT Alignment (**COS-ITA**), Interpersonal Relationships and IT Alignment (**IPR-ITA**), Cross-departmental Relationships and IT Alignment (**CDR-ITA**) are statistically significant. However, as shown in **Table 4.4**, the results show that the hypothesised path relationship between professional networks and IT alignment (**PRN-ITA**) with the path coefficient of 0.053, is not statistically significant [288].

Table 4.4: Outcomes of the structural equation modelling analysis of survey 1 (Paper IV).

Path	Hypotheses	Path Coefficient (β)	Decision
COS→ITA	H1	0.337	Supported
IPR→ITA	H2	0.181	Supported
PRN→ITA	H3	0.053	Not Supported
CDR→ITA	H4	0.445	Supported

This study began with two broad objectives, i.e., (1) to establish the influence of different forms of organisational structure on IT alignment, and (2) to assess the degree of influence of the identified forms of organisational structure on IT alignment. Using the PLS-SEM technique, the study has shown that the theoretical model and hypotheses formulated based on the findings of Papers I-III are partially supported.

Public organisations are known to have a centralised formal organisational structure with formal protocols and procedures to facilitate communication and decision-making arrangements [74; 77]. It is in an organisation's best interest to recognise the role of centralised organisational structure on IT alignment. As posited in the first hypothesis (**H1**), the model suggests that the municipality's centralised organisational structure, which was measured by its influence on communications (organisational learning) and IT governance (IT prioritisation, IT budgeting and formulation of clear administration strategy), had a considerable effect on the level of IT alignment. This is consistent with the findings of prior studies, suggesting the effect of a centralised organisational structure on IT alignment (for instance, [207]). An explanation for this finding could be that a centralised organisational structure is appropriate for managing large and complex IT initiatives that are common in the public sector [77].

The model also supports the second hypothesis (**H2**). Consistent with the findings of prior studies suggesting the positive influence of interpersonal relationships on IT alignment (for instance, [37; 206]), interpersonal relationships between employees at the case company were found to speed up IT reporting procedures, improve the flexibility of protocols and foster a social and trusting environment. The literature is also clear that the interpersonal relationships between employees at different levels of hierarchy are instrumental in improving the various dimensions of IT alignment. For instance, IT governance and skills development [208; 292].

The results of this study contradict the findings of prior studies [315; 316] about the influence of professional networks on IT alignment (**H3**). The PLS-SEM analysis does not indicate the causal relationship between professional networks and IT alignment. This was measured by the influence of professional networks—based on the effectiveness of liaison, IT investment decisions, and championship and support for IT initiatives—on IT alignment.

On the other hand, the influence of a cross-departmental relationships on IT alignment (**H4**) was found to be the strongest of all path relationships hypothesised. The construct was measured by its influence on knowledge sharing, the partnership relationship between IT and the remaining departments, and the flexibility of IT. The literature provides a possible explanation for this strong causal relationship between cross-departmental relationships and IT alignment. First, the relationship between various departments indicates that interpersonal relationships were already established between employees in the respective departments [276]. Second, this form of organisational structure was also found to be positively associated with three of the six IT alignment dimensions—communications, partnering, and dynamic IT scoping—in prior empirical studies [37; 317].

In summary, the findings of this study indicate that organisational structure is one of the factors that significantly influence IT alignment. However, as researchers have pointed out (e.g., [37; 216]), the approach towards designing an appropriate arrangement that supports organisations in reaching their overall objective while maintaining IT alignment can be a daunting task. Thus, a careful evaluation of the organisational objectives as well as the current context of organisations is paramount. In this regard, it is my conviction that this study has provided insight into a public organisation and how the different forms of organisational structure influence the various dimensions of IT alignment.

4.3 Discussion

In response to the call for studies exploring the relationship between IT alignment and digital transformation, I conducted exploratory and confirmatory studies within the public sector. With support from three theories and an analysis of the differences between public and private organisations in the extant literature (i.e., in the domains of public administration, organisation management, and IS), this study has attempted to answer the following research question:

How can public organisations pursue IT alignment to enable digital transformation success?

To address the research question, I will revisit the four research sub-questions in turn.

RSQ1: What is the role of IT alignment in digital transformation in public organisations?

The systematic literature reviews and the responses from interviewees indicate that IT alignment has become important for today's organisations, as the adoption of emerging technologies in almost all aspects of organisations has become the new norm. In particular, the digital transformation journey undertaken by organisations has become a challenge for leaders. The issue of IT alignment at times of digital transformation is more difficult for organisations in the public sector, as it requires making adjustments to accommodate the various stakeholders. Despite the challenges in achieving and maintaining IT alignment in the face of dynamic political, economical and technological landscapes, IT alignment was found to support public organisations' pursuit of successful digital transformation in three ways: (1) by improving the value of investments in IT and emerging technologies, (2) by enabling responsiveness to internal and external changes (i.e., improving organisational agility), and (3) by enabling the integration of emerging technologies into existing processes and structures.

In addition to the interview responses, the PLS-SEM analysis also confirms that IT alignment strongly influences the success of the digital transformation, accounting for the 61.9% variance.

RSQ2: Which organisational and managerial factors influence IT alignment in public organisations undertaking digital transformation?

The result of this study revealed 30 different factors that are important in determining the degree of IT alignment, which were presented in eight categories. The eight categories of factors were divided into two—organisational and managerial. Organisational factors are those dependent on how public organisations are set up, the resources they have at their disposal, and the environment in which they operate. Since these factors take time to take shape and form, they are relatively difficult to change. However, recognising their role in IT alignment and digital transformation success is important. Leaders may also have indirect alternative approaches that they can take to influence organisational settings to their advantage. The second set of categories also found in this study comprises the various managerial and leadership-related factors that can determine the degree of IT alignment. It is up to leaders to make changes to these factors as they see fit in pursuit of improved IT alignment to support digital transformation. These factors include leadership skills, stakeholder relationships, external domain alignment, digital metrics, and human resource management practices. In addition to identifying these factors, the study has also attempted to evaluate the degree of influence of these factors on IT alignment in public organisations undertaking digital transformation. Accordingly, the PLS-SEM analysis confirms that organisational culture, organisational structure, stakeholder relationships, and HR management practices seem to have strong influences on IT alignment. Although the influence of organisational agility on IT alignment was found to be moderate, the effect of external domain alignment and digital metrics was small.

RSQ3: How does organisational structure influence IT alignment in public organisations?

Given the recognition of the influence of *organisational structure* on *IT alignment* and *digital transformation*, case studies and PLS-SEM analysis were conducted to further explore the relationship between the constructs. The studies revealed two interesting findings. First, the qualitative case study identified the presence of various forms of formal and informal organisational structure in a public organisation (centralised organisational structure, interpersonal relationships, cross-departmental relationships, and professional networks). Second, the study also found associations between the identified forms of organisational structure and various IT alignment dimensions. For instance, centralised organisational structure affects the effectiveness of Communications (i.e., organisational learning), IT governance (i.e., IT prioritisation, and IT budgeting). Third, the quantitative analysis also indicated that there is a different degree of influence of the identified organisational structure forms on IT alignment in a public organisation. For instance, cross/departmental relationships were found to be the strongest determinants of the degree of IT alignment.

RSQ4:How can public organisations manage IT alignment-related factors to enable digital transformation success?

To answer the last research sub-question, the result of the two case studies and the PLS-SEM analysis from the two surveys were synthesised resulting in five important findings. These findings were instrumental in developing a framework outlining 19 actions to improve IT alignment in public organisations enabling successful digital transformation (see **Figure 4.5**). As discussed below, it is in public organisations' best interest to take appropriate actions to address the organisational and managerial factors strongly determining the degree of IT alignment.

1. An organisational culture that promotes acceptance of change, measured risk-taking, and innovative use of technology should be encouraged.

Prior IS studies acknowledge that organisational culture determines the perception, attitude and reaction of employees towards what happens within and outside their organisation [318]. Particularly, IT alignment and digital transformation researchers have highlighted the role of organisational culture towards flexibility, stability, and internal activities related to the adoption of new technologies in an organisation [164; 178; 262; 308]. The results of this study also found that organisational culture has the strongest influence on IT alignment in public organisations undertaking digital transformation. Analysis of the interviews and the public administration literature seems to suggest that public organisations exhibit risk aversion and resistance to change [28; 45; 48; 61], which influences IT alignment [318] and attitude towards digital transformation[178; 262]. On the other hand, the survey results indicate that an organisational culture that promotes change and acceptance of failure seems to be associated with improved IT alignment. In addition, public organisations with cultures that encourage the innovative use of IT are likely to improve IT alignment through the integration of new technologies with existing business processes and organisational objectives [178; 318].

In relation to the dimensions of IT alignment, organisational culture is associated with **communications, skills development and partnering**.

2. A flexible organisational structure that fosters knowledge sharing, and collaboration between IT and other units should be established/cultivated.

The results of this study indicate that successful digital transformation is a function of well-formulated strategies enabled by organisational structures that facilitate knowledge sharing, skill development, effective decision-making, and overall communication between IT and the remaining units. However, the results also suggest that various forms of organisational structure have varying influence on different dimensions of IT alignment. Even though the prior IT alignment and digital transformation studies recommend structures with less hierarchy, less centralisation and more informality [33; 44; 99; 168], the results from this study provides a different insight. According to the survey, centralisation was seen as a structure that has facilitated a better IT prioritisation process,

strategic planning and IT budgeting compared to the various informal organisational structure forms. On the other hand, a closer look into the informal organisational structure forms also revealed interesting findings. Interpersonal relationships seem to be effective for improving flexibility of protocols and interpretations, skills development, and creation of a trusting environment. Cross-departmental relationships are associated with a relationship style where IT and other units consider themselves as partners. Cross-departmental relationships were also found to have an influence on the flexibility of IT to meet current and future needs.

Among the dimensions of IT alignment, organisational structure was found to influence **communications, partnering, IT governance, skills development, and dynamic IT scope**. Therefore, I argue that organisations must make adjustments to their formal organisational structure while cultivating informal structures that are favourable for influencing IT alignment and successful digital transformation. According to Plesner et al. [29], the formal organisational structure in the public organisation is often rigid and remains so to maintain public legitimacy and accountability. However, alternative “informal” ways of going around the bureaucratic structure speed up the work in public organisations. I argue that such arrangements need to be cultivated if they serve to improve IT alignment and thus enable successful digital transformation.

3. Leaders should be prepared to assume new roles and acquire multiple skill sets.

Despite prior studies’ recognition of the important role of leaders in achieving and maintaining IT alignment, most of the studies focused primarily on the participation of top management in championing and developing strategic leadership skills [318]. However, in the context of digital transformation, IS researchers call for studies investigating the importance of other relevant leadership qualities [44; 154; 155; 223]. As such, leaders are expected to possess technical and soft skills that enable them to foster the right organisational culture and to encourage positive attitudes towards digital transformation [234]. Recent IT alignment studies have also acknowledged that leadership’s role in improving the fit between IT and the overall organisational goal has become challenging, as digital transformation alters the whole operation [319]. The results of this study also indicate that the ability of leaders to make sound strategic decisions, empower employees, and facilitate stakeholder relationships determines the degree of IT alignment. The PLS-SEM analysis, on the other hand, indicates that the ability of leaders to form a relationship with internal and external stakeholders and the ability to appropriately manage change seem to influence IT alignment more than a better understanding of digital technologies. Not surprisingly, the results also confirm the influence of leadership skills on stakeholder relationships. In terms of the dimensions of IT alignment, leadership skills were found to influence **communications, skill development, dynamic IT scope, and partnering**.

4. The important role of stakeholder relationship management should be recognised.

As the IS studies over the years have shown us, identifying the enablers and inhibitors of IT alignment is necessary to meet the challenges and exploit the opportunities afforded by emerging technologies. However, what is equally important is the role of a robust IT strategy that reflects current and future IT needs of organisations. However, as already recognised in the literature (e.g., [19; 308], the responses of the participants in this study indicate that formulating robust IT strategies that meet the interests of multiple stakeholders is a daunting task. Researchers also agree that public organisations struggle to find appropriate strategies that easily translate into the operation of a public organisation, to balance continuity and exploit opportunities [30; 90]. Thus, I argue that the IT strategies need to be drafted in collaboration with the various stakeholders.

Digital transformation in the public sector has a high chance of success when it is championed by top management, elected politicians as well as policy-makers (e.g.,[34]). On the other hand, the lack of participation of the top leaders makes it difficult to realise the anticipated results of digital transformation [47]. In addition to recognising the stakeholder relationship as one of the important factors influencing IT alignment, data analysis suggests that collaboration with other public institutions should be their priority in order to succeed in their digital transformation endeavours. I also argue that collaboration of public organisations with suppliers and partners is essential to improve the degree of IT alignment, as supported by a previous study [186]. Moreover, the analysis of the survey results indicates that the stakeholder relationship is associated with leadership skills and external domain alignment. Although leadership skills seem to influence the relationship between stakeholders (that is, based on conversational skills), external domain alignment is influenced by the stakeholder relationship. Among the dimensions of IT alignment, the stakeholder relationship was found to influence **partnering** and **IT governance**.

5. The role of human resources management for IT alignment should be acknowledged.

The IS literature acknowledges that human resources management should be conducted in such a way that skills, attitudes and behaviours are in line with the IT strategic vision of a company [320]. Thus, I argue that appropriate use of human resources contributes to digital transformation success. However, preparing employees to be partners in driving the transformation agenda and aligning organisational goals with IT-enabled changes has become daunting [19; 47; 178]. The issue of attracting and retaining talented employees has become more problematic for public organisations. The responses of the interviewees also indicate that human resource management in IT units is challenging, since leaders in the sector are constrained by rules and regulations governing strict hiring and reward practices. Given the lack of leeway to hire the best talent in the market, the most appropriate approaches to retain a talented workforce seem to be to develop a system of identifying, creating, and sharing knowledge. However, a performance appraisal system should complement knowledge sharing. In terms

of dimensions of IT alignment, human resources management was found to influence **communications**, **dynamic IT scope** and **skills development**.

Based on the discussion above, the framework shown in **Figure 4.5** is proposed. The framework borrows the six IT alignment dimensions and corresponding attributes of SAMM [7; 19]. The proposed actions are formulated based on the results of the two case studies and two follow-up confirmatory surveys.

To determine the relative degree of influence of the factors on IT alignment and the order of priority of the proposed actions (shown in the third column), the results of the PLS-SEM analysis were invaluable. Specifically, the outer weights of the indicators of the constructs were used to prioritise the list of actions proposed to improve the dimensions of IT alignment and specific attributes. Moreover, I have also consulted prior IT alignment and digital transformation studies (i.e., within the context of public organisations) to determine whether the proposed actions have been found to be associated with the specific attributes of the six IT alignment dimensions. Thus, the sources shown in brackets next to the 19 actions support the effect of the proposed actions. For instance, the critical role of acceptance and promotion of change for IT alignment and digital transformation was recognised in the literature [19; 44]. In fact, a Delphi study by Hartle and Hess [164] found that organisational culture (specifically, readiness to accept and promote change) is the most important determining factor for digital transformation success. The PLS analysis of the second survey also indicated that acceptance of change seems to contribute more to the construct than the other two indicators. Thus, the action is placed at the top of the framework.

On the other hand, the relative degree of influence of the factors influencing IT alignment was determined based on the strength of the path coefficients (see **Figure 4.2** and **Table 4.2**). Thus, I argue that the framework helps us to better understand the relationship between different organisational and managerial factors and various IT alignment dimensions and specific attributes which, in turn, are related to digital transformation success. For instance, looking at the first column on the left, **organisational culture** is the factor that influences IT alignment the most (compared to the other factors below, i.e., organisational structure, leadership skills, etc.). In the same row, the second column lists the IT alignment dimensions together with specific attributes affected by organisational culture (e.g., IT alignment dimension: **communications**, attribute: **protocol rigidity (PR)**). Then, in the next column, the four actions that could be taken to improve the dimensions and attributes are listed. So, **promoting acceptance of change** is the first action that needs to be taken to improve the IT alignment dimension **communications** (i.e., specifically the attribute **protocol rigidity (PR)**). The same action can also be taken to improve another IT alignment dimension **skills development**, particularly the dimension **change readiness (CR)**.

Factors influencing IT Alignment towards successful Digital Transformation	Influenced IT Alignment Dimensions and attributes	Actions to improve IT alignment dimensions and corresponding attributes, enabling digital transformation success in public organisations (Prioritised based on PLS-SEM analysis)
Relative degree of influence	Organisational Culture Communications -Protocol rigidity (PR) Partnering - Shared goals, risk, reward/penalty (SGR) Skills development - Change readiness (CR) - Innovation Entrepreneurship (IE)	1. Promote acceptance of change [19; 44; 164] --> CR, PR 2. Enforce acceptance of failure [44; 59; 178] --> SGR 3. Encourage Measured risk-taking [59; 154] --> SGR 4. Use IT to innovate [1; 19; 28; 87; 154; 155] --> IE
	Organisational Structure Communications -Knowledge sharing (KS) - Organisational learning (OL) Dynamic IT Scope -Architectural integrity (AI) - Standard articulation (SA) IT governance - Budgetary control (BC) - Informed IT investment decisions (IITID) - IT strategic planning (ITSP) - Prioritisation process (PP) Partnering - Business sponsorship (BS) Skills development - Career crossover (CC) Value analytics -Benchmarking (BM) - Formal assessment (FA)	5. Reduce hierarchy [44; 59; 74; 77; 208] --> BC, KS, PP 6. Centralise common services [208; 235] --> BC, BM, ITSP, SA 7. Formalise to facilitate coordination [28; 207] --> AI, CC, FA, OL 8. Reduce redundancy [90; 207] --> BS, IITID, SA
	Leadership Skills Communications - IT understanding by business (IUB) - Organisational learning (OL) - Protocol rigidity (PR) Dynamic IT Scope - Traditional enabler/driver (TED) Partnering - Relationship style, trust (RST) Skills development - Innovation oriented environment (IOE)	9. Develop conversational skills [19; 118; 225] --> OL, PR, RST 10. Develop digital strategy formulation and evaluation skills [30; 44; 90; 178; 225] --> IOE, TED 11. Develop a good understanding of IT [19; 74; 178; 225; 234] --> IUB 12. Anticipate potentials of IT [23; 154; 156; 157; 225] --> IOE, TED
	Human Resources Management Communications - Organisational learning (OL) - Protocol rigidity (PR) Dynamic IT Scope - Traditional enabler/driver (TED) - Standard articulation (SA) Skills development - Career crossover (CC) - Training/skills development (TISD)	13. Identify and cultivate knowledge [18; 22; 177; 178] --> OL, CC, TISD 14. Promote knowledge sharing [18; 234] --> OL, CC, TISD 15. Appraise and reward performance [19; 44] --> OL, CC, TISD 16. Develop hiring practices to attract the best talent [19; 44; 236] --> TED, SA
	Stakeholder Relationship IT governance - Informed IT investment decisions (IITID) - Steering committee (SC) Partnering - Business sponsorship (BS) - Relationship style, trust (RST) - Shared goals, risk, reward/penalty (SGR)	17. Collaborate with other agencies [18; 23; 33; 34; 210] --> BS, IITID, SC, SGR 18. Partner with suppliers [23; 28; 31; 33] --> BS, RST, SGR 19. Involve citizens in IT investment decisions [31; 33; 99] --> BS, IITID

Figure 4.5: Framework for actions to improve the degree of IT alignment enabling digital transformation success in public organisations.

5. Conclusions

This chapter concludes the thesis by presenting the theoretical contributions and implications for practice, limitations of the study, and propositions for future research avenues.

5.1 Contributions

This study set out to address the lack of theoretical and empirical knowledge on the relationship between IT alignment and digital transformation in public organisations. I adopted both exploratory and confirmatory research approaches to meet the aim of the study. Thus, the result of this study contributes to research and practice, as discussed below.

According to the literature on the philosophy of science, it is essential for researchers of empirical studies to describe their contributions and articulate how the findings fit in / expand the existing body of knowledge [321]. Among the two different perspectives on knowledge accumulation (i.e. *model-theoretic* or *law-statement*), this study leans towards the model-theoretic perspective, which is the dominant view in the IS research domain.

According to Harris et al. [322, p. 442], a model-theoretic approach to knowledge accumulation views theories as “*models that represent specific aspects of the real world, and empirical research demonstrates the degree to which these models fit a certain context*”. This approach informed the design of this study in a public organisations’ (i.e., context-specific) setting to (1) investigate the relationship between various organisational and managerial factors, IT alignment, and digital transformation success, and (2) later test the proposed theoretical model. Unlike the *law-statement* approach to knowledge accumulation, this empirical study was not aimed at testing whether a theory is true or false. On the other hand, my contribution to research and practice builds on what is already known.

The premise of this study is the recognition that IT alignment is one of the prerequisites for digital transformation [9; 12; 14–17], and that IT alignment, in turn, is influenced by a variety of organisational and managerial factors [8; 10; 19; 24]. Thus, the study addresses the literature gap that acknowledges the lack of IT alignment and digital transformation studies recognising the contextual settings of public organisations (e.g., [26; 27; 29; 31; 80]).

The theoretical contributions of this study are fourfold, as presented according to the four research sub-questions.

Contribution 1: In response to **RSQ1**, the findings of this study contribute to the literature as they empirically confirm the influence of IT alignment on the success of digital transformation in public organisations. Digital transformation success was evaluated in terms of improved operational efficiency, better relationships between stakeholders, and added value for citizens. The systematic literature review conducted identified three important roles of IT alignment in digital transformation in public organisations. These are: improving the value of IT investments, enabling organisational agility, and enabling the integration of digital technologies.

Contribution 2: The contribution of the study in relation to **RSQ2** is the identification of 30 organisational and managerial factors that were found to influence IT alignment in public organisations undertaking digital transformation. These factors, shown in **Figure 4.1**, were presented under eight categories. The three organisational factors (i.e., *organisational culture*, *organisational culture* and *organisational agility*) indicate the existing organisational setting that takes time to alter. On the other hand, the remaining five factors (i.e., *digital metrics*, *external domain alignment*, *human resource management*, *leadership skills*, and *stakeholder relationships*) are related to the choices made by the current leadership.

Contribution 3: The study also makes an additional contribution extending the qualitative findings that identified the eight categories of organisational and managerial factors influencing IT alignment. In relation to **RSQ3**, the thesis contributes by exploring the influence of formal and informal organisational structure on IT alignment. To this end, as shown in **Table 4.3**, the study finds the links between various organisational structure forms and SAMM's [7; 19] IT alignment dimensions. For instance, the *centralised formal structure* was found to have influence on communications and IT governance and specific attributes related to the two dimensions (organisational learning, IT prioritisation, IT budgeting, and administration strategic planning). The three informal organisational structure forms (i.e., *interpersonal relationships*, *cross-departmental relationships*, and *professional networks*) were also found to have influence on the six IT alignment dimensions and specific attributes. Moreover, the study also ranked the varying degree of influence of the identified forms of organisational structure on IT alignment in public organisations. As shown in **Table 4.4**, the study suggests that, in public organisations, cross-departmental relationships seem to have the strongest influence on IT alignment, followed by the central organisational structure and interpersonal relationships. On the other hand, the significance of professional networks was found to be insignificant.

Contribution 4: In response to **RSQ4**, the study proposed a framework (presented in **Figure 4.5**) with 19 actions that could be used to manage IT alignment-related factors as public organisations undertake digital transformation. The result of empirical studies and the synthesis with the extant literature was the basis for the proposed framework. I argue that the framework will provide insights into how public organisations could improve IT alignment to enable dig-

ital transformation success. The result of the study is also an addition to the various models and frameworks in the IS literature, within public organisations' context. The list of actions in the framework was based on the established degree of influence of the organisational and managerial factors on the six dimensions of IT alignment and the respective attributes according to SAMM [7; 19]. Thus, these actions will also have an implication for practice, as leaders will find the framework useful when they allocate their resources for the purpose of improving IT alignment, enabling successful digital transformation.

5.2 Limitations and Future Research

Readers are advised to take the following limitations into consideration when interpreting the findings of the studies included in the thesis. Starting with the literature reviews (Paper I and Paper II), the selection of the articles was restricted only to peer-reviewed articles published in journals and conference proceedings within the information systems domain. As a phenomenon transcending various disciplines, searching for articles on IT alignment in cognate research domains in addition to IS might have provided us with additional insights. Moreover, literature reviews could have been conducted targeting publications in practitioner outlets, white papers and opinion pieces to capture practitioners' perspectives. Such approaches could have addressed the criticism of many prior studies that seem to have been preoccupied with conceptual debates while issues that might be relevant to solving current organisational and managerial issues were overlooked.

The methodology used to search relevant literature for the systematic literature reviews might also be another limitations. Given the differences in conceptualisations and associated definitions of IT alignment, the terminologies I used might not be sufficient to capture all studies published in the outlets targeted. Different approaches could be taken to address this limitation. Among others, content analysis or similar methods could be employed to search for articles published in academic and practitioner outlets. It is my conviction that, with appropriate methods to capture more articles, studies might give richer and more comprehensive insights into topics under investigation.

Given the strength of case studies in providing rich insights and an in-depth analysis, I argue that the choice of the strategy to investigate IT alignment and related factors in public organisations undertaking digital transformation was justified. However, I also concur with critics of the strategy that the generalisability of the studies is limited. However, I argue that the studies have provided us with the opportunity to reveal insights that might not be observed in other settings. Thus, the results of the case studies included in the thesis should be used as a starting point for the future research arena. I also recognise that my decision to rely on a single study restricts the findings to the context of the selected public administration (e.g., organisational size, digital transformation stage). Like Lee and Baskerville [323] put it, I refrain from claiming that the case organisations exhibit similar characteristics (e.g, organisational structure, leadership style, IT alignment maturity) to those public organisations undertak-

ing digital transformation. However, the purpose of the case studies was not to claim statistical generalisation, but what Yin [259] referred to as analytical generalisation (i.e., a generalisation in which a researcher explores the link between findings of a particular case and a theory). In line with the recommendation of Yin [259], my arguments were grounded in the results of the two systematic literature reviews. Thus, the two case studies were used to explore the various organisational and managerial factors influencing IT alignment to enable successful digital transformation. The set of circumstances in the cases is used as evidence to support the theoretical model proposed. Moreover, I have also run a confirmatory PLS-SEM analysis to strengthen my claims of analytical generalisation. Since the internal and external situations are bound to change, I encourage future studies at the same or similar organisations.

The data collection method used for the case studies might also have some shortcomings. For instance, previous studies indicate that informal organisational structures might be difficult to identify when a researcher relies on the perceptions and opinions of respondents.

As discussed in the thesis, it is challenging to identify organisational structure forms beyond the officially sanctioned one. Thus, the data collection method where interviewees were asked to articulate the structure at the case organisations might not have revealed the complete picture. Since employees might have difficulty in recognising or describing informal organisational structure forms, future studies should adopt other data collection methods. For instance, such data collection methods as observation might provide better understanding of the informal arrangements that are difficult for employees to notice.

The literature indicates that researchers and practitioners subscribe to the view that IT alignment is a dynamic process rather than an outcome at a certain point. Organisations therefore need to plan activities that could help them achieve and maintain IT alignment. The findings of the case studies offer only a snapshot of IT alignment in the case organisations. There is a consensus among researchers regarding the long time it takes for an informal organisational structure to form. The same is true for digital transformation, which is a continuous process. The findings of this study reflect the snapshots of what the case organisation is doing to reach and maintain IT alignment in order to enable the success of its digital transformation endeavour. Future longitudinal studies might reveal how an organisation can realise the success of digital transformation over time as various changes are made to improve IT alignment. As for studies on organisational structure, I argue that longitudinal studies could be invaluable to reveal how various organisational structure forms are formed or change over time. Such studies might also provide opportunities to observe how such changes in organisational structure influences the degree of IT alignment over time. Various combinations of formal and informal types of organisational structure in different sectors and across industries might reveal transferable insights. Moreover, since public organisations operate under a dynamic environment (i.e., facing changes in the economic, political, and technological landscape), I endorse future research accounting for these changes.

Finally, this research conceptualised that IT alignment in the public sector

is primarily influenced by the eight categories of factors identified through literature reviews and the two empirical studies. Future studies could focus on other identified factors that could influence IT alignment in relation to digital transformation success (e.g., organisational culture, leadership skills, human resources management, and stakeholder relationships).

References

- [1] CHENG GONG AND VINCENT RIBIERE. **Developing a unified definition of digital transformation.** *Technovation*, **102**:102217, 2021. 1, 10, 11, 29
- [2] ANANDHI BHARADWAJ, OMAR A EL SAWY, PAUL A PAVLOU, AND N V VENKATRAMAN. **Digital business strategy: toward a next generation of insights.** *MIS quarterly*, pages 471–482, 2013. 1, 29, 30
- [3] EVERLIN PICCININI, ANDRE HANELT, ROBERT GREGORY, AND LUTZ KOLBE. **Transforming industrial business: the impact of digital transformation on automotive organizations.** *Proceedings of the 36th International Conference on Information Systems (ICIS)*, 2015. 1, 11, 29
- [4] MICHAEL FITZGERALD, NINA KRUSCHWITZ, DIDIER BONNET, AND MICHAEL WELCH. **Embracing digital technology: A new strategic imperative.** *MIT sloan management review*, **55**(2):1, 2014. 1, 11, 29
- [5] GEORGE WESTERMAN, CLAIRE CALMÉJANE, DIDIER BONNET, PATRICK FERRARIS, ANDREW MCAFEE, ET AL. **Digital Transformation: A roadmap for billion-dollar organizations.** *MIT Center for digital business and capgemini consulting*, 1:1–68, 2011. 1, 11, 29
- [6] LEON KAPPELMAN, EPHRAIM R MCLEAN, VESS L JOHNSON, RUSSELL TORRES, CHRIS MAURER, KEVIN KIM, KATIA GUERRA, AND MARK SNYDER. **The 2020 SIM IT Issues and Trends Study.** *MIS Quarterly Executive*, **20**(1):69–107, 2021. 1, 2
- [7] JERRY LUFTMAN. **Assessing business-IT alignment maturity.** *Communications of the Association for Information Systems*, **4**(1):1–51, 2000. 1, 23, 25, 44, 64, 66, 67, 75, 98, 99, 108, 112, 113, clix, clxii
- [8] ANNA KARPOVSKY AND ROBERT D GALLIERS. **Aligning in practice: from current cases to a new agenda.** *Journal of Information technology*, **30**(2):136–160, 2015. 1, 2, 3, 11, 22, 23, 24, 25, 32, 34, 51, 81, 111
- [9] HIND BENBYA, DOROTHY E LEIDNER, AND DAVID PRESTON. **MIS Quarterly Research Curation on Information Systems Alignment Research Curation Team.** *MIS Quarterly Research Curations*, pages 1–19, 2019. 2, 22, 30, 33, 34, 53, 111, clxii
- [10] JENNIFER E GEROW, VARUN GROVER, JASON THATCHER, AND PHILIP L ROTH. **Looking toward the future of IT–business strategic alignment through the past.** *MIS quarterly*, **38**(4):1159–1186, 2014. 22, 23, 25, 51, 111
- [11] YOLANDE E CHAN AND BLAIZE HORNER REICH. **IT alignment: what have we learned?** *Journal of Information technology*, **22**(4):297–315, 2007. 2, 22, 23, 24, 36, 68
- [12] CATHRIN KAHRE, DAVID HOFFMANN, AND FREDERIK AHLEMANN. **Beyond Business-IT Alignment-Digital Business Strategies as a Paradigmatic Shift: A Review and Research Agenda.** In *Proceedings of the 50th Hawaii International Conference on System Sciences*, 2017. 2, 4, 11, 22, 31, 32, 33, 34, 41, 45, 51, 87, 111, clxii

- [13] GIDEON MEKONNEN JONATHAN, LAZAR RUSU, AND ERIK PERJONS. **Business-IT alignment in the era of digital transformation: Quo vadis?** In *Hawaii International Conference on System Sciences (HICSS), Maui, Hawaii, USA, January 7-10, 2020*, pages 5563–5572, 2020. 2, 3, 19, 22, 23, 24, 33, 34, 41, 45, 80, 81, 83, 87, 88
- [14] KNUT HINKELMANN, AURONA GERBER, DIMITRIS KARAGIANNIS, BARBARA THOENSSSEN, ALTA VAN DER MERWE, AND ROBERT WOITSCH. **A new paradigm for the continuous alignment of business and IT: Combining enterprise architecture modelling and enterprise ontology.** *Computers in Industry*, **79**:77–86, 2016. 23, 40, 87, 111
- [15] BETTINA HORLACH, PAUL DREWS, AND INGRID SCHIRMER. **Bimodal IT: Business-IT alignment in the age of digital transformation.** *Multikonferenz Wirtschaftsinformatik (MKWI)*, **3**:1417–1428, 2016. 31, 51
- [16] KAREN OSMUNDSEN, JON IDEN, AND BENDIK BYGSTAD. **Digital Transformation: Drivers, Success Factors, and Implications.** In *MCIS Proceedings*. Association for Information Systems. AIS Electronic Library (AISeL), 2018.
- [17] ADRIAN YEOW, CHRISTINA SOH, AND RINA HANSEN. **Aligning with new digital strategy: A dynamic capabilities approach.** *The Journal of Strategic Information Systems*, **27**(1):43–58, 2018. 2, 32, 33, 34, 35, 43, 45, 111, clxii
- [18] MARCUS FISCHER, FLORIAN IMGRUND, CHRISTIAN JANIESCH, AND AXEL WINKELMANN. **Strategy archetypes for digital transformation: Defining meta objectives using business process management.** *Information & Management*, **57**(5):103262, 2020. 2, 10, 19, 30, 69, 80, 81, 86, 88
- [19] JERRY LUFTMAN, KALLE LYYTINEN, AND TAL BEN ZVI. **Enhancing the measurement of information technology (IT) business alignment and its influence on company performance.** *Journal of Information Technology*, **32**(1):26–46, 2017. 3, 11, 20, 22, 23, 24, 25, 26, 27, 28, 29, 31, 34, 39, 41, 44, 58, 64, 66, 67, 69, 73, 75, 80, 82, 83, 85, 86, 87, 88, 89, 97, 98, 99, 107, 108, 111, 112, 113, clix, clxii
- [20] FREDRIK SVAHN, LARS MATHIASSEN, RIKARD LINDGREN, ET AL. **Embracing digital innovation in incumbent firms: How Volvo cars managed competing concerns.** *MIS Q.*, **41**(1):239–253, 2017. 2, 30
- [21] FANG-MING HSU, PAUL JEN-HWA HU, AND HSINCHUN CHEN. **Examining the business-technology alignment in government agencies: A study of electronic record management systems in Taiwan.** *PACIS 2006 Proceedings*, page 98, 2006. 2, 10, 30, 33
- [22] NANCY BROWN AND IRWIN BROWN. **From digital business strategy to digital transformation-How: A systematic literature review.** *Proceedings of the South African Institute of Computer Scientists and Information Technologists 2019*, pages 1–8, 2019. 2
- [23] GIDEON MEKONNEN JONATHAN. **Digital transformation in the public sector: Identifying critical success factors.** In *European, Mediterranean, and Middle Eastern Conference on Information Systems*, pages 223–235. Springer, 2019. 2, 20, 25, 31, 34, 39, 83
- [24] TIM COLTMAN, PAUL TALLON, RAJEEV SHARMA, AND MAGNO QUEIROZ. **Strategic IT alignment: twenty-five years on**, 2015. 2, 3, 22, 23, 25, 51, 111
- [25] LAZAR RUSU AND GIDEON MEKONNEN JONATHAN. **IT alignment in public organizations: a systematic literature review.** *Information Technology Governance in Public Organizations*, pages 27–57, 2017. 2, 18, 20, 53, 79, 92
- [26] ANA ALVARENGA, FLORINDA MATOS, RADU GODINA, AND JOÃO CO MATIAS. **Digital transformation and knowledge management in the public sector.** *Sustainability*, **12**(14):5824, 2020. 2, 34, 43, 111

- [27] QING HU AND C DERRICK HUANG. **Using the balanced scorecard to achieve sustained IT-business alignment: A case study.** *Communications of the Association for Information Systems*, **17**(1):8, 2006. 25, 26, 28, 111
- [28] INES MERGEL. **Open innovation in the public sector: drivers and barriers for the adoption of Challenge. gov.** *Public Management Review*, **20**(5):726–745, 2018. 4, 10, 11, 12, 13, 18, 20, 22, 33, 42, 43, 69, 80, 86, 87, 88, 105, clxii
- [29] URSULA PLESNER, LISE JUSTESEN, AND CECILIE GLERUP. **The transformation of work in digitized public sector organizations.** *Journal of Organizational Change Management*, 2018. 2, 3, 4, 18, 19, 20, 30, 51, 79, 80, 83, 91, 92, 106, 111
- [30] ROXANNE BAUDILLA LLAMZON, FELIX TAN, LEMURIA CARTER, KON MOUZAKIS, AND RAJESH VASA. **Treating Strategic Drift: Alignment Practices in Healthcare Information Systems Implementations.** *ACIS Proceedings*, 2021. 2, 31, 85, 107
- [31] TILL WINKLER. **IT governance mechanisms and administration/IT alignment in the public sector: A conceptual model and case validation.** In *Proceedings of the 11th International Conference on Wirtschaftsinformatik. WI 2013*, pages 831–845. Association for Information Systems. AIS Electronic Library (AISeL), 2013. 2, 3, 18, 19, 20, 21, 22, 34, 43, 44, 53, 69, 73, 80, 86, 111, clxii
- [32] JEAN-LOUIS DENIS, ANN LANGLEY, AND LINDA ROULEAU. **Strategizing in pluralistic contexts: Rethinking theoretical frames.** *Human relations*, **60**(1):179–215, 2007. 3, 53
- [33] J RAMÓN GIL-GARCÍA AND THERESA A PARDO. **E-government success factors: Mapping practical tools to theoretical foundations.** *Government information quarterly*, **22**(2):187–216, 2005. 3, 69, 84, 87, 105
- [34] IDA LINDGREN, DANIEL TOLL, AND ULF MELIN. **Automation as a driver of digital transformation in local government: Exploring stakeholder views on an automation initiative in a Swedish municipality.** In *DG. O2021: The 22nd Annual International Conference on Digital Government Research*, pages 463–472, 2021. 3, 22, 34, 44, 80, 86, 92, 107, clxii
- [35] RUI MU, MAIDINA HAERSHAN, AND PEIYI WU. **What organizational conditions, in combination, drive technology enactment in government-led smart city projects?** *Technological Forecasting and Social Change*, **174**:121220, 2022. 3, 34, 92
- [36] PETER REYNOLDS AND PHILIP YETTON. **Aligning business and IT strategies in multi-business organizations.** *Journal of information technology*, **30**(2):101–118, 2015. 3, 23, 24, 28
- [37] YOLANDE E CHAN. **Why haven't we mastered alignment? The importance of the informal organization structure.** *MIS Quarterly executive*, **1**(2):2, 2008. 3, 22, 25, 36, 37, 38, 51, 58, 69, 75, 79, 80, 83, 84, 92, 96, 102, 103, clix
- [38] NILS O FONSTAD AND MANI SUBRAMANI. **Building enterprise alignment: A case study.** *MIS Quarterly Executive*, **8**(1), 2009. 23
- [39] SANG M LEE, KIHYUN KIM, PATRICK PAULSON, AND HYESUNG PARK. **Developing a socio-technical framework for business-IT alignment.** *Industrial Management & Data Systems*, **108**(9):1167, 2008. 3
- [40] ALENA BUCHALCEVOVA AND JAN POUR. **Business-IT Alignment within the Management of Business Informatics Model.** In *ICEIS (2)*, pages 696–703, 2018. 3
- [41] THOMAS KUDE, MIROSLAV LAZIC, ARMIN HEINZL, AND ALEXANDER NEFF. **Achieving IT-based synergies through regulation-oriented and consensus-oriented IT governance capabilities.** *Information Systems Journal*, **28**(5):765–795, 2018. 3, 39

- [42] LEONARDO MAXWELL, EZGI TANER, AND GIDEON MEKONNEN JONATHAN. **Digitalisation in the public sector: Determinant factors.** *International Journal of IT/Business Alignment and Governance (IJITBAG)*, **10**(2):35–52, 2019. 3
- [43] OSCAR AVILA, VIRGINIE GOEPP-THIEBAUD, AND FRANÇOIS KIEFER. **Addressing alignment concerns into the design of domain-specific information systems.** *Journal of Manufacturing Technology Management*, **29**(5):726–745, 2018. 4, 23, 35, 40, 69, 80, 89
- [44] MICHAEL BITZER, SILVANA HINSEN, JAN JÖHNK, AND NILS URBACH. **Everything Is IT, but IT Is Not Everything: What Incumbents Do to Manage Digital Transformation Towards Continuous Change.** *ICIS 2021 Proceedings*, pages 1–17, 2021. 4, 69, 80, 81, 82, 83, 84, 88, 105, 106, 108, clxii
- [45] KIM VIBORG ANDERSEN. **Reengineering public sector organisations using information technology.** In *Reinventing government in the information age*, pages 334–352. Routledge, 2002. 4, 18, 19, 105
- [46] KATHRYN E NEWCOMER AND SHARON L CAUDLE. **Evaluating public sector information systems: More than meets the eye.** *Public Administration Review*, pages 377–384, 1991. 18, 21
- [47] JEFFREY J PITTAWAY AND ALI REZA MONTAZEMI. **Know-how to lead digital transformation: The case of local governments.** *Government information quarterly*, **37**(4):101474, 2020. 11, 12, 18, 42, 44, 80, 88, 107
- [48] MUHAMMAD SHAHANOOR ALAM AND LAURENCE BROOKS. **Identifying a public sector information systems (PSIS) for E-service: a case of land records E-service in Bangladesh.** In *International Conference on Electronic Government*, pages 106–119. Springer, 2014. 18, 19, 44, 105
- [49] LUIS GARICANO AND PAUL HEATON. **Information technology, organization, and productivity in the public sector: Evidence from police departments.** *Journal of Labor Economics*, **28**(1):167–201, 2010. 4, 12, 18
- [50] GIDEON MEKONNEN JONATHAN. *Information Technology Alignment: The Role of Organisational Structure.* Licentiate Thesis. Department of Computer and Systems Sciences, Stockholm University, 2020. 6, 93
- [51] J SCOTT BRENNEN AND DANIEL KREISS. **Digitalization.** *The international encyclopedia of communication theory and philosophy*, pages 1–11, 2016. 10
- [52] SUNIL MITHAS, ALI TAFTI, AND WILL MITCHELL. **How a firm’s competitive environment and digital strategic posture influence digital business strategy.** *MIS quarterly*, pages 511–536, 2013. 10
- [53] THOMAS HESS, CHRISTIAN MATT, ALEXANDER BENLIAN, AND FLORIAN WIESBÖCK. **Options for Formulating a Digital Transformation Strategy.** *MIS Quarterly Executive*, (2):123–139, 2016. 10, 30
- [54] PHILIPP BARTHEL. **What is meant by digital transformation success? Investigating the notion in IS literature.** In *International Conference on Wirtschaftsinformatik*, pages 167–182. Springer, 2021. 11, 69
- [55] MARINA MANZONI, RONY MEDAGLIA, LUCA TANGI, COLIN VAN NOORDT, LORENZINO VACCARI, AND DIETMAR GATTWINKEL. **AI Watch Road to the adoption of Artificial Intelligence by the Public Sector: A Handbook for Policymakers, Public Administrations and Relevant Stakeholders.** Technical report, Joint Research Centre (Seville site), 2022. 11, 12
- [56] GEORGE A BOYNE. **Public and private management: what’s the difference?** *Journal of management studies*, **39**(1):97–122, 2002. 11, 12, 13, 18, 21

- [57] STUART BRETSCHEIDER, FREDERICK J MARC-AURELE, AND JIANNAN WU. “**Best practices” research: a methodological guide for the perplexed.** *Journal of Public Administration Research and Theory*, **15**(2):307–323, 2004. 11
- [58] HAL G RAINEY. **Public agencies and private firms: Incentive structures, goals, and individual roles.** *Administration & Society*, **15**(2):207–242, 1983. 12, 17, 18
- [59] BARRY BOZEMAN AND GORDON KINGSLEY. **Risk Culture in Public and Private Organizations.** *Public administration review*, **58**(2):109–118, 1998. 12, 20, 79, 92
- [60] ROBERT A DAHL AND CHARLES E LINDBLOM. *Politics, economics, and welfare.* Routledge, 2017. 12
- [61] MARK A WARD AND SCOTT MITCHELL. **A comparison of the strategic priorities of public and private sector information resource management executives.** *Government Information Quarterly*, **21**(3):284–304, 2004. 12, 18, 19, 20, 21, 22, 79, 92, 105
- [62] BART VOORN, MARIEKE L VAN GENUGTEN, AND SANDRA VAN THIEL. **The efficiency and effectiveness of municipally owned corporations: a systematic review.** *Local Government Studies*, **43**(5):820–841, 2017. 12
- [63] JOHN CAMPBELL, CRAIG McDONALD, TSHOLOFELO SETHIBE, ET AL. **Public and private sector IT governance: Identifying contextual differences.** *Australasian Journal of Information Systems*, **16**(2), 2010. 12
- [64] KERSTIN MARTENS. **Mission impossible? Defining nongovernmental organizations.** *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, **13**(3):271–285, 2002. 13
- [65] GERNOD GRUENING. **Origin and theoretical basis of New Public Management.** *International public management journal*, **4**(1):1–25, 2001. 13
- [66] STUART BRETSCHEIDER. **Management Information Systems in Public and Private Organizations: An Empirical Test.** *Public Administration Review*, **50**(5):536–45, 1990. 13, 18, 20, 21, 41, 95
- [67] PATRICK DUNLEAVY AND CHRISTOPHER HOOD. **From old public administration to new public management.** *Public money & management*, **14**(3):9–16, 1994. 13, 17
- [68] IRVINE LAPSLEY. **The NPM agenda: back to the future.** *Financial accountability & management*, **24**(1):77–96, 2008. 13, 17
- [69] MARK H MOORE. *Creating public value: Strategic management in government.* Harvard university press, 1995. 13, 42, 43, clxii
- [70] BEN S KUIPERS, MALCOLM HIGGS, WALTER KICKERT, LARS TUMMERS, JOLIEN GRANDIA, AND JORIS VAN DER VOET. **The management of change in public organizations: A literature review.** *Public administration*, **92**(1):1–20, 2014. 13, 17, 20, 21, 95
- [71] DAVID TRY ET AL. “**Mind the gap, please”:** **Using public value theory to examine executive take-up of results-based management.** *International Journal of Productivity and Performance Management*, **57**(1):22–36, 2007. 13
- [72] R EDWARD FREEMAN. *Strategic management: A stakeholder approach.* Boston: Pitman, 1984. 13, 43
- [73] KENNETH J ARROW. *The limits of organization.* WW Norton & Company, 1974. 17
- [74] KIRSTEN M ROSACKER AND ROBERT E ROSACKER. **Information technology project management within public sector organizations.** *Journal of Enterprise Information Management*, **23**(5):587–594, 2010. 18, 19, 20, 21, 42, 102

- [75] NORMA M RICCUCCI. **The " old" public management versus the" new" public management: Where does public administration fit in?** *Public Administration Review*, **61**(2):172–175, 2001. 18, 19
- [76] ADA SCUPOLA AND INES MERGEL. **Co-production in digital transformation of public administration and public value creation: The case of Denmark.** *Government Information Quarterly*, **39**(1):101650, 2022. 18, 42
- [77] SANDFORD BORINS. **A holistic view of public sector information technology.** *Journal of E-government*, **1**(2):3–29, 2005. 18, 19, 20, 21, 79, 92, 102
- [78] MICHAEL AGBEKO, JOHN EFFAH, AND RICHARD BOATENG. **Digital transformation initiative in a public sector organization: Stakeholder viewpoints and responses in Ghana.** In *Proceedings of the 54th Hawaii International Conference on System Sciences*, page 2163, 2021. 18, 19, 43, 44
- [79] GABRIELA VIALE PEREIRA, LUIS F LUNA-REYES, AND J RAMON GIL-GARCIA. **Governance innovations, digital transformation and the generation of public value in Smart City initiatives.** In *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance*, pages 602–608, 2020. 18, 22
- [80] YIWEI GONG, JUN YANG, AND XIAOJIE SHI. **Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture.** *Government Information Quarterly*, **37**(3):101487, 2020. 18, 20, 21, 79, 92, 111
- [81] BENJAMIN FARO, BABAK ABEDIN, AND DILEK CETINDAMAR. **Hybrid organizational forms in public sector's digital transformation: A technology enactment approach.** *Journal of Enterprise Information Management*, 2021. 18, 20, 41, 42, 79, 92
- [82] SHARON L CAUDLE, WILPEN L GORR, AND KATHRYN E NEWCOMER. **Key information systems management issues for the public sector.** *MIS quarterly*, pages 171–188, 1991. 18, 19, 41
- [83] SIMON VANDER ELST AND FILIP DE RYNCK. **Alignment processes in public organizations: an interpretive approach.** *Information Polity*, **19**(3-4):195–206, 2014. 18, 19, 20, 34, 79, 92
- [84] CAROLINE TUTTMAN AND MARIE ANNE MACADAR. **Public value creation through digital transformation in tax administration: A conceptual model proposal.** In *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance*, pages 762–766, 2020.
- [85] ARTO LANAMÄKI, KARIN VÄYRYNEN, SARI LAARI-SALMELA, AND MARIANNE KINNULA. **Examining relational digital transformation through the unfolding of local practices of the Finnish taxi industry.** *The Journal of Strategic Information Systems*, **29**(3):101622, 2020. 18, 42
- [86] ELENA DOBROLYUBOVA. **Measuring outcomes of digital transformation in public administration: Literature review and possible steps forward.** *NISPAcee Journal of Public Administration and Policy*, **14**(1):61–86, 2021. 18
- [87] LES METCALFE. **Public management: from imitation to innovation.** *Australian Journal of Public Administration*, **52**(3):292–304, 1993. 19
- [88] CHRISTOPHER POLLITT AND GEERT BOUCKAERT. *Public management reform: A comparative analysis-into the age of austerity.* Oxford university press, 2017. 19
- [89] GARY L WAMSLEY AND MAYER N ZALD. **The political economy of public organizations.** *Public Administration Review*, pages 62–73, 1973. 19

- [90] PANOS PANAGIOTOPOULOS, BRAM KLIEVINK, AND ANTONIO CORDELLA. **Public value creation in digital government**, 2019. 19, 20, 30, 42, 43, 44, 80, 85, 86, 87, 88, 107, clxii
- [91] GIDEON MEKONNEN JONATHAN, LAZAR RUSU, ERIK PERJONS, AND JOSUE KUIKA WATAT. **The Relationship Between Organisational Agility and IT Alignment in Public Organisations**. In *Australasian Conference on Information Systems (ACIS2021)*. Association for Information Systems (AIS), 2021. 19, 31, 80, 86, 92
- [92] FRANK HENDRIKS AND PIETER TOPS. **Local public management reforms in the Netherlands: Fads, fashions and winds of change**. *Public Administration*, **81**(2):301–323, 2003. 19
- [93] GEORGE A BOYNE AND KENNETH J MEIER. **Environmental turbulence, organizational stability, and public service performance**. *Administration & Society*, **40**(8):799–824, 2009. 20
- [94] PAUL C NUTT AND ROBERT W BACKOFF. **Organizational publicness and its implications for strategic management**. *Journal of Public Administration Research and Theory*, **3**(2):209–231, 1993. 20
- [95] MAX WEBER. *Economy and society: An outline of interpretive sociology*, **2**. University of California press, 1978. 20, 35, 94
- [96] MONTGOMERY VAN WART. **Public-sector leadership theory: An assessment**. *Public administration review*, **63**(2):214–228, 2003. 20
- [97] TRACEY TROTTIER, MONTGOMERY VAN WART, AND XIAOHU WANG. **Reinforcing the need for more sophistication in leadership studies in the government sector**. *Public Administration Review*, **68**(6):1172–1174, 2008. 20
- [98] SAMINA QURATULAIN AND ABDUL KARIM KHAN. **How does employees' public service motivation get affected? A conditional process analysis of the effects of person–job fit and work pressure**. *Public Personnel Management*, **44**(2):266–289, 2015. 21
- [99] LUIS F LUNA-REYES AND J RAMON GIL-GARCIA. **Digital government transformation and internet portals: The co-evolution of technology, organizations, and institutions**. *Government information quarterly*, **31**(4):545–555, 2014. 21, 69, 80, 84, 105
- [100] STEPHEN P OSBORNE AND NORMAN FLYNN. **Strategic alliances managing the innovative capacity of voluntary and non-profit organizations in the provision of public services**. *Public Money and Management*, **17**(4):31–39, 1997. 21
- [101] DAVID FARNHAM AND SYLVIA HORTON. **Managing public and private organisations**. *Public management in Britain*, pages 26–45, 1999. 21
- [102] NILS VENKATRAMAN, JOHN C HENDERSON, AND SCOTT OLDACH. **Continuous strategic alignment: Exploiting information technology capabilities for competitive success**. *European Management Journal*, **11**(2):139–149, 1993. 22
- [103] YOLANDE E CHAN, RAJIV SABHERWAL, AND JASON BENNETT THATCHER. **Antecedents and outcomes of strategic IS alignment: an empirical investigation**. *IEEE Transactions on engineering management*, **53**(1):27–47, 2006. 22, 73
- [104] LEON KAPPELMAN, RUSSELL TORRES, EPHRAIM R MCLEAN, CHRIS MAURER, VESS L JOHNSON, MARK SNYDER, AND KATIA GUERRA. **The 2021 SIM IT Issues and Trends Study**. *Mis Quarterly Executive*, pages 75–114, 2022. 22
- [105] YOLANDE E CHAN, SID L HUFF, DONALD W BARCLAY, AND DUNCAN G COPELAND. **Business strategic orientation, information systems strategic orientation, and strategic alignment**. *Information systems research*, **8**(2):125–150, 1997. 22

- [106] GROVER S KEARNS AND ALBERT L LEDERER. **A resource-based view of strategic IT alignment: how knowledge sharing creates competitive advantage.** *Decision sciences*, **34**(1):1–29, 2003. 22
- [107] KE PEARLSON AND CS SAUNDERS. **Managing and Using Information Systems: A Systematic Approach**, 2013. 22
- [108] RICHARD NOLAN AND F WARREN MCFARLAN. **Information technology and the board of directors.** *Harvard business review*, **83**(10):96, 2005. 22
- [109] ERIK BRYNJOLFSSON AND LORIN HITT. **Paradox lost? Firm-level evidence on the returns to information systems spending.** *Management science*, **42**(4):541–558, 1996. 22
- [110] PAUL P TALLON AND KENNETH L KRAEMER. **Investigating the relationship between strategic alignment and information technology business value: the discovery of a paradox.** In *Creating business value with information technology: Challenges and solutions*, pages 1–22. IGI Global, 2003. 22
- [111] TERRY ANTHONY BYRD, BRUCE R LEWIS, AND ROBERT W BRYAN. **The leveraging influence of strategic alignment on IT investment: An empirical examination.** *Information & management*, **43**(3):308–321, 2006. 22, 23
- [112] ALI ALPER YAYLA AND QING HU. **The impact of IT-business strategic alignment on firm performance in a developing country setting: exploring moderating roles of environmental uncertainty and strategic orientation.** *European Journal of Information Systems*, **21**(4):373–387, 2012. 23
- [113] MAGNO QUEIROZ. **Mixed results in strategic IT alignment research: a synthesis and empirical study.** *European Journal of Information Systems*, **26**(1):21–36, 2017. 22
- [114] LILY SUN, KECHENG LIU, DIAN INDRAYANI JAMBARI, AND VAUGHAN MICHELL. **Evaluating business value of IT towards optimisation of the application portfolio.** *Enterprise Information Systems*, **10**(4):378–399, 2016. 23, 31
- [115] FABRIZIO AMARILLI, MARIO VAN VLIET, AND BART VAN DEN HOOFF. **An explanatory study on the co-evolutionary mechanisms of business IT alignment.** In *38th International Conference on Information Systems: Transforming Society with Digital Innovation, ICIS 2017*, pages 1–22. AES Electronic Library, 2017.
- [116] YUN JI MOON, MYEONGGIL CHOI, AND DEBORAH J ARMSTRONG. **The impact of relational leadership and social alignment on information security system effectiveness in Korean governmental organizations.** *International Journal of Information Management*, **40**:54–66, 2018. 31, 41
- [117] WILLIAM ARTHUR BISHOP. **Addressing the challenge of strategic alignment faced by small and medium-sized entities during the selection of accounting software packages.** 2016. 39, 41
- [118] TICHAWONA MUZIRA AND LOUWRENCE D ERASMUS. **Narrative enquiry into service excellence in uncertainty: Contributions of business and information technology strategic alignment in zimbabwe.** In *2016 Portland International Conference on Management of Engineering and Technology (PICMET)*, pages 1867–1877. IEEE, 2016. 23, 31, 32, 39
- [119] PAUL P TALLON AND ALAIN PINSONNEAULT. **Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model.** *MIS quarterly*, pages 463–486, 2011. 23, 32, 64, 69, 92
- [120] JOHN C HENDERSON AND N VENKATRAMAN. **Strategic alignment: a model for organizational transformation via information technology.** *Working Paper No. 190. Sloan School of Management, Massachusetts Institute of Technology*, 1990. 23, 25, 26, 28

- [121] MUHAMMAD RIFKI SHIHAB AND IKHSAN RAHARDIAN. **Comparing the approaches of small, medium, and large organisations in achieving IT and business alignment.** *International Journal of Business Information Systems*, **24**(2):227–241, 2017. 23, 27, 45
- [122] BLAIZE HORNER REICH AND IZAK BENBASAT. **Factors that influence the social dimension of alignment between business and information technology objectives.** *MIS Quarterly*, **24**(1):81, 2000. 23, 25, 26, 28, 29
- [123] HEINZ-THEO WAGNER AND JENS MESHTAF. **Individual IT Roles in Business–IT Alignment and IT Governance.** In *2016 49th Hawaii International Conference on System Sciences (HICSS)*, pages 4920–4929. IEEE, 2016. 24, 39
- [124] JINGMEI ZHOU, GONGBING BI, HEFU LIU, YULIN FANG, AND ZHONGSHENG HUA. **Understanding employee competence, operational IS alignment, and organizational agility—An ambidexterity perspective.** *Information & Management*, **55**(6):695–708, 2018. 40
- [125] ANABEL GUTIERREZ AND MARK LYCETT. **IS alignment factors: dynamic relationships at strategic, tactical and operational level.** In *UK Academy for Information Systems Conference Proceedings*, pages 11605–11616, 2011. 24
- [126] FRANÇOIS BERGERON, LOUIS RAYMOND, AND SUZANNE RIVARD. **Ideal patterns of strategic alignment and business performance.** *Information & management*, **41**(8):1003–1020, 2004. 24, 25
- [127] LIOR FINK AND EINAT SUKENIK. **The effect of organizational factors on the business value of IT: Universalistic, contingency, and configurational predictions.** *Information Systems Management*, **28**(4):304–320, 2011. 24
- [128] RAJIV SABHERWAL, RUDY HIRSCHHEIM, AND TIM GOLES. **The dynamics of alignment: Insights from a punctuated equilibrium model.** *Organization science*, **12**(2):179–197, 2001. 24, 25, 26
- [129] FRANÇOIS BERGERON, LOUIS RAYMOND, AND SUZANNE RIVARD. **Fit in strategic information technology management research: an empirical comparison of perspectives.** *Omega*, **29**(2):125–142, 2001. 25, 26
- [130] RIK MAES, DAAN RIJSENBRIJ, ONNO TRUIJENS, HANS GOEDVOLK, ET AL. **Redefining business-IT alignment through a unified framework.** *White Paper, Universiteit van Amsterdam*, 2000. 25, 26, 28
- [131] MARIANNE BROADBENT AND ELLEN KITZIS. **Interweaving business-driven IT strategy and execution: Four foundation factors.** *Ivey Business Journal*, **69**(3):1–6, 2005. 26
- [132] BLAIZE HORNER REICH AND IZAK BENBASAT. **Measuring the linkage between business and information technology objectives.** *MIS quarterly*, pages 55–81, 1996. 25, 26, 28, clix
- [133] HUSNAYATI HUSSIN, MALCOLM KING, AND PAUL CRAGG. **IT alignment in small firms.** *European journal of information systems*, **11**(2):108–127, 2002. 25, 26
- [134] CV BROWN AND SL MAGILL. **Alignment of the IS functions with the enterprise: Toward a model of antecedents.** *MIS Quarterly*, **18**(4):371–403, 1994. 26
- [135] RAJIV SABHERWAL AND PEETER KIRS. **The alignment between organizational critical success factors and information technology capability in academic institutions.** *Decision Sciences*, **25**(2):301–330, 1994. 26
- [136] RAYMOND E MILES, CHARLES C SNOW, ALAN D MEYER, AND HENRY J COLEMAN JR. **Organizational strategy, structure, and process.** *Academy of management review*, **3**(3):546–562, 1978. 26

- [137] MONIKA JEDYNAK, WOJCIECH CZAKON, ANETA KUŹNIARSKA, AND KAROLINA MANIA. **Digital transformation of organizations: what do we know and where to go next?** *Journal of Organizational Change Management*, **34**(3):629–652, 2021. 28, 30, 80, 87, 88, clxii
- [138] GIDEON MEKONNEN JONATHAN AND LAZAR RUSU. **IT governance in public organizations: a systematic literature review.** *International Journal of IT/Business Alignment and Governance (IJITBAG)*, **9**(2):30–52, 2018. 28, 38, 43
- [139] STEVEN DE HAES AND WIM VAN GREMBERGEN. **An exploratory study into IT governance implementations and its impact on business/IT alignment.** *Information Systems Management*, **26**(2):123–137, 2009. 28
- [140] RG RATHNAM, JUSTIN JOHNSEN, AND H JOSEPH WEN. **Alignment of business strategy and IT strategy: a case study of a fortune 50 financial services company.** *Journal of Computer Information Systems*, **45**(2):1–8, 2005. 28
- [141] SAEID JORFI, KHALIL MD NOR, AND LOTFI NAJJAR. **An empirical study of the role of IT flexibility and IT capability in IT-business strategic alignment.** *Journal of Systems and Information Technology*, 2017. 29, 40
- [142] SUKANYA PANDA AND SANTANU KUMAR RATH. **Strategic IT-business alignment and organizational agility: from a developing country perspective.** *Journal of Asia Business Studies*, **12**(4):422–440, 2018. 29, 35
- [143] ALI ALPER YAYLA AND QING HU. **Antecedents and drivers of IT-business strategic alignment: Empirical validation of a theoretical model.** 2009. 29, 38
- [144] PETER C VERHOEF, THIJS BROEKHUIZEN, YAKOV BART, ABHI BHATTACHARYA, JOHN QI DONG, NICOLAI FABIAN, AND MICHAEL HAENLEIN. **Digital transformation: A multidisciplinary reflection and research agenda.** *Journal of Business Research*, **122**:889–901, 2021. 29, 30, 35, 84
- [145] EMILY HENRIETTE, MONDHER FEKI, IMED BOUGHZALA, ET AL. **Digital Transformation Challenges.** In *MCIS*, page 33, 2016. 29
- [146] PÄIVI PARVIAINEN, MAARIT TIHINEN, JUKKA KÄÄRIÄINEN, AND SUSANNA TEPPOLA. **Tackling the digitalization challenge: how to benefit from digitalization in practice.** *International journal of information systems and project management*, **5**(1):63–77, 2017. 29
- [147] CHRISTIAN MATT, THOMAS HESS, AND ALEXANDER BENLIAN. **Digital transformation strategies.** *Business & information systems engineering*, **57**(5):339–343, 2015. 30
- [148] RITU AGARWAL, GUODONG GAO, CATHERINE DESROCHES, AND ASHISH K JHA. **Research commentary—The digital transformation of healthcare: Current status and the road ahead.** *Information systems research*, **21**(4):796–809, 2010. 30
- [149] ANN MAJCHRZAK, M LYNNE MARKUS, AND JONATHAN WAREHAM. **Designing for digital transformation.** *MIS quarterly*, **40**(2):267–278, 2016. 30, 79, 92
- [150] MARYANNE M GOBBLE. **Digital strategy and digital transformation.** *Research-Technology Management*, **61**(5):66–71, 2018. 30
- [151] LISEN SELANDER AND SIRKKA L JARVENPAA. **Digital action repertoires and transforming a social movement organization.** *MIS quarterly*, **40**(2):331–352, 2016. 30
- [152] JESSICA LUO CARLO, KALLE LYYTINEN, AND RICHARD J BOLAND JR. **Dialectics of collective minding: Contradictory appropriations of information technology in a high-risk project.** *Mis Quarterly*, pages 1081–1108, 2012. 30

- [153] JAHANGIR KARIMI AND ZHIPING WALTER. **The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry.** *Journal of Management Information Systems*, **32**(1):39–81, 2015. 30
- [154] SABINE BERGHAUS AND ANDREA BACK. **Stages in digital business transformation: results of an empirical maturity study.** In *MCIS*, page 22, 2016. 31, 34, 39, 41, 106
- [155] ANTON MANFREDA AND MOJCA INDIHAR ŠTEMBERGER. **Establishing a partnership between top and IT managers: A necessity in an era of digital transformation.** *Information Technology & People*, **32**(4):948–972, 2019. 31, 32, 41, 106
- [156] NOVEL RISCA PUSPITA SENJA AND BAMBANG PHARMASETIAWAN. **Assessing the relationship among alignment business and information technology, organization culture, and information technology effectiveness.** In *2017 International Conference on ICT For Smart Society (ICISS)*, pages 1–5. IEEE, 2017. 31, 39
- [157] NING ZHANG AND BO LIU. **The key factors affecting RPA-business alignment.** In *Proceedings of the 3rd International Conference on Crowd Science and Engineering*, pages 1–6, 2018. 31, 32, 35
- [158] SYLVIE HÉROUX AND ANNE FORTIN. **The moderating role of IT-business alignment in the relationship between IT governance, IT competence, and innovation.** *Information Systems Management*, **35**(2):98–123, 2018. 31, 32
- [159] AHMAD ISSA, BUMIN HATIBOGLU, ANDREAS BILDSTEIN, AND THOMAS BAURNHANS. **Industrie 4.0 roadmap: Framework for digital transformation based on the concepts of capability maturity and alignment.** *Procedia Cirp*, **72**:973–978, 2018. 31, 32, 39
- [160] HANNU KIVIJÄRVI. **Advancing Organizational Alignment Decisions: Insights from the Structural Alignment Theory to the Business-IT Alignment Problem.** *International Journal of IT/Business Alignment and Governance (IJITBAG)*, **9**(1):53–80, 2018.
- [161] JULIAN SCHMIDT, PAUL DREWS, AND INGRID SCHIRMER. **Digitalization of the Banking Industry: A Multiple Stakeholder Analysis on Strategic Alignment.** In *Proceedings of the 23rd International Conference on Information Systems (ICIS)*. Association for Information Systems. AIS Electronic Library (AISeL), 2017. 31, 32, 35, 39, 40, 64, 69, 92
- [162] ILKKA RITOLA, ROKAS SIUGZDA, AND LAZAR RUSU. **The influence of organizational politics on business-IT alignment.** *International Journal of IT/Business Alignment and Governance (IJITBAG)*, **7**(2):33–48, 2016. 31
- [163] BERNHARD R KATZY, GORDON SUNG, AND KEVIN CROWSTON. **Alignment in an inter-organisational network: the case of ARC transistance.** *European Journal of Information Systems*, **25**(6):553–568, 2016. 31, 40
- [164] EVA HARTL AND THOMAS HESS. **The Role of Cultural Values for Digital Transformation: Insights from a Delphi Study.** In *AMCIS*, 2017. 31, 32, 35, 80, 83, 87, 105, 108
- [165] DOROTA JELONEK. **Self-Assessment of the Maturity of Management Information Systems-Business Alignment.** In *Proceedings of the 6th International Conference on Information Technology: IoT and Smart City*, pages 235–239, 2018. 31, 32
- [166] PABLO GAJARDO AND LA PAZ ARIEL. **The business-IT alignment in the digital age.** In *The 13th Mediterranean Conference on Information Systems (ITAIS & MCIS)*, Naples, Italy, 2019. 31, 32, 33, 34, 39
- [167] LEONARD HEILIG, EDUARDO LALLA-RUIZ, AND STEFAN VOSS. **Digital transformation in maritime ports: analysis and a game theoretic framework.** *Netnomics: Economic research and electronic networking*, **18**(2):227–254, 2017. 31

- [168] GREGORY VIAL. **Understanding digital transformation: A review and a research agenda.** *Managing Digital Transformation*, pages 13–66, 2021. 31, 32, 39, 79, 92, 105, clxii
- [169] MARC NIJSSEN AND JAAP PAAUWE. **HRM in turbulent times: how to achieve organizational agility?** *The International Journal of Human Resource Management*, **23**(16):3315–3335, 2012. 32, 69
- [170] DONGBACK SEO AND ARIEL I LA PAZ. **Exploring the dark side of IS in achieving organizational agility.** *Communications of the ACM*, **51**(11):136–139, 2008. 32, 69
- [171] ROGIER VAN DE WETERING, PATRICK MIKALEF, AND ADAMANTIA PATELI. **Strategic alignment between IT flexibility and dynamic capabilities: An empirical investigation.** *International Journal of IT/Business Alignment and Governance (IJITBAG)*, **9**(1):1–20, 2018. 32, 35, 40
- [172] FATEMEH RAHIMI, CHARLES MØLLER, AND LARS HVAM. **Business process management and IT management: The missing integration.** *International Journal of Information Management*, **36**(1):142–154, 2016. 32
- [173] IYAD ZIKRA. **The communicative nature of information systems integration as an enabler for business IT alignment.** In *International Conference on Business Information Systems*, pages 136–147. Springer, 2016. 32
- [174] MAGNO QUEIROZ, TIM COLTMAN, PAUL TALLON, RAJEEV SHARMA, AND PETER REYNOLDS. **The complementarity of corporate IT alignment and business unit IT alignment: An analysis of their joint effects on business unit performance.** In *Proceedings of the 51st Hawaii International Conference on System Sciences*, 2018. 32
- [175] ZHEN SHAO, TIERAN WANG, AND YU-QIANG FENG. **Impact of IS-business strategic alignment and environmental uncertainty on enterprise systems assimilation.** In *2016 International Conference on Management Science and Engineering (ICMSE)*, pages 1511–1517. IEEE, 2016. 32
- [176] W SMITH EWENSTEIN AND A SOLOGAR. **Changing change management, McKinsey Digital.** 2015. 33
- [177] NICOLA BELLANTUONO, ANGELA NUZZI, PIERPAOLO PONTRANDOLFO, AND BARBARA SCOZZI. **Digital transformation models for the 14. 0 transition: Lessons from the change management literature.** *Sustainability*, **13**(23):12941, 2021. 33, 85
- [178] ROLAND DEISER. **Digital transformation challenges in large and complex organizations.** *Claremont, CA*, 2018. 33, 80, 83, 85, 105, 107, clxii
- [179] FANNY-ÈVE BORDELEAU AND CARSTEN FELDEN. **Digitally transforming organisations: a review of change models of industry 4.0.** 2019. 33
- [180] ALBERT MEIJER AND MARCEL THAENS. **Alignment 2.0: Strategic use of new internet technologies in government.** *Government Information Quarterly*, **27**(2):113–121, 2010. 34
- [181] NEDA ABDOLVAND AND MOHAMMAD MEHDI SEPEHRI. **Antecedents of strategic information systems alignment in Iran.** *Journal of Global Information Technology Management*, **19**(2):80–103, 2016. 34
- [182] MORTEZA ALAEDDINI, HAMED ASGARI, ARASH GHARIBI, AND MONA RASHIDI RAD. **Leveraging business-IT alignment through enterprise architecture—an empirical study to estimate the extents.** *Information Technology and Management*, **18**(1):55–82, 2017.
- [183] INGMAR HAFFKE, BRADLEY KALGOVAS, AND ALEXANDER BENLIAN. **The transformative role of bimodal IT in an era of digital business.** 2017.

- [184] CHRIS T STREET, BRENT GALLUPE, AND JEFF BAKER. **Strategic alignment in SMEs: Strengthening theoretical foundations.** *Communications of the Association for Information Systems*, **40**(1):20, 2017. 39
- [185] CHRIS STREET, BRENT GALUPE, AND JEFF BAKER. **The influence of entrepreneurial action on strategic alignment in new ventures.** **27**(1)(59-81):20, 2018. 34
- [186] KOVÁCS LÁSZLÓ, NEMESLAKI ANDRÁS, ORBÓK ÁKOS, AND SZABÓ ANDRÁS. **Structuration theory and strategic alignment in information security management: Introduction of a comprehensive research approach and program.** *AARMS–Academic and Applied Research in Military and Public Management Science*, **16**(1):5–16, 2017. 35, 40, 107
- [187] JAN VOLLMAR AND STEFAN HORN. **Data driven strategy implementation in engineering: Strategic alignment of improvement projects.** In *2016 IEEE International Symposium on Systems Engineering (ISSE)*, pages 1–4. IEEE, 2016. 35
- [188] HENRY MINTZBERG. *Mintzberg on management: Inside our strange world of organizations.* Simon and Schuster, 1989. 35, 36, 93, 94, clix
- [189] WESLEY D SINE, HITOSHI MITSUHASHI, AND DAVID A KIRSCH. **Revisiting Burns and Stalker: Formal structure and new venture performance in emerging economic sectors.** *Academy of management journal*, **49**(1):121–132, 2006. 35
- [190] DAN R DALTON, WILLIAM D TODOR, MICHAEL J SPENDOLINI, GORDON J FIELDING, AND LYMAN W PORTER. **Organization structure and performance: A critical review.** *Academy of management review*, **5**(1):49–64, 1980. 35, clix
- [191] JOSÉ LUIS MOLINA. **The informal organizational chart in organizations: An approach from the social network analysis.** *Connections*, **24**(1):78–91, 2001. 35, 93, clix
- [192] W RICHARD SCOTT AND GERALD F DAVIS. *Organizations and organizing: Rational, natural and open systems perspectives.* Routledge, 2015. 35, 36
- [193] HERBERT SIMON AND JAMES MARCH. *Administrative behavior and organizations.* New York: Free Press, 1976. 35, 36, 39, 66
- [194] TODD R ZENGER, SERGIO G LAZZARINI, AND LAURA POPPO. **Informal and formal organization in new institutional economics.** In *The New Institutionalism in Strategic Management*, **19**, pages 277–305. Emerald Group Publishing Limited, 2000. 35, 36, 37
- [195] DAVID KRACKHARDT AND JEFFREY R HANSON. **Informal networks: the company.** In *Knowledge in organizations*, pages 37–49. Routledge, 2009. 35, 36, 37, 93, 96
- [196] GEORGE F FARRIS. **The effect of individual roles on performance in innovative groups.** *R&D Management*, **3**(1):23–28, 1972. 36, 37, 39, 96, 98
- [197] TODD R ZENGER AND BARBARA S LAWRENCE. **Organizational demography: The differential effects of age and tenure distributions on technical communication.** *Academy of Management journal*, **32**(2):353–376, 1989. 36, 37, 39
- [198] MICHAEL TUSHMAN AND DAVID NADLER. **Organizing for innovation.** *California management review*, **28**(3):74–92, 1986. 36, 37, 94, 96
- [199] PHILIP SELZNICK. **Foundations of the theory of organization.** *American sociological review*, **13**(1):25–35, 1948. 36
- [200] CHESTER BERNARD. **The Function of the Executive, Harvard**, 1938. 36
- [201] ETHELRED W CROZIER. *The White Caps: A History of the Organization in Sevier County.* Lulu.com, 2009.

- [202] WILLIAM J DICKSON AND FRITZ JULES ROETHLISBERGER. *Management and the Worker*. Routledge, 2004.
- [203] ERIC LANSDOWN TRIST AND KENNETH W BAMFORTH. **Some social and psychological consequences of the longwall method of coal-getting: An examination of the psychological situation and defences of a work group in relation to the social structure and technological content of the work system.** *Human relations*, 4(1):3–38, 1951. 36
- [204] MICHAEL KYOBE. **The influence of strategy-making types on IT alignment in SMEs.** *Journal of Systems and Information Technology*, 10(1):22–38, 2008. 36
- [205] THERESA K LANT. **Organizational Learning: Creating, Retaining, and Transferring Knowledge.** *Administrative Science Quarterly*, 45(3):622–622, 2000. 37
- [206] BRET L SIMMONS, JANAKI GOOTY, DEBRA L NELSON, AND LAURA M LITTLE. **Secure attachment: Implications for hope, trust, burnout, and performance.** *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 30(2):233–247, 2009. 37, 102
- [207] RANJAY GULATI AND PHANISH PURANAM. **Renewal through reorganization: The value of inconsistencies between formal and informal organization.** *Organization science*, 20(2):422–440, 2009. 37, 66, 93, 96, 102
- [208] KATJA ZOLPER, DANIEL BEIMBORN, AND TIM WEITZEL. **The effect of social network structures at the business/IT interface on IT application change effectiveness.** In *Formulating Research Methods for Information Systems*, pages 271–324. Springer, 2015. 37, 96, 97, 98, 102
- [209] ROBERT KAŠE, JAAP PAAUWE, AND NADA ZUPAN. **HR practices, interpersonal relations, and intrafirm knowledge transfer in knowledge-intensive firms: a social network perspective.** *Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, 48(4):615–639, 2009. 37
- [210] CAROLYN HILL AND LAURENCE LYNN. **Producing human services Why do agencies collaborate?** *Public Management Review*, 5(1):63–81, 2003. 37
- [211] AI LING CHUA AND SHAN L PAN. **Knowledge transfer and organizational learning in IS offshore sourcing.** *Omega*, 36(2):267–281, 2008. 37, 98
- [212] JANINE NAHAPIET AND SUMANTRA GHOSHAL. **Social capital, intellectual capital, and the organizational advantage.** *Academy of management review*, 23(2):242–266, 1998. 37
- [213] DAVID NADLER, MICHAEL TUSHMAN, MICHAEL L TUSHMAN, MARK B NADLER, ET AL. *Competing by design: The power of organizational architecture*. Oxford University Press, 1997. 37
- [214] JAMES R LINCOLN. **Intra-(and Inter-) Organizational Networks, Research in Sociology of Organizations, Vol. 1**, 1982. 37
- [215] DANIEL J BRASS, JOSEPH GALASKIEWICZ, HENRICH R GREVE, AND WENPIN TSAI. **Taking stock of networks and organizations: A multilevel perspective.** *Academy of Management Journal*, 47(6):795–817, 2004. 37, 66
- [216] PRODROMOS D CHATZOGLOU, ANASTASIOS D DIAMANTIDIS, EFTICHA VRAIMAKI, STERGIOS K VRANAKIS, AND DIMITRIOS A KOURTIDIS. **Aligning IT, strategic orientation and organizational structure.** *Business Process Management Journal*, 17(4):663–687, 2011. 38, 103
- [217] WL CURRIE. **Organizational structure and the use of information technology: Preliminary findings of a survey in the private and public sector.** *International Journal of Information Management*, 16(1):51–64, 1996. 38, clix

- [218] PIRKKO LAHDELMA. **The effect of formal and informal intraorganizational structures on the perceived strategic IT-business alignment.** In *European Conference on Information Systems*, 2010. 38
- [219] RICHARD LEIFER. **Matching computer-based information systems with organizational structures.** *MIS Quarterly*, **12**(1):63–73, 1988. 38, 39
- [220] LOUIS RAYMOND, G PARE, AND F BERGERON. **Matching information technology and organizational structure: an empirical study with implications for performance.** *European Journal of Information Systems*, **4**(1):3–16, 1995. 38
- [221] DAVID S PRESTON AND ELENA KARAHANNA. **Antecedents of IS strategic alignment: a nomological network.** *Information systems research*, **20**(2):159–179, 2009. 38
- [222] KATJA WALENTOWITZ, DANIEL BEIMBORN, AND TIM WEITZEL. **The Influence of Social Structures on Business/IT Alignment.** In *Proceedings of JAIS Theory Development Workshop;(Pre-ICIS Workshop), St. Louis (MO). Sprouts: Working Papers on Information Systems, 10 (72).-10 (2010), Art. 72.-1 pdf-Datei (578 KB)*, 2010. 38
- [223] ALBERTO LEITE CÂMARA, REJANE MARIA DA COSTA FIGUEIREDO, AND EDNA DIAS CANEDO. **Analysis of Conversation Competencies in Strategic Alignment between Business Areas (External Control) and Information Technology Areas in a Control Body.** *Information*, **9**(7):166, 2018. 39, 41, 64, 69, 106
- [224] CINDY ZHILING TU, YUFEI YUAN, NORM ARCHER, AND CATHERINE E CONNELLY. **Strategic value alignment for information security management: a critical success factor analysis.** *Information & Computer Security*, 2018. 39
- [225] WEIZI LI, KECHENG LIU, MAKSIM BELITSKI, ABBY GHOBADIAN, AND NICHOLAS O'REGAN. **e-Leadership through strategic alignment: An empirical study of small-and medium-sized enterprises in the digital age.** *Journal of Information Technology*, **31**(2):185–206, 2016. 39, 41
- [226] EDWARD J ZAJAC, MATTHEW S KRAATZ, AND RUDI KF BRESSER. **Modeling the dynamics of strategic fit: A normative approach to strategic change.** *Strategic management journal*, **21**(4):429–453, 2000. 39, 40
- [227] DAY-YANG LIU, SHOU-WEI CHEN, AND TZU-CHUAN CHOU. **Resource fit in digital transformation: Lessons learned from the CBC Bank global e-banking project.** *Management Decision*, **49**(10):1728–1742, 2011. 40
- [228] PEDRO MALTA AND RUI DINIS SOUSA. **Process oriented approaches in enterprise architecture for business-IT alignment.** *Procedia Computer Science*, **100**:888–893, 2016. 40
- [229] FREDERICK WONGES, JACK ZIJLMANS, AND LEO WILLYANTO SANTOSO. **The alignment of IT and business strategy at ROC leeuwenborgh.** In *2017 International Conference on Soft Computing, Intelligent System and Information Technology (ICSIIIT)*, pages 208–213. IEEE, 2017. 40
- [230] YUGO KARTONO ISAL, GAYUH PRIMA PIKARTI, ACHMAD NIZAR HIDAYANTO, AND EDSON YAHUDA PUTRA. **Analysis of IT infrastructure flexibility impacts on IT-Business strategic alignment.** *Journal of Industrial Engineering and Management (JIEM)*, **9**(3):657–683, 2016. 40
- [231] HUIGANG LIANG, NIANXIN WANG, YAJIONG XUE, AND SHILUN GE. **Unraveling the alignment paradox: how does business—IT alignment shape organizational agility?** *Information Systems Research*, **28**(4):863–879, 2017.
- [232] GARY SC PAN AND DONAL J FLYNN. **Towards a stakeholder analysis of information systems development project abandonment.** In *ECIS*, pages 1462–1473, 2003. 40, 86

- [233] PETER VOGEL AND GÖRAN HULTIN. **Introduction: Digitalization and Why Leaders Need to Take IT Seriously.** In *Conquering digital overload*, pages 1–8. Springer, 2018. 40
- [234] GIOVANNI SCHIUMA, EVA SCHETTINI, FRANCESCO SANTARSIERO, AND DANIELA CARLUCCI. **The transformative leadership compass: six competencies for digital transformation entrepreneurship.** *IJEER*, **87**(1):19, 2021. 40, 41, 69, 106
- [235] OFIR TUREL, PENG LIU, AND CHRIS BART. **Board-level information technology governance effects on organizational performance: The roles of strategic alignment and authoritarian governance style.** *Information Systems Management*, **34**(2):117–136, 2017. 41
- [236] KIRSTEN M ROSACKER AND DAVID L OLSON. **Public sector information system critical success factors.** *Transforming Government: People, Process and Policy*, 2008. 41
- [237] ALESSANDRO AURIGI. **Competing urban visions and the shaping of the digital city.** *Knowledge, Technology & Policy*, **18**(1):12–26, 2005. 41
- [238] JANE E FOUNTAIN. *Building the virtual state: Information technology and institutional change.* Brookings institution press, 2004. 42
- [239] FRANCOIS-XAVIER DE VAUJANY. **Strategic alignment: What else? A practice based view of IS value.** In *International Conference on Information Systems (ICIS), proceedings on Aisel, Paris*, 2008. 42
- [240] ANTONIO CORDELLA AND CARLA M BONINA. **A public value perspective for ICT enabled public sector reforms: A theoretical reflection.** *Government information quarterly*, **29**(4):512–520, 2012. 42, 43, clxii
- [241] SARA GIOVANNA MAURO, LINO CINQUINI, AND DANIELA PIANEZZI. **New Public Management between reality and illusion: Analysing the validity of performance-based budgeting.** *The British Accounting Review*, **53**(6):100825, 2021. 43
- [242] FEDERICO BRUNETTI, DOMINIK T MATT, ANGELO BONFANTI, ALBERTO DE LONGHI, GIULIO PEDRINI, AND GUIDO ORZES. **Digital transformation challenges: strategies emerging from a multi-stakeholder approach.** *The TQM Journal*, **32**(4):697–724, 2020. 43, 44
- [243] JEREMY ROSE, LEIF SKIFTENES FLAK, AND ØYSTEIN SÆBØ. **Stakeholder theory for the E-government context: Framing a value-oriented normative core.** *Government Information Quarterly*, **35**(3):362–374, 2018. 43, 44
- [244] T DONALDSON AND LE PRESTON. **The stakeholder theory of the corporation: Concepts, evidence, and implications.** *Academy of Management Review*, **20**(1):65–91, 1995. 44
- [245] ALOK MISHRA AND DEEPTI MISHRA. **Applications of stakeholder theory in information systems and technology.** *Engineering Economics*, **24**(3):254–266, 2013. 44, 86
- [246] PRANAS ŽUKAUSKAS, JOLITA VVEINHARDT, AND REGINA ANDRIUKAITIENĖ. **Philosophy and paradigm of scientific research.** *Management culture and corporate social responsibility*, **121**, 2018. 47, 48
- [247] BRIAN D HAIG. **Using the philosophy of science to better understand research methods.** *Comprehensive Psychology*, **3**:11–05, 2014. 47
- [248] NIK RUSHDI HASSAN, JOHN MINGERS, AND BERND STAHL. **Philosophy and information systems: where are we and where should we go?**, 2018. 47
- [249] G BURELL AND G MORGAN. **Sociological Paradigms and Organisational Allalysis, Sociological Paradigms and Organizational Analysis**, 1979. 47, 48

- [250] GÖRAN GOLDKUHL. **Pragmatism vs interpretivism in qualitative information systems research.** *European journal of information systems*, **21**(2):135–146, 2012.
- [251] WANDA J ORLIKOWSKI AND JACK J BAROUDI. **Studying information technology in organizations: Research approaches and assumptions.** *Information systems research*, **2**(1):1–28, 1991. 47, 48
- [252] JOHN MINGERS. **Real-izing information systems: critical realism as an underpinning philosophy for information systems.** *Information and organization*, **14**(2):87–103, 2004. 47
- [253] MICHAEL D MYERS AND DAVID AVISON. *Qualitative research in information systems: a reader.* Sage, 2002. 48
- [254] JANE WEBSTER AND RICHARD T WATSON. **Analyzing the past to prepare for the future: Writing a literature review.** *MIS quarterly*, pages xiii–xxiii, 2002. 50, 51, 53, 73, 74, 76, 78
- [255] CHITU OKOLI AND KIRA SCHABRAM. **A Guide to Conducting a Systematic Literature Review of Information Systems Research.** Available at SSRN 1954824, 2010. 51, 73, 74, 76, 78
- [256] JAN VOM BROCKE, ALEXANDER SIMONS, KAI RIEMER, BJOERN NIEHAVES, RALF PLAT-
TFAUT, AND ANNE CLEVEN. **Standing on the shoulders of giants: Challenges and recom-
mendations of literature search in information systems research.** *Communications of the
association for information systems*, **37**(1):9, 2015. 51
- [257] AZMAT ULLAH AND RICHARD LAI. **A systematic review of business and information
technology alignment.** *ACM Transactions on Management Information Systems (TMIS)*, **4**(1):1–
30, 2013. 51
- [258] BRIONY J OATES. *Researching information systems and computing.* Sage, 2005. 53
- [259] ROBERT K YIN. *Case study research: Design and methods*, **6**. Sage, 2017. 53, 54, 58, 72, 73, 74,
75, 78, 114, clxx, clxii
- [260] CLARE ATKINS AND JENNIFER SAMPSON. **Critical appraisal guidelines for single case
study research.** In *Proceedings of the 10th European Conference on Information Systems (ECIS)*.
Association for Information Systems. AIS Electronic Library (AISeL), 2002. 54
- [261] MARTYN DENSCOMBE. *The good research guide: For small-scale social research projects.*
McGraw-Hill Education (UK), 2017. 54, 58, 64, 65, 72, 74, 75, 76, 77, 78, clxx, clxii
- [262] GIDEON MEKONNEN JONATHAN, KING SOLOMON HAILEMARIAM, BEMENET KASAHUN
GEBREMESKEL, AND SILESHI DEMESIE YALEW. **Public Sector Digital Transformation:
Challenges for Information Technology Leaders.** In *2021 IEEE 12th Annual Information Tech-
nology, Electronics and Mobile Communication Conference (IEMCON)*, pages 1027–1033. IEEE,
2021. 56, 57, 105
- [263] GIDEON MEKONNEN JONATHAN AND JOSUE KUIKA WATAT. **Strategic alignment during
digital transformation.** In *European, Mediterranean, and Middle Eastern Conference on Infor-
mation Systems*, pages 657–670. Springer, 2020. 57, 79, 92
- [264] SONIA M OSPINA, MARC ESTEVE, AND SEULKI LEE. **Assessing qualitative studies in pub-
lic administration research.** *Public Administration Review*, **78**(4):593–605, 2018. 58
- [265] GEOFF WALSHAM. **Doing interpretive research.** *European journal of information systems*,
15(3):320–330, 2006. 58, 63, 74
- [266] JANE RITCHIE, JANE LEWIS, CAROL MCNAUGHTON NICHOLLS, RACHEL ORMSTON,
ET AL. *Qualitative research practice: A guide for social science students and researchers.* Sage,
2013. 58

- [267] ALEXANDER BOGNER, BEATE LITTIG, AND WOLFGANG MENZ. **Introduction: Expert interviews—An introduction to a new methodological debate.** In *Interviewing experts*, pages 1–13. Springer, 2009. 58
- [268] BARNEY G GLASER AND ANSELM L STRAUSS. *The discovery of grounded theory: Strategies for qualitative research*. Routledge, 2017. 59
- [269] JILL J FRANCIS, MARIE JOHNSTON, CLARE ROBERTSON, LIZ GLIDEWELL, VIKKI ENTWISTLE, MARTIN P ECCLES, AND JEREMY M GRIMSHAW. **What is an adequate sample size? Operationalising data saturation for theory-based interview studies.** *Psychology and health*, **25**(10):1229–1245, 2010. 59, 61
- [270] RICHARD E BOYATZIS. *Transforming qualitative information: Thematic analysis and code development*. sage, 1998. 62
- [271] VIRGINIA BRAUN AND VICTORIA CLARKE. *Thematic analysis*. American Psychological Association, 2012. 62, clx, clxiii
- [272] JENNIFER FEREDAY AND EIMEAR MUIR-COCHRANE. **Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development.** *International journal of qualitative methods*, **5**(1):80–92, 2006. 63
- [273] BENJAMIN F CRABTREE. *Doing qualitative research*. sage, 1999. 63
- [274] PETER R NEWSTED, SID L HUFF, AND MALCOLM C MUNRO. **Survey instruments in information systems.** *MIS quarterly*, **22**(4):553, 1998. 64
- [275] OU UGBOMHE AND AB DIRISU. **Organizational structure: Dimensions, determinants and managerial implication.** *International Journal of Economic Development Research and Investment*, **2**(2):10–18, 2011. 66
- [276] MARIELBA ZACARIAS AND PAULA VENTURA MARTINS. **Collaborative methods for business process discovery.** *Spatial and Organizational Dynamics Discussion Papers*, (7):45–55, 2011. 66, 98, 102
- [277] HARDEEP SINGH ANANT. **A Study of the Impact of Openness and Trust on the Quality of Interpersonal Relations within Organizations.** *International Journal of Recent Advances in Organizational Behaviour and Decision Sciences (IJRAOB)*, **1**(3), 2015. 66
- [278] PATRICIA J DAUGHERTY, HAOZHE CHEN, AND BRUCE G FERRIN. **Organizational structure and logistics service innovation.** *The International Journal of Logistics Management*, **22**(1):26–51, 2011. 66
- [279] MICHAEL D SICILIANO. **Professional networks and street-level performance: How public school teachers' advice networks influence student performance.** *The American Review of Public Administration*, **47**(1):79–101, 2017. 66, 98
- [280] P PANOS, B KLIEVINK, AND A CORDELLA. **Public value creation in digital government.** *Government Information Quarterly*, **36**(4):101421, 2019. 69
- [281] JOHANNES PENNINGNS. **Measures of organizational structure: A methodological note.** *American Journal of Sociology*, **79**(3):686–704, 1973. 69
- [282] HEUNGSUN HWANG, NARESH K MALHOTRA, YOUNGCHAN KIM, MARC A TOMIUK, AND SUNGJIN HONG. **A comparative study on parameter recovery of three approaches to structural equation modeling.** *Journal of Marketing research*, **47**(4):699–712, 2010. 70
- [283] KEN KWONG-KAY WONG. **Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS.** *Marketing Bulletin*, **24**(1):1–32, 2013. 70, 90, 99, 101

- [284] JOSEPH F HAIR, G TOMAS M HULT, CHRISTIAN M RINGLE, MARKO SARSTEDT, NICHOLAS PATRICK DANKS, AND SOUMYA RAY. **Partial least squares structural equation modeling (PLS-SEM) using R: a workbook**, 2021. 70, 76
- [285] JOSEPH F HAIR, JEFFREY J RISHER, MARKO SARSTEDT, AND CHRISTIAN M RINGLE. **When to use and how to report the results of PLS-SEM**. *European business review*, **31**(1):2–24, 2019. 70, 71, 76, 89, 90
- [286] JOE HAIR, CAROLE L HOLLINGSWORTH, ADRIANE B RANDOLPH, AND ALAIN YEE LOONG CHONG. **An updated and expanded assessment of PLS-SEM in information systems research**. *Industrial Management & Data Systems*, **117**(3):442–458, 2017. 70, 100
- [287] CHRISTIAN M RINGLE, SVEN WENDE, JAN-MICHAEL BECKER, ET AL. **SmartPLS 3**. *Boenningstedt: SmartPLS GmbH*, **584**, 2015. 70
- [288] JACOB COHEN. *Statistical Power analysis for the behavioral sciences*. Routledge, 2013. 71, 91, 101
- [289] MARIE-CLAUDE BOUDREAU, DAVID GEFEN, AND DETMAR W STRAUB. **Validation in information systems research: A state-of-the-art assessment**. *MIS Quarterly*, **25**(1):1, 2001. 72
- [290] JOHN W CRESSWELL. **Educational research: Planning, conducting, and evaluating quantitative and qualitative research**. *Lincoln: Pearson*, 2012. 72, 74, 77
- [291] ANOL BHATTACHERJEE. **Social science research: Principles, methods, and practices**. 2012. 72, 78
- [292] TRUDY CAMPBELL. **Technology, multimedia, and qualitative research in education**. *Journal of research on Computing in Education*, **30**(2):122–132, 1997. 102
- [293] NAHID GOLAFSHANI. **Understanding reliability and validity in qualitative research**. *The qualitative report*, **8**(4):597–607, 2003. 72, 74, 76
- [294] HEINZ KLEIN AND MICHAEL MYERS. **A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems**. *Management Information Systems Quarterly*, **23**(1):3, 1999. 72, 73, 74, 75, 76, 77
- [295] DETMAR STRAUB, MARIE-CLAUDE BOUDREAU, AND DAVID GEFEN. **Validation guidelines for IS positivist research**. *Communications of the Association for Information systems*, **13**(1):24, 2004. 72, 73, 74
- [296] BARBARA KITCHENHAM, RIALETTE PRETORIUS, DAVID BUDGEN, O PEARL BRERETON, MARK TURNER, MAHMOOD NIAZI, AND STEPHEN LINKMAN. **Systematic literature reviews in software engineering—a tertiary study**. *Information and software technology*, **52**(8):792–805, 2010. 73, 74, 76, 78
- [297] CLAES FORNELL AND DAVID F LARCKER. **Evaluating structural equation models with unobservable variables and measurement error**. *Journal of marketing research*, **18**(1):39–50, 1981. 73, 99, 100
- [298] R BURKE JOHNSON. **Examining the validity structure of qualitative research**. *Education*, **118**(2):282–292, 1997. 74
- [299] XIN ZHOU, YUQIN JIN, HE ZHANG, SHANSHAN LI, AND XIN HUANG. **A map of threats to validity of systematic literature reviews in software engineering**. In *2016 23rd Asia-Pacific Software Engineering Conference (APSEC)*, pages 153–160. IEEE, 2016. 74, 75, 76
- [300] DIANA CARTER AND SAMUEL PORTER. **Validity and reliability**. In *The Research Process in Nursing*, pages 29–42. Wiley-Blackwell Science, 4th edition, 2000. 75

- [301] RICK H HOYLE. *Structural equation modeling: Concepts, issues, and applications*. Sage, 1995. 76
- [302] MICHAEL D MYERS. *Qualitative research in business and management*. Sage, 2019. 77
- [303] JESSIE MCGOWAN AND MARGARET SAMPSON. **Systematic reviews need systematic searchers**. *Journal of the Medical Library Association*, **93**(1):74, 2005. 78
- [304] YASIR RASHID, AMMAR RASHID, MUHAMMAD AKIB WARRAICH, SANA SAMEEN SABIR, AND ANSAR WASEEM. **Case Study Method: A Step-by-Step Guide for Business Researchers**. *International Journal of Qualitative Methods*, **18**:1–13, 2019. 78, clix
- [305] JANE E FOUNTAIN. **The Virtual State: Transforming American Government?** *National Civic Review*, **90**(3):241–252, 2001. 80, 85
- [306] KENNETH KRAEMER AND JOHN LESLIE KING. **Information technology and administrative reform: will e-government be different?** *International Journal of Electronic Government Research (IJEGR)*, **2**(1):1–20, 2006. 80, 85
- [307] STEPHEN A WOODS, SARA AHMED, IOANNIS NIKOLAOU, ANA CRISTINA COSTA, AND NEIL R ANDERSON. **Personnel selection in the digital age: A review of validity and applicant reactions, and future research challenges**. *European Journal of Work and Organizational Psychology*, **29**(1):64–77, 2020. 80, 89
- [308] JAN JÖHNK, PHILIPP OLLIG, PATRICK RÖVEKAMP, AND SEVERIN OESTERLE. **Managing the complexity of digital transformation—How multiple concurrent initiatives foster hybrid ambidexterity**. *Electronic Markets*, pages 1–23, 2022. 83, 84, 105, 107
- [309] ATHANASIA POULOU DI. **Aspects of the stakeholder concept and their implications for information systems development**. In *Proceedings of the 32nd Annual Hawaii International Conference on Systems Sciences. 1999. HICSS-32. Abstracts and CD-ROM of Full Papers*, pages 17–pp. IEEE, 1999. 86
- [310] DIAN BALTA, VANESSA GREGER, PETRA WOLF, AND HELMUT KRCCMAR. **E-government stakeholder analysis and management based on stakeholder interactions and resource dependencies**. In *2015 48th Hawaii International Conference on System Sciences*, pages 2456–2465. IEEE, 2015. 86
- [311] PRITHVI BHATTACHARYA. **Modelling strategic alignment of business and IT through enterprise architecture: augmenting archimate with BMM**. *Procedia computer science*, **121**:80–88, 2017. 87
- [312] ALLEN C JOHNSTON AND MERRILL WARKENTIN. **Fear appeals and information security behaviors: An empirical study**. *MIS quarterly*, **34**(3):549–566, 2010. 99
- [313] RICHARD P BAGOZZI AND YOUJAE YI. **On the evaluation of structural equation models**. *Journal of the academy of marketing science*, **16**(1):74–94, 1988. 100
- [314] WYNNE W CHIN. **Commentary: Issues and opinion on structural equation modeling**, 1998. 101
- [315] SANJAY GOSAIN. **Enterprise information systems as objects and carriers of institutional forces: the new iron cage?** *Journal of the Association for Information Systems*, **5**(4):6, 2004. 102
- [316] KAREN SWAN, PETER SHEA, ERIC FREDERICKSEN, ALEXANDRA PICKETT, WILLIAM PELZ, AND GREG MAHER. **Building knowledge building communities: Consistency, contact and communication in the virtual classroom**. *Journal of Educational Computing Research*, **23**(4):359–383, 2000. 102
- [317] MONIDEEPA TARAFDAR AND SUFIAN QRUNFLEH. **Examining tactical information technology—business alignment**. *Journal of Computer Information Systems*, **50**(4):107–116, 2010. 102

- [318] ZHEN SHAO. **Interaction effect of strategic leadership behaviors and organizational culture on IS-Business strategic alignment and Enterprise Systems assimilation.** *International journal of information management*, **44**:96–108, 2019. 105, 106
- [319] CHARLES A O'REILLY, DAVID F CALDWELL, JENNIFER A CHATMAN, MARGARET LAPIZ, AND WILLIAM SELF. **How leadership matters: The effects of leaders' alignment on strategy implementation.** *The leadership quarterly*, **21**(1):104–113, 2010. 106
- [320] CAROLINE E OEHLHORN, CHRISTIAN MAIER, SVEN LAUMER, AND TIM WEITZEL. **Human resource management and its impact on strategic business-IT alignment: A literature review and avenues for future research.** *The Journal of Strategic Information Systems*, **29**(4):101641, 2020. 107
- [321] JAN RECKER. *Scientific research in information systems: a beginner's guide*. Springer, 2013. 111
- [322] JARED D HARRIS, SCOTT G JOHNSON, AND DAVID SOUDER. **Model-theoretic knowledge accumulation: The case of agency theory and incentive alignment.** *Academy of Management Review*, **38**(3):442–454, 2013. 111
- [323] ALLEN S LEE AND RICHARD L BASKERVILLE. **Generalizing generalizability in information systems research.** *Information systems research*, **14**(3):221–243, 2003. 113

Appendix A: Articles Included in the Literature Reviews

Literature Review 1 - Paper I

1. Abdolvand, N., & Sepehri, M. M. (2016). Antecedents of strategic information systems alignment in Iran. *Journal of Global Information Technology Management*, 19(2), 80-103.
2. Alaeddini, M., Asgari, H., Gharibi, A., & Rashidi Rad, M. (2017). Leveraging business-IT alignment through enterprise architecture—an empirical study to estimate the extents. *Information Technology and Management*, 18(1), 55-82.
3. Amarilli, F., Van Vliet, M., & Van Den Hooff, B. (2017). An explanatory study on the co-evolutionary mechanisms of business IT alignment. In *Proceedings of the 38th International Conference on Information Systems (ICIS)*, (pp. 1-22). AIS.
4. Avila, O., Goepf-Thiebaud, V., & Kiefer, F. (2018). Addressing alignment concerns into the design of domain-specific information systems. *Journal of Manufacturing Technology Management*, 29(5), 726-745.
5. Berghaus, S., & Back, A. (2016). Stages in digital business transformation: Results of an empirical maturity study. In *Proceedings of the 10th Mediterranean Conference on Information Systems (MCIS)*, p. 22. AIS
6. Bhattacharya, P. (2018). Aligning enterprise systems capabilities with business strategy: An extension of the strategic alignment model (SAM) using enterprise architecture. *Procedia Computer Science*, 138, 655-662.
7. Bhattacharya, P. (2017). Modelling strategic alignment of business and IT through enterprise architecture: augmenting architecture with BMM. *Procedia Computer Science*, 121, 80-88.
8. Bishop, W. A. (2017). Addressing The Challenge Of Strategic Alignment Faced By Small And Medium-Sized Entities During The Selection Of Accounting Software Packages. *International Business & Economics Research Journal (IBER)*, 16(1), 31-54.
9. Buchalcevova, A., & Pour, J. (2018). Business-IT Alignment within the Management of Business Informatics Model. In *Proceedings of the 20th International Conference on Enterprise Information Systems (ICEIS)*, pp. 696-703.
10. Câmara, A. L., Maria da Costa Figueiredo, R., & Canedo, E. D. (2018). Analysis of Conversation Competencies in Strategic Alignment between Business

Areas (External Control) and Information Technology Areas in a Control Body. *Information*, 9(7), 166.

11. Gajardo, P., & Ariel, L. P. (2019). The business-it alignment in the digital age. In *Proceedings of the 13th Mediterranean Conference on Information Systems (MCIS)*, p. 28. AIS

12. Haffke, I., Kalgovas, B., & Benlian, A. (2016). The Role of the CIO and the CDO in an Organization's Digital Transformation. In *Proceedings of the International Conference on Information Systems (ICIS)*, p. 3. AIS.

13. Hartl, E., & Hess, T. (2017). The Role of Cultural Values for Digital Transformation: Insights from a Delphi Study. In *Proceedings of the 23rd Americas Conference on Information Systems (AMCIS)*, p. 8. AIS.

14. Héroux, S., & Fortin, A. (2018). The moderating role of IT-business alignment in the relationship between IT governance, IT competence, and innovation. *Information Systems Management*, 35(2), 98-123.

15. Hinkelmann, K., Gerber, A., Karagiannis, D., Thoenssen, B., Van der Merwe, A., & Woitsch, R. (2016). A new paradigm for the continuous alignment of business and IT: Combining enterprise architecture modelling and enterprise ontology. *Computers in Industry*, 79, 77-86.

16. Imgharene, K., Doumi, K., & Baina, S. (2018, April). Toward a model of Agility and Business IT Alignment. In *Proceedings of the International Conference on Big Data, Cloud and Applications* (pp. 406-416). Springer, Cham.

17. Isal, Y. K., Pikarti, G. P., Hidayanto, A. N., & Putra, E. Y. (2016). Analysis of IT infrastructure flexibility impacts on IT-Business strategic alignment. *Journal of Industrial Engineering and Management (JIEM)*, 9(3), 657-683.

18. Issa, A., Hatiboglu, B., Bildstein, A., & Bauernhansl, T. (2018). Industrie 4.0 roadmap: Framework for digital transformation based on the concepts of capability maturity and alignment. *Procedia Cirp*, 72, 973-978.

19. Jackson, G. W., & Rahman, S. S. (2017). Security governance, management and strategic alignment via capabilities. In *Proceedings of the International Conference on Computational Science and Computational Intelligence (CSCI)* (pp. 44-49). IEEE.

20. Jelonek, D. (2018). Self-Assessment of the Maturity of Management Information Systems-Business Alignment. In *Proceedings of the 6th International Conference on Information Technology: IoT and Smart City* (pp. 235-239).

21. Jonathan, G. M. (2019, December). Digital transformation in the public sector: Identifying critical success factors. In *Proceedings of the European, Mediterranean, and Middle Eastern Conference on Information Systems* (pp. 223-235). Springer, Cham.

22. Jorfi, S., Nor, K. M., & Najjar, L. (2017). An empirical study of the role of IT flexibility and IT capability in IT-business strategic alignment. *Journal of Systems and Information Technology*, 19(1/2), 2-21.

- 23.** Katzy, B. R., Sung, G., & Crowston, K. (2016). Alignment in an inter-organisational network: the case of ARC transistance. *European Journal of Information Systems*, 25(6), 553-568.
- 24.** Kaur, G. J., & Nor, M. H. M. (2017). Revisiting strategic alignment maturity: Initial evaluation of Malaysian Technical Vocational Education and Training institutions. In *Proceedings of the IEEE Conference on e-Learning, e-Management and e-Services (IC3e)* (pp. 108-113). IEEE.
- 25.** Kivijärvi, H. (2018). Advancing Organizational Alignment Decisions: Insights from the Structural Alignment Theory to the Business-IT Alignment Problem. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, 9(1), 53-80.
- 26.** Kritikos, K., Laurenzi, E., & Hinkelmann, K. (2017). Towards business-to-IT alignment in the cloud. In *Proceedings of the European Conference on Service-Oriented and Cloud Computing* (pp. 35-52). Springer, Cham.
- 27.** Kude, T., Lazic, M., Heinzl, A., & Neff, A. (2018). Achieving IT-based synergies through regulation-oriented and consensus-oriented IT governance capabilities. *Information Systems Journal*, 28(5), 765-795.
- 28.** László, K., András, N., Ákos, O., & András, S. (2017). Structuration theory and strategic alignment in information security management: Introduction of a comprehensive research approach and program. *AARMS-Academic and Applied Research in Military and Public Management Science*, 16(1), 5-16.
- 29.** Li, W., Liu, K., Belitski, M., Ghobadian, A., & O'Regan, N. (2016). e-Leadership through strategic alignment: An empirical study of small-and medium-sized enterprises in the digital age. *Journal of Information Technology*, 31(2), 185-206.
- 30.** Liang, H., Wang, N., Xue, Y., & Ge, S. (2017). Unraveling the alignment paradox: how does business—IT alignment shape organizational agility?. *Information Systems Research*, 28(4), 863-879.
- 31.** Malta, P., & Sousa, R. D. (2016). Process oriented approaches in enterprise architecture for business-IT alignment. *Procedia Computer Science*, 100, 888-893.
- 32.** Manfreda, A., & Štemberger, M. I. (2018). Establishing a partnership between top and IT managers: A necessity in an era of digital transformation. *Information Technology & People*, 32(4), 948-972.
- 33.** Moon, Y. J., Choi, M., & Armstrong, D. J. (2018). The impact of relational leadership and social alignment on information security system effectiveness in Korean governmental organizations. *International Journal of Information Management*, 40, 54-66.
- 34.** Muzira, T., & Erasmus, L. D. (2016). Narrative enquiry into service excellence in uncertainty: Contributions of business and information technology strategic alignment in zimbabwe. In *Proceedings of the International Conference on Management of Engineering and Technology (PICMET)* (pp. 1867-1877). IEEE.
- 35.** Nicho, M., & Khan, S. (2017). IT governance measurement tools and its ap-

plication in ITbusiness alignment. *Journal of International Technology and Information Management*, 26(1), 81-111.

36. Ohlsson, J., Han, S., Hultin, M., & Rosengren, B. (2016). How to Achieve Sustainable Business IT Alignment–Designing a Circular Organizational Structure at SAAB. In *Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 5116-5125). IEEE.

37. Óri, D., & Szabó, Z. (2018). Discovering and Analyzing Alignment Problems in a Public Organization. In *Proceedings of the International Conference on Electronic Government and the Information Systems Perspective* (pp. 71-85). Springer, Cham.

38. Panda S., Rath, S. K. (2018). Strategic IT-business alignment and organisational agility: From a developing country perspective. *Journal of Asia Business Studies*, 12(4), 422-440.

39. Queiroz, M.(2017). Mixed results in strategic IT alignment research: A synthesis and empirical study. *European Journal of Information Systems*, 26(1), 21-36.

40. Queiroz, M., Coltman, T., Tallon, P., Sharma, R., & Reynolds, P. (2018). The complementarity of corporate IT alignment and business unit IT alignment: An analysis of their joint effects on business unit performance. In *Proceedings of the 51st Hawaii International Conference on System Sciences (HICSS)*, pp. 4901-4910.

41. Rahimi, F., Møller, C., & Hvam, L.(2016). Business process management and IT management: The missing integration. *International Journal of Information Management*, 36(1), 142-154.

42. Ritola, I., Siugzda, R., & Rusu, L. (2016). The influence of organizational politics on business-IT alignment. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, 7(2), 33-48.

43. Schmidt, J., Drews, P., & Schirmer, I. (2017). Digitalisation of the banking industry: A multiple stakeholder analysis on strategic alignment. In *Proceedings of the 23rd International Conference on Information Systems (ICIS)*, p. 27. AIS.

44. Senja, N.R.P., & Pharmasetiawan, B.(2017). Assessing the relationship among alignment business and information technology, organisation culture, and information technology effectiveness. In *Proceedings of the International Conference on ICT For Smart Society (ICISS)*, pp. 1-5. IEEE

45. Shao, Z., Wang, T., & Feng, Y. Q. (2016). Impact of IS-business strategic alignment and environmental uncertainty on enterprise systems assimilation. In *Proceedings of the International Conference on Management Science and Engineering (ICMSE)* (pp. 1511-1517). IEEE.

46. Shihab, M.R., & Rahardian, I.(2017). Comparing the approaches of small, medium, and large organisations in achieving IT and business alignment. *International Journal of Business Information Systems*, 24(2), 227–241.

47. Street, C.T., Gallupe, B., & Baker, J.(2017). Strategic alignment in SMEs: Strengthening theoretical foundations. *Communications of Association for Infor-*

tion Systems, 40(1), 420-442.

48. Street, C., Gallupe, B., & Baker, J. (2018). The influence of entrepreneurial action on strategic alignment in new ventures. *Journal of Strategic Information Systems*, 27(1), 59-81.

49. Sun, L., Liu, K., Jambari, D. I., & Michell, V. (2016). Evaluating business value of IT towards optimisation of the application portfolio. *Enterprise Information Systems*, 10(4), 378-399.

50. Tu, C. Z., Yuan, Y., Archer, N., & Connelly, C. E. (2018). Strategic value alignment for information security management: a critical success factor analysis. *Information & Computer Security*, 26(2), 150-170.

51. Turel, O., Liu, P., & Bart, C. (2017). Board-level information technology governance effects on organizational performance: The roles of strategic alignment and authoritarian governance style. *Information Systems Management*, 34(2), 117-136.

52. Wetering, R. V. D. (2016). Modeling alignment as a higher order nomological framework. In *Proceedings of the International Conference on Business Information Systems* (pp. 111-122). Springer, Cham.

53. van de Wetering, R., Mikalef, P., & Pateli, A. (2018). Strategic alignment between IT flexibility and dynamic capabilities: An empirical investigation. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, 9(1), 1-20.

54. Vollmar, J., & Horn, S. (2016). Data driven strategy implementation in engineering: Strategic alignment of improvement projects. In *Proceedings of the IEEE International Symposium on Systems Engineering (ISSE)* (pp. 1-4). IEEE.

55. Wagner, H. T., & Meshtaf, J. (2016). Individual IT Roles in Business-IT Alignment and IT Governance. In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 4920-4929). IEEE.

56. Walser, K., Weibel, D., Wissmath, B., Enkerli, S., Bigler, N., & Topfel, M. (2016). Business-IT Alignment In Municipalities: The Swiss Case. In: *Proceedings of the 22nd Americas Conference on Information Systems (AMCIS)*, p. 2. AIS.

57. Wang, J., & Rusu, L. (2018). Factors hindering business-IT alignment in small and medium enterprises in China. *Procedia Computer Science*, 138, 425-432.

58. Wonges, F., Zijlmans, J., & Santoso, L. W. (2017). The alignment of IT and business strategy at ROC leeuwenborgh. In *Proceedings of the International Conference on Soft Computing, Intelligent System and Information Technology (ICSIT)*, (pp. 208-213). IEEE.

59. Yeow, A., Soh, C., & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *Journal of Strategic Information Systems*, 27(1), 43-58.

60. Zhang, N., & Liu, B. (2018). The key factors affecting RPA-business alignment. In *Proceedings of the 3rd International Conference on Crowd Science and Engineering* (pp. 1-6).

- 61.** Zhou, J., Bi, G., Liu, H., Fang, Y., & Hua, Z. (2018). Understanding employee competence, operational IS alignment, and organizational agility—An ambidexterity perspective. *Information & Management*, 55(6), 695-708.
- 62.** Zikra, I. (2016). The communicative nature of information systems integration as an enabler for business IT alignment. In *Proceedings of the International Conference on Business Information Systems* (pp. 136-147). Springer, Cham.

Literature Review 2 - Paper II

1. Benbya, H., & McKelvey, B. (2006). Using coevolutionary and complexity theories to improve IS alignment: A multi-level approach. *Journal of Information Technology*, 21(4), 284-298.
2. Bergeron, F., Raymond, L., & Rivard, S. (2001). Fit in strategic information technology management research: An empirical comparison of perspectives. *Omega*, 29(2), 125-142.
3. Bergeron, F., Raymond, L., & Rivard, S. (2004). Ideal patterns of strategic alignment and business performance. *Information & Management*, 41(8), 1003-1020.
4. Broadbent, M., & Weill, P. (1993). Improving business and information strategy alignment: Learning from the banking industry. *IBM systems Journal*, 32(1), 162-179.
5. Brown, C. V., & Magill, S. L. (1994). Alignment of the IS Functions with the Enterprise: Toward a Model of Antecedents. *MIS Quarterly*, 18(4), 371-403.
6. Campbell, B., Kay, R., & Avison, D. (2005). Strategic alignment: a practitioner's perspective. *Journal of Enterprise Information Management*, 18(6), 653-664.
7. Chan, Y. E. (2008). Why haven't we mastered alignment? The importance of the informal organization structure. *MIS Quarterly Executive*, 1(2), 97-112.
8. Chatzoglou, P. D., Diamantidis, A. D., Vraimaki, E., Vranakis, S. K., & Kourtidis, D. A. (2011). Aligning IT, strategic orientation and organizational structure. *Business Process Management Journal*, 17(4), 663-687.
9. Chen, C. J. (2007). Information technology, organizational structure, and new product development—the mediating effect of cross-functional team interaction. *IEEE Transactions on Engineering Management*, 54(4), 687-698.
10. Currie, W. L. (1996). Organizational structure and the use of information technology: Preliminary findings of a survey in the private and public sector. *International Journal of Information Management*, 16(1), 51-64.
11. Fiedler, K. D., Grover, V., & Teng, J. T. (1996). An empirically derived taxonomy of information technology structure and its relationship to organizational structure. *Journal of Management Information Systems*, 13(1), 9-34.
12. Gallagher, K. P., & Gallagher, V. C. (2012). Organizing for post-implementation ERP: A contingency theory perspective. *Journal of Enterprise Information Management*, 25(2), 170-185.
13. Hu, Q., & Huang, C. D. (2006). Using the balanced scorecard to achieve sustained IT-business alignment: A case study. *Communications of the Association for Information Systems*, 17(1), 181-204.
14. Jarvenpaa, S. L., & Ives, B. (1993). Organizing for global competition: The fit of information technology. *Decision sciences*, 24(3), 547-580.
15. Jordan, E., & Tricker, B. (1995). Information strategy: alignment with organization structure. *The Journal of Strategic Information Systems*, 4(4), 357-382.
16. Knoll, K., & Jarvenpaa, S. L. (1994). Information technology alignment or "fit" in highly turbulent environments: the concept of flexibility. In *Proceedings of the computer personnel research conference on Reinventing IS: managing information technology in changing organizations* (pp. 1-14).
17. Lahdelma, P. (2010, December). The effect of formal and informal intraorganizational structures on the perceived strategic IT-business alignment. In *Pro-*

ceedings of the European Conference on Information Systems (ECIS), p. 131. AIS.

18. Lee, S., & Leifer, R. P. (1992). A framework for linking the structure of information systems with organizational requirements for information sharing. *Journal of Management Information Systems*, 8(4), 27-44.

19. Lee, A., Cheng, C. H., & Chadha, G. S. (1995). Synergism between information technology and organizational structure: A managerial perspective. *Journal of Information Technology*, 10(1), 37-43.

20. Leifer, R. (1988). Matching computer-based information systems with organizational structures. *MIS Quarterly*, 12(1), 63-73.

21. Levy, M., Powell, P., & Yetton, P. (2011). Contingent dynamics of IS strategic alignment in small and medium-sized enterprises. *Journal of systems and information technology*, 13(2), 106-124.

22. Luftman, J., & Kempaiah, R. (2007). An Update on Business-IT Alignment: "A Line" Has Been Drawn. *MIS Quarterly Executive*, 6(3), 165-177.

23. Ohlsson, J., Han, S., Hultin, M., & Rosengren, B. (2016). How to Achieve Sustainable Business IT Alignment—Designing a Circular Organizational Structure at SAAB. In *Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 5116-5125). IEEE.

24. Preston, D. S., & Karahanna, E. (2009). Antecedents of IS strategic alignment: A nomological network. *Information systems research*, 20(2), 159-179.

25. Ravishankar, M. N., Pan, S. L., & Leidner, D. E. (2011). Examining the strategic alignment and implementation success of a KMS: A subculture-based multilevel analysis. *Information Systems Research*, 22(1), 39-59.

26. Raymond, L., Pare, G., & Bergeron, F. (1995). Matching information technology and organizational structure: An empirical study with implications for performance. *European Journal of Information Systems*, 4(1), 3-16.

27. Sha, X., Cheng, Y., Pan, S., & Yen Teoh, S. (2011). The implementation success of healthcare information systems: A business-IT alignment perspective. In *Proceedings of the European Conference on Information Systems (ECIS)*, p. 29. AIS.

28. Silva, L., & Hirschheim, R. (2007). Fighting against windmills: Strategic information systems and organizational deep structures. *MIS Quarterly*, 31(2), 327-354.

29. Walentowitz, K., Beimborn, D., & Weitzel, T. (2010). The Influence of Social Structures on Business/IT Alignment. *Sprouts: Working Papers on Information Systems*, 10 (72), 1-36.

30. Yayla, A., & Hu, Q. (2009). Antecedents and drivers of IT-business strategic alignment: Empirical validation of a theoretical model. In *Proceedings of the European Conference on Information Systems (ECIS)*, p. 56. AIS.

31. Yusof, M. M., Kuljis, J., Papazafeiropoulou, A., & Stergioulas, L. K. (2008). An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit). *International Journal of Medical Informatics*, 77(6), 386-398.

Appendix B: Interview Guides and Informed Consent Forms

For the two qualitative case studies, interview guides containing a set of semi-structured interview questions were used. Before each interview, participants were provided with brief background information about the case studies, the aim of the study, and how the data was collected and how the results of the studies would be used. Finally, they were asked to sign an informed consent form. The blank consent forms used for the two case studies appear after the corresponding interview guides.

Case Study 1 - Paper III

General information

1. Would you please state your name and your current position?
2. How long have you worked in your current capacity?
3. What is your academic and professional background?
4. What does your job entail?

Formal organisational structure

5. Can you describe how the municipality is organised?
6. How is IT organised, as a separate unit with own hierarchy or integrated?
7. How many employees do you have (IT, administration staff)?

IT alignment (communications, dynamic IT scope), informal organisational structure

8. How are the strategic plans communicated to IT and administrative staff?
9. How formal are the communications between IT and other units?
10. How informed are you about the overall goal of your organisation?
11. What is the administration's awareness of IT's role in the municipality?
12. How informed are you about IT and its role?
13. What about IT staff awareness of the overall organisational goals?
14. How flexible are the working arrangements and knowledge sharing?

IT alignment (partnering, dynamic IT scope)

15. In your opinion, how important is IT for your organisation?
16. How do you characterise your organisation's view of IT?
17. How do the administrative leaders perceive IT and the role it plays in organisational performance?

18. How do the IT leaders view IT and the role it plays on organisational performance?
19. Have the views that employees and administrative/business leaders have of IT changed over time? If so, how?

IT alignment (value analytics)

20. How is the contribution of IT measured?
21. Do you have service level agreements?

IT alignment (communications, dynamic IT scope, skills development)

22. In your opinion, how conversant are the administrative/business leaders with IT?
23. Do you think leaders know, for instance, how IT works, how much IT costs, or what challenges, opportunities IT brings?
24. Do you have formal training, incentive and skills development arrangement for the employees?

IT alignment (communications, IT governance, partnering, dynamic IT scope)

25. Who is involved in formulating the administrative plans?
26. How involved are you?
27. Do you have a separate IT strategic plan at your organisation?
28. If so, who is involved in formulating the IT strategic plan?
29. How involved are the administrative leaders?
30. Are the two strategic plans formulated together?
31. If not, which comes first?
32. Whose responsibility is it to correctly implement the IT strategic plan?
33. What happens if one of the strategic plans changes?
34. Do you recall an instance where both IT and the overall organisational strategy changed?
35. How long are the strategic plans for? Five years, or more or less?
36. How smooth is the relationship between IT and administration staff?

IT alignment

37. Do you think IT and administration are aligned at your organisations?
38. Can you think of factors that might have contributed to the current degree of alignment at the municipality?
39. Is there anything you want to add?

Date: _____

INFORMED CONSENT FORM

Thank you for agreeing to take part in this research which attempts to explore the issues of IT alignment in public organisations. The researcher is Gideon Mekonnen Jonathan, a PhD candidate at the Department of Computer and Systems Sciences (DSV), Stockholm University.

IT alignment refers to the appropriate application of IT in such a way that it supports the overall organisational objective. Organisations with IT aligned position are better equipped to add value derived from their investment in IT. However, achieving and maintaining IT alignment is dependent on various factors. The aim of this study is to investigate one of these factors that influence IT alignment in public organisations, organisational structure.

The data for this study will be collected through interviews which will be recorded in audio. The audio file, which will be stored in a safe place, will only be used to transcribe the answers given and will be deleted no later than four weeks after the interview took place. The transcript will be sent to you by email to make sure your responses are accurately captured. You may at any time withdraw from participation should you no longer wish to take part in this study. The information gathered during the study will be used for the preparation of scientific articles that will become public once published. However, any information that could be used to identify your identity will not be revealed.

By signing this form, you acknowledge that you have read and understood the information in this form and agree to take part in this study.

Participant/position: _____

Signature _____

Researcher _____

Signature _____

Thank you for your participation!

Department of Computer and Systems Sciences

Stockholm University
Post Box 7003
SE-164 07 Kista
SWEDEN

Visiting address:
Borgarfjordsgatan 12
Kista
www.dsv.su.se

Phone: +46 076 085 44 34
Telefax: +46 8 703 90 25
Email: gideon@dsv.su.se

Figure 5.1: Informed Consent Form used in case study 1 (Paper III).

Case Study 2 - Paper V

General information

1. Would you please state your name and your current position?
2. How long have you worked in your current capacity?
3. What is your academic and professional background?
4. What does your job entail?

Organisational settings

5. Can you explain how your organisation is structured?
6. How many employees/departments do you have?
7. Where is the IT unit placed in the organisation chart?
8. How strict or flexible are your job descriptions?
9. How do you characterise the acceptance of change in your organisation?
10. How long is the decision making process at your organisation?
11. To what extent are employees encouraged to look for new ways of solving problems?
12. How is innovation viewed in your organisation, and are IT and new digital technologies used for innovation?

Success factors related to IT alignment and digital transformation

13. In your opinion, how is the organisation aligning IT with the overall organisational goals?
14. What do you think is important to affect the appropriate and timely use of IT at your organisation?
15. What do you think supports/hinders the appropriate use of IT?
16. Is digital transformation an important agenda for your organisation?
17. How are digital transformation and appropriate use of IT related?
18. How do you characterise the digital transformation in your organisation and the rate of success in meeting your needs?
19. Do you think your organisation is doing what is necessary to succeed in its digital transformation endeavours?
20. If there are things that needs to be changed or improved to realise the benefits of digital transformation, what would they be?
21. Can you think of any challenges that makes digital transformation difficult for your organisation?
22. What are the anticipated results, outcomes or impacts of digital transformation at your organisation?
23. What are the reasons for your organisation to embark on its digital transformation journey?
24. What do you think needs to be done to improve the organisational performance through digital transformation?

IT alignment (communications, IT governance, dynamic IT scope)

25. Are you aware of any strategic IT/ digital transformation plans?
26. Do you have a separate IT strategy at your organisation or is it included in the overall organisational strategy?

27. How involved are the IT leaders in the overall strategic planning?
28. How are IT priorities set and decisions regarding IT made at your organisation?
29. Do you think leaders in other departments are familiar with the number of IT systems and how IT can be invaluable to support your organisation?
30. How flexible is the IT system in accommodating new organisation needs?
31. How flexible is the organisational structure in accommodating new technologies and business processes?
32. Do you think your organisation has employees with the necessary skill sets to learn and use new technologies?
33. How well do you think IT personnel understands other departments and vice-versa?

IT alignment (skills development, partnering, digital metrics and analytics)

34. How is IT viewed in your organisation (a strategic partner, support or service provider)?
35. How involved are the IT leaders in important strategic decisions at your organisation?
36. How do you measure the contribution of IT at your organisation?
37. Do you use digital metrics to measure organisational performance?
38. Who is involved in formulating the digital metrics used to measure organisation performances?
39. How do you characterise the relationship between leaders in the IT and other departments?
40. How do you rate the IT skills level of the employees at your organisation?
41. To what extent do you think the IT employees are committed to supporting other departments?
42. What arrangements are there in place to help employees develop their skills in using new technologies?
43. Are there formal incentives and skills development programmes?
44. Is there anything you want to add?

Date: _____

INFORMED CONSENT FORM

Thank you for agreeing to take part in this research which attempts to study IT alignment and digital transformation in public organisations. The researcher is Gideon Mekonnen Jonathan, a PhD candidate at Stockholm University.

IT alignment, which refers to the appropriate application of IT to support the overall organisational objective, is one of the prerequisites for successful digital transformation. However, achieving and maintaining IT alignment is a challenging endeavour for many organisations. The aim of this study is to investigate the current state of IT alignment and digital transformation in public organisations.

The data for the study will be collected through interviews, surveys and analysis of internal organisational documents. The interviews will be recorded for transcription purposes. The audio file will be deleted after the transcription, no later than four weeks after the interview took place. Copy of the transcript will be sent to you by email to confirm your responses are accurately captured. You may at any time withdraw from participation should you no longer wish to take part in this study. The information gathered during the study will be used for the preparation of scientific articles that will become public once published. However, any information that could be used to identify your identity may not be revealed if you want to maintain anonymity.

By signing this form, you acknowledge that you have read and understood the information in this form and agree to take part in this study.

Participant and position: _____

Signature _____

Researcher _____

Signature _____

Thank you for your participation!

Department of Computer and Systems Sciences

Stockholm University
Post Box 7003
SE-164 07 Kista
SWEDEN

Visiting address:
Borgarfjordsgatan 12
Kista
www.dsv.su.se

Phone: +46 076 085 44 34
Telefax: +46 8 703 90 25
Email: gideon@dsv.su.se

Figure 5.2: Informed Consent Form used in case study 2 (Paper V).

Appendix C: Survey Instruments

Online survey questionnaires were used to collect data for all quantitative studies (Paper IV and Paper VI). To test the theoretical models, all constructs, **marked in bold italics**, were measured with a number of items adopted from the extant literature. A single statement was formulated for each of the measurement items. Respondents were then asked to rate the statements using a seven-point Likert scale (7 - strongly agree, 6 - agree, 5 - somewhat agree, 4 - neutral, 3 - somewhat disagree, 2 - disagree, 1 - strongly disagree). The Google Forms (with online questionnaire samples) are also displayed.

Survey 1 - Paper IV

1. IT alignment (ITA)

ITA1: The IT and administration units have a shared understanding of how IS can be used to meet our organisation's goals.

ITA2: We have a flexible IT department capable of meeting the current and future IT needs of our organisation.

ITA3: We have an effective IT decision making structure in our organisation.

ITA4: IT is viewed as a partner to the other departments in our organisation.

ITA5: We have well-developed skills development plans and activities.

ITA6: We have metrics to measure the contribution of IT in our organisation.

2. Centralised organisational structure (COS)

COS1: The COS has made organisational learning possible with consideration of the entire municipality.

COS2: The COS has made it possible to have fair IT prioritisation across departments in the municipality.

COS3: The COS is necessary to include a well-established administration strategy in the municipality.

COS4: The COS is necessary to have effective IT budgeting.

3. Interpersonal relationships (IPR)

IPR1: IPR helps to make protocols flexible and their interpretations favourable.

IPR2: IPR speeds up IT reporting procedures.

IPR3: IPR helps the municipality as it fosters a social and trusting environment.

4. Professional networks (PRN)

PRN1: PRN helps with liaison between IT and other departments through their networks.

PRN2: PRN is instrumental in informed IT investment decisions.

PRN3: PRN helps to champion and support IT initiatives through their networks.

5. Cross-departmental relationships (CDR)

CDR1: CDR helps to improve knowledge sharing between the IT and other departments.

CDR2: CDR makes it possible for other departments to view IT as a partner, not a service provider.

CDR3: CDR is necessary to make IT flexible and to meet the current and future IT needs of other departments in the municipality.

 **Stockholm University**

Section 1 of 3

IT/Administrative Employees survey

Dear Participant,


Thank you for considering to take part in this study which attempts to investigate the influence of organisational structure on IT alignment. The researcher is Gideon Mekonnen Jonathan, a PhD candidate at the Department of Computer and Systems Sciences (DSV), Stockholm University.

IT alignment refers to the appropriate application of IT in such a way that it supports the overall organisational objective. The aim of the study is to investigate the different types of working arrangements, relationships and organisational structure within the municipality and their influence on IT alignment.

The survey is intended for municipality employees, with the exception of department heads. All answers are collected anonymously and will only be used for this study. The 19 questions ask you to give a score to statements on the organisational structure as well as different forms of relationships at your municipality. You may be expected to choose from seven scores ranging from 'strongly agree' to 'strongly disagree' based on your assessment of the current situation at the municipality.

Participation is voluntary and takes about 8 minutes. You can, at any time, withdraw from participation. By proceeding to answer the questions, and completing the survey, you acknowledge that you understood the information provided and agree to participate in this study.

For more information, please contact Gideon Mekonnen Jonathan: gideon@dsv.su.se

Do you work  municipality? *

Yes

No

The IT and administration units have a shared understanding of how IS can be used to meet our organisation's goals. *

1. Strongly disagree

Figure 5.3: Google Online Survey Form used in survey 1 (Paper IV).

Survey 2 - Paper VI

1. Digital Transformation Success (DTS)

DTS1: The digital transformation in our organisation has resulted in improved operational efficiency.

DTS2: Our work towards digital transformation has helped us improve our relationships with other public institutions, citizens, and suppliers.

DTS3: Digital transformation in our organisation has resulted in added value for citizens.

2. IT alignment (ITA)

ITA1: We have well-developed skills development plans and activities.

ITA2: We have a flexible IT department capable of meeting the current and future IT needs of our organisation.

ITA3: We have an effective IT decision-making structure in our organisation.

ITA4: IT is viewed as a partner to the other departments in our organisation.

ITA5: The IT and administration units have a shared understanding of how IS can be used to meet our organisation's goals.

ITA6: We have metrics to measure the contribution of IT in our organisation.

3. Digital metrics (DMT)

DMT1: Our organisation has established metrics to account for the outputs as a result of investment in IT.

DMT2: We have established metrics to account for the direct and indirect impacts of our organisation on the public service, as a result of IT use.

DMT3: Our organisation has established metrics to measure the outcomes as a result of investment in IT.

4. External domain alignment (EDA)

EDA1: We have managed to streamline our IT infrastructure and processes with our partners and collaborators.

EDA2: Our partners and collaborating organisations seem to have a similar affinity towards adoption of technology, embracing change and innovative solutions.

EDA3: As a public institution, our collaborators and partners also operate under strict regulation and accountability.

5. Human resources management (HRM)

HRM1: We have a hiring practice that attracts the best employees with skill sets to meet current and future challenges.

HRM2: We have a performance appraisal system to recognise and reward employees' learning and innovation efforts.

HRM3: We have a systematic approach to identify, create and share knowledge within our organisation.

6. Leadership skills (LSK)

LSK1: Our leaders have the conversational skills to bring internal and external stakeholders together to embrace the adoption of technology to create value.

LSK2: Our leaders have good understanding of digital tools and the potentials of emerging technologies for our organisation.

LSK3: Our leaders possess skills to intellectually stimulate and encourage employees to challenge the status quo.

7. Organisational agility (OAG)

OAG1: We have an IT infrastructure that can accommodate reorganisation of IT resources and integration of new technologies as quickly as needed.

OAG2: We have competent human resources aligned with our organisation needs that can be assigned different roles as quickly as needed.

OAG3: We have learning and knowledge management arrangements that can mobilise and train employees as quickly as needed.

8. Organisational culture (ORC)

ORC1: Our organisation promotes change and the adoption of new technologies.

ORC2: There is acceptance of failure among leaders and employees are encouraged to take measured risks.

ORC3: We use new technologies to search for innovative solutions.

9. Organisational structure (OST)

OST1: Centralisation of common services at our organisation has facilitated good coordination and efficient use of resources.

OST2: The reduced hierarchy in our organisation enables quick decisions, making the processes short.


OST3: The formalised structure of our organisation facilitates coordination and accountability while reducing redundancy.

10. Stakeholder relationships (SRL)

SRL1: Our organisation collaborates well with other public institutions.

SRL2: Citizens participate in discussions on major investment decisions.

SRL3: Our organisation considers suppliers as partners.

 **Stockholm University**

Section 1 of 3

IT Alignment and Digital Transformation in the Public Sector: Survey

Dear Participant,

Thank you for considering to take part in this study which attempts to explore the relationship between IT alignment and digital transformation success. The researcher is Gideon Mekonnen Jonathan, a PhD candidate at the Department of Computer and Systems Sciences (DSV), Stockholm University.

IT alignment refers to the appropriate application of IT in such a way that it supports the overall organisational objective. The aim of the study is to explore the factors related to IT alignment and if these factors are also relevant to the digital transformation success in public organisations.

The survey is intended for those who have an understanding and are involved in digital transformation and IT management decision making. All answers are collected anonymously and will only be used for this study. The 33 questions ask you to give a score to statements about different aspects related to IT alignment and digital transformation. You are expected to choose from seven scores ranging from 'strongly agree' to 'strongly disagree' based on your assessment of the current situation at your organisation.

Participation is voluntary and takes between 15 and 20 minutes. You can, at any time, withdraw from participation. By proceeding to answer the questions, and completing the survey, you acknowledge that you understood the information provided and agree to participate in this study.

For more information, please contact Gideon Mekonnen Jonathan: gideon@dsv.su.se

Which type of public organisation do you work for? *

- Regional government
- City administration
- Ministry
- Public University
- Justice
- Other
- I do not work at a public organisation

...

Which of the following leadership positions describe your position best? *

- Executive
- City administration
- Middle Management
- Team Leader
- Other
- I do not have a leadership position

Figure 5.4: Google Online Survey Form used in survey 2 (Paper VI).

Appendix D: Case Study Protocols

The contents of the case study protocols prepared for the two case studies, according to Rahid et al. [304], are presented here.

Case Study 1 - Paper III

Research question

How can the formal and informal organisational structures influence IT alignment and its maturity in a public organisation? In order to answer the research question, the case study first attempts to investigate the various forms of formal and informal organisational structure in a public organisation. Establishing the degree of IT alignment maturity was also invaluable to determine the influence of organisational structure on IT alignment.

Central concepts

IT alignment, the six IT alignment dimensions and corresponding attributes, formal organisational structure, informal organisation structure.

Important literature

Three sets of literature were used for the study. The following are the primary sources of conceptualisation guiding the study.

1. IT alignment and IT alignment maturity [7; 19; 37; 132].
2. Organisational structure [188; 190; 191; 217].
3. Research methodology [259–261].

Case Organisation

A single case study was deemed appropriate to gain a deeper insight into the relationship between the various organisational structure forms and IT alignment. Thus, a mid-size Swedish municipality was selected for the study. The Municipality was selected as it is known to be among the most ambitious public institutions, and is recognised for its major investments in digital transformation and public service delivery.

Research methods

Data collection methods: The principle of multiple sources of evidence, as recommended by Yin [259] was adopted for this study. Thus, interviews were the primary sources of data. Ten interviews (four at strategic, four at tactical, and two at operational levels). The interviews were conducted face-to-face in the vicinity of the municipality in March 2018. The following internal organisa-

tional documents were also obtained to enrich the interview data, i.e., organisational chart for the whole municipality, an organisational chart for departments and enterprises, IT organisational structure, IT Governance model, the municipality's and IT unit's strategic plan.

Sampling strategy: Purposive sampling (only those with experience and knowledge to contribute to the study). Interviewees came from both the IT department and the various administrative departments. No more than ten interviews were necessary to reach data saturation.

Interview guide: For consistency and reliability, an interview guide with 39 questions was used. The questions captured information about the participants, formal and informal organisational structure forms, and the six IT alignment dimensions according to SAMM.

Data analysis method: The interviews were transcribed manually, and notes were checked during the transcriptions. Theme generation was similar for the interview transcription and the internal documents obtained. A hybrid approach incorporating both inductive and deductive coding was adopted. The six thematic analysis steps by Braun and Clarke [271] were followed. First, the formal and informal organisational structures were identified and categorised. Second, these organisational structure forms were linked with the various IT alignment dimensions.

Permission seeking

Permission was obtained in two levels. First, the CIO of the case organisation was contacted to request consent for the study and ensure the municipality provided the right organisational setting for the study. Second, the interviewees of the study were provided with sufficient information to make an informed decision about their participation in the study.

Ethical considerations

To meet the ethical considerations for studies with human subjects, the following four steps were taken.

1. The case organisation was not mentioned in the final report.
2. The privacy and confidentiality of participants were protected during and after the study.
3. Participants were provided with informed consent forms.
4. There was complete transparency throughout the whole research process and participants were provided with accurate and clear information about their participation and what it entailed.

Interpretation process

After the final themes were generated, the next step was to interpret the connections and categories. Consulting with seminal organisational studies literature and prior IT alignment studies, as well as the IT alignment maturity results, all

the analysis were integrated to reveal how various organisational structure forms influence IT alignment.

Criteria for assessment

The case study applied an interpretivist approach to scientific enquiry. Thus, to ensure the quality of research, the four common criteria were adhered to, i.e., construct validity, internal validity, external validity and reliability. For construct validity, data triangulation with multiple sources of evidence and data validation was applied. To improve internal validity, sufficient detail about the study (sources of data and the model used) was provided. Detailed case study settings and findings were provided to help readers make decisions on the generalisability of the study (external validity). By describing the research process in detail (including the interview guides and data analysis and interpretation procedures) and providing motivations for the choices, the study addresses the issue of reliability.



Case Study Protocol

IT Alignment and Organisational Structure in Public Organisations

Research Question	<p>Main Research Question: How can the formal and informal organisational structures influence IT alignment and its maturity in a public organisation?</p> <p>To answer the main research question, the following research subquestions were derived.</p> <ol style="list-style-type: none"> 1. Which formal and informal organisational structure forms exist in a public organisation? 2. What is the degree of IT alignment in the public organisation?
Central Concepts	IT alignment, the six IT alignment dimensions and corresponding attributes, formal organisational structure, informal organisation structure.
Important Literature	<p>Three sets of literature were mainly used for the study.</p> <ol style="list-style-type: none"> 1. IT alignment and IT alignment maturity (Chan, 2008; Luftman, 2000; Luftman et al., 2017; Reich and Benbasat, 1996). 2. Organisational structure (Currie, 1996; Dalton, 1980; Mintzberg, 1989; Molina, 2001) 3. Research methodology (Atkins and Sampson, 2002; Denscombe, 2014; Yin, 2017)
Case Organisation	A single case study was deemed appropriate to gain a deeper insight into the relationship between the various organisational structure forms and IT alignment. Thus, a mid-size Swedish municipality was selected for the study. [redacted] Municipality was selected as it is known to be among the most ambitious public institutions recognised for its major investments in digital transformation and public service delivery.
Research Method	<p>Single case study</p> <p>Data collection method: Interviews and documents.</p> <ol style="list-style-type: none"> 1. Ten interviews (four at strategic. four at tactical. and two at

Figure 5.5: Case Study Protocol used for case study 1 (Paper III).

Case Study 2 - Paper V

Research question

Which factors related to IT alignment are important to enable successful digital transformation in a public organisation?

Central concepts

IT alignment, the six IT alignment dimensions and corresponding attributes, organisational and managerial factors.

Important literature

Four categories of literature were used for the study. The following are primary sources of conceptualisation guiding the study.

1. IT alignment [7; 9; 17; 19; 31].
2. Digital transformation [12; 28; 34; 44; 137; 168; 178; 240].
3. Public value [69; 90].
4. Research methodology [259–261].

Case organisation

A single case study was deemed appropriate to gain a deeper insight into the relationship between the various organisational and managerial factors in public organisations undertaking digital transformation. Thus, Addis Ababa city administration was selected for the study. The City Administration is recognised to be among the public administrations investing highly in digital transformation in the country.

Research methods

Data collection methods: The principle of multiple sources of evidence, as recommended by Yin [259] was adopted for this study. Thus, interviews were the primary sources of data. Out of the 21 interviews, six of them took place face-to-face at the city administration, while the remaining interviews were conducted online via Zoom. The interviews were conducted between March and July 2021. The following internal organisational documents were also obtained to enrich the interview data, i.e., an organisational chart of the city administration, administrative structure of sub-cities, IT organisational structure, Core and supporting processes, a digital transformation strategic plan.

Sampling strategy: Purposive sampling (only those with experience and knowledge to contribute to the study). Interviewees came from both the IT department and the various administrative departments. No more than 21 interviews were necessary to reach data saturation.

Interview guide: For consistency and reliability, an interview guide with 43 questions was used. The questions captured information about the participants, digital transformation, and the six IT alignment dimensions according to SAMM.

Data analysis method: The interviews were transcribed manually, and notes

were checked during the transcriptions. Theme generation was similar for the interview transcription and the internal documents obtained. A hybrid approach incorporating both inductive and deductive coding was adopted. The six thematic analysis steps of Braun and Clarke [271] were followed. First, the various organisational and managerial factors were identified from the interview transcripts and internal organisational documents obtained. Second, these factors were linked to the six IT alignment dimensions.

Permission seeking

Permission was obtained in three levels. First, the PR manager of the case organisation was contacted to request consent for the study and ensure the city administration provided the right organisational setting for the study. Second, the CIOs of the ten sub-cities were approached to gain access. Once positive responses were obtained from four of the sub-cities, the selected interviewees of the study were provided with sufficient information to make an informed decision about their participation in the study.

Ethical considerations

To meet the ethical requirements of studies with human subjects, the following three steps were taken. (1) the privacy and confidentiality of participants were protected during and after the study, (2) participants were provided with informed consent forms, (3) There was complete transparency throughout the whole research process, and participants were provided with accurate and clear information about their participation and what it entailed.

Interpretation process

After the final themes were generated, the next step was to interpret the connections and categories. Consulting with seminal IT alignment studies and prior digital transformation research, all the analysis results were integrated to reveal the list of organisational and managerial factors influencing IT alignment in a public organisation.

Criteria for assessment

The case study applied an interpretivist approach to scientific enquiry. Thus, to ensure the quality of research, the four common criteria were adhered to, i.e., construct validity, internal validity, external validity and reliability. For construct validity, data triangulation with multiple sources of evidence and data validation was applied. To improve internal validity, sufficient detail about the study (sources of data and the model used) was provided. Detailed case study settings and findings were provided to help readers make decisions on the generalisability of the study (external validity). By describing the research process in detail (including the interview guides and data analysis and interpretation procedures) and providing motivations for the choices, the study addresses the issue of reliability.



Case Study Protocol

Digital Transformation in Public Organisations: IT Alignment-Related Success Factors

Research Question	Which factors related to IT alignment are important to enabling successful digital transformation in a public organisation?
Central Concepts	IT alignment, the six IT alignment dimensions and corresponding attributes, organisational and managerial factors.
Important Literature	Three sets of literature were mainly used for the study. 1. IT alignment and IT alignment maturity (Benbya et al., 2019; Luftman, 2000; Luftman et al., 2017; Winkler, 2013; Yeow et al., 2018). 2. Digital transformation (Bitzer et al., 2021; Cordella and Bonina, 2012; Deiser, 2018; Jedynak et al., 2021; Kahre et al., 2017; Lindgren et al., 2021; Mergel, 2018; Vial, 2019). 3. Public value (Moore, 1995; Panagiotopoulos et al., 2019). 3. Research methodology (Atkins and Sampson, 2002; Denscombe, 2014; Yin, 2017)
Case Organisation	A single case study was deemed appropriate to gain a deeper insight into the relationship between the various organisational and managerial factors in public organisations undertaking digital transformation. Thus, Addis Ababa city administration was selected for the study. The City Administration is recognised to be among the public administrations highly investing in digital transformation in the country.
Research Method	Single case study Data collection method: Interviews and documents. 1. 21 interviews. Six interviews took place face-to-face at the city administration, while the remaining interviews were conducted online via zoom. The interviews were conducted between March and July 2021. 2. Internal organisational documents (organisational chart for the city administration, administrative structure of sub-cities, IT organisational structure, Core and supporting processes, digital transformation strategic plan)

Figure 5.6: Case Study Protocol used for case study 2 (Paper V).

Appendix E: Papers Included in the Thesis

The six papers in the following pages are reprints included in the thesis, with permissions from the respective publishers when required.

Permission was obtained from **IGI Global** to include **Paper II** in this thesis. However, the publisher of the remaining five papers, the **Association for Information Systems (AIS)**, does not retain copyright of articles published in its digital library by participants in its own or affiliated conferences. Thus, no permission was necessary to reprint **Papers I, III, IV, V, and VI**. More information about the AIS policy on conference and journal publication is available at: <https://rb.gy/6upxbh> (accessed 20th March 2023).