Enacting Ambidextrous IT Governance in Healthcare

THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Enacting Ambidextrous IT Governance in Healthcare

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This book is dedicated first to God for His Faithfulness then to my wife Diana, our sons Jeremiah, Joel and Micah Miracle, my parents and siblings.

"Success is not final, failure is not fatal: it is the courage to continue that counts."
— *Winston S. Churchill*

ACKNOWLEDGMENTS

I would like to state that in my acknowledgments, I will express myself freely mainly writing about this PhD journey following from some PhD colleague who stated in their acknowledgment section that this is the only section where the PhD student is allowed to write whatever they want. Besides, it is the most read section in the thesis.

I will start by giving thanks to the Almighty God for thus far He has brought me. This mainly because I before I embarked on this journey I had been praying and asking God for what direction I needed to take in my life. This had been over a period of about 4 years. I had left the industry and joined the university but I really wanted to go back to the industry. I thought I would have a brief stint in academia before going back to the industry. But that was to change after I underwent two interviews and getting to the end but not getting the job. Further inquiry on why I did not get either position made me realize that probably it was time to consider staying in academia. I continued in prayer and also started looking for PhD scholarship opportunities and I went on to apply for some positions. I was unfortunately unsuccessful and so I chose to start doing my PhD at Makerere University. I talked to my head of department who welcomed my idea and was willing to be my supervisor and I embarked on the journey. Shortly after a call for MAK-SIDA study scholarships was shared on the university mailing list and I straight away applied. This call had ten (10) positions.

Having earlier applied for PhD positions, I had most of the documents ready and so I immediately applied. After the application deadline a shortlist of 22 people was shared on email and we were informed of the next steps. These included an aptitude test and an oral interview for those who got the pass mark for the aptitude. I was able to get the pass mark and went on to do the oral interview. I interviewed with academic members of the faculty at the division of Informatics, Department of Applied IT at the University of Gothenburg. These were the potential supervisors who were looking out for which students to work with. By the grace of God, one of the potential supervisors was happy with my proposal and that got me on to the list of the ten. In fact, I received an email about 30mins after the interview with an offer to which a response was need to enable start of the admission process. Needless to say, I accepted the offer and the ball was set rolling. That was on the 12th January 2016. Out of the 10 successful PhD students, 3 were admitted to the Department of Applied IT, University of Gothenburg (GU), 5 were admitted at Chalmers University

of Technology and 2 at Makerere University Kampala (MAK). I was among the 3 admitted at GU and we started the PhD studies officially in March 2016.

After all this process, I was thankful to God for the success in getting the scholarship and still made an extra prayer. The prayer was that I am able to complete the PhD within the project time (i.e. 2016-2020). The Almighty God was merciful to me and answered my prayer and this is the reason I am defending my thesis as a sign that God answered my prayer and I have completed within the set time. I give honour and glory to God and thank and praise His Name for enabling me to pull this off. It was not easy and some of you who have been through it will testify. I remember in the beginning, the first mandatory course we started with or embarked on while still in Uganda required that we read between 5-12 papers and then summarize them in a position paper which was to be presented at a seminar fortnightly. There were four themes and so we had four seminars in total. During the seminars we present to our supervisors in Uganda and I must say some of the comments they gave were rather disheartening. But I was reminded that I had committed all this to God and so I took courage and realized that this was the time to dig in my heels and that kept me focused. Five months later after embarking on the reading course, we headed for Gothenburg for our first 10 months stint. We were primarily supposed to follow the mandatory courses and get them done during that period based on the plan that had been drawn by Associate Prof Urban Ask, the project Lead at the Department of Applied IT together with Pär Meiling. I must say, two months into the courses, the going got tough and as the old adage goes "when the going gets tough, the tough get going." I had to find ways of coping, as I had started feeling overwhelmed and I asked myself how I would handle the 4 years with the kind of pressure I was experiencing at the time. As usual, I run back to God in prayer and I got this idea of just coming up with a plan to handle the different tasks I had to do. This helped me a great deal as I got calm and was able to complete the mandatory courses in the 10 months period. I must say by the end of the 10 month I was burnt out and I need to take a break and thankfully I was headed home.

Having completed the mandatory courses, I was now set to engage fully in research which I was doing more less on the side since the priority was to complete the mandatory courses. I had done my planning seminar which meant, my proposal was approved and I had a plan/direction for my research. I collected some data while still in Sweden thanks to Lars Lindsköld and my supervisor Johan Magnusson who introduced me to potential informants. I collected some more data in Uganda and then the paper writing set in. Thanks to Denis Ssentamu, Timothy Tavuga, Leo Semaganda, Deo Semwogerere, Julius Sendiwala, Jenard Ntachotugira, Moses Bagyendera, William Kafeero

and Peter Kahiigi for providing me with relevant material and linking me to potential informants in Uganda. In the beginning I was worried about whether I would pull of the requirement of 5 conferences papers in AIS conferences (This was the initial requirement for submission outlets). The first attempt to one of the conferences was disaster. The paper was rejected and as I was talking to myself about the way forward and convincing myself that I should wait for the next year to submit another article/paper, my supervisor Johan quickly responded to the email which I sent him with the reject decision and he was like, work on the comments and submit to the next conference whose deadline was in a space of two weeks. My first response was that I could not make it and he was like, what better way is there as to work under pressure! This got me psyched up and renewed my energies to work on the comments. Thankfully The paper was accepted and that gave me the courage to move on and also to believe in myself. Nonetheless, in as much as I worked hard, I still attribute it to the favour of God (Psalm 37:3-4, Psalm 131). Commit your activities to the Lord and your plans will be established (Proverbs 16:3).

I would like to thank the BRIGHT project team, Urban Ask, Engineer Bainomugisha, Evelyn Kahiigi, Pär Meiling, Michel Chaudron, Regina Hebig for all the support and guidance they rendered to me during the course of my study. I would like to also thank William Nsubuga who was very helpful in helping me settle in during our first 10 months. Your tips on which stores to buy various things and which buses or trams to take was very helpful. For the BRIGHT team members based in Sweden (Urban and Pär), I would like to thank you specifically for the structured plan you developed for us. I found it a very useful guide which I laboured to follow religiously. Thank you for the regular meetings we had and also for the reminders to submit the monthly reports. To me this was a check mechanism which helped me work hard to keep in phase with the plan. Furthermore, your support towards pushing for fulltime study leave was something that I do think among other things contributed towards seeing me complete my studies within the project allotted time. Thank you for always responding in a timely manner on matters to do with Visa Application letters and in all the practical matters i.e. booking housing for us, booking our travels for the MIT conferences and the AIT conferences. Thanks also go out to Urban Ask, who thought it prudent for us to be a part of the Swedish Research School of Management and Information Technology (MIT). The MIT conferences were very helpful for me especially in terms of getting feedback for the articles I was working on before I would submit them to an outlet we agreed upon with my supervisor. MIT enabled me to meet new people and also grow my network. On that note I would also like to thank Christina Keller, Dean of the Swedish Research School and Peter

Ekman, the deputy Dean for all the supported they rendered to us and for the funding. MIT contributed a lot to my PhD process.

Back to the division of Informatics, I would like to thank Kalevi Pessi, who was very supportive at the beginning of the first ten months period in Sweden. He was the division head at the time and helped me and my colleagues settle in. He offered us bus cards to help us move to Johanneberg for the different lectures we had to attend over the autumn and spring semesters. During the Christmas break he offered us cards to Liseberg and that was something that helped me pull off some stress by taking a break off books. He also introduced us to Magnus Bergquist who gave us insights on how to write articles and what keys issues we needed to focus on. Magnus the time we had with you every Monday morning was a critical input in helping me learn the craft of writing. I know I am not yet there but certainly I am on the right track!

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written in my planning and halfway seminar reports. I realized that it was important that I get that added to my text as a way to improve it in preparation for writing the Kappa. You got me to learn that in academia hard questions are asked not to bring one down but to help them actually understand what they are working on or to enable them see another perspective of the same work they are working on. I would also like to thank Tero Päivärinta who was the discussant for my final seminar. Your comments were spot on and gave me the confidence to believe in my work and myself. There were issues I had in mine but for some reason I had left them out of my Kappa but you insisted they were necessary. Your critical and candid discussion helped a lot to improve my Kappa which is now this thesis. Your effort in this cause was much appreciated. I also thank Jan Ljunberg for the role he played as an examiner of this PhD. Thanks go to Johan Lundin also for his role as Deputy head of Research at the department. I would also like to thank Mattias von Feilitzen for the help he gave me in preparation for the printing.

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I specifically bonded with Swaib, Hawa and Rashidah. During our first period in Sweden, I share a room with Swaib, we cooked and shared stuff together. During the second period, we shared an apartment and we each had our own rooms. We discussed a lot and encouraged ourselves in regard to our research and life in general. Swaib, the brotherhood should continue. As for Hawa, we almost meet on a daily basis since we shared the office and I remember in the beginning when things were not clear at all we always met and encouraged each other. I still remember those times when we met and laughed about how our supervisors had given us a bashing in regard to the text, we had shared with them. We used to tell ourselves we had no choice but to soldier on. We were already into the tunnel and that the only option we had was to walk forward and until we got out of it. We also usually read through each other's work at a peer to peer level and gave each other candid and constructive feedback. I am thankful that we have come to this stage and it is all by the grace of God.

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contributed immensely to my thesis. I look forward to continued collaboration with you.

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— Winston S. Churchill

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ABSTRACT

With digitalization, Information Technology (IT) is increasingly an integral part of strategies and solutions. This calls for organizations to prioritize the governance of IT if they are to succeed and remain relevant. Previous research in IT governance has been criticized for an over-emphasis on design rather than enactment, as well as on efficiency rather than innovation. This thesis responds to previous calls for research on how IT governance is enacted in healthcare organizations. The study is guided by the theory of organizational ambidexterity and research orchestration. Although IT usage in the health sector has seen slow adoption in comparison to other sectors, digitalization is currently accelerating the use of IT. The adoption of IT is attributed to the intense pressure placed on hospitals to provide better quality of care at lower costs with more and easier access to medical information for patients. This empirical research adds to theoretical insights in the field of IT governance through the resource orchestration and ambidexterity perspective. After applying this open-ended and exploratory research question in two different geographic settings—Sweden and Uganda—the research employed qualitative data collection and -analysis strategies. The first contribution of this thesis is in identifying where the ambidextrous balancing point between exploitation and exploration is expected to differ by comparing the two settings. This was done by offering a unique account of how ambidextrous IT governance is enacted, operationalized through the resource orchestration lens. The second contribution is to the role of policy in both the dynamic process of ambidextrous balancing and the digitalization of healthcare. As such, this thesis suggests that digital policy design should utilize the findings and method of the cross-country ambidextrous policy study examined in this thesis to inform future design decisions.

Keywords: IT governance, Resource orchestration, Ambidexterity, Enactment, Exploitation, Exploration, Healthcare

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LIST OF PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. KIZITO, Michael. Digital resource orchestration in healthcare: The case of Västra Götaland Region. In: *Proceedings of the 52nd Hawaii International Conference on System Sciences*. 2019.

II. KIZITO, Michael, and KAHIIGI, Evelyn. Conflicting logics in IT governance: Achieving ambidexterity in healthcare organizations. 2018.

III. KIZITO, Michael. An inquiry into IT governance in healthcare organizations in Uganda. In: *International Conference on Social Implications of Computers in Developing Countries*. 2019.

IV. KIZITO, Michael. Ambidextrous IT governance enactment in healthcare: A comparison between the Swedish and Ugandan setting. In: *Proceedings of the 53rd Hawaii International Conference on System Sciences*. 2020.

V. KIZITO, Michael, and MAGNUSSON, Johan. Ambidextrous policy: Cross-country comparison of policies for the digitalization of healthcare. In: Accepted for presentation at the EGOV2020 Conference. 2020.

CONTENT

1 INTRODUCTION

The now commonplace disruptions caused by digitalization require agility and adaptability in information technology (IT) capabilities and governance alike (Janssen and Van Der Voort, 2016, Lappi et al., 2019, Mergel, 2016, Mergel et al., 2019, Svahn et al., 2017, Vial, 2019). Digitalization, herein understood as "a sociotechnical process of applying digitizing technologies to broader social and institutional contexts" (Lindgren et al., 2019), is a macro trend that is changing society and business. Not surprisingly, digitalization has contributed to the redesign of the identities and processes of many organizations in the private and public sectors (Agarwal et al., 2010, Bharadwaj et al., 2013). Notably, digital technologies have transformed the way industries and sectors operate in today's economy, resulting in organizations of all sizes incorporating digital innovation as a basis of their value creation and strategy (Nambisan et al., 2017). Thus, for organizations to effectively adopt digitalization, they must be willing to foster new capabilities in order to identify novel ideas within the prevailing institutional contexts (Henfridsson and Yoo, 2013).

IT has become an integral part of digital business strategies and future solutions (Janowski, 2015), which calls for organizations to prioritize the governance of IT if they are to succeed and remain relevant (Agarwal et al., 2010, Bharadwaj et al., 2013). Recent studies (Baker et al., 2017, Chae et al., 2018, Costello and Omale, 2019) indicate that although there is considerable IT spending in organizations, few have reaped the rewards of digitalization.

Organizations have been urged to extend their strategic directing and controlling responsibility into IT through IT governance (Campbell et al., 2010, Chou and Liao, 2017, van Grembergen, 2007, Weill and Ross, 2005, Weill and Ross, 2004) to ensure that it is aligned with the corporate vision and mission (Posthumus et al., 2010). Organizations are still struggling to achieve adequate control over IT even while grasping the necessity of implementing IT governance in one form or another (Hardy, 2006). Organizations also fail to comprehend to what extent they are operationally reliant on IT systems or the level to which IT participates in the development and execution of their business strategies (Nolan and McFarlan, 2005). In addition, senior management often lacks the knowledge required to ask the right questions about IT risk and expense, making organizations vulnerable to great risk (ibid.).

Previously, information systems (IS) research has focused on the transformation of the IT function, where IT governance is considered one component of the IT function profile (Gregory et al., 2015, Guillemette and Paré, 2012). In terms of previous research, IT governance studies have addressed the shift in locus of IT decision-making (Olson and Chervany, 1980, Weill and Ross, 2004, Wu et al., 2015), the evolution of IT governance modes (George and King, 1991, Williams and Karahanna, 2013), and the contingency conditions that influence the IT governance mode adoption (Sambamurthy and Zmud, 1999, Tiwana and Kim, 2015). At the same time, previous research in IT governance has been criticized for an overemphasis on design (mechanisms) rather than on enactment (Gregory et al., 2018), as well as an overemphasis on efficiency through diagnostic control at the expense of innovation capabilities (Magnusson et al., 2020). As a means to counter this imbalance, bimodal IT (Haffke et al., 2017), meaning the IT function needs to be able to handle two parallel modes of delivery, has been introduced. Here, the traditional mode is biased to efficiency, and the new innovation-oriented mode is biased to innovation. However, the scope of IT governance remains largely confined to the IT function, which is responsible for user support as well as design, development, and maintenance of IT systems (Niederman et al., 2016). Future research should focus on the enactment of governance (Magnusson et al., 2020) as well as different control purposes (Wiener et al., 2019), such as innovation (Cram et al., 2016).

Magnusson et al. (2020) argue that even though organizations are biased toward exploitation (efficiency), they are able to simultaneously employ exploitative and explorative activities; however, the balancing point is neither explicit nor formally controlled (Magnusson et al., 2017). In line with this bias, the empirical studies in this thesis are guided by the theory of organizational ambidexterity (March, 1991), which suggests that successful organizations need to exploit existing opportunities to achieve efficiency while at the same time explore new opportunities to achieve innovation (i.e., ambidexterity involves the balancing of exploitation and exploration) (Benner and Tushman, 2003, Duncan, 1976).

Because balancing efficiency and innovation is viewed as an ambidextrous activity, ambidexterity is considered dynamic rather than static (Luger et al., 2018, Zimmermann et al., 2018), that is, an issue of balancing rather than balance. Indeed, recent research has highlighted the need for approaching issues such as adaptive governance (Janssen and Van Der Voort, 2016), agility (Mergel, 2016, Mergel, 2018), and organizational ambidexterity (Cannaerts et al., 2019) in the study of governance. The industry response to the same challenge (i.e., bimodal IT) calls for dividing the IT function into two entities

where IT directed toward efficiency is handled in a shared service center configuration, and IT directed toward innovation is handled through temporary entities such as innovation hubs (Youtie and Shapira, 2008). This structural separation (or structural ambidexterity) (Benner and Tushman, 2003, Birkinshaw et al., 2016, O'Reilly 3rd and Tushman, 2004, Raisch and Tushman, 2016) is encouraged by practitioners in both industry and consultancy firms as a path to bimodality through increased proactivity (Xue et al., 2017).

Although IT usage in the health sector—specifically in hospitals—has seen slow adoption in comparison to other sectors (Raghupathi and Tan, 2008), healthcare has now embraced the use of IT in digitalization (Gastaldi and Corso, 2012). The adoption of IT is attributed to the intense pressure placed on hospitals to provide better quality of care, lower costs, and more and easier access to medical information for patients (Chaudhry et al., 2006, Glaser et al., 2008, Thrasher et al., 2007). Moreover, the use of IT in hospitals has followed a predictable pattern seen in other sectors with more advanced IT resources (Bradley et al., 2012). Although earlier IT applications were stand-alone with little or no integration (Chaudhry et al., 2006), this has changed in that more hospitals have implemented integrated IT applications that span several functions (Garets and Davis, 2006). Some implementations include enterprise resource planning (ERP) systems, electronic medical records, and electronic medical administration records (DesRoches et al., 2008, Stefanou and Revanoglou, 2006).

This change has contributed to the increase in complexity and sophistication of the IT capability in hospitals/healthcare and, in turn, increased the importance of IT governance in healthcare organizations (Bradley et al., 2012). As a result, IT investment and capability have grown in hospitals, creating the need to manage these growing IT resources. The fast-paced investment in IT resources and the associated potential impact on the performance of hospitals necessitate an active governance stance (Kaarst-Brown, 2005).

The digitalization of healthcare is part of a dedicated and ongoing strategy that has been active since the 1970s in Scandinavia (Ellingsen and Bjørn, 2014). This strategy can be associated with societal structures such as personal identification numbers, universal healthcare for all citizens, and taxation systems in some countries. Thus, designing large ISs in healthcare is doable and realistic. Unpacking the information infrastructures for healthcare in Scandinavian countries provides insight into the underlying complexities of standardization, flexibility, dynamics, coordination, and connectivity relevant for resource orchestration research (Ellingsen and Røed, 2010, Hanseth and

Lyytinen, 2010). At the same time, recent contributions have integrated the knowledge of organizational ambidexterity into the IT governance field (Gregory et al., 2015, Roberts et al., 2016). Seeing the trade-offs between efficiency and innovation as avoidable, Xue et al. (2012) urge that IT governance needs to be configured to achieve both efficiency and innovation. This involves supporting both the efficient use of IT in the organization and the practical involvement of an innovation partner to the organization (Banker et al., 2011). In fact, Magnusson et al. (2017) posit that efficiency and innovation exist as modes of IT governance in organizations, and they add that all organizations are ambidextrous to some extent. They further recognize the challenge that comes with the distribution of activities between these modes and the role of IT governance in formulating and implementing ambidextrous IT governance. IT governance should, in other words, act to support digitalization, driving both innovation and efficiency. This idea is in line with Gregory et al. (2015) who acknowledge driving innovation and efficiency this as a paradox where impressions of parallel logics need to be pursued in day-to-day work. Recent research (Chi et al., 2017, Gregory et al., 2018) supports simultaneously achieving efficiency and innovation through the possible redesign of IT governance.

Furthermore, some studies (Heracleous et al., 2019, Luger et al., 2018, Zimmermann et al., 2018) push for disbandment of the static perspective of ambidexterity in favor of a process-oriented perspective with a focus on enactment. As such, available control mechanisms lack the necessary support for facilitating innovation (Cram et al., 2016), which suggests that innovation is not given the due attention it needs in governance (Nambisan et al., 2017, Svahn et al., 2017). Digitalization calls for new IT governance that is capable of shifting from the predominant focus on efficiency to a focus on exploiting existing opportunities to achieve efficiency while simultaneously exploring new opportunities to achieve innovation (Chi et al., 2017, Raisch and Birkinshaw, 2008). The emphasis of IT governance design on continuous improvements and other incremental activities primarily geared toward efficiency (Bradley et al., 2012, Grover and Kohli, 2012, Prasad et al., 2012) and counteracting innovation (Magnusson et al., 2020) is seen as a deterrent to the opportunities that may come about as a result of digitalization (Gregory et al., 2018). The study of IT governance over time has focused more on design, producing a dearth of studies concerning the enactment of IT governance. The importance of investigating how organizations actually enact IT governance in their daily practices points to the need for research on how ambidextrous IT governance is enacted in organizations (Wiener et al., 2016).

One of the objectives of this thesis is to add empirical and theoretical insights into the field of IT governance through the resource orchestration and ambidexterity perspectives. When organizations focus on efficiency, the improvement activities are referred to as *exploitative*; when they focus on innovation, the improvement activities are referred to as *explorative* (Xue et al., 2012). This thesis further addresses the calls for research on the balancing act and reliance on ambidextrous strategies for adaptive governance by Janssen and Van Der Voort (2016), on enactment of IS project control (Remus et al., 2020, Wiener et al., 2016), and on control mechanisms for innovation by Cram et al. (2016). The extensive body of ambidexterity research notwithstanding, a few empirical studies in the public sector adopt this theoretical lens (Cannaerts et al., 2019, Choi and Chandler, 2015, Smith and Umans, 2015, Trong Tuan, 2017). Consequently, this thesis aims to expand on the seemingly limited theoretical foundation regarding the practical application of ambidexterity within healthcare by answering the following research question:

How are healthcare organizations enacting ambidextrous IT governance?

The research question is answered using five studies that range from understanding the state of IT governance in the two settings (Sweden and Uganda) to comparative studies in Sweden and Uganda in terms of enacting ambidextrous IT governance. Each study resulted in a paper that is included in the thesis. The first three studies were exploratory and aimed at providing an understanding of the different IT governance practices in Sweden and Uganda, including how they support or contribute to the digitalization of healthcare. Studies 1 and 2 were done in Sweden among health IT (HIT) staff and managers in the health and digitalization space. These two studies responded to the call for research by Sirmon et al. (2011) to identify the locus of resource synchronization across managerial levels. Empirical research was conducted to identify resource synchronization efforts. Study 3 was done in Uganda, and the results demonstrated the state of IT governance in healthcare organizations there. This study explored how healthcare organizations use their resources and capabilities to create a competitive advantage.[1] This follows from Helfat and Peteraf (2003) argument that "It is difficult to fully explain how organizations create a competitive advantage through using the resources and capabilities available to them." The findings from the three studies provided insights for the fourth and fifth studies, which focused on the comparison of ambidextrous IT governance enactment in healthcare in the two settings, and

[1] Competitive advantage here is in line with healthcare organizations remaining relevant and working on their sustainability in the face of digitalization.

the comparison of policies to support the digitalization of healthcare in the two settings, respectively.

By so doing, the papers (listed at the beginning of the Summary and Positioning of Papers section) contributed accordingly to the thesis. Paper 1 contributed by identifying the resource orchestration actions carried out by HIT staff at various managerial levels in Västra Götaland Region (VGR) healthcare organizations. Paper 2 contributed to helping HIT managers understand how the conflicting logics may affect IT decision-making and, as a result, reveal the internal forces that hinder the success of ambidextrous IT governance. Paper 3 contributed in terms of suggestions for how senior management can enact the strategies and make use of the organization's knowledge base and financial resources to inform the adoption of IT governance. Paper 4 contributed by comparing two settings where the ambidextrous balancing point between exploitation and exploration is expected to differ, as well as by offering a unique account of how ambidextrous IT governance is enacted and operationalized through the resource orchestration lens. Paper 5 contributed by answering the call for research presented by Luger et al. (2018) through additional studies of the role of policy in the dynamic process of ambidextrous balancing, as well as responding to the call from Greve (2015) on the role of policy in digitalization.

The rest of the thesis is organized as follows: chapter 2 presents the precursory findings; chapter 3, the theoretical framing; chapter 4, the method; chapter 5, the summary of papers; chapter 6, the results; chapter 7, the discussion; chapter 8, the limitations; and chapter 9, the conclusion.

2 PRECURSORY FINDINGS

2.1 Healthcare Organizations and Health IT

The information age has given rise to new ways of looking at information and how powerful it can be in causing change in society if used in a purposive manner. As in many organizations in other sectors, healthcare organizations are looking to IT for solutions to help control costs and improve the quality of their service, that is, patient care. Looking to IT for solutions has resulted in more IT investment and increased IT capability in healthcare organizations. The subsequent complexity of the IT capability in healthcare organizations (Bradley et al., 2012) calls for and necessitates IT governance. Although most of the early IT applications in hospitals were stand-alone applications (Chaudhry et al., 2006), over time, increasing numbers of hospitals have begun implementing integrated IT applications that cut across several functions (Bygstad et al., 2017, Garets and Davis, 2006).

In Norway, for example, patients complained about the poor coordination between different units where information on schedules, waiting time, and further actions was lacking (Norwegian Ministry of Health, 2015, Salazar et al., 2004). Reasons advanced for these practices included that patient flow was given lower priority than medical treatment, and the organizational processes and IT solutions were designed to support medical treatment and not logistics. As much as the hospitals seemed to reduce their costs and improve the quality of medical care, the patient and societal view showed the reverse—the costs were high in terms of wasted time. In seeking solutions to this common complaint, politicians and healthcare managers chose two approaches: (1) a process initiative implemented under different names focusing on redesigning and institutionalizing a sequence of work tasks, and (2) an IT initiative focusing on integrating the many silo systems in hospitals to support a more holistic patient flow (Bygstad et al., 2017).

In the United States, adoption of HIT has been on the rise since the establishment of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009 to prioritize and improve the delivery of patient-centered care (DesRoches et al., 2008, Kellermann and Jones, 2013). The outcome, however, has not been as expected as only marginal improvements have been observed in the quality of healthcare and efficiency (Black et al., 2011, Landrigan et al., 2010). HIT applications that are geared toward supporting patient-centered communication are seen as a solution to improve outcomes for patients, caregivers, and healthcare providers. To support patient-centered communication and care delivery, the implementation

and use of HIT has great potential to enable health promotion and disease management in a way that is coordinated with patients' needs, preferences, and resources (Finney Rutten et al., 2014). Patient-centered communication obtains and verifies a patient's perspective, recognizes the psychological and social context of the patient (thus providing a shared understanding of the patient's health needs), and ensures shared decision-making rights (Epstein and Street, 2007).

The increased investment in IT and the potential impact on the performance of hospitals necessitate an active governance stance (Bradley et al., 2012). The Norway case corroborates the need for improved IT governance. One objective of IT governance, among others, is in the area of capability management, which refers to the actions of managers within an organization that are intended to effectively develop and manage IT capabilities (Willson and Pollard, 2009). The desirable behavior should be coherent with the organization's mission, values, norms, and culture. IT governance is considered an initiative that encompasses two aspects of process mechanisms: (1) enterprise management methodologies and (2) metric and compliance processes (Bradley et al., 2012). Given that health information system (HIS) implementations have evolved significantly in recent years within the IS discipline, Chen et al. (2019) recently analyzed the intellectual structure of the HIS literature to demonstrate how the HIS research field has evolved through changes in research themes and the emerging thought leaders in the organically growing subdiscipline of IS. This was accomplished by showing what IS scholars have studied in the past alongside studies in the present and then suggesting possible areas for future research. This research was done on the depth of the organization—ranging from all levels of management—and therefore focused on the enterprise management methodologies that pertain to developing executive committees, determining core processes, and funding priorities (Weill and Ross, 2005).

2.2 IT Governance and Enactment

The pervasive use of IT as a crucial support for the sustainability and growth of business creates a critical dependency on IT that demands a specific focus be placed on IT governance (De Haes and Van Grembergen, 2008). Given the increased pressure to control and monitor costs and with IT investments comprising a significant portion of organizations' budgets, effective IT governance is considered a vital way to ensure returns on IT investments and improved organizational performance. IT governance has been portrayed as a necessary element to support digitalization in general (Campbell et al., 2010) because it is concerned with IT project selection and prioritization issues, as well as how the authority for resources and the responsibility for IT are shared

among business partners, IT management, and service providers (Weill and Ross, 2005, Weill, 2004). Effective IT governance requires a set of IT governance mechanisms to encourage congruence with an organization's mission, strategy, values, norms, and culture (Ali and Green, 2012, De Haes and Van Grembergen, 2008, Herz et al., 2012, Huang et al., 2010), which, in turn, promote desirable IT behaviors and governance outcomes. An organization's IT governance mechanisms are often indicative of the sophistication of its management capability—both in IT and business (Bradley et al., 2012). Solid IT and business relationships can be considered one way of realizing successful digitalization due to the trust and shared understanding between IT and business executives.

IT governance has changed over time, and studies from both the private and public sectors show that IT governance growth has occurred through certain stages (Figure 1), with the first stage occurring between the 1980s and 1990s. This stage involved a shift away from the autonomous and decentralized way IT investments were being handled to a management style that emphasized individual initiative and self-organization to accomplish tasks (Mintzberg and McHugh, 1985). This shift was prompted by a development in technological design in which desktop computing was taking root in the workplace, together with the availability of software designed for more niched solutions than the erstwhile architecture dominated by mainframe systems (Magnusson and Nilsson, 2015). This brought about redundancies and their associated risks, which called for better governance. The result was formalization of IT governance and a change in the control locus from siloed departments to central management (Weill and Ross, 2004). The formalization increased the legitimacy of the IT department in such a way that the department was able to push its agenda into higher levels of management (Magnusson and Bygstad, 2013).

The next stage of IT governance evolution was built on the basis of formalization. IT departments were governed by following a strict supply and demand logic, which meant a standardized internal procurement process (Chen et al., 2010) between the organization and the IT department. In this structure, there was a service portfolio influenced by governance frameworks such as Control Objectives for Information Technologies (COBIT) and Information Technology Infrastructure Library (ITIL) (Peterson, 2004b). This created a dominance of large-scale, capital-intensive investments as the core element of IT aimed at reducing complexity and the risk in the internal IT supply. IT staff roles were assigned with the goal of delimiting the fluctuation of demand toward the IT department and driving efficiency in delivery. Guillemette and Paré (2012) and Lutchen (2011) argue that the internal market perspective of "IT as a business" contributed to the scenario, which compounded the reactive

stance that focused on efficiency while crippling innovation, thus leading to other risks such as shadow IT and other forms of unsanctioned IT provisioning (Myers et al., 2017). This led to the current state of IT governance, which has been largely influenced by the previous IT governance stages. Earlier, IT governance was mainly aimed at achieving efficiency through analytical control (Simons, 1995); as such, the current IT governance mechanisms lack the necessary support for facilitating innovation (Cram et al., 2016). This lack of support has led to the introduction of bimodal IT, which advocates for the IT function needing to handle two parallel modes of delivery (Haffke et al., 2017): the traditional one focused on efficiency, and the other focused on innovation. The bimodal IT scenario suggests the need for ideas regarding adaptive governance (Janssen and Van Der Voort, 2016), agility (Mergel, 2018), and organizational ambidexterity (March, 1991). This is associated with the idea that the digitalization of society involves a dual aspiration of improved efficiency and new operating models/means of value creation(Nambisan et al., 2017, Yoo et al., 2010), suggesting that digitalization is loaded with connotations from operational excellence, disruption, and innovation.

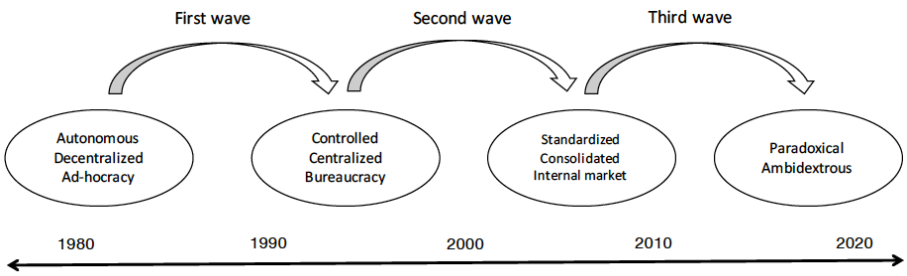

Figure 1. Three methods of IT governance (adapted from Magnusson et al. (2020))

The likely new direction for IT governance would be to support an interplay among formal and informal control (Chua et al., 2012), the dynamics of control activities (Gregory et al., 2013), and the contradictory recurrences of results as an outcome of internal and outsourced IT projects (Tiwana and Keil, 2009). Research on control configuration and control enactment in IS projects focuses on the modes of control portfolio configurations, antecedents, consequences, and dynamics of such configurations (Wiener et al., 2016). Implementing IT governance involves, among other things, how controls are put into practice to achieve the organization's objectives. Prior studies have shown the need to consider other aspects that go beyond the traditional focus on control portfolio

configurations, including control style (Gregory et al., 2013, Gregory and Keil, 2014, Heumann et al., 2015) and control congruence (Narayanaswamy et al., 2013, Tiwana and Keil, 2009, Wiener et al., 2015). On the other hand, these studies do not provide an integrative view of how the controller interacts with the controllee to implement the controls in the portfolio. As such, Wiener et al. (2016) suggest the concept of control enactment, which, in this thesis, is considered one aspect of expanding the view on IT governance.

Taking on an expanded view of traditional IT governance or IT project control, control enactment contributes to understanding how the controller interacts with the controllee by highlighting certain control activities. Control portfolio configuration is a critical control activity; however, control enactment actually determines control consequences (Tiwana and Keil, 2009). The expanded view focuses on how control portfolio configurations are enacted by the integration of control style and congruence concepts (Wiener et al., 2016). Control enactment is defined as the interaction between the controller and controllee through which the controller implements formal controls. Control enactment hinges on the potential inherent in the selected controls and attempts to realize this potential to influence controllee behaviors in order to fulfill a desired goal by the controller (Tiwana and Keil, 2009). Control enactment focuses on two views: control style, which is how the interaction between the controller and the controllee is conducted, and control congruence, which is the degree of similarity between the controller and controllee concerning the enacted controls.

Enacting IT governance brings into play the collection of activities carried out in relation to IT governance configuration. This calls for deliberate effort to ensure control in a behavioral role so that individuals working on IT projects act in a manner consistent with organizational objectives (Kirsch, 1997). Control refers to any attempt to align individual behaviors with organizational objectives (Cardinal, 2001, Kirsch, 1996). In IT/IS projects, the relationships between controller and controllee assume various forms that include but are not limited to hierarchical relationships between superiors and subordinates and lateral control relationships (Kirsch et al., 2002). Control relationships can include client-vendor dyads in cases of outsourcing (Tiwana, 2010). The role of the controller in the organizational control theory is mainly to build on the idea of the principal—the owner interested in a collection of tasks—who assigns the controllee (agent) to accomplish the task. This poses a challenge of control with information asymmetries, risks of moral hazard, and cost versus time constraints related to exercising control (Dalton et al., 2007). Ownership is thus seen as a central idea in control activities that take place within an organization to the extent that such activities relate to control over IT projects. Some extant literature on IT governance focuses on the corporate level (De

Haes and Van Grembergen, 2009) regarding issues related to structures, processes, and relational mechanisms. Given that control is a central theme in IT governance, attempts are made in this thesis to bring control into context as a means of supporting ambidextrous IT governance enactment in healthcare organizations.

An expanded theoretical framework of IT/IS project control by Wiener et al. (2016) builds on conceptual and contextual assumptions. The conceptual assumption looks at the control style and congruence as both applying to formal and informal controls. Chua et al. (2012) describe the enactment of behavior control in an authoritative style and illustrate how corporate management "mandated the adoption of a new single process modeling notation that project members were not familiar with" (p. 589). This was after a disagreement on the choice of process modeling. However, using the enabling style, Gregory et al. (2015) demonstrate how enactment of behavior control was accomplished: Consensus was reached and reestablished recurrently through weekly meetings that involved the project sponsors and project managers. The stakeholders were also updated on the status of the project so they could offer their feedback. The fundamental logic here is that the type of control enactment (input, behavior, outcome, self-control) could be misinterpreted by the controllee, which is referred to as lack of communicational congruence. The individuals who qualify to be called controllers, that is, IT managers and business managers, do not constitute the core project team; however, in reality, they are part of the project team.

The choice of control mode depends on the knowledge of the controller and the controllee as vital antecedents (Wiener et al., 2016). This knowledge further influences the style in which these controls are enacted, and this choice may be influenced by important aspects of the controller-controllee relationship. Control relationships are depicted as power asymmetries, which result from differences in dependency relationships. Normally, the party with great power is less dependent on the other party (Emerson, 1962). The power or ability to influence can be looked at from the interpersonal perspective and depends on a number of power sources, such as legitimate, expert, referent, reward, and coercive (French et al., 1959). Legitimate power is derived from the organizational hierarchy where the controller has authority over the controllee, so the controller can request a set of behaviors from the controllee based on a signed agreement or a job description (Pfeffer, 1994). Expert power is based on knowledge, which could be from the technical or business domain. The power asymmetries therefore can arise out of the differences in the formal authorities. Empirical work by (Bower, 1970), which includes both top-down and bottom-up influence, is partly responsible for this line of inquiry(Noda and Bower, 1996, Wooldridge and Floyd, 1990). The work of Wooldridge and

Floyd (1990) triggered studies on the unique role of middle managers. These works demonstrate that managers at different levels interact dynamically to influence organizational outcomes that include innovation, strategy development, learning, and performance, as opposed to static interaction (Sirmon et al., 2011).

Power asymmetries in control relationships may be a result of differences in knowledge between the controller and the controllee (Adler and Borys, 1996). Literature highlights controller-controllee knowledge as a key antecedent for the selection of control modes that will enable the configuration of the control portfolio (Choudhury and Sabherwal, 2003). Similarly, controller-controllee knowledge has a bearing on how the selected control style is enacted. IT projects may require broad specialized knowledge, and controllers may not have the suitable knowledge to successfully enact controls in an authoritative style. This happens in cases where the top managers are at a distance from the operational project activities. The same may also occur when business users who act as liaisons on IT projects are unable to exercise strong control due to the essential lack of IT knowledge (Mao and Zhang, 2008). In many outsourced IT projects, clients suffer from a lack of critical IT knowledge and thus become dependent on their vendor, which brings about an asymmetrical distribution of power to favor the controllee. In these circumstances, controllers should enact controls in an enabling style to compensate for their lack of knowledge (Hekkala and Urquhart, 2013).

In the top-down strategy-making sequence, top managers declare initiatives, middle managers implement the strategy, and operational managers follow the plan (Floyd and Lane, 2000). In strategy development, top management provides a vision and plan of action, which may require major changes in the resource portfolio (structuring actions), such as acquisition or divestment of resources. On top of providing the vision, top management emphasizes and controls the deployment strategy (leveraging actions). The middle managers then take on the bundling actions that are meant to build the organization's capabilities on top of supervising the operational managers to match the strategy. They do this by selecting a bundling approach that matches the plan of action laid down by top management, which may be stabilizing, enriching, or pioneering (Sirmon et al., 2011). With this strategy, synchronization of resource orchestration actions is likely to be high in the top-down sequence because the roles of each level are relatively well defined. Operational managers are less likely to stray from clear directives, which may make the top-down process more efficient while simultaneously affecting exploration in the process's value creation (ibid.).

Critical events during the IT project may affect the control style if there is inappropriate progress or poor performance. Consequently, the controller who has been using an enabling style changes to the authoritative control style or another control style (Gregory et al., 2013). This shift enables the controller to enact controls in good time to get the project back on track and get the controllee focused on resolving the problem. In this case, the repair and transparency features that come with the enabling style slow down the enactment process. The critical events or problems during the IT project may help uncover a lack of knowledge on the part of the controllee. When the controller identifies the knowledge gaps, the next likely step is to weigh the pros and cons of allowing the controllee autonomy, embracing their feedback (repair), and communicating the rationale behind the controls in place and how they affect the project outcomes (transparency). Eventually, the controller shifts to the authoritative style. Enacting formal controls in an enabling style is likely to promote clan control, which operates when behaviors are motivated by shared norms and values and when shared experiences are enforced through commonly accepted behaviors (Kirsch et al., 2010). Using the enabling control style, the controllee is encouraged to give feedback on the enacted controls; this feedback provides the controller with the opportunity to identify and enforce acceptable controllee behaviors. Sharing the rationale of the enacted controls with the controllee leads to embracing the shared group norms, values, and alignment with the project.

Enactment of self-controls can be facilitated by using formal controls in an enabling style. Giving the controllee the flexibility to deviate from formal prescriptions as a way of responding to contingencies when needed creates a degree of temporary autonomy that promotes self-controls. Transparency, which is about making known the rationale of the project context, equips the controllee with the IT and business domain knowledge required for implementing self-controls (Choudhury and Sabherwal, 2003).

Chua et al. (2012) argue that reorganizing work processes (behavioral control) and redesigning office space (input control) as proposed by the controllee are helpful events for the successful enactment of clan controls. Enacting formal controls in an authoritative style interferes with the promotion of informal controls. The authoritative style limits the controller-controllee interactions to unidirectional communication demands (Adler and Borys, 1996). This creates a scenario where the controllee stays in the confines of the inputs, behaviors, and outcomes outlined by formal controls, lowering the ability and conduciveness of the controllee to promote informal controls. For the enabling style, the quality-enhancing effect is consistent with (Gopal and Gosain, 2010) empirical support for the positive link between the quality of the project outcomes and the collaborative team culture.

The distinctive features in an enabling style are vital to helping the controller understand which enacted controls work and which do not, as well as helping the controllee understand the rationale for the enacted controls and any recent developments in the IT project context. The environment created using the enabling style favors the development of trust, which encourages the controller and controllee to openly discuss and mutually agree upon practical adaptations and improvements that may become clear when the project activities have begun (Tiwana, 2010). Enacting controls in an enabling style can promote both quality and adaptiveness in IT projects. Existing literature (Ahrens and Chapman, 2004, Jørgensen and Messner, 2009) corroborates the fact that the enabling style allows for better management of tension between traditional performance goals and adaptive goals. Gregory and Keil (2014) argue that to achieve an IT project's ambidexterity—the traditional performance aspect and adaptiveness aspect—the authoritative and enabling control styles should be used in combination. Although the hybrid results of using the two styles may bring about tensions that a single project manager may find difficult to cope with, these issues can be handled alongside each other by two project managers who draw on contrasting control styles.

Recently, Gregory et al. (2018) came up with an explanation of how and why IT consumerization leads to the transformation of IT governance in large organizations. They view IT consumerization as a process in which changing practices and expectations of consumers—shaped by the wide adoption of digital technologies in everyday life—influence the IT-related activities of workers and managers in organizations. They further identify two mechanisms whereby everyone's IT influences the IT-related activities of workers (Figure 2). The first mechanism is the enactment of everyone's IT beliefs by consumer-workers. In other words, when there is increased engagement with consumer digital technologies by the workers (Mazmanian et al., 2013), it starts to bring consumer judgments and behaviors into the workplace, resulting in a dual role of consumer-workers (Gabriel et al., 2015). The second mechanism is that the enactment of everyone's IT beliefs by consumer-customers has not been studied much and yet plays a crucial role in influencing the IT-related activities of workers in organizations.

Wiener et al. (2016) provide an integrative view of IT project control that incorporates both control portfolio configurations (what) and control enactment (how). They state that power asymmetries between controller and controllee offer guidance regarding the choice of control style and that IT project performance problems can prompt a shift to an authoritative control style. This indicates how control enactment can inspire further research on control dynamics if it focuses on the dynamics of the interactions between controller and controllee. Furthermore, they state that different control styles

are likely to promote the efficiency, quality, and adaptiveness of an IT project to different extents. Managers have to decide on a control style that matches the priorities of the organization or the project outcomes. The other possibility could be having two managers who enact control in the IT project using different styles (Gregory and Keil, 2014). Wiener et al. (2016) show that most of the existing literature focuses on contextual antecedents and performance consequences of control portfolio configurations (what), and little is said about control enactment (how).

Continuing from the preceding discussion, digitalization increases demands on ambidextrous capabilities, and IT governance needs to support and drive these capabilities rather than counteract them. Bimodal IT—which suggests the division of the IT function into two separate entities, that is, efficiency-centered IT and innovation-centered IT—is likely to lead to structural ambidexterity (Benner and Tushman, 2003, Birkinshaw et al., 2016, Raisch and Tushman, 2016) advocated for by industry analysts and consultancy firms through increased proactivity (Xue et al., 2017). Structural ambidexterity brings new professional roles into the public sector, especially the role of overseeing the digitalization agenda (Singh and Hess, 2017).

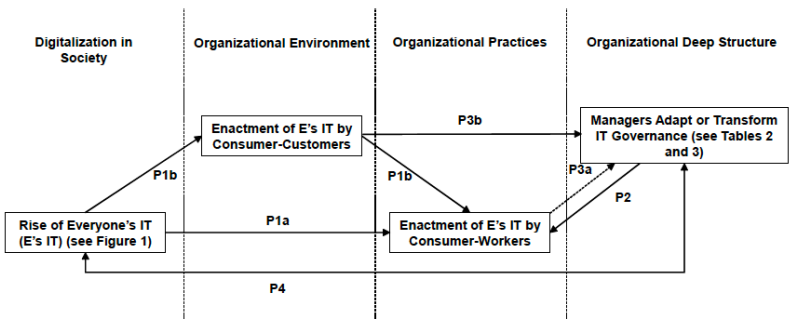

Figure 2 IT consumerization and IT governance transformation (adapted from (Gregory et al., 2018)The Ps refer to the propositions made in the paper)

At the same time, overreliance on structural separation rather than other alternatives, such as temporal separation (Romanelli and Tushman, 1994, Siggelkow and Levinthal, 2003) or contextual ambidexterity (Birkinshaw and Gibson, 2004, Gibson and Birkinshaw, 2004), could oversimplify the need for ambidexterity in IT governance. Gregory et al. (2015) argue that the increased interest by organizations to manage the paradoxical tensions regarding demand for ambidextrous capabilities resulting from digitalization signifies the emerging enactment of ambidextrous IT governance. This calls for achieving efficiency and innovation simultaneously, which are both necessary and feasible to drive performance (Junni et al., 2013). To corroborate this, new

findings have been associated with how this is possible through IT governance redesign (Chi et al., 2017, Gregory et al., 2018, Mithas and Rust, 2016). However, other studies suggest that ambidexterity is studied in an exceedingly acontextual, configuration-driven approach (Heracleous et al., 2019, Raisch and Birkinshaw, 2008). More recent studies in the organizational ambidexterity field also call for disbanding the static perspective of ambidexterity (Luger et al., 2018, Zimmermann et al., 2018) and push for more process-oriented perspective studies focusing on enactment.

2.3 Ambidexterity and Digitalization

To achieve successful control enactment, ambidexterity—in the form of traditional performance and adaptiveness aspects—is necessary. IT governance enactment in healthcare organizations has created tensions regarding whether exploitation or exploration should be the outcome of IT governance implementation. This question calls for exploring the best ways to balance exploitation and exploration, which is otherwise referred to as ambidexterity. Organizational ambidexterity (Raisch et al., 2009b) has emerged as a research archetype to explore central tensions in organizations. As a result, Raisch et al. (2009a) argue that organization mechanisms may be required to enable ambidexterity at the individual level, and ambidextrous individuals may be vital to the usefulness of organizational mechanisms. Should organizations achieve ambidexterity through differentiation or integration? Should ambidexterity occur at the individual or organizational level, or should it take on the static or dynamic perspective? Should it arise internally, or is there a need to externalize some processes? These are some of the questions for which previous studies (Gibson and Birkinshaw, 2004, He and Wong, 2004, Lubatkin et al., 2006) regarded the tensions between exploitation and exploration as challenging. However, contemporary research describes ambidextrous organizations that are in position to simultaneously exploit existing competencies and explore new opportunities.

According to ambidexterity theory, the emphasis on dual IT in relation to IT flexibility and standardization is likely to lead to better organizational performance than the emphasis on IT flexibility or standardization (Gibson and Birkinshaw, 2004). IT ambidexterity could have moderating effects on the connection between interorganizational IT governance strategies and relational performances (Chi et al., 2017). Furthermore, IT ambidexterity is likely to support higher organizational performance due to causal ambiguity (Mithas and Rust, 2016). The positives as a result of the complementary effect of IT ambidexterity and interorganizational IT governance strategies are difficult to separate from the publicly available information because organizations

following this novel process defy conventional logic, and their initiatives and resulting competitive advantages are hard to classify. The adaptability and scalability of digital technologies are reflected in IT flexibility (Tallon and Pinsonneault, 2011); thus, IT flexibility can complement contractual governance, while IT standardization can complement relational governance. The absence of the complementing effects of IT ambidexterity to help mitigate the limitations of unbalanced governance strategies would lead to the pursuit of balanced governance strategies in organizations with low levels of IT ambidexterity; the reverse would also be true (Chi et al., 2017).

Organizations have started to divide the IT function into two entities, namely, IT geared toward efficiency and IT geared toward innovation (Youtie and Shapira, 2008). The former is handled in a type of shared service center configuration, whereas the latter is handled through temporary entities, for example, innovation hubs. This separation is akin to the structural separation (Birkinshaw et al., 2016) that analysts argue is a path to bimodal IT (Haffke et al., 2017) through increased proactivity (Xue et al., 2017). The structural separation has led to the introduction of a new professional role—chief digital officer—that is gaining popularity and handles the digitalization agenda of the organization (Singh and Hess, 2017). In circumstances where an organization hires new people in the exploitation and exploration roles, Groysberg and Lee (2009) state that those hired for exploration roles experienced an immediate drop in performance that persisted for some time. This decrease in performance was attributed to the fact that the person moved alone from the previous workplace, leaving others behind who would have provided beneficial support. As for the people who join new organizations in exploitation roles, it was observed that they also experienced a drop in their performance but for a shorter time. These results suggest that at the individual level, the chances of success are lower in exploration activities, thus tending toward exploitation. The growing interest of managing the paradoxical tensions between exploitation and exploration in organizations brings to light what happens when IT governance is enacted (Gregory et al., 2015). This is consistent with organizational ambidexterity (March, 1991, Raisch and Birkinshaw, 2008, Smith et al., 2016) research, which regards natural trade-offs as unnecessary. Today, performance is dependent on how organizations balance exploitation and exploration. This is corroborated by recent studies (Chi et al., 2017, Chou and Liao, 2017, Saldanha et al., 2017) which argue that this balance is possible through redesigning IT governance.

The redesign of IT governance is primarily a result of digitalization, which increases the demands for ambidextrous capabilities that need to be supported and driven by IT governance rather than counteracted by it. Organizations' increasing interest in managing the paradoxical tensions inherent in the

demand for ambidextrous capabilities due to digitalization denotes the emerging enactment of IT governance (Gregory et al., 2015). It further calls for achieving efficiency and innovation simultaneously, which are both feasible to drive performance (Junni et al., 2013). Therefore, it is possible, according to recent findings from Gregory et al. (2018), to redesign IT governance.

On the other hand, other studies (Luger et al., 2018, Zimmermann et al., 2018) push for a more process-oriented perspective through a focus on enactment. They suggest the disbanding of organizational ambidexterity studies with the static perspective. These studies focus their arguments on bandit models (Lee and Puranam, 2016, Posen and Levinthal, 2012, Stieglitz et al., 2016), which use the analogy of a slot machine with *N* arms to model policy choices. Any policy that is considered to have a superior payoff indicates an exploitative choice, whereas the unknown policy taken as inferior indicates an exploratory choice. (Lee and Puranam, 2016) and (Posen and Levinthal, 2012) argue that the specific degree of balance between exploitation and exploration is best for organizational performance. The process that involves exploratory and exploitative actions, where feedback from the actions constructs beliefs about alternatives, is referred to as the underlying mechanism of reinforcement learning (Sutton and Barto, 1998). In addition to the ambidexterity theory, Luger et al. (2018) suggest that ambidexterity shows reinforcing effects over time. The effects of self-reinforcement lead organizations with high levels of slack into maintaining their ambidextrous orientation. The stability is good or bad for organizations' long-term performance depending on the environmental conditions they face. Organizations in environments with incremental changes benefit more from the learning effects of maintaining ambidexterity over time, resulting in positive performance. Those organizations with discontinuous change environments face the inertia and misalignment that self-reinforcement creates, leading to undesirable performance. The dynamic perspective pushed by Luger et al. (2018) shows that self-reinforcing effects are not only associated with focused strategies (Levinthal and March, 1993) but can also be an outcome of practicing balanced orientations. Moreover, they reconceptualize ambidexterity as the ability to dynamically balance exploration and exploitation, which emerges from combining capability-building processes (to balance exploitation and exploration) with capability-shifting processes (to adapt the exploration-exploitation balance). It is important, however, that managers advised to balance exploitation and exploration take caution to remain adaptive and continue adjusting their organization's exploitation-exploration allocation to match the changing environmental conditions. In reality, managers are forced to simultaneously address multiple tensions if organizations are to dynamically balance their exploitative and explorative actions.

3 THEORETICAL FRAMEWORK

Resource orchestration (Sirmon et al., 2011) is a result of merging the resource management framework (Sirmon et al., 2007) and the asset orchestration framework (Helfat C et al., 2007). The argument is that it is possible to increase the accessibility of the manager role in achieving a resource-based competitive advantage by reviewing, contrasting, and integrating the processes included in the logic of asset orchestration. The integration yields a more comprehensive review of what they term *resource orchestration*. They go on to develop a more robust perspective of resource orchestration to consider variance in organizations' breadth (scope of firm), depth (levels of hierarchy), and life cycle (stage of maturity). They argue that the breadth, depth, and life cycle affect how managers manage their organization's resources to maximize the likelihood of achieving a competitive advantage. The competitive advantage is more in the line of an organization remaining relevant and working on its sustainability in the face of digitalization.

Work on resource management distinguishes the processes of structuring, bundling, and leveraging from the actual resources being managed (Sirmon et al., 2008). Ray et al. (2004) state that processes are "actions that organizations engage in to accomplish some business purpose or objective" (p. 24). Thus, the processes of resource management refer to what Kraaijenbrink et al. (2010) call "managerial capabilities" (p. 356). In essence, managers engage in structuring, bundling, and leveraging processes with the purpose of effectively utilizing the organization's resources to reach an objective, such as entering and successfully competing within target markets. This is supported by the empirical tests by Ndofor et al. (2011), and the results show that managerial actions mediate the resource-performance linkage, thereby providing support for the manager's role in creating a competitive advantage. Valuable and rare resource management actions are important to the recovery of organizations facing performance crisis (Morrow Jr et al., 2007). Managers' actions must simultaneously address the strengths and weaknesses of capabilities in order to realize a competitive advantage (Sirmon et al., 2010). Helfat and Peteraf (2009) produced a related framework based on asset orchestration that consists of two primary processes: search/selection and configuration/deployment. The search/selection process requires managers to identify assets, make investments concerned with them, design organizational and governance structures for the organization, and create business models. The configuration/deployment process requires coordinating cospecialized assets, providing a vision for those assets, and nurturing innovation.

Resource orchestration comprises structuring, bundling, and leveraging processes (Figure 3). The structuring process involves three subprocesses: acquiring, accumulating, and divesting. Acquiring is about identifying and procuring the needed resources to enable the organization to achieve its strategy. The accumulating subprocess involves managing the internally available resources to get more value out of them. Divesting involves doing away with the resources that no longer help the organization create value, for example, a change of equipment. As noted earlier, the three main processes feed into search and configuration, and the search process involves identification, investing, governance, and a business model. The key here is that to acquire a resource, identification must occur first, which is handled in governance, showing the interdependence of the two processes in resource orchestration. The bundling process is also made up of three subprocesses: stabilizing, enriching, and pioneering. Stabilizing is about taking on minor incremental improvements to existing capabilities. Enriching then involves extending the existing capabilities, and pioneering goes a little further by focusing on creating new capabilities. The final process, leveraging, involves mobilizing, coordinating, and deploying strategy subprocesses. Mobilizing involves providing a plan or vision for the capabilities needed to form requisite capability configurations. Coordinating involves integrating capability configurations to work toward achieving the vision of the organization. Deploying strategies is more about following up on the capability configurations formed by the coordinating subprocess. The bundling and leveraging processes are also interdependent with the configuration/deployment process. Each of the structuring, bundling, and leveraging processes and subprocesses are important, but there is no specific way of pursing the resource management framework; rather, there are many ways that can be pursued to yield results. The most important thing to note is that an organization needs to work at synchronizing all the processes in order to yield good results (Sirmon et al., 2011).

Resource orchestration draws on both resource management and asset orchestration, with an emphasis on how managers can achieve a resource-based competitive advantage. Sirmon et al. (2011) explore the integration of the two frameworks by addressing issues not previously considered, including the organization's breadth (scope of the organization), depth (levels within the organization), and life cycle. Based on their study, this research focuses on the depth of the organization in order to explore how managers at different levels work together to enact resource orchestration.

Resource orchestration is fundamental in the development and implementation processes of a range of organizational strategies. Managers need to create synergy by integrating across diverse business divisions to promote

cooperation among the divisions. This may require the formation of liaison units or positions that are described in the control styles in the Precursory Findings section. These units or positions should facilitate information flow, encourage joint decision-making, and work at building trust between managers in each of the units. Employing the enabling style of control is one way of achieving this, among others. Subsequently, changes to the organization's governance and incentives may be handy. If the coordination is done in an acceptable manner, the sharing of acquired or accumulated resources among units is likely to follow. In comparison to the resource management framework, this acquired knowledge facilitates enriching and pioneering, which are bundling activities that can be leveraged as deemed fit by each unit, ultimately facilitating resource orchestration.

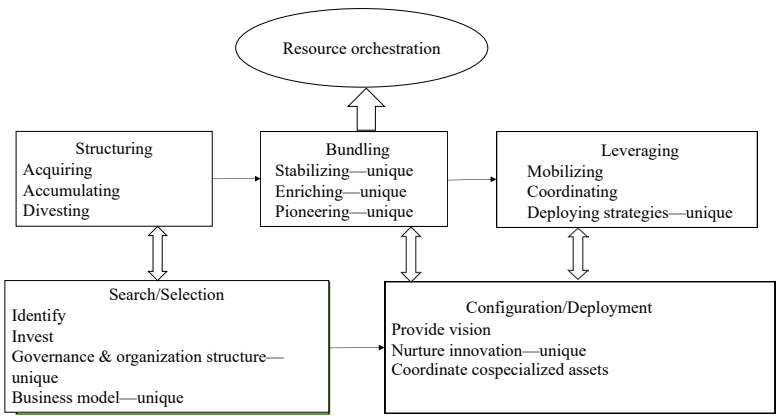

Figure 3 Resource orchestration framework (adapted from (Sirmon et al., 2011))

To achieve the organization's outcomes, the resource portfolio needs to be structured and bundled to allow for the appropriate capabilities to effectively implement their strategy. Hitt et al. (2006) argue that both human capital and relational capital moderate the relationship between internalization and organizational performance. This puts the managers in a position where they have to search for resources to help build their organization's human capital and then use the human capital by assigning jobs in the best way to effectively implement the organizational strategy. Building relationships with key stakeholders is important as a foundation for ensuring organizational success when implementing the strategy. Sometimes getting in the required human capital may be expensive, leaving managers with the option of developing talent internally (bundling actions). In general, by implementing corporate- and

business-level strategies, managers can achieve a competitive advantage if they orchestrate the organization's assets and configure the capabilities appropriately. Many times, the competitive advantages are short-lived, and the need for sustainability arises, which managers can realize through orchestration of their resources to implement strategies that contribute to a series of momentary competitive advantages over time (Sirmon et al., 2010). This research argues that ambidextrous IT governance is necessary for organizations to achieve adaptive governance (Janssen and Van Der Voort, 2016) and agility (Mergel, 2016).

At the core of this research is the conceptualization of ambidexterity as activities directed toward exploitation or exploration (March, 1991). Following Benner and Tushman (2003), in this research, we regard exploitation as activities related to exploiting existing opportunities. Following the same rationale, exploration is regarded as activities related to exploring new opportunities. This research further refers to exploitation as efficiency and to exploration as innovation, according to Teece (2018) and Xue et al. (2012). Going by Zimmermann et al. (2018) and Luger et al. (2018), this research considers ambidexterity as a continuous process rather than a steady state. Through this dynamic perspective, balance is not static but continuously evolving (Teece, 2018). Gilley and Rasheed (2000) state that the level of innovation is contingent upon the dynamism of the outside environment. Thus, organizations acting in a highly dynamic environment will need to display a higher level of innovation than organizations acting in nondynamic environments (Luger et al., 2018). Using the definitions of ambidexterity by the different authors, this research develops a method for assessing the current ambidextrous balancing point based on the resource orchestration actions occurring in healthcare organizations in two settings (Sweden and Uganda) and from secondary material, such as policy documents, supported by the findings from Uotila et al. (2009) that content analysis holds great potential for studies of ambidexterity.

All organizations go through the different life cycle stages—start-up, growth, maturity, and decline—and it is imperative that organizations investigate resource orchestration efforts across their life cycle. For a long time, entrepreneurs have had the task of identifying, accumulating, and acquiring resources that enable their organizations to gain legitimacy and viability in the marketplace (Miller and Friesen, 1984). Efficient transactions between stakeholders and organizations in their earlier stages are driven by legitimacy, which is especially important for the Ugandan setting in which healthcare organizations are more or less at the start-up stage. To gain legitimacy, an organization should attempt to understand and conform to at least formal institutional rules and regulations (Webb et al., 2009). This legitimacy may

also require understanding the informal institutional norms and values of target customers. Without going through the other stages that make up the breadth of the organization, note that resource orchestration actions are important at every stage of the organization's life cycle. But again, every stage emphasizes the importance of one or two resource management actions. Understanding the requirements at each stage of the organization's life cycle is important to extend growth and promote the organization's strategy.

Research on the role of managerial action in achieving competitive advantage has, in most cases, assumed the actor to be a chief executive or, in some cases, has not stated the different managerial levels. The conceptual arguments of (Helfat and Peteraf, 2009, Sirmon et al., 2007) do not identify the management level to which they apply, although most of the studies analyze the top-/senior-level manager. Other empirical studies, such as Holcomb and Hitt (2007) and Sirmon et al. (2008), have limited their investigations to a single managerial level. Given that organizational structures vary in size and complexity, different levels of management coexist with each level, and all of them contribute to achieving the competitive advantage. This thesis focuses on the different levels of management, that is, top-, middle-, and operational managers, as previous studies (Floyd and Lane, 2000; Ireland et al., 1987) grouped them, to explore how they carry out resource orchestration actions to balance exploitation and exploration. For that reason, the structuring, bundling, and leveraging subprocesses of resource orchestration (Figure 3) vary by managerial levels. The quality of information transferred between managers commonly decays when managerial hierarchies exist (Teece, 2007). These decays may disrupt managerial incentives, leading to more complexity in the synchronization of resource orchestration actions than the existing work suggests. Like the arguments of the different control styles, Floyd and Lane (2000) also posit that the main differences involved at the different managerial levels are dependent on the variance in behaviors and the amount and type of information each manager holds. Operational managers deal with the day-to-day activities of specific groups within the organization, and top management is focused on the overall organization. Middle managers are understood differently depending on the size and diversity of the organization. In this research, we consider them as holding the position between top managers and operational managers (Wooldridge, Schmid, and Floyd, 2008).

When an organization adopts a top-down strategy, the top managers direct, the middle managers implement the strategy, and the operational level managers adapt to the plan. In this case, the top managers provide the vision and plan of action. Some of these plans may require a change in resource portfolio (structuring actions), necessitating the top managers to act. These structuring actions call for the top managers' emphasis and control of the deployment

(leveraging). The middle managers take on the task of building the organization's capabilities, which is referred to as bundling. They follow the top management's structuring and leveraging actions as a guide to selecting the appropriate bundling approach, which might take on stabilizing, enriching, or pioneering. By default, the operational managers work under the supervision of the middle managers to adapt the strategy. In the top-down strategy, like the authoritative control style, the synchronization of resource orchestration actions is likely to be high in the top-down sequence because the roles for each level are clearly defined. With no room to explore, the process value is reduced as operational managers follow clear directives flowing down from the top.

In the bottom-up strategy, top management approves plans backed by middle managers, which, in most cases, are based on localized experiments by operational managers (Floyd and Lane, 2000). They often get approvals due to the influence and trust they have built based on successful mediation of information flows within the organizational hierarchy. Thus, they take on greater responsibility for the necessary resource orchestration actions. Top management tends to delegate authority to middle managers who can then supervise the structuring, bundling, and leveraging activities. In this way, risk is reduced because the delegation eliminates conflict that can develop due to information decay as communication occurs across hierarchical levels. Ultimately, there are fewer resource orchestration actions because they are based on localized experiments and approved on a contingent, incremental basis that reduces risk and increases exploration. The link created by middle managers between the activities of top managers and operational managers indicates that middle managers play a key role when an organization navigates technological changes (Taylor and Helfat, 2009), such as from a core technology to a new technology (divesting actions), in order for the organization to survive the competitive dynamics.

Resource orchestration has been a top managerial concern, as highlighted by Sirmon et al. (2011). The understanding of how IT governance is enacted in healthcare organizations through resource orchestration actions and how IT governance mechanisms in healthcare organizations align is embryonic. These gaps offer considerable practical significance because they address necessary governance practices that impact the capability of IT to influence the balance between exploitation and exploration. The overall rationale in this research is how resource orchestration can influence enacting ambidextrous IT governance to support digitalization in healthcare. Maes et al. (2012) indicate that implementation of processes, structures, and relational mechanisms enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled investments (p. 2–3).

In the same way, Sirmon et al. (2011) also demonstrate how resource orchestration explicitly addresses the role of managers' actions to effectively structure, bundle, and leverage the organizational resource portfolio. This research proposes that effective structuring, bundling, and leveraging of resources in healthcare organizations coupled with organizational ambidexterity lead to enacting ambidextrous IT governance, which is considered critical in the digitalization of healthcare.

According to previous literature, resource orchestration in an organization can start from any level; however, mobilizing the various actions needed to support resource orchestration depends on the type of strategy used. Just as synchronization among organizational activities is vital, it is hard to achieve the needed degree of coordination if a bidirectional sequence is used. Subsequently, middle managers are essential to ensuring that structuring, bundling, and leveraging activities are harmonious. Another aspect that could generate debate and possible research is the role of managerial levels in synchronization (Sirmon et al., 2011). Theory from the resource-based view suggests that resources influence organizational performance (Crook et al., 2008). Although this does not mean that organizational performance is based on an organization's resources, organizational performance is attributed to the involvement of managerial action regarding structuring the organization's portfolio of resources, bundling those resources into capabilities, and leveraging the capabilities to realize competitive advantage (Helfat C et al., 2007, Sirmon et al., 2007). Because tensions are involved in organizations while working at balancing exploitation and exploration, it is imperative that organizations venture into the different configurations as a means of determining what works well for supporting the digitalization of healthcare in healthcare organizations. Ambidexterity, from the configurational perspective, begins from operational managers' continuous modeling and remodeling of the organizational contexts they face (Zimmermann et al., 2018). In contexts characterized by incremental change, organizations take advantage of the learning effects of sustaining ambidexterity, which results in greater performance (Luger et al., 2018).

Alternative perspectives to study ambidexterity include dynamic capabilities, which govern how an organization integrates, builds, and reconfigures internal and external competences to address the changing environment (Teece et al., 1997). Dynamic capabilities are characterized by the ability of organizational and managerial competences to predict and shape the environment and then develop models that address new threats and opportunities. In a way, these capabilities define an organization's capacity to innovate, adapt to change, and create change that is favorable to customers and unfavorable to competitors. Teece (2007) categorizes dynamic capabilities as being able to sense the

unknown future—identifying, developing, and evaluating technological opportunities—in relation to customer needs and mobilize resources to address needs and opportunities for the organization's benefit and continued transformation. These categories need to be continuously engaged. Furthermore, dynamic capabilities must be separated from strategy formulation but must be consistent with the strategic direction that emerges from the strategy process. Teece (2018) adds that business models, dynamic capabilities, and strategy are interdependent. Thus, a strategy that is clear and accommodating of innovation is as vital as dynamic capabilities to achieving ambidexterity. In addition, strategy and capabilities need to be developed together in such a way that they can be analytically separated.

In this thesis, one way of enacting ambidextrous IT governance is through the various activities that take place in healthcare organizations at the different stages of resource orchestration. Resource orchestration actions at all stages are enforced by the different managerial levels and may be done in different ways. Top management, for example, may issue guidelines to help the organization achieve its mission and objectives, and then the middle and operational managers will take up and agree on which activities will enable the organization to achieve its objectives. This may require procurement of new IT equipment or systems in addition to the existing infrastructure and may also call for divesting some of the infrastructure (structuring). If new systems are not procured, however, the capabilities of existing systems may need to be improved or used in a new way (pioneering) for better productivity, which is the bundling stage of resource orchestration. Next, the leveraging stage is about providing the vision and nurturing of innovation, and this is mostly the role of top management in conjunction with middle managers and sometimes the operational managers, depending on how control enactment is done in the organization. Given that background, the conceptual model that guided the research is shown in Figure 4.

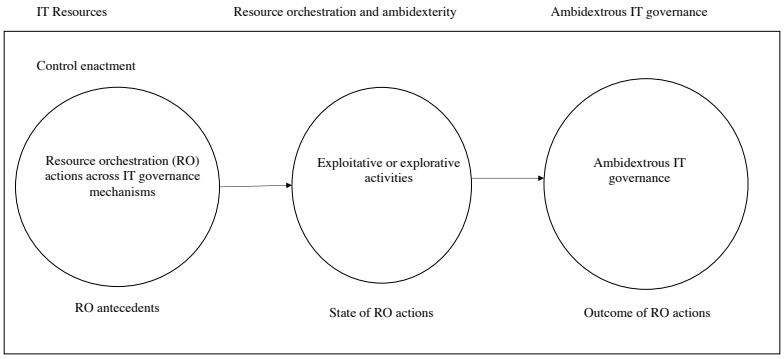

Figure 4 Conceptual model of research

4 METHOD

This section describes the methods, empirical settings, and procedures used in collecting and analyzing measures of the variables specified in the research problem. This research employed qualitative data collection and analysis strategies using an open-ended and exploratory research question. The suitability of exploratory questions as a basis for qualitative inquiry is determined when little is known in a particular research area, when existing research is not moving forward, and when the topic is complex (Barker et al., 2002). Exploratory questions can mainly be definitional, descriptive, or interpretative. An interpretative approach was adopted to advance theoretical insights (Ozcan and Eisenhardt, 2009). According to (Orlikowski and Baroudi, 1991), interpretivism attempts to understand phenomena through the meanings that people assign to them. In this respect, this research explored perspectives of the individuals of the ecosystem in the two settings (i.e., Sweden and Uganda) and the values and meanings they attach to IT governance in the digitalization of healthcare in general. The ecosystem in this context included the HIT staff, clinicians, and managers at different levels in healthcare and regulatory organizations. Secondary sources of data included online newsletters and organizational documents on the websites of healthcare organizations involved in the research in the two settings. They also included IT policies concerned with digital healthcare/eGovernment and healthcare in general in the two settings.

The research was qualitative and as transparent as possible, which was especially helpful when analyzing interviews that involved but was not limited to interpretation of the interview text by the researcher (Myers et al., 2007). The interviews were done both informally, which allowed interviewees to relay their views, and formally, which made use of a structured interview guide. The research was designed as an exploratory and descriptive multiple-case study (Yin, 2013). The case study method typically helps to answer the “how” or “why” questions, and it is appropriate for the study of a contemporary phenomenon in a real-life context in which the researcher has little or no possibility to control the events. Case study is an empirical inquiry suitable for studying complex social phenomena. Some of the procedural characteristics in these complex phenomena may include many variables of interest, multiples sources of evidence, and theoretical propositions to guide the collection and analysis of data. Furthermore, the research’s theoretical propositions were geared toward pointing attention, limiting scope, and suggesting possible links between phenomena in the two settings. The research units of analysis were embedded designs, including managers at different levels and some key stakeholders in healthcare governance (multiple units of analysis), which were

helpful in looking for evidence across the various units but within each of the different settings.

The case study approach was adopted particularly because it permits researchers to understand the nature and complexity of the processes taking place in a given environment. Given the limited knowledge of the resource orchestration perspective as an emerging field, it is necessary to develop theories to explain resource orchestration practices in healthcare, and the case study methodology helps in this endeavor. Furthermore, case-based research permits researchers to investigate the phenomena of interest embedded in specific contexts, as was done in this research. The two contexts were Sweden, which represents a developed economy, and Uganda, which represents a developing economy. The aim was to understand how ambidextrous IT governance is enacted in healthcare organizations.

4.1 Empirical Description of the Swedish and Ugandan Settings

The research was done in Sweden and Uganda to represent a developed and a developing economy, respectively. The two settings are characterized by varying levels of environmental dynamism. The rationale for the selection was related to the underlying assumption within organizational ambidexterity that the level of dynamism in the environment impacts the optimal ambidextrous balancing point (Raisch and Birkinshaw, 2008). The environment with high dynamism is linked to a higher emphasis on exploration than in lower levels of dynamism. As such, we expected to find juxtaposed balancing points in the two settings. Sweden was selected as an example of a country with a lower level of dynamism and deemed a developed economy, whereas Uganda was selected as a country with a higher level of dynamism and deemed a developing economy.

The Västra Götaland Region (VGR) was selected on the basis that it is a relatively large organization with about 55,000 employees and is a driving force for development in West Sweden. The region has collaborations at many levels with academia, the private sector, and other public organizations. Moreover, the VGR has a history of many successful IT projects while partnered with the European Union (Vastra Gotaland Region). However, the successful projects have not been free of challenges. In addition, most of the developed systems are limited in that they are only able to serve individual county councils within the VGR. This makes sharing information among the different county councils complicated, creating an impediment to the digitalization of healthcare and negatively impacting the effectiveness of

healthcare service delivery. In the VGR, governance is set up so that each county council takes care of its healthcare. For example, when people visiting other counties find themselves in need of medical help from their county council, they must print out their medical history and share it with the doctor in the other county council themselves due to the inability of healthcare organizations across the region to share information.

As a politically governed region, one of the VGR's missions is to ensure that its population has access to good medical care, among other services. In terms of IT governance, which involves decision-making rights and accountabilities (Weill and Ross, 2004), the hierarchy in the VGR plays an important role in who is accountable for the major decisions and for implementing what is agreed upon. The VGR has different levels of managers in healthcare organizations, and the HIT managers at various levels provide unique input into the ecosystem. If any improvements need to be made, there must be mutual consent among the different stakeholders and regarding the different professional logics (Boonstra et al., 2017) in the healthcare organization, which are dependent on the regulations in place to guide the different processes.

In Uganda, a low- and middle-income country (LMIC), the research was carried out in healthcare organizations in the capital city of Kampala and in two towns: Mbale in eastern Uganda and Fort Portal in western Uganda. As the capital city, Kampala is home to both public and private healthcare organizations. The private healthcare organizations offer top-tier healthcare services insofar as Uganda is concerned. Kampala is also home to government ministries and authorities (i.e., regulators) that influence both IT and healthcare policies. Many of the HIT systems and applications are mainly deployed in the private sector; therefore, understanding the state of healthcare in Uganda necessitated carrying out the research in Kampala. To get an understanding of the inner workings of public healthcare organizations, the up-country towns were selected because they are home to the regional referral centers, which are public healthcare organizations meant to refer patients to the national referral hospital in Kampala. Conducting research in the two regional referrals provided an understanding of healthcare service delivery in the other parts of the country. The focus, however, was on governance and how the available IT systems could support the digitalization of healthcare. Given the low digital base in Uganda, many public healthcare organizations are likely still at the start-up stage, while the private healthcare organizations are assumed to be in the growth stage (Sirmon et al., 2011).

The empirical setting is described on the basis of resource orchestration, as explained by Sirmon et al. (2011) in regard to the variations in scope, levels of hierarchy, and stage of maturity of the organization. This research focuses on

the levels of hierarchy deep into the organization. In the two settings, data collection was done in two phases: In the first phase, suitable online secondary data sources and newsletters regarding healthcare initiatives were selected. In the second phase, interviews were conducted with 21 respondents (10 in the Swedish setting and 11 in the Ugandan setting), as shown in Table 1. IT policies concerned with digital health/eGovernment and healthcare in general were also collected as additional secondary data sources in this phase. The secondary data sources portrayed the VGR as a well-established organization that is funded and overseen by political leadership. In terms of hierarchy, the VGR has top-, middle-, and operational managers in the various healthcare organizations. The available information led to the categorization of the VGR as being at the mature stage, given the strategies it uses and the operating procedures it applies as a way of achieving clarity in its internal and external environments. This is premised on the fact that the VGR hires experienced personnel to help refresh and improve its resource portfolios and build capabilities to back up new innovation efforts (Sirmon et al., 2011).

Table 1 showing respondents interviewed in the organizations and their roles in the two settings

Swedish setting			Ugandan setting		
Organization*	Role	Management level	Organization*	Role	Management level
Black	Head of Fund	Top	Omega	Head IT	Middle
Yellow	Area IT Manager	Middle	Beta	IT Manager	Middle
Red	IT strategist/Radiology	Operational	Alpha	Systems Administrator	Operational
Blue	Strategist and Enterprise Architect	Operational	Gamma	IT Head	Middle
	Strategic Architect	Operational	Phi	Manager Medical Services	Middle
	eHealth Expert/Radiology Nurse	Top	Delta	IT Officer	Operational
	Head Care Digitalization/Retired Medical Doctor	Middle	Theta	IT Officer	Operational
	Digitalization Strategist	Middle	Lambda	IT Head	Middle
	Chief Standardization officer	Top	Kappa	Commissioner	Top
Green	Programme Manager Prehospital ICT Arena (PICTA)	Middle	Epsilon	Director e-government services	Top
				Health Lead	Operational

**Pseudo names are used for the organizations*

4.2 Data Collection

Before the interviews were conducted, it was important that potential organizations and participants were identified to get an indication of potential participants. This was done via online searching and contacting my social network to identify which organizations were suitable. More informally, colleagues gave recommendations of potential respondents in various healthcare organizations in both settings. Following the recommendations from colleagues and results from the online searches, e-mails were sent and some telephone calls were made to potential participants. In some instances, informal meetings were arranged by my colleagues with influential managers in organizations that were deemed relevant in the online search to discuss and clarify the intentions of the interview and later seek access even to other potential respondents within the organization. These meetings also enabled proper time and location scheduling for the interviews.

It was also important that the interview guide was in place. This guide was formulated from reading various online articles along with the relevant literature. The questions were skewed toward getting the respondents to share their experiences and, in so doing, to answer the research question. Although the schedules included complete questions for the informants to answer, it was not the aim of the interviewing procedure to read the questions verbatim. Throughout the interviews, an in-depth, semi-structured (i.e., conversational) interviewing style was adopted to encourage the respondents to speak personally and at length about their experiences regarding the orchestration of digital resources in their organizations, while simultaneously covering the issues in the research question. This resulted in efforts to strike a constant balance between what was interesting to the interviewer and the interviewee. Thus, the relationship between the two parties swung between impersonality and rapport. After meeting and interviewing some of the respondents, they recommended other potential respondents, resulting in a snowball effect (Biernacki and Waldorf, 1981). The interviews were conducted with a sample of 21 respondents, of which 10 interviews were done in the Swedish setting, and 11 were done in the Ugandan setting. Respondents were asked about their experiences in their work positions, how they determine the position or place where resource orchestration actions happen, and how the organization orchestrates digital resources across the different levels of management (i.e., depth of the organization).

Respondents were chosen carefully by following the purposive sampling method (Silverman, 2013), which involved critically thinking about the parameters of the population that was studied. Thereafter, the snowball sampling (Biernacki and Waldorf, 1981) was done using the social networks

of one or two initial respondents. The prospective respondents were contacted through e-mails that included a summary of what the research was about and a request to persuade their friends to also get involved by asking them if they would be available for an interview at a convenient date, time, and location. The research used information from a total of 21 interviews primarily because qualitative interview studies tend to be conducted with small numbers and with rather informal patterns of questioning where the aim is to allow the respondent (interviewee) to set the pace (Silverman, 2013). The other reason was that saturation (Guest et al., 2006) had been reached after interviewing the 10 respondents in the Swedish setting and the 11 respondents in the Ugandan setting. The respondents seemed to be talking about similar occurrences and more or less corroborating each other.

The different respondents were categorized as top-, middle-, and operational-level managers. The top managers are at the highest level of the management hierarchy and are responsible for the welfare and survival of the organization. These top managers, which include the chairman, managing director, board of directors, C-suite officers, president, vice president, and general manager, among others, are responsible for the ultimate success or failure of the organization. Middle management acts as a link between top management and supervisory management. They are mainly responsible for implementing and controlling plans and strategies formulated by top management. They receive orders and plans from top managers and get work done through the operational managers. Middle management consists of heads of departments such as Finance, IT, and Sales. The operational managers are at the bottom level of management, which is considered operative management. Operational managers are first-line managers, such as supervisors, foremen, and inspectors, who oversee the efforts of the workforce and actually carry out the operational work in the organization.

De Haes and Van Grembergen (2006) show that the necessary elements of an IT governance network are structures, processes, and relational mechanisms. The respondents in this research at the various levels of management fall mainly under the element of structures in this IT governance framework. The data from the interviews provided insights into the processes and relational mechanisms in the organizations of the respective respondents. For instance, in terms of hierarchy in healthcare organizations in Uganda, there are government bodies, in addition to the organizational hierarchy, that act as regulators to oversee the enforcement of regulations. The advantages notwithstanding, this affects the governance of IT in healthcare because bureaucracy is involved in getting things approved, procured, and implemented. In the Swedish setting, there are fewer regulatory bodies implying less dependency on government in terms of decision-making, which

reduces the time delays in approval, procurement, and implementation of the agreed-upon strategies.

The collected data were organized in constructs derived from the theoretical framework to help answer the research question, and then the data were analyzed based on themes from the various stages of resource orchestration. The analysis took into consideration the managerial level of each respondent, which was useful in giving insights into how far each managerial level was able to go in influencing and contributing to resource orchestration actions. The data collected during interviews were recorded and transcribed as interview records. During the analysis, these records were listened to and compared with the transcribed interviews with the intention of identifying resource orchestration actions. This also helped expose possible tensions that were being experienced at the different managerial levels and how managers worked toward achieving the organization's strategy. Formal documentation was obtained from a variety of sources, including official organization websites, newsletters, and reports. The information gathered from the secondary sources enhanced the interview data regarding the unique aspects and pertinent issues in the two settings. To make room for new constructs to emerge, some level of openness was maintained, allowing the respondents to speak even out of the bounds of the question as long as they felt it was relevant to the topic of discussion and also to the development of the theoretical lens (Walsham, 2006). The adoption of the resource orchestration perspective and the collected secondary data enabled an initial theoretical framing (Pan et al., 2011) that served as a guide for subsequent interviews and case analyses.

4.3 Data Analysis

Thematic analysis (Braun and Clarke, 2006) was used to identify, analyze, and report themes in the data set. During the analysis, a moderate literature review was undertaken regarding resource orchestration (Sirmon et al., 2011), which provided an understanding of the theory and helped in identifying themes from the data. The themes did not reside in the data per se but emerged from thinking about the data and creating links as we understood them (Anzul et al., 2003). The coding started during data collection and during transcription where the researcher became familiar with the data. Initial codes were generated by coding interesting features of the data in a systematic manner across the data set. The following categories emerged: enriching, pioneering, coordinating, mobilizing, and integrating resources to form capabilities; stabilizing, acquiring, accumulating, and divesting resources; providing vision; and nurturing innovation.

In the analysis, the multiple coding technique was used to focus on thematic similarity, and theoretical coding was used to help discover the core category that identified the primary research theme. This framework was used because it focuses on the managers' resource-related actions and how these actions influence organizational outcomes, such as value creation and the development of competitive advantage.

This research in paper 5 (see Table 2 in the next section) in the two settings was considered relevant based on the preliminary study, which showed more efficiency in the Swedish setting compared to innovation in the Ugandan setting. This innovation may be due to lack of HIT systems and the need to share information among the patients and hospitals in the Ugandan setting (Kizito, 2019b). As the intention in paper 5 was to compare existing polices, the secondary data collected was in the form of existing policy documents on the national level in the two settings. In both settings, snowball sampling was used in which each contact person was asked both about policy documents and about who they thought would know about more policy documents (following inspiration from Elo et al. (2014). For this particular study, after reaching a level of saturation—no new policy documents were identified even after contacting individuals in each setting—the policy documents were inductively categorized and distributed into three categories. A total of 26 (16 Sweden vs. 10 Uganda) policy documents were collected, displaying an expected difference in the level of policy formalization in the two settings. From the recommendation of Uotila et al. (2009) regarding future research into ambidexterity, the selected documents were used as a basis to calculate the ambidextrous balance through content analysis. Drawing from (March, 1991) definition of *exploitation* and *exploration*, the associated words and search strings were derived.

With the search strings, word counts associated with efficiency and innovation in each policy document were identified to determine the percentage balance in terms of exploitation and exploration. Identification of, for example, 25 occurrences of *exploitation* and 45 occurrences of *exploration* in a document translated into a balance of 35% exploitation and 65% exploration. The frequency analysis of occurrences was done through the qualitative analysis software NVivo. The use of March (1991) coupled with explicit identification of words associated with exploitation and exploration safeguards the validity. Inasmuch as efficiency and innovation were equated to exploitation and exploration, respectively, efforts were made to stay close to the foundational source of exploitation and exploration, as suggested by Benner and Tushman (2003) and Xue et al. (2012). The issue of semantic validity advanced by (Krippendorff, 1980) is central when conducting content analysis. This was assessed through proxy by relying on earlier findings where March (1991)

conceptualizations of exploitation versus exploration were used, thus deeming the level of semantic validity high (Uotila et al., 2009). Concerning reliability, numerous examples have used coding and scoring of words with reliable results in the past (King and Lowe, 2003, Laver et al., 2003, Porac et al., 1999, Tetlock et al., 2008). Based on that evidence, the method is deemed reliable. As a way to further validate the findings, recommendations from in the analysis led to a derivation of propositions from the findings. However, the propositions are not presented as core conclusions because the empirical material limitation was used. This particular study (paper 5) in the entire research helped to identify how organizational ambidexterity can inform the design of policies for the digitalization of healthcare.

The results were presented following the three main stages of the resource orchestration framework: structuring, bundling, and leveraging. Analysis continued in order to refine the themes and create clear definitions and names for each theme. The last opportunity for analysis was done while compiling the results in which vivid and compelling extract examples relating back to the research question and literature were selected to help produce the results.

5 SUMMARY AND POSITIONING OF PAPERS

This thesis is a compilation of five papers, and each paper represents one of the studies that were carried out during the entire research (Table 2). The first three papers (studies) were done in the two settings studied here—Sweden and Uganda. The studies were exploratory with the aim of understanding the state of IT governance and resource orchestration actions in the selected healthcare organizations in Sweden and Uganda. Resource orchestration is considered a key element of IT governance and is advocated as a critical mechanism for digitalization. In this digitalization era, it is imperative that good IT governance practices are in place that will support creating value through IT investments, managing IT risks, and providing IT assurance.

The first paper, "Digital resource orchestration: The case of Västra Götaland Region," was based on an exploratory study done among IT managers and HIT staff in the VGR. With the evolution of technology in many areas, IT has become the backbone of organizations; in fact, if there is interference in the IT network or systems, organizations are usually unable to function.

Table 2 Papers contributing to this thesis

Paper #	**Title**	**Study location**
1	Digital resource orchestration in healthcare: The case of Västra Götaland Region	Sweden
2	Conflicting logics in IT governance: Achieving ambidexterity in healthcare organisations	Sweden
3	An inquiry into IT governance in healthcare organizations in Uganda	Uganda
4	Ambidextrous IT governance enactment in healthcare: A comparison between the Swedish and Ugandan setting	Sweden and Uganda

5	Ambidextrous policy: Cross-country comparison of policies for the digitalization of healthcare	Sweden and Uganda

The aim of this study was to establish the IT resource orchestration actions that are being carried out in the region and determine what the HIT staff are doing to remain relevant and provide the needed healthcare services amid the digitalization of society. We can consider this as organizations having a competitive advantage, which essentially means organizations need to work at remaining relevant for their own sustainability.

HIT staff at different managerial levels in the VGR were interviewed to gain an understanding of how they orchestrate digital resources. In a digitally intensive world, organizations operate in business ecosystems that are intricately intertwined. As such, digital resources should be viewed relatively broadly because they transcend traditional resources to include technology and digital services. Digital infrastructures consist of institutions, practices, and protocols that together organize and deliver the increasing power of digital technology to business and society (Bharadwaj et al., 2013). Leaders need to take some actions to facilitate efforts to effectively manage the organization's resources, which is referred to as resource orchestration (Hitt et al., 2011, Ndofor et al., 2011). Ireland et al. (2003) and Sirmon et al. (2007) state that managers at the different levels in an organization influence organizational performance by structuring the organization's resource portfolio, bundling resources, and leveraging those resources in the marketplace. The many stakeholders and valuable knowledge guaranteed within individuals in the healthcare sector make the social complexities complicated to leverage. The challenge then becomes how to get these individuals to understand the shared purpose to effectively leverage the knowledge resources—a key component of resource orchestration. This study investigates the resource orchestration phenomenon in healthcare organizations in order to contribute to the IT governance field by identifying resource orchestration actions carried out by HIT staff at various managerial levels in VGR healthcare. The identified resource orchestration actions in this study proved to be important later in the research in providing an understanding of how ambidextrous IT governance is enacted in healthcare organizations in Sweden.

The second paper, "Conflicting logics in IT governance: Achieving ambidexterity in healthcare organizations," is a follow-up on the first study, and it investigates how institutional logics in healthcare organizations contribute or hinder their ambidexterity. According to the available literature,

three institutional logics are identified in healthcare organizations: managerial, IT professionalism, and medical professionalism. With the diverse backgrounds among stakeholders in healthcare comes different perspectives on IT governance dilemmas. This study investigated how conflicting logics become connected in IT governance practices through key stakeholders' views. It was clear in the study that the logics are coupled with the HIT managers, clinicians, and top managers.

The study involved the HIT staff and medical practitioners at the top, middle, and operational levels of management in the region, and it focused on how evidence from the institutional logics in IT governance challenges the predominantly prescriptive and unilateral IT governance literature (Debreceny, 2013, Xue et al., 2008). The respondents also highlighted the challenge of sharing health information among the county council health facilities. All this information points to a governance problem. Moreover, Mignerat and Rivard (2009) urge that the implementation success of IT governance is directly influenced by the similar IT arrangements with existing institutions. Using the resource orchestration lens, the investigation showed that new strategies are leading to improved IT governance practices, and there is a desire to listen, negotiate, and innovate. Through structuring, acquisition of new IT health systems is ongoing, and this process involves consultations among the three professions. Concerning listening and negotiating, key stakeholders in the VGR meet regularly at the regional level with representatives from the county councils and tailor IT arrangements in line with the competing logics. This has led to the introduction of science parks and the Innovation Fund to support innovations in the key sectors in the region, of which healthcare is a part. (Boonstra et al., 2017) identify managerial logic and medical professionalism as the two logics in healthcare organizations. With the advent of digitalization, this study used the resource orchestration lens to demonstrate that the IT professionalism logic is appreciated and recognized as necessary for improving IT governance practices.

The third paper, "An inquiry into IT governance in healthcare organizations in Uganda," was done in Uganda and attempted to answer this question: "How are managerial strategies impacting the adoption of IT governance in healthcare organizations?" The respondents included managers, IT staff, and policy makers from select healthcare organizations in Uganda. The managers and IT staff were from private and public healthcare organizations, and the policy makers were from the National Information Technology Association-Uganda (NITA-U) and the Kampala Capital City Authority.

Over the years, there has been a growing need to provide both high-quality health services at an affordable cost and easier access to medical information

for patients. This need has resulted in hospitals turning to IT to find solutions (Glaser et al., 2008, Raghupathi and Tan, 2008). Subsequently, most of the hospitals that have embraced IT have implemented integrated IT applications that cut across many functions (Garets and Davis, 2006). The desire to move away from traditional healthcare to what is referred to as eHealth has stimulated some debates leading to research focusing on the role IT plays in improving efficiency in healthcare (Haddad et al., 2014). The adoption of IT in healthcare has in a way increased the complexity of healthcare, thus calling for improved IT governance in organizations. To get value from IT governance, organizational board members should ensure the management, organizational structures, and processes are in place that sustain the organization's IT in order to extend the organization's strategy and objectives (ITIG, 2000).

Findings from this study show that the various managerial levels in the healthcare organizations are not supporting each other because they seem to all have different agendas. However, to realize value for IT investment, the synchronization of resource orchestration actions must be a priority. Thus, top management must be involved concurrently at all stages of the resource management process while constantly scanning external surroundings for vital prompts about change (Sirmon et al., 2007). Most respondents stated that their organizations did not have a clear IT governance structure in place and that most structural issues, such as IT steering committees and IT strategy committees, only exist on paper and are not "implemented." In addition, due to the unclear IT strategy, the IT structures and processes are not clear or are nonexistent in almost all the healthcare organizations. Therefore, it is paramount that IT structures and IT processes are in place because their absence is a barrier to operational IT governance (Peterson, 2004a). This study provides insights into possible research on how value for IT investment can be realized in a setting without defined IT governance structures.

In general, this study demonstrated that the state of IT governance in Ugandan healthcare organizations requires improvement. Most of the healthcare organizations have IT policies on paper but have not been able to implement some issues stated in the policy. Managerial teams in the healthcare organizations need to support the development of electronic health records. This study (Kizito, 2019b) further demonstrated that in the private healthcare organizations, the top-, middle-, and operational-level managers are involved in IT investment decisions, which is considered a good IT governance practice.

The next studies in this thesis, paper 4 (Kizito, 2020) and paper 5 (Kizito and Magnusson, 2020), focused on a comparative study of Sweden and Uganda. According to the findings from the first three studies, the direction the research

took was a focus on investigating how healthcare organizations in the two settings enact ambidextrous IT governance. This was arrived at based on the challenge by (Debreceny, 2013, Xue et al., 2008) of the predominantly prescriptive and unilateral IT governance literature. In this digitalization era, it is important that healthcare organizations come up with improved IT governance practices that support the digitalization of healthcare and simultaneously enable the organization to remain relevant. Subsequently, the study presented in paper 4 compared the ambidextrous IT governance enactment in healthcare in Sweden and Uganda, whereas the study in paper 5 focused on ambidextrous policy and did a cross-country comparison of policies for healthcare digitalization.

Paper 4, "Ambidextrous IT governance enactment in healthcare: A comparison between the Swedish and Ugandan setting," reports on a comparative case study of Swedish and Ugandan settings on the enactment of ambidextrous IT governance within healthcare. Ambidextrous IT governance is perceived as governance designed to balance targets of exploitation (efficiency) and exploration (innovation), and the study is informed by the resource orchestration logic. There have been notable new directions for organizations and individuals ushered in by the digitalization of society. With digitalization comes the parallel utilization of digital technologies for increased efficiency and innovation, along with new operating models introduced in parallel featuring continuous enhancements to efficiency (Garavaglia et al., 2011, Gregory et al., 2015). Notions such as HIT and eHealth initiatives have existed for a while (Bradley et al., 2012, Locatelli et al., 2010), and their development is expected to continue. Now with the digitalization of healthcare, new challenges have already emerged concerning technology and how it should be organized, managed, and governed (Bygstad et al., 2017), warranting that the right IT governance mechanisms are in place to support the digitalization of healthcare.

Through the resource orchestration perspective, the study highlights the different resource orchestration actions carried out by healthcare organizations as a way of enacting ambidextrous IT governance. From previous literature (Boumgarden et al., 2012, Garavaglia et al., 2011), IT governance has displayed a tendency for increased focus on exploitation over time partly due to bureaucracy and formalism being a function of time in large organizations (Magnusson et al., 2019, Magnusson et al., 2017). Therefore, the Swedish setting, with its longer track record of automation and its larger installed digital base, has geared itself into a position where innovation is not supported by formal control. This explains the increased demand for shifting the emphasis away from efficiency and toward innovation. In contrast, the Ugandan setting displayed a lower degree of formal control, which resulted in a tendency to

focus on innovation at the expense of efficiency. A smaller installed digital base supports the development and adaptation of new solutions because the legacy environment is limited.

The findings in this study pointed to a central difference in terms of how ambidextrous IT governance is enacted in the two settings. Previous research posits that the difference in necessary focus on innovation versus efficiency is contingent upon the level of dynamism in the external environment (Raisch and Birkinshaw, 2008, Zimmermann et al., 2018); however, the findings in this study suggest a different interpretation to this relationship. The Ugandan setting is invariably more dynamic than the Swedish one, with more political and geopolitical turbulence, alongside a major revamping of the healthcare system itself. On the other hand, a little institutional inertia is present within the Swedish setting with a strong installed digital base and existing solutions acting as deterrents to change. The study offered to nuance ambidexterity research in two ways: First, there is the assumption that in a dynamic environment, focus on efficiency is meant to attain a certain level of efficiency. This suggests that in the Ugandan setting, if sufficient efficiency is not attained, the organization is not in position to shift its emphasis more toward innovation. Second, the findings point to the issue that the enactment of ambidextrous IT governance is contingent upon the historical development of governance structures, processes, and relational mechanisms (Herz et al., 2012). The increased formalization over time causes an increased tendency to shift ambidextrous balance toward innovation. This tendency is internal to the organization and thus challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism. The change to an increased focus on innovation may be caused by either environmental changes or increased inertia due to the formalization of controls (Urbach et al., 2019). Further research should be directed toward better understanding the intricate process of dynamic ambidexterity, and this paper proposes that the perspective of IT governance enactment may prove a fruitful avenue through which these issues may be approached.

Finally, paper 5, “Ambidextrous policy: Cross-country comparison of policies for the digitalization of healthcare,” explored how healthcare policies in Sweden and Uganda are positioned in terms of ambidextrous balance. Looking at the digitalization of society, it involves a dual aspiration of increased efficiency on one side and new operating models and the means of value creation on the other (Nambisan et al., 2017, Yoo et al., 2010). Thus, digitalization is associated with complex issues that include operational excellence, which may involve disruption and innovation. This dual perspective on digitalization is a core part of the literature on digitalization (Nardi and Ekbia, 2017, Svahn et al., 2017). Considering that digitalization is

the parallel striving for exploitation and exploration, there is a growing body of literature utilizing findings from the field of organizational ambidexterity to study digital initiatives (Berghaus and Back, 2016, Haffke et al., 2017, Raisch et al., 2009a). Organizational ambidexterity is understood as the organization's capability to attain exploitation and exploration in parallel (March, 1991), and it mirrors the dual characteristics of digitalization. This makes organizational ambidexterity a relevant perspective for new insights into the study of the digitalization of society (Dávideková, 2016, Gimpel and Röglinger, 2015).

Through a content analysis of national policies, the study found that policies regarding IT are identical in terms of ambidextrous balance, whereas policies regarding digital healthcare/eGovernment display a distinct difference as Uganda is more focused on exploration than Sweden. In terms of general healthcare policies, Uganda stands out with a sole focus on exploitation, whereas Sweden has a mix of exploitation and exploration. The aim of this paper was to contribute through exploring how healthcare-related digital policies address the necessary ambidextrous characteristics for digitalization. By analyzing the policies in two separate settings, the study offers a first step toward a new theoretical understanding of the role of policy in ambidextrous balancing and how policy impacts the direction of healthcare digitalization. Furthermore, the study in paper 5 answered the calls for research presented in (Luger et al., 2018) through additional studies of the role of policy in the dynamic process of ambidextrous balancing together with (Greve, 2015) on the role of policy.

6 RESULTS

In this section, the results are presented per country using the three key resource orchestration processes (components) as described in the Theoretical Framework section and in terms of the ambidextrous balance and categorization of associated constructs. The various resource orchestration actions in the two settings, starting with the Sweden and then Uganda, are presented, followed by a discussion of how resource orchestration through its processes is viewed as a way of enacting ambidextrous IT governance. This involves balancing exploitation and exploration in healthcare organizations in the two settings.

6.1 Enacting Ambidextrous IT Governance in the Swedish Setting

Looking at the various stages of resource orchestration in Figure 5, the direction of ambidextrous balancing at each stage is different. However, from Table 3, it is clear that the overall balancing is in the direction of exploitation. Table 3 was generated to help show the direction of balancing (in terms of the policies) at each of the resource orchestration stages in the different settings. This was further helpful in the conceptualization of what happens in terms of ambidextrous balancing in healthcare organizations in both settings. From Table 3, the indication is that there are no resource orchestration actions toward exploration at the leveraging stage in the Swedish setting. This is most likely due to the increased formalization, which, over time, comes with a stronger tendency to shift the ambidextrous balance toward exploration. This tendency is internal to the organization and therefore challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism. A strategist and enterprise architect at one of the hospitals stated the following concerning formalization:

"It was this procurement project for which they needed to change the Lab system, and they realized that it was not possible to do the migration in eight months, so they escalated the issue to the regional steering committee, which comprised members from the different labs in the region."

This suggests that decisions in the organizations concerning which resource orchestration actions to consider are taken after mutual consent from the responsible stakeholders. The process is more likely that top managers highlight what they want to achieve (vision/strategy of the organization) and then allow the experts who are normally at the middle and operational levels

to advise on the procurement of the agreed-upon IT health systems that will resource orchestration actions.

In the Swedish setting, there has been a perennial challenge of the inability to share information and interoperability among the different hospitals. However, efforts were noted to overcome this challenge given support from the county councils, hospital management, and political leadership. These efforts include the acquisition of equipment and an adaptable HIS, as well as tapping into the capabilities of talented individuals in specific county councils to help in other county councils. To corroborate this, the Area and Investment Manager ICT Business Region stated:

"My predecessor had started a lot of networks and clusters. The areas of strength were the clusters that we had. The areas of strength in Gothenburg are not the organizations. The areas of strength are we have to go back to the masters. We had a good workshop in 2010 to help us understand what we are good at. What five technologies are we good at? All the technologies are on our website. There are five technologies: mobile, microwave, visualization, logistics and IT infrastructure. We need to reshape it because it is seven years old, but it needs slight changes. Then we have some verticals that are important: health, transport, and energy. The basic idea is that there should be at least one meeting place and one cluster initiative or organization for each and every area in West Sweden. I don't believe in one big IT cluster because ITs are broad and can become diluted, so we need to have a critical mass for each of the areas. Therefore, for each area, we need to have an organization where people meet, and we have almost succeeded in this area."

These respondents seem to suggest the need for improved interaction between the controller and controllee to implement or realize selected controls in healthcare organizations in Sweden to vary the resource portfolio toward more resource orchestration actions directed at exploration in the leveraging stage. In the Swedish setting, there has been a noted change in the governance structure, among other things, arising from the resource orchestration actions going on in healthcare organizations. As a result, for example, talented individuals or masters within Gothenburg have been tapped to make use of what they have to offer, as stated by the Area ICT manager in Gothenburg.

As for the divesting part, the VGR is on course to get rid of the old systems and replace them with new systems seamlessly built into the core system.

In the Swedish case, exploitative actions are being taken on the old systems to create a clear patient history to help the younger clinicians deliver the necessary treatment and services. At the same time, explorative actions are

being taken, especially insofar as having the older and newer systems working together is concerned. This calls for innovative ways to share information among the old and new systems, which suggests enactment efforts—that is, interaction between controller and controllee—in the Swedish case. The other efforts include procuring new systems that are compliant with an already agreed-upon information model to create opportunities to exploit and explore resources in the organizations. The efforts highlighted are considered supportive of enacting ambidextrous IT governance.

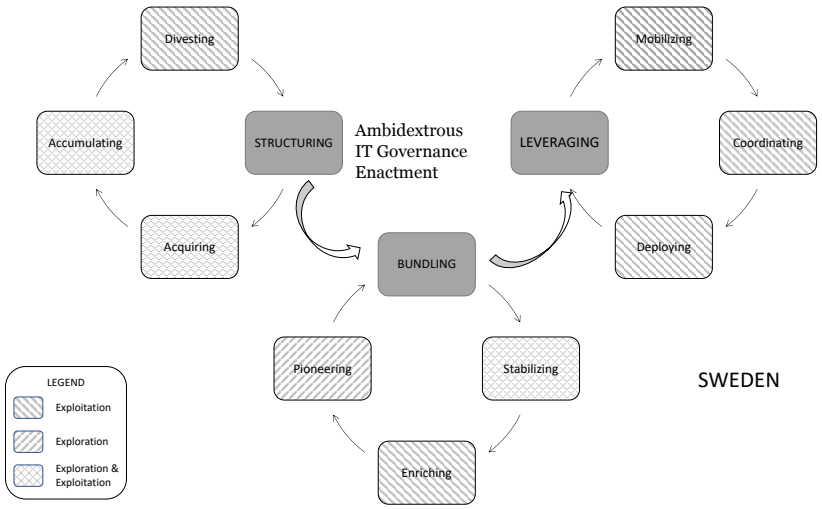

Figure 5 Different activities occurring at the various resource orchestration stages in select Swedish healthcare organizations

Most organizations are aware that they need to adapt to the changes that accompany digitalization. Some of these changes have been and can be disruptive, and the capability of organizations to adapt revolves around institutional arrangements, decision-making patterns, and governance. Therefore, governance mechanisms need to be in place to handle any possible problems that might arise. Concerning policies as part of the study for this research (paper 5), an analysis of Swedish policies was done using organizational ambidexterity as a lens (see Table 3). The policies were categorized as IT, digital healthcare/eGovernment, and healthcare in general. The outcome was that the policies emphasize exploitation much more than exploration (81% vs. 19%). Furthermore, the analysis showed that of the three policy categories, the IT category had the highest bias toward exploitation. This suggests that the IT category is largely focused on exploitation rather than exploration. The other categories are more open to addressing issues related to

exploration. Overall, the ambidextrous balance of Swedish policy is largely geared toward exploitation.

The second round of analysis (paper 5) led to the identification of 38 second-order constructs related to exploration, exploitation, or both. In terms of characteristics, the majority of identified constructs are associated with either only exploitation or with both exploitation and exploration. In regard to the prerequisites, only one construct is shared between exploitation and exploration; the rest are associated with exploration. When it comes to the effects, the use of *exploitation* turns out as expected following internal issues such as decreased costs, rationalization, and improvement (bundling). As for the use of *exploration*, it is related to a mix of internal and external forms of development, growth, and competitive advantage. The difference between the internal focus of exploitation and the external focus of exploration places more emphasis on the system effects of exploration rather than exploitation. This suggests that Swedish policy is more aligned with exploitation for exploration. These tables, as you will note later in other sections, should not be mistaken for quantitative data. They are simply used to help visualize the direction of ambidextrous balancing in the two settings. Tables 3 and 4 show the ambidextrous balance of the two settings in the selected categories of three policies: IT, digital healthcare/eGovernment, and healthcare (general). First, the ambidextrous balance of each category of policies is done, and then the aggregate ambidextrous balancing is done later for all the policies using the search strings from the list of words that represent exploitation and exploration (March, 1991) on the different policy categories. The respective policies under the three categories were all searched, and the outcome regarding ambidextrous balance in the two settings is represented in Tables 3 and 4.

Table 3 Overview of the ambidextrous balance of Swedish policy

Policy category	**Document (#)**	**Exploitation**	**Exploration**
IT	1	0	0
	2	0	0
	3	6	1
	4	252	43
	5	12	9
	Mean (%)	84%	16%
Digital healthcare/eGovernment	6	10	1
	7	12	4
	8	8	0
	9	5	8
	10	9	2
	11	13	0
	12	37	7
	13	0	0
	14	7	5

	Mean (%)	79%	21%
Healthcare (general)	15 16	74 30	13 15
	Mean (%)	79%	21%
Mean (Overall)		81%	19%

6.1.1 Enacting through Structuring

This research clearly shows that the HIT staff and management in the VGR are making efforts to foster a new and technologically compliant resource portfolio. There has been and continues to be coordination among the various county councils, which will lead to sharing of newly acquired resources as well as support the procurement process of standardized IT health systems. The centralized/regional procurement of standardized IT systems and equipment is envisaged to considerably reduce the perennial challenge of information sharing and interoperability. The chief standardization officer noted that there is political support to help them realize the projects they have created to address the problems within the VGR:

"For our case, the politicians set aside some money for the projects. Then there is the steering committee and a project manager, which is the team that decides what should be purchased. In case the amounts involved are out of the stipulated budget, then we go back to the politicians."

This suggests that there is support from the county councils, the hospitals' management, and the political leadership in the bid to acquire a new and adaptable HIS and to accumulate resources, such as sharing the skills and resources of talented individuals from some county councils to help other county councils. In the resource orchestration search/selection process, which ties into the structuring process, we noted that the governance and organizational structure (unique addition) have enabled and enhanced decision-making from the lower managerial levels through the hierarchy. IT investments agreed upon at the regional level follow the initial agreement by the county councils. They agree on what to procure by following the information model that was developed by the regional steering committee. This is considered a new process because decision-making in a lot of organizations for a long time has been reserved mainly for top management. An important resource orchestration action in the VGR is the divesting of resources. A couple of IT strategic architects noted that the process of divesting needs to be done in phases because there are old systems with important information that are still in use but are not compatible with the new systems. These old systems need to be replaced with better and more technologically up-to-date systems capable of interoperability and information sharing. The problem with most of

the old systems is that they were based on organization standards (developed from personal opinions) and not international standards. This was one of the causes for the failure to exchange data among the systems. One of the strategic architects who was part of the process of developing a new information model to guide the procurement and development of HIT systems stated:

"There is a lack of some kind of connecting environment. The background makes it like isolated islands. We have something for primary care, for the hospitals, and county council care, and they are not interlinked. One thing is also the lack of governance when it comes to informatics and the need to change thereof."

As a result, there is an information model in place to help in the governance of IT. This guide is now followed during the procurement process for the IT infrastructure. The VGR is a growing organization and has chosen to identify and invest in the right resources while forming the appropriate resource portfolio. During the investment and divestment processes, the VGR is mindful of the fact that these processes need phasing. The chief standardization officer corroborated this:

"A lot of people in healthcare in Sweden and many countries don't realize what systems they are buying. They oftentimes buy and inherit an information model that causes the organization a lot of trouble when it comes to interoperability because it can't be changed or customized. But the step we took is that we put the most effort in defining our information model—how the data should be structured. By doing that, it is simpler to connect our systems to other systems."

Currently, the accumulation of resources is ongoing while divesture and acquisition of resources is also planned because some of the old systems have a lot of information that is useful but not compatible with the newer systems. The existence of old and new systems creates difficulty in sharing information among the systems. Structuring efforts (accumulation) have been devised to temporarily solve the problem as a bigger and more lasting solution is being worked on. There is a growing need for standardization to guide the procurement of new healthcare systems that will provide for the sharing of information and interoperability among the financial and administrative systems. The strategist and enterprise architect stated:

"Up until now, this has not been done in the architectural way; it is only done by getting some money, and some people start some project like Sahlgrenska, which sometimes doesn't work. So much of my work right now is working on a strategy looking at five years ahead and trying to start the right things."

In terms of divesting, the VGR is on course to decommission the old systems and replace them with new systems seamlessly built into the core system. An IT strategist described it this way:

"The next step which we are about to take is to throw out a lot of older systems and reset the healthcare IT with a new core system for general healthcare. Speaking of the diagnostics part of this, I am not sure that we shall exchange the current systems, not all of them. For example, for X-ray we have well-functioning infrastructure, but for Laboratory, there must be some kind of change."

Having highlighted some of the structuring efforts happening in the VGR, there are exploitative actions happening with the old systems in order to obtain a clear patient history. This is specifically to help the younger health professionals (or for cases where a patient does not see a specific doctor) have a better understanding of the patients who have chronic diseases and thus be able to administer the right prescription or offer the right treatment over the long term. There is now a strict requirement to procure new systems that meet the specifications of the developed information model, which allows for sharing of information and interoperability.

According to what happened earlier in many of the healthcare organizations in the VGR, managers at all levels in both the IT and managerial fields in the VGR now consider identification and investment decisions as important and necessary resource orchestration actions in healthcare organizations. This has brought about compromise between the conflicting institutional logics and thus resulted in relevant solutions for the healthcare sector (paper 2). The regional steering committees are made up of members from the different county council steering committees in the region, which implies that resource orchestration actions are taken collectively as top-, middle-, and operational managers in the region mutually agree on and approve what needs to be done within the region. The coming together of the different managers at the regional steering committee level helps in addressing and managing the tensions that arise among the institutional logics in the healthcare organizations. In general, this research shows that there are already ongoing resource orchestration actions in the VGR that are likely to positively influence future IT governance practices to support the digitalization of healthcare in the region.

6.1.2 Enacting through Bundling

Most of the healthcare organizations in the VGR still use old IT systems due to their usefulness and the nature of data that they hold. This had created a challenge of getting the new systems to work with the old systems, especially

regarding interoperability and information sharing. This situation has led to minor incremental improvements to existing capabilities as well as enrichment that extends current capabilities. Example application programming interfaces (APIs) have been developed in order to get information out of the old systems to feed into the new systems. They have also categorized the systems as mode 1 and mode 2 as stated by an IT strategist and enterprise architect:

"There are two modes. Mode 1 is getting old systems to work right, which involves maintenance. These old systems from the eighties have to run and cannot shut down, so we have the backups. Then, mode 2 is the innovation mode where we have the new systems that provide for the sharing of information with other compatible systems."

The storage infrastructure was developed along the lines of mode 2 systems. In the storage infrastructure, the space is seen as a single space by the user because it was built based on international standards. There is noted effort toward integrating resources to form capabilities through minor improvements to existing capabilities and creation of new capabilities. The chief standardization officer stated the following in support of this:

"In some cases, we have the same space for radiology, cardiology, and dentistry, and we use the same infrastructure, which was developed over 10 years ago. When it comes to pathology, it is given more space due to the original data and that the amount of data is high, on the one hand, but also due to the high demand for pathology data to help in the pathological process. The shared space is seen as a single space by the user since the space has been created out of global standards."

Ongoing projects under the Innovation Fund in the VGR are considered resource orchestration actions in the bundling process and into the pioneering subprocess. These are aimed at creating new capabilities in healthcare. For example, in one of the ongoing projects, the objective is to try to reduce the healthcare professional's work by having the patients share their information on a daily basis in real time. The head of the Innovation Fund stated:

"Patient-related apps that are works in progress include a solution where the patient can manage their sickness using a measuring device, such as a T-shirt that has sensors tailored for Parkinson's disease. These sensors send real-time information to the doctors about whether the patients have taken their medication and also the shakiness levels, blood pressure, and other relevant measurements."

Furthermore, in support of the bundling efforts, an IT strategist stated:

"We have in place a system that is compatible with other devices. For example, in the X-ray, ECG, and laboratory departments, the core system that processes the images is compatible with any type or model of camera. The X-ray system is working well and requires no change, unlike the laboratory system that needs to be changed to cater to the general practitioner and other specialties."

Another project, called the Prehospital ICT Arena (PICTA), is geared toward pioneering how IT and eHealth can work together for better healthcare. PICTA is a project under the Lindholmen Science Park in collaboration with organizations from healthcare, business, and academia in the region. The aim is to harmonize semantic and technical interoperability to improve conditions for the efficient use of IT and eHealth in prehospital healthcare. This initiative ties in with the head care digitalization professional's desire to see how IT can support clinicians to improve their healthcare service delivery. He was keen to hear from HIT staff on how they can support the clinicians:

"We can also use our clinicians in a more efficient way via new technology, video, and the Internet of Things solutions to enhance those possibilities. Health IT staff need to come in to support the clinicians. I think that the problem is all our governance structures are still as they were in the 1600s, and we need to have a huge change in our governance structures."

The response from someone in top management conjures the need to change the governance structures. Resource orchestration actions already happening in the healthcare organizations are a step in the right direction to achieve improved and better IT governance practices in the VGR healthcare organizations.

6.1.3 Enacting through Leveraging

Leveraging as a resource orchestration process involves a sequence of subprocesses—mobilizing, coordinating, and deployment—to exploit the organization's capabilities and take advantage of market opportunities. It is important that top management provides a plan for capabilities needed to form requisite capability configurations that lead to the deployment of systems or strategies used to exploit capability configurations formed by the coordinating subprocess. The VGR is already on track and has an information model in place to steer IT in the entire region. The model takes all the technological advancements into consideration and puts strategies in place that can take advantage of the available IT opportunities within the healthcare organizations. This is what leveraging is about. The VGR has used the available political support to work toward achieving the digitalization of healthcare.

The VGR has an annual healthcare investment budget in place that, among other things, supports innovations in healthcare. HIT managers of county councils in the VGR are happy to cooperate with each other at the regional level. This is envisaged to avert the current challenges of information sharing and interoperability the region is facing. According to the already-existing information model, this will make it easier to add new systems or devices onto the existing systems without making critical changes. The chief standardization officer corroborated this:

"Regularly, it is about 200M SEK in a year for healthcare, but currently we are in a phase where we are looking at the future healthcare environment. It is a huge business deal that will require a single investment of a couple of billion SEK, and it will have brand-new thinking. It will cover most domains, and we will replace our current electronic patient records."

According to the respondents, plans are developed, and the people involved are willing to improve the effectiveness of healthcare service delivery through the use of IT. In addition, coordination has improved between the clinicians and HIT staff of the county councils in the region. An IT strategist stated:

"We are too slow. We are very good at maintaining the old EHR system, but in terms of innovative things, we are pretty lacking on the IT side. We need to be better on that side, and there is some effort, especially on the IT side, to get better. We are looking at our capabilities and trying to see what we are lousy at and how we can improve three things: strategies, getting everything together, and being better at innovations."

For coordination and deployment, which involves providing a vision and nurturing innovation, the VGR has formed a collaboration with academia through the science parks. These science parks and the Innovation Fund are key stakeholders that support resource orchestration actions that are likely to improve IT governance practices to support the digitalization of healthcare.

6.2 Enacting Ambidextrous IT Governance in the Ugandan Setting

In the three stages of resource orchestration in the Ugandan setting (Figure 6), the resource orchestration actions occurring in each of the substages show the direction of the ambidextrous balance pointing toward exploitation. Given the dynamic environment in Uganda relating to the proposed revamping of the healthcare system and the ongoing political turbulence, working toward automating the processes in healthcare seems practical in supporting the

improvement of service delivery in healthcare. This may explain why the ambidextrous balancing is in the direction of exploitation for all resource orchestration stages. Furthermore, from the data, the Ugandan setting displays a lower degree of formalization, which likely diverts the focus to exploration at the expense of exploitation. The lack of formalization, especially in the public sector, was validated by an IT officer in one of the regional referral hospitals:

"In the current state, we have no IT team; we rely on the services of an outsourced IT company. This is mainly because we literally have no IT network in place. There are just a few stand-alone computers that are used for various tasks in the hospital."

A smaller digital base is less complex and therefore supports the development and adaptation of new solutions given the limited legacy environment to take into account. The efficiency gains in the Ugandan setting are necessary due to the strained economic situation; however, at the same time, findings indicated a "ban on innovation" that was pushed by legislation. This presented a contrary viewpoint to the Swedish setting in their aspiration to shift the emphasis away from exploration to exploitation.

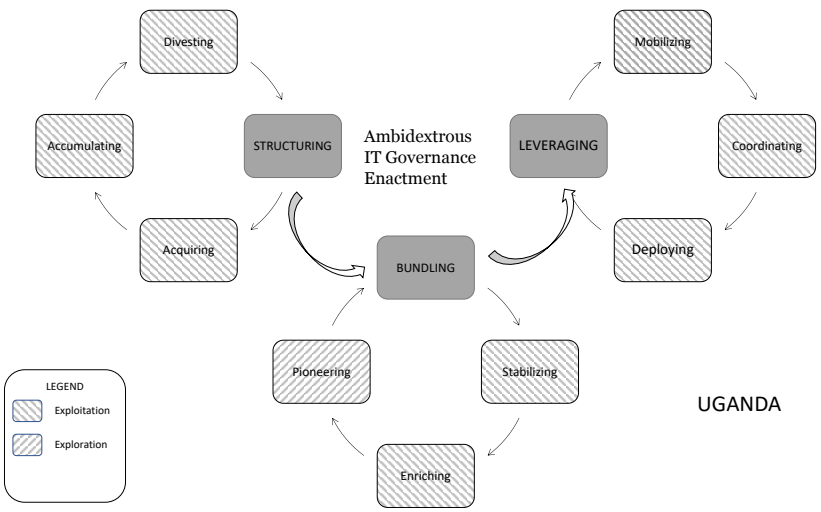

Figure 6 Different activities occurring at the various resource orchestration stages in select Ugandan healthcare organizations

The difference in the necessary focus is dependent upon the level of dynamism in the external environment (Raisch and Birkinshaw, 2008, Zimmermann et al., 2018), but the findings add a different interpretation to this relationship. The Ugandan setting is consistently dynamic with more political and geopolitical turbulence, alongside the planned major revamping of the healthcare system. To revamp the healthcare system and make information sharing among the existing stand-alone computers possible, support from top management and the board was needed, as stated by an IT officer in one of the private hospitals:

"There were many challenges as we moved toward realization of the integration process, and these included infrastructural changes, bureaucracy in getting the new infrastructure, non-IT savvy clinicians, and insufficient training of both IT staff and end users."

In the private sector, most of the healthcare organizations have embraced the use of IT, and the boards of the different hospitals have approved funds to acquire new systems and to improve the existing ones. The board supported completing the integration of available systems by approving the IT budget, which included the necessary financing for the integration project. In the Ugandan setting, ambidexterity research can be nuanced in one way given the assumption that in a dynamic environment, focus on exploitation is meant to attain a certain level of exploitation. This suggests that if sufficient exploitation is not reached in the Ugandan setting, the healthcare organizations are not in position to shift their emphasis toward exploration.

Despite the limited funding, there was noted support for the use of technology in the endeavor to improve healthcare service delivery via new IT systems and infrastructure. In addition, technology has created ample opportunities for government to improve its services and to innovate. That notwithstanding, digital innovations are linked with developments that have the potential to disrupt society; therefore, it is inherent on governments to put in place mechanisms to handle any eventual problems that arise due to such innovations. This emphasizes the need for governments and policy makers to start thinking about governing the digital space. In this research, for the Ugandan setting, the policies were categorized in the same way as they were for the Swedish setting, that is, IT, digital healthcare/eGovernment, and healthcare (general). The focus of these policies (Table 4) was more on exploitation than exploration (77% vs. 23%). The policies in the healthcare (general) category turned out to have the highest bias toward exploitation. This

indicates that the area of healthcare (general) is still largely focused on exploitation rather than exploration, whereas the IT and digital healthcare/eGovernment categories are open to exploration. Even with the two categories focused on exploration, the ambidextrous balance of Ugandan policy is designed to meet the needs of exploitation.

Table 4 Overview of ambidextrous balance of Swedish Policy

Policy category	**Document (#)**	**Exploitation**	**Exploration**
IT	1	18	1
	2	29	3
	3	8	4
	Mean (%)	*84%*	*16%*
Digital healthcare/eGovernment	4	71	2
	5	3	3
	6	3	18
	7	3	13
	8	4	4
	Mean (%)	*46%*	*54%*
Healthcare (general)	9	0	0
	10	137	0
	Mean (%)	*100%*	*0%*
Mean		*77%*	*23%*

The analysis of the policies in the Ugandan setting shown in Table 4 indicates that the policies focus on exploitation rather than exploration. After the second round of analysis, 31 second-order constructs related to exploitation, exploration, or both were identified. In terms of characteristics, the majority of the identified constructs are associated largely either with exploitation or both exploitation and exploration. As for the prerequisites, the identified constructs are shared between exploitation and exploration. For the effects, the use of *exploitation* is as expected in relation to internal issues, which include strategies to groom well trained information and communications technology (ICT) personnel. As for the use of *exploration*, it is similar to the Swedish setting and is related to a mix of internal and external forms of development, growth, and competitive advantage. Exploration causes an abundance of expected results, making it significantly harder to realize than exploitation.

6.2.1 Enacting through Structuring

Most of the private and public healthcare organizations still use the books (both kept by the patients and the health facility) and cards as a way of recording patient records. Although this has worked in the past, there are issues of privacy and proper storage of these patient records. As a result, proper

assessment of patients suffers when they lose their books or cards. This is especially problematic because patients may see a different clinician each time they come for treatment. To reduce or eradicate this problem, private and public health organizations have worked to deploy IT systems by implementing HIS to improve the current healthcare service delivery.

Most of the healthcare organizations from which the respondents in this research work are in the process of acquiring, accumulating (improving), or divesting their IT infrastructure. Their actions range from minor improvements on existing infrastructure (accumulating) to the divestiture of both software and hardware that has been replaced with new software and hardware to suit the requirements of the organizations. Table 5 shows the IT systems available in the hospitals and whether they are stand-alone or integrated. This suggests that the IT value from the use of these systems is not yet optimal. These systems need to be integrated to share information for better healthcare service delivery, which requires support from the board to fund the IT budget. According to the respondents in this research, the board is already in support of the suggested improvements to the existing systems. In particular, one of the HIT staff said this:

"The board approved the integration of Clinicmaster [a locally developed health information system] with the ERP system currently in use. This is one way of aligning IT with the business to realize value for the IT investment and the strategic objectives of the organization."

Enabling the stand-alone systems to share information requires procuring the necessary infrastructure and software. With the procurement complete, integrating the IT systems is the next required phase to allow information sharing among the IT systems.

Table 5 IT systems available and whether they are stand-alone or integrated

Organization	**System types**	**Integrated or standalone**
Alpha	Electronic Health Record (EHR), radiology, billing, pharmacy	Over 50% integrated
Omega	Hospital Management Information System (HMIS), lab system, billing	Heterogeneous integrated systems

Beta	Uganda Electronic Medical Record (UgandaEMR), pharmacy and lab system	Stand-alone
Nano	Billing, pharmacy and lab system, patient records	30% integrated
Gamma	District Health Information Systems (DHIS 2), UgandaEMR, HMIS	Stand-alone

**Pseudo names are used for the organizations.*

With the implementation of the systems done, it is important to train all users, including clinicians and HIT staff, on their use and maintenance in order to get the most out of the systems. This requires support from the board and top management.

Generally, structuring is happening mainly in private hospitals where management at all levels is keen to support the use of IT. As for the public hospitals, they are still tied to District Health Information System 2 (DHIS 2), which focuses on aggregated data from all districts in the country. This information is provided by district health officers (DHOs) and is mainly about the outbreaks, infections, and death statistics for various diseases. For more accurate reports and improved healthcare service delivery in the future, an IT infrastructure procurement plan is needed for HISs in health centers at all levels in the country.

In contrast, the board and top management have given the necessary support by approving the roll out of the HIS to the entire network of clinics in the chain of a specific private hospital (i.e., Nano in Table 5). The customized HIS is operational at the Nano headquarters and will be rolled out to the clinics' network in a year's time.

6.2.2 Enacting through Bundling

Bundling activities or actions were noted in healthcare organizations in the Ugandan setting, including evidence of efforts to improve the existing capabilities as well as extend and create new capabilities. For instance, in one of the private hospitals, there is an ongoing effort to improve the existing capabilities of the HIS. The HIS currently only serves the clinicians and top

management; however, a reasonable HIS should minimally serve the entire healthcare ecosystem. An IT manager in one of the health organizations described the current scenario and advised top management that it is imperative to modify the existing HIS to involve and serve all stakeholders (this work in progress should be operational now):

"Streamline [It is a locally developed health information system] was designed by the doctors, and they did not involve other stakeholders like patients and the business side of the organization. In terms of performance, it is good for the doctors but not good for the patients. This means that one of the key stakeholders in the healthcare ecosystem is left out, so there is little value added. In order to improve this, the board and top management agreed to procure another health information system Clinicmaster, which would be more effective. Clinicmaster was integrated with Navision in order to provide for the seamless flow of information among the different departments in the organization with the objective of improving the efficiency in healthcare service delivery."

In the public hospitals, the government's Ministry of Health (MoH) has embarked on enriching the current capabilities by adding HIS at the regional referral hospitals and at some health centers. This will require setting up an appropriate governance structure and the right infrastructure behind the scenes. Regarding the processes to have in place, such as the governance structures and infrastructure, a commissioner in the MoH explained:

"There are different patient information systems that don't "talk" to each other. For proper system integration, there is a need for a national health facility master list that is coded and an infrastructure that can facilitate the use of systems at the health center level and regional referral hospitals. Ultimately, an appropriate governance structure is necessary."

There was noted effort at the Nano hospital in making minor improvements to existing capabilities by upgrading its customized HIS after the acquisition of new and better hardware and software. The IT manager there explained the process that they have been through and continue with as they upgrade the systems to provide better healthcare services:

"Originally, the hospital (headquarters) was using Navisionattain ver 3.6 and has now upgraded to MS Dynamics Nav 2016 (ERP), which had been customized to include patient handling. The clinics still use Navisionattain but Nav 2016 will be rolled out in a year's time. The upgrade will provide better services to the entire ecosystem with the ability to seamlessly share information among the clinics and hospital, among other advantages."

As it was for the other private hospitals in terms of challenges in the bundling efforts, it was no different for Omega hospital. The challenges faced by Omega hospital include bureaucracy in the procurement of IT infrastructure equipment, non-IT savvy clinicians, and insufficient training of both clinical and HIT staff in IT system use and patient records security. Top management has been supportive despite the challenges, as stated by the IT officer at Omega hospital:

"As the IT team, we advise management on what needs to be in place to improve the efficiency of the systems currently in use. They have been supportive and approve our requests. The challenge though is that the procurement takes ages and so affects the entire process. Then after implementation of the new systems, only a few IT and clinical staff are trained to handle the new systems. This affects the systems' performance as they will not work at its optimal level."

At the Alpha hospital, there are two systems—Clinicmaster (HIS) and Navision (ERP)—that do not share information. Upon learning about this lack of sharing information, the hospital director requested that a seamless flow of information be created between the two systems to improve their effectiveness and the efficiency of healthcare service delivery in general. The project was approved and was underway during the time of this research, as stated by the IT manager at Alpha hospital:

"The hospital management in the bid to realize improved efficiency ran to IT in the form of a HIS. The outcome was procurement of Clinicmaster and Navision. After a while, management requested an integration of the two systems. The project was approved and is now close to completion."

In general, there is a drive to improve the existing capabilities as well as create new capabilities in most of the private hospitals as a way to tap into possibilities that come with the use of IT.

6.2.3 Enacting through Leveraging

When it comes to leveraging, there are practical issues and managerial strategies in place aimed at improving the efficiency of healthcare service delivery. During this research, a couple of projects were ongoing in many of the private hospitals and were being supported by the board and top management. In addition to support, the board and top management monitored the progress of the projects and also followed through with implementing recommendations accruing from IT audits to improve healthcare service delivery. For instance, one IT audit indicated the absence of IT governance

structures and the inability to implement IT projects in a timely manner in Nano hospital. The IT manager at Nano hospital stated:

"At the moment, we don't use any IT governance frameworks; these are some of the recommendations to be handled following the IT audit. The board takes keen interest in the recommendations made and oversees their implementation."

Looking at hospitals, Beta home care, which is part of Omega hospital, is focusing on fully using the UgandaEMR system as a way of tracking and monitoring patients in any part of the country. The UgandaEMR is a medical records system focusing on HIV treatment and is in use in more than 340 sites in Uganda. The system serves the patients better and avoids making them travel long distances to pick up their drugs and undergo routine tests. The Beta home care IT officer stated:

"In collaboration with development partners, we are in the process of having UgandaEMR to help us in the monitoring of the following aspects of the patients: demographics, vitals for the patient, and viral loads. With UgandaEMR, we will be able to track patients in any part of the country."

Concerning the public hospitals, there are literally no HISs. The MoH relies on information from the DHIS 2, which is provided on a monthly basis and is input by the DHOs. An addition has been made to the DHIS 2 platform called the DHIS 2 tracker, which focuses on sharing critical clinical health data across multiple health facilities. However, to use the addition as a HIS at the national level, it has to be combined with more advanced electronic medical records, as stated on the DHIS 2 website:

"The DHIS 2 tracker currently does not aim at becoming an advanced EMR system to support clinical care, but rather a basic transactional system that is easy to set up and that builds on an existing and proven platform and available technical capacity."

In terms of coordination, bringing together key stakeholders to agree on the best way to deliver health services was evident in the Ugandan setting. Presently, there is an eHealth working group whose membership comprises people from the MoH, the National Information Technology Authority-Uganda (NITA-U), and academia. The health lead at NITA-U pointed out that the eHealth working group is working on providing policy guidelines that will guide the operations of HIT in the country:

"When people have any innovation in health IT, they never consult with NITA-U; they go to the Ministry of Health, which grants them the permission to do whatever they have proposed. Over time, this has led to duplication of the same applications, subsequently leading to a ban. With the eHealth working group, there can be consultations among the eHealth group membership before granting permission to implement any proposed innovation."

Concerning deployment, the MoH has implemented DHIS 2 in many of the health centers in the country, which has considerably improved the monthly reporting of health-related concerns from the districts. These reports include but are not limited to the patients who receive treatment and the corresponding ailments in a given month; the number of cases of outbreaks and deaths, if any; and other concerns. This has provided clarity on the actual needs of the different health centers because they all have their own unique challenges and have supported the planning process, as stated by the Commissioner of Health Information Management systems in the MoH:

"With DHIS 2, we have been able to get timely information from the health centers in the districts. This has equally supported the planning process, as the technocrats are well informed about what is happening in the various parts of the country. As the Ministry, we can then place the right order with the National Drug Authority and National Medical Stores."

Typically, findings showed that there are leveraging efforts in the various healthcare organizations, whether private or public, with strategies to help the healthcare organizations achieve their mission or vision. The private hospitals showed more interest in finding innovative ways of providing healthcare services.

6.3 Comparison of Swedish and Ugandan Setting

The Swedish and Ugandan settings were compared by categorizing the differences and similarities. To start with, as shown in Figure 5 and Figure 6, there is a difference in the balancing directions of ambidextrous IT governance in the two settings. Considering Figure 5 and the different resource orchestration actions, further analysis leads to Table 6, which shows the extent of the balance between exploitation and exploration for each component and then the aggregate balancing for the three stages in Sweden. In Figure 6, resource orchestration actions aimed at balancing exploitation and exploration are different at each stage in the Ugandan setting. Table 7 shows the extent of

balancing exploitation and exploration for each component and then the aggregate balancing among the three stages in Uganda.

For the structuring and bundling stages, the direction of balancing is more toward exploitation, although explorative activities are also happening. As for the leveraging stage, the balancing is biased to exploitation, and no explorative activities are happening at this stage. This suggests that resource orchestration actions responsible for balancing are probably only occurring at the structuring and bundling stages and not at the leveraging stage. This brings into perspective the argument of Wiener et al. (2016) regarding the interaction between the controller and the controllee to put the portfolio of controls into practice. According to Wiener et al. (2016), varying the resource orchestration actions at the mobilizing and coordinating substages by top management could affect the direction of balancing at the leveraging level. The effect from this is likely to give healthcare organizations a competitive advantage. Competitive advantage, in this case, is about the healthcare organizations being able to remain relevant and offer the needed healthcare service amid digitalization that is characterized by disruptions. In other words, healthcare organizations need to work on their sustainability. The findings show that the top management in the region coordinate resource people, as earlier stated by the Area ICT manager. Given the interest from politicians and top ICT management in the region, the governance of HIT is set to improve for the better, which will, in turn, support the digitalization of healthcare.

Table 6 Direction of balancing in the Swedish setting

Component/subcomponent	**Resource orchestration actions**	**Exploitation activities**	**Exploration activities**
Structuring			
Acquiring	2	1	1
Accumulating	3	2	1
Divesting	1	1	
Total	6	4	2
% representation		66.7%	33.3%
Bundling			
Stabilizing	3	2	1
Enriching	1	1	
Pioneering	1		1
Total	5	3	2
% representation		60%	40%
Leveraging			
Mobilizing	1	1	
Coordinating	2	2	

Deploying	2	2	
Total	5	5	
% representation		100%	0%
Aggregate % representation		75.6%	24.4%

Table 7 Direction of balancing in the Ugandan setting

Component/subcomponent	**Resource orchestration actions**	**Exploitation actions**	**Exploration actions**
Structuring			
Acquiring	1	1	
Accumulating	2	2	
Divesting	1	1	
Total	4	4	
% representation		100%	0%
Bundling			
Stabilizing	3	3	
Enriching	2	2	
Pioneering	1		1
Total	6	5	1
% representation		83.3%	16.7%
Leveraging			
Mobilizing	1	1	
Coordinating	1	1	
Deploying	1	1	
Total	3	3	
% representation		100%	0%
Aggregate % representation		94.4%	5.6%

Tables 6 and 7 help visualize the direction of balancing in the two settings. The tables should not be mistaken as representing quantitative data; rather, they are used to visualize the direction of ambidextrous balance within the Swedish and Ugandan settings. The identified resource orchestration actions in the two settings were placed in the resource orchestration processes/components, that is, structuring, bundling, and leveraging, and then percentages were derived from the number of activities identified under each process. Later, the aggregate representation showed the balancing points in the two settings.

Table 6 depicts the direction of balancing in Sweden as 75.6% exploitation to 24.4% exploration, and Table 7 depicts the direction of balancing in Uganda

as 94.4% exploitation to 5.6% exploration. The outcome is that in both settings, although more exploitation is happening, exploration is happening as well. The balancing results suggest that innovation is happening more in the Swedish setting than in the Ugandan setting. This can be attributed to the long history of automation and large digital base in Sweden. The automation was primarily aimed at offering efficiency, but with so many siloed systems over the years, it appears that efficiency cannot be improved further, and the option then becomes innovation. The levels at which the balancing occurs differ, which confirms that the balancing act is continuous and happens at varying differences in the two settings. As the analysis continued, new constructs emerged using the resource orchestration and ambidexterity lenses to show how healthcare organizations in the two settings enact ambidextrous IT governance. The process resulted in a description of the differences and similarities in the two settings and how they are influenced at the different managerial levels.

Considering the categories of policies in the Swedish and Ugandan settings, differences are evident in the ambidextrous balance of the compared countries/settings. The three categories of policy align comparatively in the Swedish setting. The digital healthcare/eGovernment and healthcare (general) policies are aligned concerning ambidextrous balance, but IT policies indicate a higher skew toward exploitation rather than exploration. For the Ugandan setting, there is no alignment between the three categories of policies. The healthcare (general) and IT policies are focused on exploitation, whereas the digital healthcare/eGovernment policies are focused on exploration. Figure 7 represents the various levels of alignment among the categories of policies in the two settings.

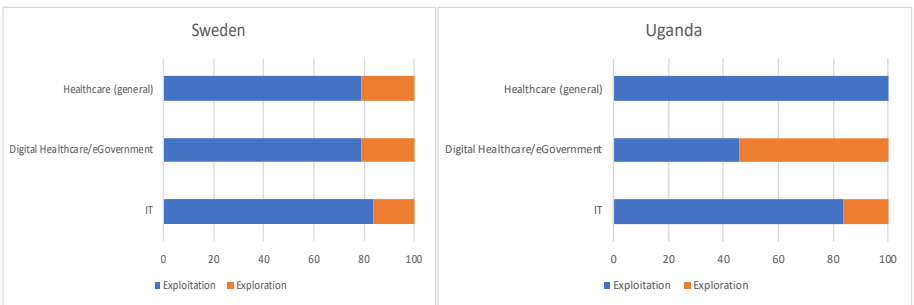

Figure 7 Ambidextrous balance in Sweden and Uganda

6.3.1 Differences between the Swedish and Ugandan Setting

In the Swedish setting, healthcare is mainly the preserve of the public sector and fully financed by the local council authorities (Agerholm et al., 2013). However, over the years, healthcare has seen the emergence of private healthcare providers (Romøren et al., 2011). Efficiency has been the main focus in public healthcare service delivery with innovation occurring at a low rate. With the existing innovation gap, private healthcare service providers have come into the sector with the hope of providing innovative ways of providing effective healthcare services (Wadmann et al., 2009). In the Swedish setting, there is also a lot of control, which affects IT investment decisions. The politicians determine what will be financed by the budget, and priority is given to achieving efficiency as opposed to innovation (Kizito, 2019a). On the other hand, county councils have the right to make independent decisions regarding financing and therefore can implement various projects that have been agreed upon by the steering committee of the respective county council promptly and without external interference from the regional level. In addition, the fact that each county council is able to finance its own projects gives room for innovation, thus leveraging the aspired shift from predominantly pushing toward exploitation to the desired balance between exploitation and exploration. However, the freedom to implement whatever each county council wants creates other challenges, such as the inability to share information among the county councils, which act as a hindrance to the digitalization of healthcare. This calls for innovative ways in which county councils can work toward implementing systems that are able to support the digitalization of healthcare. In support of this goal, the AllAgeHub platform (Region Municipal Association, 2017) has been set up so that anyone with an idea can share it, and all interested municipalities can then contact the entrepreneur. This platform is considered a gateway of testing ideas in the various municipalities that will result in supporting sustainability concerns in the region.

Furthermore, in the Swedish setting, regional authorities are attempting to work with other stakeholders, such as academia, start-ups, and industries. The financing is available and has been operationalized through a support cluster initiative for some industry sectors in the VGR (Alfresco). The main objective is to have people meet and discuss how to work together using the existing infrastructure to create the needed solutions aimed at supporting the digitalization of healthcare. Again, however, there is a need to be open and consider new ways of doing things to match the rapidly changing technology and human resources environments.

Like Sweden, healthcare in Uganda is also primarily the preserve of the public sector; however, poor financing from the central government and local governments in the various regions has led to growth in private healthcare service providers over the years (Kizito, 2019b). Moreover, private healthcare service providers offer better care at an affordable cost, which might be the result of the innovative methods they have adopted in providing healthcare services. In the Ugandan setting, given that there is already poor financing for basic healthcare systems, it follows that limited or no funding is available for innovation in public healthcare. The available funding, if any, comes from projects funded by development partners. The solutions from such projects are not sustainable because they never see the light of day after the projects end. The projects that come up with innovative solutions are in most cases piloting those solutions, and they are not pursued further if they do not yield the desired results. Given such a scenario, it is better to pursue more efficiency in the available healthcare systems than to seek innovations in the Ugandan setting.

Another issue is that HIT is underdeveloped in Uganda and is characterized by many stand-alone systems (in the public sector at the district level) that store data collected from the various health centers across the country. In the private sector, some healthcare organizations have integrated systems but also suffer from not being able to share information among the different private and public healthcare organizations in case of referrals. In the public sector, the MoH embarked on e-HMIS training for some district staff to strengthen the technical skills of district health teams and support health facilities in efforts to improve data collection and reporting. Because there are no fully-fledged HIT departments in the public healthcare organizations, IT work is outsourced. This affects the rate of automation of the processes in the public healthcare organizations. Although this is a problem, there is less control, which is a good opportunity for Uganda to leapfrog technologies because it does not have a large digital base, making it easier to transform and adapt state-of-the-art HIT systems and equipment. In the current state, most of the healthcare organizations in both public and private organizations have no IT steering committees in place. This can reasonably reduce the delay in the decision-making process, thus allowing for exploitative or explorative initiatives. These initiatives should be able to support the digitalization of healthcare. Table 8 summarizes the differences in terms of the structures and processes in the two settings.

Table 8 Summary of differences between the Swedish setting and the Ugandan setting

Swedish setting	**Ugandan setting**

Big digital base – HIT is more developed with a variety of systems and is well financed. There are fully-fledged IT departments.	Low digital base – HIT is undeveloped and poorly financed. There are no fully-fledged IT departments; they depend on outsourcing instead.
Too much control – In terms of decision-making, there are many IT governance structures at the county council levels that need to decide before the regional steering committee finally approves.	Less control – In most of the healthcare organizations, there are few IT governance and management structures, and thus decisions are reached much faster.
The work dynamics may demand more innovative ways of healthcare service delivery due to the many IT systems (silo systems) in place that may not be providing the envisaged performance improvements.	The work dynamics demand more use of IT systems to improve efficiency because they are still stuck in rudimentary methods of keeping health records.
Science parks are created to carry out research and promote innovation through the collaboration of academia and industry both in the private and public sectors.	Minimal effort is spent on promoting research. The little research that occurs is in academia and is mainly for academic purposes.
Funding is available from the government to facilitate innovations that offer solutions to existing problems.	Funding from the government is not enough, and this affects any efforts to innovate. Recently, however, the government has shown increased interest in funding innovations.

In terms of governance, the policies related to digital healthcare/eGovernment place Uganda as more focused on exploration in comparison to exploitation in Sweden's case (paper 5). This is interpreted from (Rolland et al., 2018) findings about the constraining aspects of digital heritage and the leapfrogging phenomena (Steinmueller, 2001). Uganda has just began investing in digital infrastructure for healthcare, unlike Sweden, which has a long tradition of digitization. This contributes to a substantial level of path dependency in

digital healthcare in Sweden, where new solutions are likely to be associated with high costs of integration with the existing infrastructure. On the other hand, Uganda's almost nonexistent digital infrastructure is based on obsolete technologies, which makes it easier for Uganda to utilize newer or emerging technologies. This offers more opportunities for leapfrogging and makes exploration naturally a better choice than exploitation.

6.3.2 Similarities between the Swedish and Ugandan Settings

The two settings have three things in common, discussed further in this section: conflicting logics, lack of information sharing, and the need for additional research. First, they both have tensions among their institutional logics (paper 2). These were seen through the control relationships depicted as power asymmetries, which are a result of differences in dependency relationships. The power or ability to influence can be viewed from the interpersonal perspective, which depends on a number of power bases, such as legitimate, expert, referent, compensation, and intimidation. Legitimate power is derived from the organizational hierarchy where the controller has authority over the controllee; therefore, the controller can request a set of behaviors from the controllee based on a signed agreement. The power asymmetries mainly affect the decision-making process in regard to what is to be procured. In the Swedish setting, there is more willingness to allow the different logics to work together as opposed to the Ugandan setting. Mutual consent is preferred and works best in the Swedish setting rather than the top-down arrangement in the Ugandan setting. In the Ugandan setting, the power asymmetries may be due to the differences in formal authorities or differences in knowledge between the controller and the controllee. Due to such occasional scenarios, top managers make a decision based on what they deem fit for the organization or after receiving recommendations from IT middle managers. Although this may result in far-reaching consequences, somehow someone has to make a decision.

Second, the inability to share information among the different healthcare organizations is common to both settings. The low digital base in the Ugandan setting makes it hard for healthcare organizations to share information as many of the systems are stand-alone and not integrated. For the Swedish setting, the combination of old and new systems (siloed systems) makes it complicated to share information even within the same organization.

The third similarity is the need for additional research regarding how policy development can be enhanced through the ambidexterity perspective in the two settings. In the Swedish setting, the current polices were drafted at a time when

technology advancement was at an early stage. With the advent of digitalization, research is required to inform policy amendments or guide the drafting of new policies to regulate the digitalization of healthcare. As for the Ugandan setting, the growing adoption of HIT systems has included drafting policies to regulate the systems. Even with policy drafting ongoing, research is still needed so that the policies are developed to be valid for both current and future situations.

7 DISCUSSION

In this thesis, resource orchestration was integrated with ambidexterity to theorize how managers enact ambidextrous IT governance in healthcare organizations. Carnes et al. (2017) state that although much is known about the innovation process and how organizations orchestrate their resources (Sirmon et al., 2011), more research is needed to understand how organizations orchestrate their resources to create innovation (exploration) (see also (Nambisan et al., 2017, Nambisan et al., 2019). They argue that research could help provide an understanding of how organizations pursue growth through innovation (exploration) in different contexts/settings. The thesis answers the call by Carnes et al. (2017) by investigating resource orchestration actions in healthcare organizations in two different settings. The thesis demonstrates how the enactment of ambidextrous IT governance is possible through the implementation of resource orchestration actions in healthcare organizations. The investigation used the resource orchestration lens and was later complemented by the organizational ambidexterity perspective, which brought to light ways in which healthcare organizations are coping amid digitalization. The digitalization phenomenon has not been around for long but continues to grow and spread in almost all areas of society, necessitating new ways to govern IT in order to support it. Ambidexterity, according to the foundational literature (Chi et al., 2017, Duncan, 1976, Raisch and Birkinshaw, 2008), indicates that successful organizations are aligned and efficient in their management of business demands while also remaining adaptive to changes within the environment. This thesis further responds to the concern of Miao et al. (2017) on how managers may mobilize resources to influence organizational performance by demonstrating how resource orchestration actions contribute to the synchronization of incremental and discontinuous innovation in enacting ambidextrous IT governance in the two different settings of Sweden and Uganda.

Figure 8 below presents more of a generic model that shows the different resource orchestration activities (i.e. exploitative or explorative) that happen differently in the two settings. During structuring, the acquiring and accumulating take on both exploitative and explorative activities in the Swedish setting and only exploitative activities in the Ugandan setting as following from Figure 6. During the bundling, stabilizing is done through exploitative and explorative activities in the Swedish setting while in the Ugandan setting it is done exclusively through exploitative activities (As circled in the figure). For the rest of the sub stages of resource orchestration, the activities are mainly exploitative. Figure 8 below shows a mapping of the two settings highlighting the differences that happen at the two sub stages of

structuring i.e. acquiring and accumulating and at the one sub stage of bundling i.e. stabilizing. This can be considered a generic model that represents a developed setting vs a developing setting where we have Sweden representing a developed setting while Uganda is representing a developing setting.

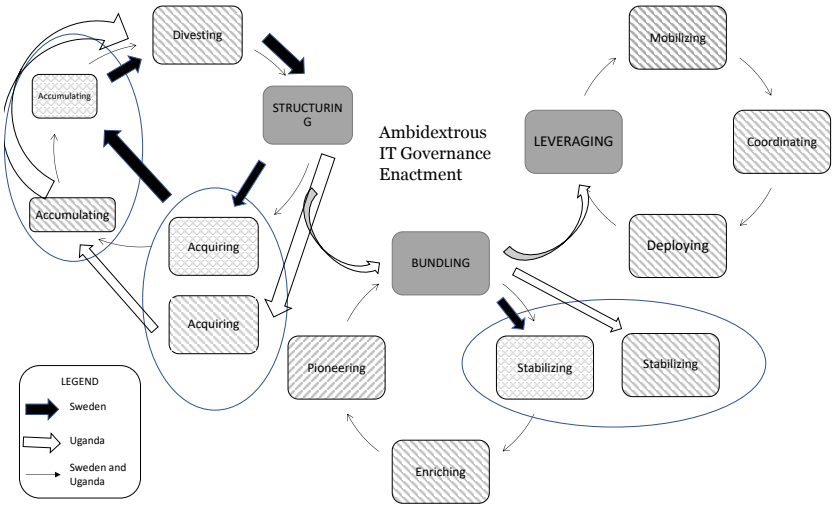

Figure 8 showing the differences of resource orchestration actions at different stages of resource orchestration during the enactment of ambidextrous IT governance in the two settings

In the Swedish setting, the findings identify improved governance and organizational structure, deployment of new strategies, and nurturing of innovation as key contributors to the resource orchestration actions in healthcare organizations. In terms of the improved governance and organizational structure, the findings show that there was a change in the governance and organizational structure addressing issues of standardization and information sharing. For instance, in the Swedish setting, most of the county councils had their own individual governance structures that made internal decisions to either procure or deploy/implement whatever they wanted. This structure led to a lack of information sharing among the county councils in the region. This is in line with Tilson et al. (2010) who state that digital infrastructures take a long time to build, often spanning decades rather than a couple of years, and require extensive financial investment and careful coordination of the standards that define the important interfaces and behaviors (Star, 2002). There is prior research on the evolution of digital infrastructure and the attention given to creating effective strategies for resolving contradictory tensions. In response to the inability to share information, the VGR has developed an information model that will guide all procurement of

infrastructure systems and support interoperability and information sharing (Kizito, 2019a).

With the improvement of the regional governance and organizational structure, an information model to guide all future HIT system procurements in the region is in place. This is expected to enable the connection of systems to improve interoperability and information sharing in the region. Moreover, the resource orchestration actions currently undertaken will simultaneously address capability strengths and weaknesses in order to realize exploitation and exploration (Sirmon et al., 2010). In line with Helfat C et al. (2007), the new aspects of governance and organizational structures have led to decision-making at various managerial levels at the county councils, which culminated in an agreement at the regional level. Notable coordination among the county councils has resulted in the sharing of newly acquired or accumulated resources, for example, the AllAgeHub[2] (Region Municipal Association, 2017).

Concerning the deployment of new strategies, the configuration/deployment process has seen the top managers highlight what they want to achieve. For example, the head care digitalization manager stated that he was interested in more cooperation between the clinicians and the HIT staff to see how IT can provide solutions to improve the efficiency of the clinicians in healthcare service delivery. The HIT staff welcomed this and agreed to have a HIT staff member closer to the clinicians to provide the needed support. As a short-term plan, the resource portfolio has been reorganized to provide for the creation of the capabilities to effectively implement the enterprise service bus, which is an integration layer that allows for information sharing. This is in response to the polarizing effects that IT can have, as argued by Boonstra et al. (2017). The polarizing effects are part of the debate on governance issues presented by the managerial-IT hybrid and medical-IT hybrid. Both hybrids are enacted in parallel and have good intentions to drive the healthcare organizations toward new IT initiatives, but in opposing ways. This culminates in unstable IT governance, and IT performance suffers. The dynamics show that the way IT professionalism is enacted polarizes the differences between the medical and managerial logics. When it comes to IT governance decisions, the managers and clinicians need to rely on IT professionals, and this is important in helping understand the logic that governs the IT profession and how it interacts with the managerial logic and medical professionalism. Ultimately, Boonstra et al. (2017) suggest that the ones responsible for IT governance are not the

[2] AllAgeHub is a joint initiative launched by twelve municipalities in the region of Gothenburg, with the Gothenburg Region's municipal association (GR) as project owner during the development phase from 2017–2019.

designers of the "best solution" but rather the listeners, negotiators, and innovators who work with other key stakeholders to customize IT governance arrangements that correspond to the enacted logics. This is corroborated by the action the IT professionals have taken in the VGR to assign IT personnel closer to the managers and clinicians, which is expected to make the IT professionals better listeners, negotiators, and innovators. This will likely guide all the actions of the stakeholders, providing a comprehensive understanding of the competing logics in IT governance as well as sensitivity to how these logics are being enacted in their organizations.

One of the studies in this thesis (paper 2) highlighted the centrality of IT professionalism among the logics and benefits accrued from IT investments. The focus was on HIT staff and medical practitioners at the top, middle, and operational levels, and the evidence from the institutional logics seemed to challenge the predominantly prescriptive and unilateral IT governance literature (Debreceny, 2013, Xue et al., 2008). The findings showed that amid the conflicting logics, IT governance is fairly successful given that the IT arrangement for healthcare organizations in the VGR are similar (Mignerat and Rivard, 2015, Mignerat and Rivard, 2009). Boonstra et al. (2017) identify two prominent logics in healthcare organizations as managerial and medical professionalism. However, given the technological advancements and the advent of digitalization, this research, conducted through the resource orchestration lens, noted that the two prominent logics in healthcare have come to appreciate the need for the IT professionalism logic. Resource orchestration actions have been seen to foster close collaboration among the logics, which has greatly improved IT governance practices. According to Boonstra et al. (2017), an implication for practice is that organizations should appreciate that there will always be tensions among the different stakeholder institutional logics. Because of the tensions, it is important that regular meetings are held that allow key stakeholders to discuss their plans for the organization in order to find middle ground and propel the organization further.

In terms of nurturing innovation, the findings highlight initiatives in place to support innovation, such as science parks[3] and the Innovation Fund.[4] The science parks and innovation fund work together with stakeholders that include

[3] Science parks are arenas dedicated to research and development in different dynamic areas in Sweden but are open to collaboration without geographical boundaries.

[4] The Innovation Fund in VGR is set aside by the political leadership to support new products, processes, methods, or organizations that are more efficient and/or better meet the needs of different stakeholders in VGR's healthcare systems.

clinicians, HIT staff, and other relevant solution providers. This is in line with dynamic capabilities, which Adner and Helfat (2003) refer to as the capabilities with which managers build, integrate, and reconfigure organizational resources and competences. The building, integrating, or reconfiguring of an organization requires that managers make high-level decisions. Reconfiguration in the capabilities of the healthcare organizations will require constant updates and innovative ways to support the sustainability of healthcare organizations.

On the contrary, Gregory et al. (2018) suggest that the enactment of everyone's IT by consumer-workers and consumer-consumers alters the IT-related activities of workers, resulting in the creation of significant discrepancies between the actual behaviors of the workers in their use of IT and what is prescribed by practical IT governance. They refer to the discrepancies as IT governance misalignments, which incite clashes between workers and managers. This is in agreement with György et al. (2012) who state that placing empowered individuals into a strictly regulated IT environment will lead them out of the IT department and to their own IT solutions, which will end in noncompliance. It is clear that IT champions (Beath, 1991) concerned with organizational inertia and struggling to find solutions to new demands of consumer-customers may take a realistic approach and enact new behaviors that naturally will clash with existing policies and norms (Jarrahi et al., 2017). On the contrary, Magnusson et al. (2020) argue that it is counterintuitive for organizations to adamantly refuse to respond to the identified need for increased innovation. They further state that organizations refusing to increase innovation, is a result of designing IT governance based on the New Public Management logic with a bias toward attaining efficiency. Furthermore, they argue that the mechanisms of efficiency, that is, creep and shadow innovation, provide new highlights concerning adaptive governance (Janssen and Van Der Voort, 2016). This thesis demonstrates that healthcare organizations have used the adaptive governance concept by balancing the exploitative and explorative activities to remain relevant and cope with digitalization.

In the Ugandan setting, the findings show that the various managerial levels all seem to have their own agendas, resulting in no support for each other. Synchronization of resource orchestration actions is important if the value of IT investment is to be realized (Sirmon et al., 2011). There is a need for top management to be involved concurrently at all stages of the process of resource management while consistently scanning the outside surroundings for relevant prompts for change (Helfat and Peteraf, 2009). The findings show that many of the organizations in Uganda did not have a clear IT governance structure in place, that is, IT steering committees, IT strategy committees, COBIT, ITIL, and so on. The unclear IT strategy subsequently suggests that IT structures and

processes are not clear or are nonexistent in many of the healthcare organizations. Another hindrance to IT structures could be IT outsourcing in public healthcare organizations, which affects IT investment decisions. No IT structures and unclear IT processes in place are barriers to effective IT governance (Weller and Wolff, 2005, Wolff, 2013).

In the public sector, the number of functional healthcare centers and regional referral hospitals is still low in comparison to the population in Uganda. Moreover, public health facilities are deficient in drugs and basic equipment for diagnosis and laboratory tests. With this in mind, the use of IT was noted mainly at the referral hospitals but still at a low scale. At the health centers, patient health records are recorded in exercise books that are left in the care of the patients, which sometimes results in the loss of patient history when the books are destroyed or misplaced. In addition, a patient may have more than one book (a book for each health center) in an attempt to get as many drugs as are available from the different health centers. This scenario results in inaccurate statistics regarding the number of patients being treated, culminating in an inaccurate aggregate number of patients treated over a period of time for different ailments as sent by the DHOs to MoH headquarters. The MoH in Uganda should consider adopting IT systems to help eliminate this duplication through accurate electronic health records that provide unique identifiers for patients.

According to previous literature (Boumgarden et al., 2012, Garavaglia et al., 2011), there is a tendency for IT governance over time to increase its focus on efficiency (exploitation) partly due to bureaucracy and formalism being a function of time in especially large organizations (Adler and Borys, 1996). As a result, in the Swedish setting, which has a long track record of automation and a larger digital base, low support was noted for innovation (exploration) that is mainly attributed to formal control. This may explain the increased demand for shifting the emphasis away from efficiency and toward innovation. In the Ugandan setting, there was a lower degree of formal control, resulting in a tendency to focus on innovation (exploration) at the expense of efficiency (exploitation). The existence of a smaller digital base and no legacy environment allows for easier development and adoption of new solutions, which also reduces the complexity of adaptation to new solutions. Furthermore, the strained economic situation in the Ugandan setting calls for exploitation of the available resources, which was supported in a way by the ban on innovation pushed by legislation (Kizito, 2019b). Thus, the Ugandan setting displays a contrary stance to the Swedish setting in its aspiration to shift from exploration to exploitation.

The findings further identify a central difference in terms of how ambidextrous IT governance is enacted in the Swedish and Ugandan settings. This is partly attributed to the difference in challenges and opportunities faced by the two settings, as shown in Table 9. Luger et al. (2018) and Raisch and Birkinshaw (2008) argue that the difference from the necessary focus on exploitation versus exploration is contingent upon the level of dynamism in the external environment, but the findings bring out a different interpretation of this relationship. The Ugandan setting is consistently more dynamic than the Swedish setting with more political and geopolitical turbulence occurring in parallel with a major revamping of the healthcare system itself. In addition, the Ugandan setting has little of the institutional inertia present within the Swedish setting, which is characterized by a strong installed digital base of existing solutions that end up acting as deterrents to change. This suggests the possibility of nuancing ambidexterity research further in two ways.

First, the assumption that focus on exploitation is meant to attain a certain level of efficiency in a dynamic environment indicates that, in the Ugandan setting, if sufficient exploitation is not attained, the organization is not in position to shift its emphasis more toward exploration. This assumption is in line with Sabherwal et al. (2019) argument that strategic IT alignment does reflect a capability that enhances the positive effect of IT investment on organizational performance in dynamic, complex, and hostile environments. On the contrary, strategic IT alignment reflects a rigidity that reduces the positive effect of IT investment on organizational performance in stable, simple, and liberal environments. This is consistent with describing strategic IT alignment as reflective of a capability to leverage IT. In the Ugandan setting, the current scenario requires that IT is deployed to boost efficiency in existing processes and structures. Going for innovation will not help much as there is not much IT infrastructure to support innovation. It is better to use the existing IT infrastructure and determine how to improve efficiency levels.

Second, findings in this thesis show that the enactment of ambidextrous IT governance is contingent upon the historical development of governance structures, processes, and relational mechanisms (Heracleous et al., 2019, Herz et al., 2012). With increased formalization over time, as in the Swedish setting, comes an increased leaning to shift the ambidextrous balance toward exploration. This leaning is endogenous in character and therefore challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism. The shift toward more focus on exploration suggests the effect of either environmental changes or sustained internal inertia due to formalization of controls (Urbach et al., 2019). Thus, the causal relationship assumed in the literature calls for additional inquiry. Future

research should focus on better understanding the intricate process of dynamic ambidexterity.

Concerning the managerial levels of the organization, existing resource orchestration research focuses on top-level managers (Holcomb et al., 2009). This research brings to light a methodological contribution in terms of an entirely new stance on how IT governance can be enacted through resource orchestration actions at all managerial levels. This thesis responds to the call for research in IT governance by Chua et al. (2012) that would support an interplay between formal and informal control, the dynamics of control activities (Gregory et al., 2013), and the contradictory recurrences of results as an outcome of internal and outsourced IT projects (Tiwana and Keil, 2009). Furthermore, the suggested cycle is an alternative to Zimmermann et al. (2018) who highlight the central, proactive, and strategic role that the operational managers play in contrast to the established design perspective on ambidexterity. The findings show that the decision-making process depends more on mutual understanding among the members of the steering committees and at the different managerial levels in healthcare organizations.

Previously, each county council chose to do whatever they wanted without consideration of information sharing and cooperation with other county councils. Over time, this scenario affected IT governance, causing IT performance to suffer in the region. In order to work together as county councils in the region, the county council steering committee members struck a compromise and agreed to have a standard method for all county council healthcare organizations to share information in the future. This resulted in the development of an information model for the region, which is very pivotal in sharing information. This was possible also due to the openness and willingness of HIT staff to provide the needs solution to the managers and clinicians. This is in line with what Boonstra et al. (2017) proposed would raise managers' awareness of the competing logics underlying IT governance practices and clarify the pivotal role of IT professionalism in IT governance debates. They suggest that IT professionalism is central to the possibility of the organization determining the resulting enactment patterns, such as polarization, compromise, or synthesis. Reaching consensus was achieved through regular meetings that involved the project sponsors and managers. This particular means of achieving consensus is in agreement with the enabling style suggested by Gregory et al. (2015), which demonstrates how enactment of behavior control is accomplished.

Findings from the last study (paper 5) in this thesis led to a discussion that culminated in five propositions intended to guide future research into ambidextrous IT policy. This is one of the first pieces of work to target or study policies for the digitalization of healthcare from an ambidextrous perspective. The choice for presenting the findings as propositions and not conclusions stems from the need for additional studies to prove or disprove the findings. In terms of the IT policies and the identified alignment between the two settings, the IT policies seem to be subjected to isomorphism in the two settings. Isomorphism refers to the similarity of processes or structures of one organization to those of another, whether as a result of imitation or independent development under similar constraints.

Regarding the policies that govern general healthcare, the findings demonstrate a reverse phenomenon in which Sweden focused more on exploration in contrast to Uganda. Uganda's focus on exploitation as opposed to exploration can be attributed to the lower level of general maturity within healthcare in Uganda in comparison to Sweden. Sweden is considered one of the leading nations in the world in healthcare quality, and the country has invested in assuring economies of scale and high levels of exploitation. Conversely, Uganda has not had the opportunity to consolidate its resources and achieve exploitation. The resulting broad focus on exploitation in general healthcare policies in Uganda is regarded as a cap on exploration and risk because reaching a sufficient level of exploitation is necessary.

Table 9 Summary of resource orchestration actions (challenges and opportunities in Sweden and Uganda)

Resource orchestration actions	**Swedish setting**	**Ugandan setting**
Structuring	Procurement process underway for a standardized HIT system with information sharing among the different county council health facilities in the region Procurement of more IT systems to incorporate IT in	Procurement of basic HISs Begining to incorporate IT in key processes of healthcare organizations

	areas where processes were not digitized	
Bundling	Using APIs to get critical health records from the old IT systems into the new IT systems Creating new capabilities in the region by, for example, adopting a new information model Supporting innovations from individuals of start-ups through science parks and the Innovation Fund	Using appropriate technology to report outbreaks given the low digital base Registering patients and storing their records to replace the rudimentary methods of writing in books
Leveraging	Bringing together the different specialist clusters in the region and tapping into their professionalism as a way of planning for the future Piloting the different initiatives that are outputs from the science parks Setting up the AllAgeHub as a means for entrepreneurs to share their ideas with the different stakeholders	Encouraging the clinicians to adopt the use of IT in their processes Having a team to coordinate the various processes in healthcare organizations to realize strategic objectives

Table 10 below summarizes the relationship of the results from the research and how they support the contributions of in the thesis and previous research literature that supports or contradicts the results.

Table 10 Contributions and how they relate to the results and literature gaps

Results/findings	**Contribution**	**Literature**
Amid the environmental uncertainty, there is a revamping of the IT healthcare system in the Ugandan public sector and improvement and upgrading of existing IT healthcare systems in the private sector (p. 58).	In a dynamic environment, focus on exploitation is meant to attain a certain level of efficiency. In the Ugandan setting, this means if sufficient exploitation is not attained, the organization is not in position to shift its emphasis more toward exploration.	This finding contradicts the suggestion of Luger et al. (2018) and Raisch and Birkinshaw (2008) that the necessary focus on exploitation versus exploration is contingent on the level of dynamism in the external environment. On the other hand, the finding is consistent with Sabherwal et al. (2019) who argue that strategic IT alignment interacts positively with IT investments to affect organizational value in uncertain environments.
Findings suggest that there are threshold levels for exploitation that need to be met before exploration is considered an option (p. 91).	If the organization does not achieve a sufficient level of exploitation, then	The findings further contradict Kim and Rhee (2009) and Peng and Lin (2019) who argue that the higher the degree of environmental dynamism an organization faces, the more

	exploration is not deemed relevant.	it needs to spend on exploration rather than exploitation. In this case, Uganda has a higher degree of dynamism compared to Sweden, and the findings demonstrate that Uganda needs to achieve a certain threshold of exploitation before it can turn to exploration.
There is some kind of constant pressure on IT to run healthcare organizations and contribute to the efficiency ratio. This has created a bias for efficiency rather than innovation-oriented investments (p. 91).	With the increased formalization over time, as in the Swedish setting, comes an increased leaning to shift the ambidextrous balance toward exploration. This leaning is endogenous in character and therefore challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism.	This finding supports Herz et al. (2012) who state that the enactment of ambidextrous IT governance is contingent upon the development of governance structures, processes, and relational mechanisms. This finding further supports the claim by Gregory et al. (2015) that there is a tendency by organizations to drift toward short-term IT demands to contribute to the efficiency ratio. They further suggest that exercising ambidexterity in IT transformation programs is an important capability.
The findings demonstrate that the decision-making	This research brings to light a methodological	This responds to the call for research in IT governance

process in the Swedish setting depends more on mutual understanding among the members of the steering committees and at all the different managerial levels in healthcare organizations as opposed to the top-down approach of implementing instructions from the top in the Ugandan setting (pp. 46, 53, 74).	contribution in terms of an entirely new stance of how IT governance can be enacted through resource orchestration actions at all managerial levels.	that would support an interplay between formal and informal control (Chua et al., 2012), the dynamics of control activities (Gregory et al., 2013), and the contradictory recurrences of results as an outcome of internal and outsourced IT projects (Tiwana and Keil, 2009). The methodological contribution is an alternative to Zimmermann et al. (2018) who highlight the central, proactive, and strategic role that the operational managers play in contrast to the established design perspective on ambidexterity. This finding, on the other hand, contradicts what Holcomb et al. (2009) state concerning the managerial levels of the organization and how resource orchestration research focuses on top-level managers. The findings

		demonstrate that resource orchestration happens at all managerial levels.
The findings suggest that in terms of the IT policies and the identified alignment between the two settings, there is an effect of IT policies being subject to similarity of the processes or structures among the healthcare organizations (isomorphism) (p. 70). The findings demonstrate that the configurations for governing IT, as well as the policies that guide them, do not display contextual contingencies. As such, the effect of a potential misalignment will become visible in the effectiveness of the IT policies (p. 70).	This is one of the first pieces of work to target or study policies for the digitalization of healthcare from an ambidextrous perspective.	This finding is considered as breaking new ground to guide the design of policies to support the digitalization of healthcare through the ambidextrous lens. On the other hand, the findings support the argument by Gregory et al. (2018) and Magnusson and Bygstad (2013) that there is a tendency within IT governance practice to fall subject to mimetic behavior, that is, adopting standardized models for governing IT into context-aware and customized models.
The findings show that there are many old siloed HIT systems in Sweden as compared to a few or no HIT systems in Uganda. (p. 70, 75)	Uganda is well positioned to technologically leapfrog by investing in digital infrastructure for healthcare and is freer to utilize emerging technologies as opposed to Sweden, which	This finding supports the recent findings from the study of the constraining aspects of digital heritage by Rolland et al. (2018) and the phenomenon of technological leapfrogging

	has a lot of siloed systems that are associated with significant costs for integration and sunk costs in the existing infrastructure.	by Steinmueller (2001). The long tradition of automation in Sweden led to siloed systems (Bygstad et al., 2017), but digitalization requires a change in systems and reskilled staff (Lappi et al., 2019, Lindgren et al., 2019).

7.1 Implications for Research

Some findings in this thesis contradict earlier research findings while at the same time are consistent with other research findings. On one hand, for example, one finding contradicts Luger et al. (2018) and Raisch and Birkinshaw (2008) who suggest that the necessary focus on exploitation versus exploration is contingent upon the level of dynamism in the external environment. Another finding contradicts the argument by Kim and Rhee (2009) and Peng and Lin (2019) that the higher the degree of environmental dynamism an organization faces, the more it needs to spend on exploration rather than exploitation. In this case, Uganda has a higher degree of dynamism compared to Sweden, and the findings demonstrate that it needs to achieve a certain threshold of exploitation before it can turn to exploration.

On the other hand, one of the findings in the thesis is consistent with recent research findings of Sabherwal et al. (2019) who argue that strategic IT alignment interacts positively with IT investments to affect organizational value in uncertain environments. Another finding in the thesis supports Herz et al. (2012) in their statement that the enactment of ambidextrous IT governance is contingent on the development of governance structures, processes, and relational mechanisms. The same finding further supports the claim by Gregory et al. (2015) that there is a tendency by organizations to drift toward short-term IT demands to contribute to the efficiency ratio.

As mentioned in an earlier section, this thesis responds to the call for research in IT governance that would support an interplay between formal and informal control (Chua et al., 2012), the dynamics of control activities (Gregory et al., 2013), and the contradictory recurrences of results as an outcome of internal

and outsourced IT projects (Tiwana and Keil, 2009). It introduces a methodological contribution as an alternative to Zimmermann et al. (2018) who highlight the central, proactive, and strategic role that the operational managers play in contrast to the established design perspective on ambidexterity.

Based on the findings in this thesis, further research could examine how knowledge is structured and bundled at various managerial levels in healthcare organizations. This is expected to highlight the varying knowledge skill sets of the different managerial levels in an organization and in which ways they contribute to enacting ambidextrous IT governance. To understand the contributions of knowledge by the different managers, a case study can be conducted of a healthcare organization as an appropriate qualitative method. Understanding how knowledge is structured and bundled at various managerial levels may require the use of a combination of methods, such as conducting interviews, reading documents, watching videos, or visiting places and events. A lot of interviews will be required to build a sufficient data set to look for emerging themes and to use other participants to validate the findings. This endeavor is expected to be informative to other healthcare organizations.

Another interesting line of research would be to isolate the processes that facilitate the actual flow of knowledge about the capabilities that have been formed to help shape decisions regarding the leveraging of those capabilities. The research will provide a better understanding of the roles and mundane tasks that managers, clinicians, and HIT staff undertake, thus being able to determine how their capabilities shape decisions and how they contribute to organizational performance and value from IT investment. The shaping of decisions is important given the digital transformation phenomenon. This study would be based on the case study approach because it involves a deep understanding through multiple data source types. Preferably, the case study should be explanatory, that is, describing an event.

Building on the work of Vial (2019), the research agenda would be to investigate how dynamic capabilities contribute to resource orchestration actions as important possibilities for the future of strategic IS research on digitalization. This could be carried out in a longitudinal case study of an organization involving multiple data sources, such as interviews, document reviews, and observations. The interviews can be done with the different stakeholders that have dynamic capabilities to investigate how resource orchestration actions contribute to the future of strategic IS research on digitalization.

Further research with the aim of understanding the causal relationship assumed in the literature will help provide some causes for this shift toward innovation. The findings in this thesis demonstrate that there is a shift toward an increased focus on innovation, which is attributed to either environmental changes or increased internal inertia due to formalization of controls (Urbach et al., 2019). Most organizations work at being efficient in what they do, and seeing this change toward innovation provides a good and possibly interesting area of research for understanding the need for dynamic ambidexterity. This research can be done as a longitudinal case study in an organization as this will reveal the circumstances under which the healthcare organizations choose the appropriate ambidextrous balance.

7.2 Implications for Practice

This thesis offers two main implications for practice. First, organizations should carefully assess the alignment of ambidexterity between their strategies and the policies governing them by performing an internal study aimed at getting to know some key issues. One key issue is to determine whether the employees are aware of the strategies the organization has in place and what they are meant to accomplish. It is also imperative that managers at all levels have a clear implementation plan of the strategies and the policies governing them. The assessment of the alignment of ambidexterity between their strategies and the policies governing them becomes easier to realize when employees have a real understanding of the strategies and when managers provide a clear implementation plan. The method used in the study in paper 5 (refer to Table 2) could be seen as a first step toward working with assessing the ambidextrous balance of both policies and internal steering documents (e.g., strategies).

Second, as noted by Zimmermann et al. (2018), the actual balancing, that is, the enactment of ambidexterity, is done by front-line managers and not through centralized, top management. Therefore, managers at all levels should consider not merely the ambidextrous balance but also the actual enactment of ambidexterity, that is, balancing. In line with this idea, organizations should consider understanding the contribution of each manager at the different levels. This is likely to bring out the various roles each managerial level plays in the actual enactment of ambidexterity in the organization, which will help the organization remain relevant in the long run amid the disruptions that accompany digitalization.

7.3 Implications for Policy

One of the studies (paper 5) in this thesis focused on policies governing healthcare (general), digital healthcare/eGovernment, and IT. The study was a cross-country comparison of health-focused policies. The rationale was to investigate the ambidextrous balancing point and how the policies in place affect the digitalization of healthcare. As one of the first studies to target policies for the digitalization of healthcare from an ambidextrous perspective, this is a valuable area for future research to help inform policy development that will support the digitalization of society. Policy makers would profit from adopting the development of policies using the ambidexterity perspective with the aim of developing robust policies to manage disruptions caused by digital transformation.

8 LIMITATIONS

The research was carried out in select organizations in both Sweden and Uganda, which differ in terms of geography, level of development, and culture. In the Swedish setting, the research was done in one region—the VGR—which is within the public sector. It is important to note that different regions in Sweden operate differently and may have varying regulations in comparison to other regions. In addition, Sweden is a developed country in Europe where healthcare is the preserve of the public sector and is well funded by government. However, private healthcare organizations are steadily on the rise. Finally, Sweden has had a long history of an installed digital base.

In the Ugandan setting, the research was done in both private and public healthcare organizations. Because the public healthcare organizations are underfunded, private healthcare organizations came into play to meet the desired healthcare needs. The public and private healthcare organizations are different, although they work together, especially concerning referrals and other related issues. Uganda is a LMIC in Africa where healthcare is distributed between public and private healthcare organizations. It was originally a preserve of the public sector, but the private sector filled the gap created by underfunding. Uganda is characterized as having a low installed digital base and is working at setting up a better and appropriate IT infrastructure to meet the ever-growing needs that come with digitalization.

Again, it would be hard to say that some of the suggestions made in this research are one size fits all. Overall, however, the ways that healthcare organizations enact ambidextrous IT governance are dependent on how managers at the various levels in the organizations work with each other to achieve the mission and objectives of the organization. In line with this, Bannister (2007) discusses some tentative theories about the purpose, pressures, and limitations that benchmarks place on public managers and their significance.

9 CONCLUSION

Through a combined resource orchestration- and ambidexterity perspective, this thesis explores how ambidextrous IT governance is enacted in healthcare organizations. Enactment is found to involve dynamic processes in all the levels of management. This includes finding solutions to resolving paradoxes and exercising ambidextrous leadership. Enactment happens differently in different environments and the level of formalization overtime impacts shifts in ambidextrous balancing point. This thesis explores the different perspectives of the individuals of the ecosystem in Sweden and Uganda and the highlights the unique differences in the ambidextrous balancing point in the two settings. The ambidextrous balancing point is different at each of the stages of resource orchestration in the Swedish setting but the overall balancing is in the direction of exploitation. As for the Ugandan setting, resource orchestrations actions occurring at each of the stages shows that the direction of ambidextrous balance is pointing toward exploitation.

The thesis contributes through answering the research calls from Janssen and Van Der Voort (2016) on the balancing act and reliance on ambidextrous strategies for adaptive governance, Remus et al. (2020) and Wiener et al. (2016) on enactment of IS project control and on the control mechanisms for innovation by Cram et al. (2016). The thesis further expands on the apparently limited theoretical foundation regarding the practical applications of ambidexterity within healthcare. The theoretical contributions consist of a new stance on how IT governance is enacted through resource orchestration actions at all managerial levels in a healthcare organization. Moreover, this is one of the first pieces of work to study policies for the digitalization of healthcare from an ambidexterity perspective. The contributions that resulted from answering the calls to research earlier mentioned consist of the following: The first contribution lies in identifying where the ambidextrous balancing point between exploitation and exploration is expected to differ by comparing the two settings. The thesis discusses how the following issues influence how ambidextrous balancing decisions are made in healthcare organizations. These are: (1) In a dynamic environment, focus on exploitation is meant to attain a certain level of efficiency. This means that if sufficient exploitation is not attained, the organization is not in position to shift its emphasis more toward exploration; (2) With increased formalization over time, comes increased leaning to shift the ambidextrous balance toward exploration. This leaning is internal to the organization and thus challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism. The second contribution lies in the role of policy in both the

dynamic process of ambidextrous balancing and the digitalization of healthcare. Thus, this thesis recommends that digital policy design should utilize findings and method of the cross-country ambidextrous policy study examined in the thesis to inform future design decisions.

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Digital resource Orchestration in Healthcare: The Case of Västra Götaland Region

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Abstract

Resource orchestration is seen as a key element of IT governance and is advocated as a critical mechanism for digital transformation. Given the current trend of digital transformation it is imperative to have in place good IT governance practices to create value through IT investments, manage IT risks, and provide IT assurance. There are shortcomings in the implementation process to turn Health IT (HIT) investment into tangible benefits. HIT staff at different managerial levels in the Västra Götaland Region (VGR) in Sweden, were interviewed to understand how they orchestrate digital resources. The findings showed that they are already carrying out digital resource orchestration actions to keep abreast with the digital transformation. They have put in place a governance and organizational structure on top of prioritizing innovation. The contribution is in the identification of resource orchestration actions carried out by HIT staff at various managerial levels in VGR healthcare organizations.

1. Introduction

Resource orchestration is seen as a key element of IT governance and is advocated as a critical mechanism for digital transformation. Given the current trend of digital transformation it is imperative to have in place good IT governance practices to create value through IT investments, manage IT risks, and provide IT assurance. With the evolution of technology in various areas, we see that information technology has become the backbone of organizations to the extent that some of the organizations would come to a ground halt without information technology. It is now impossible for business executives to delegate or avoid IT decisions [1]. The board of directors, through management, should guide an institution in fulfilling her corporate mission as well as protect its institution's assets. This is termed governance and effective governance is realised when the board gives proper guidance to management regarding the strategic direction for the institution and oversees management's effort to move in this direction [2]. IT governance is about those who have input and are entitled to making major decisions and ultimately those accountable for implementing those decisions [3]. They emphasize that taking the time to design, implement, and communicate IT governance processes to senior management is worthwhile and bears results.

In a digitally intensive world, organizations operate in business ecosystems that are intricately intertwined. As such digital resources should be viewed relatively broadly since they transcend traditional resources to include technology and digital services. Digital infrastructure consists of institutions, practices, and protocols that together organize and deliver the increasing power of digital technology to business and society [4]. Resource orchestration is concerned with the actions leaders take to facilitate efforts to effectively manage the organization's resources [5,6]. Managers at the different levels in the organization influence organizational performance by structuring the organization's resource portfolio, bundling resources, and leveraging those resources in the marketplace [7,8]. When knowledge resources or the specific expertise possessed by individuals is in a given domain in this case healthcare, mobilization and coordination are particularly useful [10]. In the healthcare sector where there are many stakeholders and valuable knowledge can be guaranteed within individuals and so social complexities complicate its leveraging [11]. The challenge now becomes how to get the individuals understand their shared purpose as well as cooperate in pursuit of that purpose in order to effectively leverage the knowledge resources. This is key component of resource orchestration.

The study investigates the resource orchestration phenomenon in healthcare organizations in order to contribute to the IT governance field. This research is guided by the following research question.

How can digital resource orchestration actions of Health IT (HIT) staff at the different managerial

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levels inform the design of improved IT Governance within healthcare organizations?

The central contribution of this study is to identify the resource orchestration actions at the different managerial levels in healthcare organizations using the resource orchestration framework as the theoretical lens. Empirical research was conducted to identify the most effective locus of resource synchronization. The empirical contribution in this study is important to the literature given that most work has either been conceptual [8,9] or focused on mobilization or coordination [12,13].

2. Precursory findings and positioning of research

The digitalization of healthcare (DoH) has been an on-going dedicated strategy since the 1970s in Scandinavia [14]. Digitalization may refer to enabling, improving and transforming business operations or processes by leveraging digital technologies and a broader use and context of digitized data turned into actionable knowledge with a defined benefit in mind [15]. DoH can be attributed to the society structures like the personal identification numbers, universal healthcare for all citizens, and established societal structures for handling taxation systems in some countries. As such, designing large information systems in healthcare is doable and realistic. Exploring and unpacking the information infrastructures for healthcare in Scandinavian countries provides insight into the core complexities of standardization, flexibility, dynamics, coordination, and connectivity relevant for resource orchestration research [16,17].

In many organizations today, there is pervasive use of IT which is necessary in the support of processes, sustainability and growth of the organizations. [19] states that IT governance is made up of leadership, organizational structures and processes. These are able to guarantee that IT sustains and extends the organization's strategy and objectives [20]. As many organizations shape new strategies, IT governance is high on the priority list for many organizations including healthcare organizations [18,21].

2.1. IT Governance

It is not clear from literature when the new challenge of IT governance began, however many organizations have taken it on seriously as a challenge that needs to be discussed and remedies devised for the issues raised [22]. Most of the organizations that took on the IT governance challenge implemented it in order to merge business and IT, and as a means of having senior managers get involved in IT decision making. These decisions include how much to invest in IT in terms of infrastructure, hardware and software.

[23] state that the use of IT governance best practices is different in the various sectors. They focus on the financial sector which they say was among the first sector to use IT in its operations and thus is mature. The argument of maturity from the financial sector is supported by [24]. This paper focuses on the healthcare sector with an objective of understanding how HIT staff carry out resource orchestration actions to inform the design of improved IT governance.

COBIT is a tool that organizations can use to help them align the business with the IT processes. It is therefore important that managers and users benefit from the development of COBIT as this will help them understand their IT systems and decide the level of security and control needed to protect the organization's assets through development of an IT governance model [25]. [26] states that COBIT and ITIL assessments can be used to audit and identify IT governance weakness and opportunities. He further argues that the processes in the organizations can reveal IT improvement priorities. Furthermore, [26] used the IT governance standard ISO/IEC 38500 to provide guiding principles to effective use of IT while setting up the IT governance initiative at the hospital Sao Sebastiao according to the Calder-Moir framework. IT governance focuses on systematically determining who makes each type of decision, who has input to a decision, and how these people are held accountable for their role [3]. Some guiding principles include, evaluation of the current and further use of IT, direct preparation and implementation of plans and policies to ensure that the organization's objectives are met from the use of IT and finally monitoring conformance to policies and performance against the plans [26].

Encouraging and leveraging the ingenuity of all organizational personnel in using IT may lead to the desired IT governance. At the same time this leads to compliance with the visions and mission of the organization.

For healthcare organizations, [27] posits that IS investment is by default necessary. Therefore, evaluating the consequences of IS investments is paramount and has to be done. Little is known though about how senior management determines how much to allocate to the IS function in the face of competing priorities [27]. However, [28] and [29] highlight how investment decisions in IS are made.

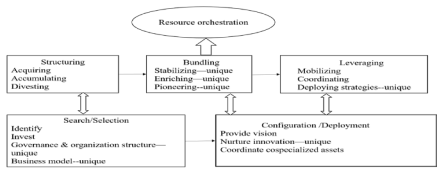
In order to assess the business value of IS, it is imperative that IS researchers understand what motivates senior management into deciding on IS investment. When it comes to practice, funding for the IS function to realize IS initiatives is based on senior management [27]. Given the criticality of the healthcare sector, [30] suggest that healthcare organizations can adopt IT to provide quality improvement at reduced costs to an organization. Designing proper IT governance in healthcare with the help of available tools is therefore necessary.
[31] posits that the digitization process has not been smooth in the healthcare sector like in other areas. Having in place a good IT governance tool can help provide the right information to senior management for decision making. The design of IT governance for organizations, depends upon a range of conflicting internal and external factors within the organization (ibid). Being able to determine the right match of mechanisms is an uphill task. Moreover, if the right match is found for a particular organization, it might not necessarily work for another organization.

2.2. Resource orchestration

The background of not ably managing the implementation process to turn HIT investment into tangible benefits creates a gap. This gap could be bridged by carrying out resource orchestration (RO). RO is concerned with describing and examining the roles of managerial actions during the process of structuring the resource portfolio, building relevant capabilities through bundling, and leveraging on these capabilities as an organization to realize a competitive advantage [8]. The resource orchestration framework [9] is a result of integration of the resource management framework and the asset orchestration framework. The only difference is that the resource management framework draws on the Resource Based view (RBV) and has been explicitly linked with RBV's primary logic while asset orchestration draws from the concept of dynamic capabilities. The resource management's treatment of resource divestment and the strategies for resource deployment are lacking from the asset orchestration arguments. The detailed types of bundling actions are also lacking. For instance, issues to do with business models, organizational and governance structures, and innovation are not reflected. In regard to managing resources strategically, resource orchestration addresses the actual role of the manager during the process [9]. The resources include the organization-controlled assets, capabilities, processes, attributes, information, and knowledge.

The complementarities of the resource management and asset orchestration frameworks suggest that integrating them will facilitate research of managers' actions within capability and resource-based logics. In support of the integration, they came up with the term resource orchestration and ultimately a resource orchestration framework (Figure 1). To further explore the integration and develop a research agenda for the two frameworks, [9] address issues not previously considered including the organization's breadth (scope of the organization), depth (managerial levels within the organization) and the life cycle. They provide a road map for further research in resource orchestration. The empirical study within the Västra Götaland Region (VGR) in this study focuses on the resource orchestration actions carried out in the organization's depth by HIT staff at the different managerial levels in the organization and how they can inform the design of improved IT governance.

Figure 1. Resource Orchestration Framework (Adapted from Sirmon et al., 2011)



3. Method

The case study approach is adopted particularly because it is suitable for answering the "How" question [32]. It permits researchers to understand the nature and complexity of the processes taking place in a given environment [33]. Given the limited knowledge of the resource orchestration perspective as an emerging field, [34] it is necessary to develop theories to explain resource orchestration practices. Case study methodology helps in effectively building new theories [35]. Furthermore, case-based research permits researchers to investigate the phenomena of interest, embedded in specific contexts [32]. As such the case study approach was considered for this study. The aim is to understand how the HIT staff in VGR healthcare organizations orchestrate digital resources as a key component of IT governance.

3.1. Empirical selection and description of case

Västra Götaland Region (VGR) was selected on the basis that it is a relatively big organization and is a driving force for development in western Sweden. The region collaborates at many levels with academia, the private sector and other public organisations. Besides, VGR is an active partner in the EU with a track record of many successful IT related projects [36]. However, the challenge has been that the successful IT systems but particularly health IT systems served/serve only a given county council and up to today still serve individual county councils within VGR. As such, digital resource orchestration is difficult and this is a limiting factor to the digitalization of healthcare services. Given those limiting factors makes VGR a good case to study in order to come up with theories of digital resource orchestration.

One aspect of Västra Götaland Region's main mission is to ensure that the population in Västra Götaland has access to good medical care among other missions. Another thing to note is that Västra Götaland Region is a politically governed organization. This points to the various decision-making levels. Given that IT governance is about who is entitled to make majors decisions, who has input and who is accountable for implementing those decisions, the hierarchy in VGR could affect the IT governance.

3.2. Data Collection

Data collection was carried out in two phases. In the first phase selection of suitable secondary sources of data from sources like the VGR website and a web search for newsletters regarding healthcare initiatives in VGR was done. The information gathered from the secondary sources served to enhance the pre-understanding toward the unique aspects and pertinent issues of VGR. This provided a basis for the choice of the interviewees. In the second phase interviews were carried out with HIT staff, IT managers and clinicians at different managerial levels within VGR healthcare organizations. An initial guide to design the interview questions was based on a combination of both the secondary data and the relevant literature. To allow for emergence of new constructs, some level of openness was maintained allowing the interviewees to speak even out of the bounds of the question as long as they felt it was relevant to the topic of discussion and also to the development of the theoretical lens [37]. The adoption of the resource orchestration perspective and the collected secondary data enabled an initial theoretical framing [38] which was a guide for subsequent interviews and case analysis.

Data collection through interviews was conducted amongst VGR's HIT staff, business managers and heads of healthcare departments/funds. Different digitalization initiatives implemented in VGR were reviewed. Interviews were conducted with 10 informants (see Table 1). The interviews took on both unstructured conversations and structured questions to guide the discussion. The interviews lasted between 45 to 60 minutes. During the interviews, interviewees were asked to introduce themselves and then share about how they have been handling the delivery of healthcare services amidst the digital transformation. At the end of the interview they were requested to suggest other potential interviewees which augurs well with the snowball sampling method, regularly used by case-based researchers as external interviewers can have difficulty in identifying the right informants [39].

All the interviews were digitally recorded and later transcribed. The interviews being the primary source of data were supplemented on the other hand by informal and conversational interactions from colleagues (Swedish natives) at work and other social gatherings in order to understand what happens in the healthcare organisations in VGR. The resulting discussion corroborated some of the issues that were raised during most of the interviews. The participants involved in the interactions are beneficiaries and therefore stakeholders of the healthcare systems managed by the VGR HIT staff.

3.3. Method of Analysis

The analysis of data was done following the deductive framework approach [40]. Using the resource orchestration framework [9], examination of the findings was done. The results were presented using the three components of the resource orchestration framework. During the analysis, moderate literature review was done in regard to the resource orchestration framework. The themes were developed from the framework as well as from thinking about the data and creating links from the understanding derived [41]. The categories that emerged included: enriching, pioneering, and coordinating, mobilizing, and integrating resource to form capabilities. Others included stabilizing, acquiring, accumulating and divesting resources as well as provision of vision and nurturing innovation. The categories were related to the components of the resource orchestration framework which include

structuring, bundling and leveraging. Analysis continued in order to refine the themes and come up with clear definitions and names of each theme. The last opportunity for analysis was done while compiling the results. A selection of vivid and compelling extract examples relating back to the research question and literature was done to help produce the results.

4. Results

This section presents the results from study that are presented using the key components of resource orchestration framework (as described in section 2.2).

4.1. Structuring

What is clear from this study is that there is a deliberate move by HIT staff and management in VGR to form a new and technologically complaint resource portfolio. There has been coordination among the various county councils which will lead to sharing of newly acquired resources as well as support the procurement process of standardized IT health systems. The Strategist and Enterprise architect in their submission stated that:

Table 1 showing informants' organizations and designations

Organisation	Designation of person interviewed
Innovation Fund	Head
Goteborg Business Region	Area IT Manager
Sodra Alvsborg Hospital	IT strategist/Radiology
Västra Götaland Region	Strategist and Enterprise Architect
	Strategic Architect
	eHealth Expert/Radiology Nurse
	Head Care Digitalization/Retired Medical Doctor
	Digitalization Strategist
	Chief Standardization officer
Lindholmen Science Park	Programme Manager PICTA

'*It was this procurement project for which they needed to change the Lab system and they realised that it was not possible to do the migration in 8 months so they raised it in the regional steering committee for the project which comprised of members of the steering committees of individual labs in the region.*'

This is an indication that decisions for digital resource orchestration actions are taken collectively. Top management highlights what they want to achieve and then allow the experts who are normally at the middle and operational levels to advise on the procurement of IT health systems. The centralized/regional procurement of standardized IT systems and equipment will therefore eliminate the problem of information sharing and interoperability that have been a perennial challenge in the region. Like the standardization officer stated: '*For our case, the politicians set aside some money for the project. Then there is the steering committee and project manager which is the team that decides what should be purchased. In case where the amounts involved are so high out of the stipulated budget, then we go back to the politicians'*

Given the above responses we noted that there is support from the county councils, the hospitals' management and political leadership in the bid to acquire new and adaptable healthcare information systems, accumulating resources such as sharing the resources of the talented individuals from some county councils to help other county councils. In the search/selection of resources, the governance and organization structure has enabled decision making starting from the lower managerial levels and going up the hierarchy. As noted by the standardization officer: '*we see the business request and from that we see what kind of standard will be suitable for them and that is part of my role to do that'*. IT Investments are done as a region following initial agreement by the county councils that follow the information model. An important resource orchestration action is divesting of resources, for example old systems need to be replaced with better and more technologically up-to-date systems in the bid to achieve improved efficiency. One of the IT Strategic Architect pointed out:

'*We see that the old systems, don't work in an up to date context where we have for example doctors sitting in one hospital and operating the diagnostics on another patient in another hospital. This was noted because hospitals are short on staff both nurses and doctors who are hard to find in Sweden these days'*. VGR is a growing organization and has chosen to identify and invest in the right resources while forming the resource portfolio. During the investing

process, VGR is mindful of the fact that the process of divesting needs to be done in phases. As stated by a standardization officer:

'*A lot of people in healthcare in Sweden and many countries don't realise what systems they are buying. They often times buy and inherit an information model that causes the organization a lot of trouble when it comes to interoperability because it can't be changed or customised. But the step we took is we put the most effort in defining our information model, how the data should be structured. By doing that it is simpler to connect our systems to other systems.'*

The problem with most of the systems built was that they were based on personal opinions and not international standards. This is one of the causes for failure to exchange data among the systems. One of the strategic architects who is part of the process of getting a new information model stated:

'*I would say we lack some kind of connect environment. The background makes it isolated islands. We have something for primary care, for the hospitals and county council care and they are not interlinked. One thing is also the lack of governance when it comes to informatics*.'

In VGR, there is an informational model in place to help in the governance of IT. It is a guide that is now followed during the procurement process of IT infrastructure. Managers in VGR consider identification and investment decisions very important and necessary resource orchestration actions in healthcare organizations.

In the bid to nurture innovation, science parks have been set up as initiatives with academia. For example, the Lindholmen science park [5] and the Sahlgrenska science park. Further support for innovation is channelled through the innovation fund which started at Sahlgrenska Hospital. It is a purely innovative and development project open to collaboration between academia and hospitals.

The head innovation fund stated that there is support from the county council towards innovative ideas of how IT can support the doctors and nurses. He further stated that decision making happens at the top level but the ideas begin at the operation level as evidenced in his statement that follows:

'*The county councils want to support innovation in the region. So, they look out for ideas that the nurses and doctors come up with in their departments and see how IT can be used to create solutions. The key thing is how can they innovate? Moreover, for the first time we have this opportunity and the politicians have approved 20M SEK this year (2017)'.* The findings show that there are already ongoing digital resource orchestration actions aimed at supporting the digitalization of healthcare.

4.2. Bundling

In VGR hospitals, there are quite a number of old systems that are still in use due to their usefulness and nature of data that they hold. However, there is a challenge of trying to have these systems work with new systems majorly in the area of trying to retrieve data from the old systems by the new systems as stated by an IT strategist and Enterprise architect:

'*There are two modes, mode 1 getting old systems to work—getting things to work right now that is maintenance. The old systems from the 80s have to run since they are still in use, they have to run and cannot shut down so we have to have the backups and the mode 2 we have the innovation mode'*

What is worth noting is that there are minor incremental improvements to existing capabilities as well as enrichment which extends current capabilities. For example, there has been creation of APIs for the old systems as a means of getting information from the old systems for use in the new systems. One of the informants a standardization officer noted that:

'In some cases, we have the same space for radiology, cardiology, dentistry and we use the same infrastructure which was developed over 10 years ago. When it comes to pathology we have specific space given the original data and amount of data on the one hand but also due to the high demand for pathology data to help in the pathology process. The shared space is seen as a single space by the user since the space has been created out of global standards'

There is a deliberate move to integrating resources to form capabilities through minor improvements to existing capabilities, and creation of new capabilities. There are ongoing projects under the Innovation Fund in VGR and they are aimed at creating new capabilities in healthcare. For instance, one of the projects aims at trying to reduce on the healthcare professionals' work by having the patients to share their information on a daily in real time. This was noted from the interaction with the head innovation fund in which he stated:

'*For example, patient related apps that are being worked on, include a solution where the patient can manage their sickness, using a measuring device like a T shirt that has sensors for Parkinson disease and sends real time information to the doctors about whether the patient has taken their medication and also the shakiness levels, blood pressure and other relevant measurements.'*

The head Care Digitalization was keen in getting to see how the HIT staff are able to make use of IT to

help them improve in the way they offer healthcare services. He stated: *'We can also use our experts in a more efficient way via new technology, video and the Internet of Things (IoT) solutions to enhance those possibilities. I think that the problem is all our governance structures are still as they were in the 1600s and we need to have a huge change in our governance structures'*

The incremental improvements and extending of current capabilities are resource orchestration actions that are already happening in VGR. The creation of mode 2 systems and having an informational model in place are resource orchestrations actions that have been adopted. In support of this an IT Strategist stated that: *'There are so many rapid and complex changes happening at the same time'*

There is already a shared storage space for the various data from the different medical disciplines that is cardiology, radiology and so on. This creates easier sharing of data.

4.3. Leveraging

There is need to provide a plan for capabilities needed to form requisite capability configurations as well as coordinating the integration of capability configurations which leads to deployment of systems or strategies used to exploit capability configurations formed by the coordinating sub process. VGR is already on the right track and has a model in place to steer the entire IT in the region. This is corroborated by one of the object leaders at one hospital in VGR noted that:

'The region has a model of how to steer the entire IT in the region, I am a part of this and that's my task is for the entire region'

The model in VGR takes into consideration all the technological advancements and therefore puts strategies in place that are able to take advantage of the available IT opportunities within the healthcare organizations. This is exactly what leveraging is all about. It exploits the organization's capabilities and takes advantage of the market opportunities. For instance, VGR has taken advantage of the digital transformation and the support from the county councils in the region

towards realizing the digitalization of healthcare. VGR has in place an annual healthcare investment budget. This is a step in the right direction and indicates the willingness by the management of VGR to support innovations in healthcare. Already most HIT managers of county councils in VGR are happy to cooperate with each other to avoid the current challenges of information sharing they are facing currently. This makes it easier to add new systems or devices on the existing systems without making critical changes. This is corroborated by the Chief standardization officer who stated:

'Regularly it is about 200M SEK in a year for healthcare but currently we are in a phase where we are looking for the future healthcare environment. It is a huge business deal which will require a single investment of a couple of billion SEK and it will have brand new thinking. It will cover most domains and we will replace our current electronic patient records (EPRs).'

Leveraging involves a sequence of processes to exploit an organization's capabilities. From the interviews it was clear that most of the HIT staff were very much willing to come up with innovations so as to realise efficiency in healthcare services. As noted by an IT strategist: 'We are too slow, we are very good at maintaining the old EHR system, but these innovations things we pretty lacking on the IT side. We need to be better on that side and there is some effort especially on the IT side to get better. We are looking at our capabilities and trying to see what we are lousy at and how we can improve. Three things; strategies, getting everything together and be better at innovations.' There is increased coordination between the clinicians and HIT staff of the county councils. The programme manager PICTA [46] stated that: 'In order to benefit from the advantages that come with technology, there has to be close collaboration between the healthcare professionals and health IT staff who provide healthcare solutions'

This is evidence that the healthcare organizations are out to look out for new ways in which they can use IT to improve the healthcare services.

5. Discussion

The study outlines how digital resource orchestration actions are carried out in VGR across the managerial levels. Drawing upon the process of resource orchestration, this study works to advance the current knowledge. The key aspects that have contributed to the resource orchestration actions are an improved governance and organizational structure, deploying new strategies and nurturing of innovation in healthcare organizations. Using the resource orchestration framework, the above-mentioned aspects are used to explain further how digital resource orchestration actions are being carried out in VGR.

An improved governance and organizational structure

There is a change in the governance and organizational structure which has taken care of issues mainly to do with standardization and sharing of information. Most of the county councils have had their own governance structures in which they decide internally on what to procure and deploy or implement. The coordination between the county council governance structures will guide all future procurements of HIT systems in the region guided by the information model. This will enable connection of systems and sharing of information within the region. With an improved governance and organizational structure in place VGR will only get better at innovation and mobilizing of the existing capabilities [9]. The resource orchestration actions currently undertaken will simultaneously address capability strengths and weaknesses in order to realise efficiency and innovation [42].

[43] in their framework state that asset orchestration consists of two primary processes. Under the search/selection, new aspects of the governance and organization structures have led to decision making takes place at various managerial levels and finally an agreement is arrived at amicably. Subsequently, there is coordination among the county councils which leads to sharing newly acquired or accumulated resources.

Deploying of new strategies

The configuration/deployment process has seen the top managers highlight what they want to achieve. For example, the Head Care Digitalization is interested in having the clinicians share with HIT staff what they would like them to do to improve their efficiency. This is spot on as the HIT staff are also ready to be close to the clinicians to provide the needed support. The standardization officer has done the same as well by having in place an information model which will guide the procurement of HIT systems.

The resource portfolio has been reorganised in order to create the appropriate capabilities to effectively implement the enterprise service bus—and integration layer to enable sharing of information.

Nurturing of innovation

There are initiatives in place to support innovation, for example collaboration between key stakeholders. Key stakeholders include the patients, doctors and nurses, and IT solutions providers. There is now a plan to have HIT staff sit at the healthcare organizations to interface directly with the clinicians and provide the required solutions. [44] state that the capabilities through which the healthcare organizations provide superior values must be dynamic, that is requiring constant update. The dynamic superior value requires innovation which is being nurtured through the innovation fund. The idea behind the innovation fund provides incentives to key stakeholders in order to work together to come up with innovations that can help improve service delivery by making use of the available technology. This will fill the gap of caused by the dwindling numbers of nurses and to improve efficiency at the hospitals.

5.1. Implications for Research

With respect to the managerial levels of the organization, existing resource orchestration research focuses on top level managers [45]. Theoretically this paper illustrates that resource orchestration actions can be carried out at all levels of management. The main idea is that there should be a strong coordination team that oversees the implementations of the agreed upon issues in steering committee meetings. Future research could examine how knowledge is structured and bundled at the various managerial levels. Another area for research could try to isolate the processes that facilitate the actual flow of knowledge about the capabilities that have been formed to help shape decisions regarding the leveraging of those capabilities.

5.2. Implications for Practice

Carefully choose a change management team and encourage their work throughout the entire process of development and spread of the innovation.

It is important that there is mutual understanding between the professionals in the healthcare organizations. Many times, it is not the development that is fought but change.

The managers at all levels should strive to share information even when it is between competitors. This will go a long way in improving healthcare service delivery as there will be no need to repeat the same test or diagnosis that has already been done at a different healthcare facility.

Capitalize on the positive outcomes from the innovation for instance the initiatives in place to fill the gap of limited staff to handle certain patients and increase knowledge about the treatment outcomes and costs that are observable in healthcare organizations. The value additions can be seen as the strongest driver or behavioural intention to use the new systems.

On the contrary, the absorption and diffusion of newly gained knowledge is still complex. There has been visits to Denmark (top down approach) to pick the best practices but given the way things are done in Sweden (Mutual understanding) it is still hard to absorb the newly gained knowledge.

6. Conclusion

Resource orchestration actions are critical to developing and implementing a number of organizational strategies or initiatives. From the resource orchestration framework perspective, VGR has been able to structure, bundle and leverage its resources in order to keep abreast with the digital transformation. From the findings it is noted that resource orchestration actions can begin at any level of management. However, the implementation of the different actions needed to support resource orchestration are dependent the mutual understanding amongst the managers at the different levels in the organization. Getting to synchronize the various resource orchestration actions could be the ideal situation but is rather difficult to achieve. The findings show the following ongoing processes in resource orchestration; coordination among county councils which leads to sharing newly acquired resources, provision of incentives through the innovation fund and science parks and structuring and bundling of the resource portfolio to create the needed capabilities.

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Conflicting Logics in IT Governance: Achieving Ambidexterity in Healthcare Organisations

Completed Research

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Abstract

Three institutional logics in healthcare organizations have been identified in literature, and these are managerial, IT professionalism and medical professionalism. IT governance among stakeholders with diverse backgrounds comes along with different perspectives on IT governance dilemmas. In this study interviews of health IT managers, clinician managers and Västra Götaland Region managers was done and the analysis was done using a resource orchestration lens to examine how the conflicting logics get connected in IT governance practices through the key stakeholders' views. It is clear that the logics are coupled to the health IT (HIT) managers, doctors and managers at the top. Findings reveal that amidst the conflicting logics, there are compromises that arise amid the circumstances. The managerial logic was seen to compromise in order to support IT professional logic. As a result, IT professionalism seeks to find out the needs of the medical professions and offer the much needed solutions.

Keywords

Institutional logics, IT governance, resource orchestration, ambidexterity.

Introduction

In most of the professional organizations, a few stakeholders dominate IT decision making. The decisions they make are based on their own beliefs and world views (Boonstra et al. 2017). The beliefs and worldviews that serve to legitimize human decisions and activities (Thornton and Ocasio, 2008) have been referred to as institutional logics. Lounsbury (2002) defines institutional logics as "the organizing principles that govern the selection of technologies, define what kinds of actors are authorized to make claims, shape and constrain the behavioural possibilities of actors and specify criteria for effectiveness and efficiency."

Organizational performance is expected to improve due to a number of factors, mechanisms and complex interactions between the various elements of the organization. Previous research has advocated that the said elements are not studied in isolation (Melville et al. 2004). Existing literature makes mention of the purposes of IT as well as how the governance of IT should be done. Alternative IT governance frameworks adopt the prescriptive (Dietrich, 2005) perspective. If an organization is carrying out an IT transformation program, it should be able to coordinate, manage and prioritize amongst the ongoing joint business and IT projects, activities, goals and the conflicting stakeholder interested over a period of time (Jiang et al., 2014). This posits that there is need to find a balance between efficiency and innovation given the many joint business and IT projects. Furthermore, Raisch and Birkinshaw (2008) discuss the two concepts of exploration (innovation) and exploitation (efficiency) and how they affect organizational performance. They state that adopting the exploration (innovation) strategy will realise better performance for the organization as opposed to the exploitation (efficiency) strategy.

More recently, IT governance practices are bent more on trying to balance between attaining innovation and efficiency (Banker et al., 2011; Wu et al., 2015). Weill and Ross (2004) state that IT governance represents the framework for decision rights and accountabilities to encourage desirable behaviour in the use of IT. Some decisions may be affected by established beliefs and values or diverse backgrounds of key stakeholders in the debate. In some cases this leads to inconsistent decisions and as result affects the IT

performance (Balka and White, 2006; Boonstra and Van Offenbeek, 2010). There is the notion of exploratory technology adaptation (R-TECH) advanced by Schmitz et al., (2016). They affirm that the way R-TECH works leads to the development and nonstandard ways of interpreting the technology and it is qualitatively different from what previously existed. The need to facilitate or support new functional capabilities results into a vital change to the core principles of the artifact (Kallinikos at al. 2013). When a technology is changed toward an unintended capability, exploratory technology adaptation seeks to add functionality that did not previously exist. These adaptations create entirely new perceptions of effectiveness and place the technology artifact on a new performance course (Schmitz et al. 2016). Looking at innovation and efficiency as a question of considerable tradeoffs, has been an issue of discussion for a while now (Stigler, 1939; Merton 1958; Stettner and Lavie, 2014). The choice between innovation and efficiency is dependent on the organization in question.

The past contributions of tradeoffs between innovation and efficiency, have led to contributions in literature regarding organizational ambidexterity in the area of IT governance (Gregory et al. 2015; Roberts et al. 2016). Some scholars (e.g. Xue et al. 2012) however note that tradeoffs can be avoidable and therefore suggest that IT governance is designed in such a way as to achieve the two that is innovation and efficiency. To realise this means that the organization needs to have to deploy IT in most of its operations and processes in order to get the best out of IT and reap efficiency but also to also to involve other partners of the organization bent to innovation (Banker et al. 2011).

Smith and Lewis (2011) came up with a dynamic equilibrium model of organizing to help understand the organizational environments that are becoming more global, dynamic and competitive giving rise to contradictory demands. They categorize diverse application of a paradox perspective which represents core activities and elements of organizations. The categories are learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes) and performing (goals). They note that tensions occur between and within the mentioned categories. Learning and performing create tensions between building capabilities for the future while guaranteeing success in the current period (Andriopoulos and Lewis, 2009; Tushman and O'Reilly, 1996). The need for change and the desire to retain a developed sense of self and purpose are normally in conflict and this brings about tensions between learning and belonging. As for the organizing and performing categories, the tensions can be summarized by the interplay between process and outcome which is apparent in conflicts between meeting employee and customer demands (Gittell, 2004) and between seeking high commitment and high performance (Eisenstart et al., 2008). Dynamic equilibrium highlights the integrative model's key features which are the persistence of conflicting forces and purposeful, cyclical responses over time that enable sustainability (Smith and Lewis, 2011). The assumption here is constant motion across opposing forces and by adapting a continuous pull in opposing directions leads to equilibrium.

The available IT governance frameworks as advanced by Weill and Ross (2005) and Xue et al (2008) are strict and one-sided in nature. Bechky (2003) states that they generally avoid the complexity that different sociocultural perspectives may bring when it comes to shared meaning. In healthcare organizations where there are various professional groups that work together, several institutional logics are expected to be suggested in IT governance debates (Wooten and Hoffman, 2008). Given that IT governance is affected by sociocultural mechanisms (Mignerat and Rivard, 2009), the study applies the resource orchestration approach while focusing on the institutional logics at the top, middle and operational managers' level. Traditional IS scholars often don't focus on institutional logics (Buchana and Seymour, 2017). With a clear comprehension of institutional logics, suggestions of how to create a balance between efficiency and innovation are tabled thus leading to improved design of IT governance practices. From the above perspective, the research question guiding this research is:

How do the conflicting institutional logics in various managerial levels influence IT governance practices in healthcare organizations?

To address this research question a review of relevant literature focusing on IT governance, institutional logics and ambidexterity was done to guide an empirical study conducted within the Västra Götaland Region (VGR), one of Sweden's largest public healthcare organizations. The contribution is for health IT (HIT) managers to understand how the conflicting logics may affect IT decision making and as a result revealing the internal forces that hinder the success of ambidextrous IT governance. In the next section the method is presented and then the results of an empirical study are reported. Finally a discussion of the

implication of research and practice. This study investigates how institutional logics can inform the study of IT governance enactment.

Theoretical Background

IT governance and institutional logics

Institutional logics recognize that finding a balance depends on what is deemed legitimate in a specific IT service climate (Boonstra et al. 2017; Lowry and Wilson, 2016).Extant literature points out two prominent institutional logics namely professionalism and managerialism (O'Reilly and Reed, 2011). Decision-making by the various stakeholders in an organization may be influenced by the different logics (Xue et al., 2008). For instance, in hospitals some stakeholders control IT decision making based on their own beliefs and worldviews which are referred to as institutional logics (Thornton and Ocasio, 2008). In other words, institutional logics are "the organizing principles that govern the selection of technologies, define what kinds of actors are authorized to make claims, shape and constrain the behavioural possibilities of actors and specify criteria for effectiveness and efficiency" (Lounsbury, 2002, p.253). An institutional perspective looks more on the legitimation function of beliefs and norms which are a key condition in governance (Boonstra et al., 2017).

A healthcare organization setting presents a motivating context for IT governance. This is partly because of the varied stakeholders therein who impact IT governance. The dominant stakeholders are the healthcare organizations managers, clinicians and IT professionals (Heeks, 2006). Other stakeholders include the patients, healthcare insurance companies and legislative bodies (e.g. medical councils). The prominent logics mentioned earlier in this section prevail in healthcare organizations (Scott et al., 2000). Institutional logics literature puts emphasis on how these logics influence the technological choices and get inscribed in the technology (Hayes and Rajao, 2011; Nigam and Ocasio, 2010). The missing part is the recognition of the role of IT professionalism related logics in IT governance of healthcare organizations.

IT governance and Ambidexterity

Following from IT governance literature, what is clear is that coping with IT governance dilemmas is no longer optional but rather a must and so there is need to strike the right balance (Debreceny, 2013). The idea of tradeoffs or balancing between efficiency and innovation has been studied in management (Alder and Borys, 1996). Studies have also focused on identifying the link between goal displacement and rigidity (Merton, 1958) to the notions of excess capacity versus specialization (Hannan and Freeman, 1977). Many IS scholars have tackled the concept of balancing between efficiency and innovation. Indeed Wu et al., (2015) and Banker et al., (2011) put emphasis on the strategic dimension of managing the tradeoff between efficiency and innovation. Xue et al., (2012) study relating to IT investments reveals that where innovation is concerned the outcome leads to improved performance in dynamic markets. However it's worth noting that that in low dynamic markets, the need for efficiency geared towards increased performance determines the IT investments.

Robert et al., (2016) states that the routine information systems versus the role of innovation tells that innovative use drives idea volume and diversity, two important areas for successful innovation. Gregory et al., (2015) refer to trying to achieve a balance between efficiency and innovation as a paradox. This involves pursuing the parallel logics in the daily routine work. There is ongoing research towards trying to avoid tradeoffs and it is referred to as organizational ambidexterity (Smith et al., 2016). Organizational ambidexterity is all about alignment and efficiency of day to day management of business demands and at the same time adjusting to the changes in the environment (Raisch and Birkinshaw, 2008). They provide practical solutions they refer to as structural and contextual ambidexterity. On the contrary some studies indicate that ambidexterity undermines organizational performance through conflicting routines and limited specialization (Stettner and Lavie, 2015).

By applying the resource orchestration lens to a wide but yet limited setting of IT governance, findings reveal that IT governance decisions are not necessarily determined by institutional logics, but they are as a result of the understanding derived from the presentation of these logics in the stakeholders' shared meaning and negotiations within their environment (Epstein, 2013; Jesen et al., 2009)

Resource Orchestration

Managing the implementation process to turn HIT investment into tangible benefits requires rearrangement of resources. The resource orchestration framework through its enriching and pioneering bundling activities (Sirmon et al., 2011) can enable finding a balance between efficiency and innovation. The resource orchestration framework as suggested by Sirmon et al. (2011) is a result of integration of the resource management framework and the asset orchestration framework. The only difference is that the resource management framework draws on the RBV and has been explicitly linked with RBV's primary logic while asset orchestration draws from the concept of dynamic capabilities. On the other hand, Helfat & Peteraf (2003) provide an indirect connection between asset orchestration and resource management. The resource management's treatment of resource divestment and the strategies for resource deployment are lacking from the asset orchestration arguments. The detailed types of bundling actions are also lacking. For instance, issues to do with business models, organizational and governance structures, and innovation are not reflected.

The resource management and asset orchestration frameworks complement each other (Sirmon et al., 2011) and so integrating them will facilitate research of managers' actions within capability and resource based resource-based logics. The term resource orchestration was in support of the integration, and ultimately a resource orchestration framework (Figure 1). To further explore the integration and develop a research agenda for the two frameworks, Sirmon et al. (2011) address issues not previously considered including the organization's breadth (scope of the organization), depth (managerial levels within the organization) and the life cycle. They provide a road map for further research in resource orchestration. The empirical study within the Västra Götaland Region (VGR) in this study focuses on the resource orchestration actions carried out by HIT staff at the different managerial levels in the organization and how they can inform the design of ambidextrous IT governance.

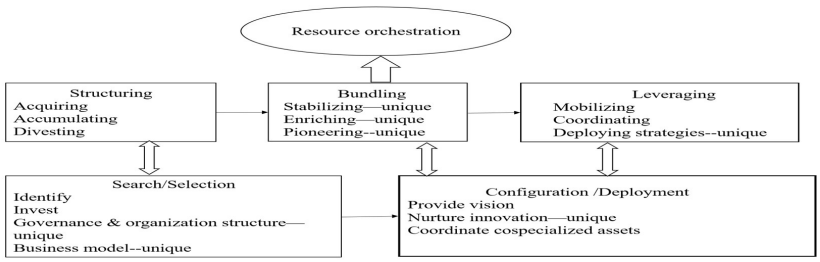

Figure 1: Resource Orchestration Framework (Adapted from Sirmon et al., 2011)

Method

There is limited theory about how institutional logics influence IT governance. As a result an interpretative approach was adopted to advance theoretical insights (Ozcan and Eisenhardt, 2009). According to Orlikowski and Baroudi (1991), interpretivism attempts to understand phenomena through the meanings that people assign to them. In this respect, the research presented explores perspectives of individuals (health IT (HIT) staff, doctors, managers) and the values and meanings they attach to IT governance within the healthcare organizations' context in general.

Since the research is qualitative, the role of the research should be as transparent as possible. This is helpful especially when it comes to interview analysis which involves but is not limited to interpretation of the interview text by the researcher (Myers and Newman, 2007). The interviews were done informally allowing the interviewees to relay their views and formally with a structured interview guide.

Empirical selection and description of case

The research was designed as a case study (Yin, 2013). The rationale was that Västra Götaland Region (VGR) is a relatively big organization and is a driving force for development in western Sweden. The region collaborates at many levels with academia, the private sector and other public organisations. Besides VGR is an active partner in the EU with a track record of many successful IT related projects (Västra Götalandsregionen, 2017). But the challenge has been that the successful IT systems serve only a given county council instead of the many county councils. As such, interoperability and sharing of information is not possible and this is a limiting factor to the digitalization of healthcare services. The fact that there has been a number of successful IT systems shows that VGR is mature in the area of health IT which makes a good case to study.

One aspect of Västra Götaland Region's main mission is to ensure that the population in Västra Götaland has access to good medical care. They aim at providing conditions for a good and healthy life. Also another thing to note is that Västra Götaland Region is a politically governed organization. This indicates that there are various decision-making levels, which could affect IT governance.

Data collection

Data was collected from various stakeholders who are part of HIT professionals, clinicians and academia. In depth semi structured interviews were conducted with 10 informants (See Table 1). The idea of selecting from different departments of the organization in the region was to enable the researcher capture the different logics that are involved. The interviews covered the governance of IT in healthcare and targeted the interviewees' experience with IT projects. Each interview lasted between 45 minutes to 60 minutes. The interview information was complemented by reading documentation from the Västra Götaland Region website and other documentation recommended by some of the interviewees. The documents used were mainly to contextualize the findings based on interviews.

Organisation	Designation of person interviewed
Innovation Fund	Head
Goteborg Business Region	Area IT Manager
Sodra Alvsborg Hospital	IT strategist
Västra Götaland Region	IT Strategist and Enterprise Architect
	IT Strategic Architect
	eHealth Expert/Radiology Nurse
	Head Care Digitalization
	Digitalization Strategist
	Chief Standardization officer
Lindholmen Science Park	Programme Manager

Table 1 Overview of data collection informants

Method of analysis

Thematic analysis (Braun and Clarke, 2006) was used to identify, analyze and report themes in the data set. During the analysis, moderate literature review was done in regard to the resource orchestration framework. The review provided an understanding of the resource orchestration framework which helped in coming up with the themes from the data. The themes do not reside in the data per se but in our heads from the thinking about the data and creating links as we understand them (Ely et al., 1997: 205-6). The coding started during data collection and also during transcription where familiarization of the researchers with the data was done. Initial codes were generated by coding interesting features of the data in a systematic manner across the data set. The categories that emerged included: enriching, pioneering, and coordinating, mobilizing, and integrating resource to form capabilities. Others included stabilizing, acquiring, accumulating and divesting resources as well as provision of vision and nurturing innovation. The next step was to collate the codes into potential themes by gathering all data relevant to potential

themes. A secondary analysis was done by doing iterations through the transcribed interviews and later comparing with the documents analyzed as an internal validity check for the constructs identified.

Results

This section presents results from the study that have been structured using the key components resource orchestration framework (as described under the resource orchestration sub section).

Structuring

Looking at resource orchestration, structuring involves acquiring new systems or resources, accumulating and divesting of resources to form the organization's portfolio. Findings show that there has been a change in the way the conflicting institutional logics used to be managed. The centralized/regional procurement of standardized IT systems and equipment will therefore eliminate the problem of information sharing and interoperability that have been a perennial challenge in the region. Creation of science parks has improved on the collaboration between the medical and IT professionals. Furthermore, the Programme Manager Prehospital ICT Arena (PICTA) from the Lindholmen science park noted that*: 'In trying to bring on board new systems, it is important that the new system is piloted in one county council and when all goes well it can then be deployed across the rest of the county councils'*

This has led to compromise between the conflicting institutional logics and therefore coming up with relevant solutions for the healthcare sector.

This is an indication that decisions for digital resource orchestration actions are taken collectively. It suggests more or less that the top, middle and operational managers in the region mutually agree on the procurements to do within the region. This is seen from the fact that the regional steering committee is made up of members from county council steering committees which means that the counties are involved in the planning for the region. The managers of the conflicting institutional logics are brought together in the regional steering committee and this has influenced the IT governance practices in that issues agreed upon in the steering committees of county councils are easily passed at the regional steering committee.

There has been a realization of the need to intentionally identify and invest in the right resources while forming the resource portfolio. This is as a result of compromise between the conflicting institutional logics. Most of the issues raised by most interviewees were specifics of governance of IT and they have influenced the IT governance practices. The standardization officer stated that "*the step we took was to put emphasis on defining our information model—how the data should be structured. By doing that it is simpler to connect our systems to other systems*". The managers of the conflicting logics have agreed on an information model, which provides for standardization and interoperability. There is also an intentional move by the HIT managers, the clinicians' managers and top management of the region(political) to carry out structuring to acquire a new technologically complaint resource portfolio. Before the procurement happens, there is cohesion between the three dominant stakeholders (conflict logics). There is a sense of realization that the IT professional logic is important and that IT decisions hinge on the IT professions. The cohesion has influenced IT governance practices for the better.

Bundling

The resource orchestration framework, refers to bundling as integrating resources to form capabilities. This involves three sub processes namely: minor incremental improvements or stabilizing the current capabilities; then extending the current capabilities or enriching them and finally creating new capabilities which they refer to as pioneering. Findings indicate that there is need to have new systems in place in order to replace the old or current systems. However, the organizations cannot get rid of the old systems just like that as they possess valuable information. The three conflicting logics work hand in hand to find solutions by consulting each other. The managers in the various professions have come up with ideas of how to integrate resources to form capabilities. This they have done through the development of APIs which help connect the old systems to the new systems. This is clear from the creation of the mode 1 and mode 2 systems by the HIT staff as stated by the IT strategist and Enterprise Architect. "*The mode 1 is more about maintenance getting the old systems to work and mode 2 is about innovation*". Here the organization realizes an enrichment in the current capabilities as well as aiming at creation of new capabilities.

The IT strategist indicated that "*we have adopted having in place a system that is compatible with other devices. For example in the X-ray, ECG and laboratory departments, the core system that processes the images should be compatible with any type of model of camera. He further stated that the X-ray system is working well and requires no change unlike the laboratory system that needs to be changed to cater for the general practitioner and other specialities*". This posits that there is influence on the IT governance practices in healthcare organizations.

On the other hand the area IT manager made mention of an innovation that is going on at the Lindholmen science park. He stated that "*we have seen development in certain areas but specifically one is pre hospital ICT arena (PICTA 2017)*". It is about harmonizing semantic and technical interoperability, to improve conditions for the efficient use of ICT/eHealth in prehospital healthcare. The minor improvements to existing capabilities have been realised by enriching the clinicians' capabilities using technology to create new capabilities that match the new technology.

The head of digitalization care (a medical doctor) was keen in getting to see how the HIT staff are able to make use of IT to help them improve the way they offer healthcare services. He stated that "*we can also use our clinicians in a more efficient way via new technology, video and the Internet of Things (IoT) solutions enhance those possibilities. I think that the problem is all our governance structures are still as they were in the 1600s and we need to have a huge change in our governance structures*". This indicates that there is a willingness to change the old governance structures. This has resulted into consultation between the three dominant logics. This will culminate into better IT governance practices in future.

Leveraging

Leveraging involves a sequence of processes to exploit the organization's capabilities and take advantage of specific market opportunities; it includes mobilizing, coordinating and deployment. Findings reveal that through the innovation fund, the political leadership of the region has provided funds to help in coming up with a plan or vision for the requisite capability configurations. The Innovation fund manager stated that "they work together with the medical and IT professionals to come up with solutions to current challenges and future challenges in healthcare." The innovation fund works hand in hand with the various science parks, clinicians and HIT staff in the region and this is aimed at integrating capability configurations. One of the ongoing projects under the Innovation Fund in VGR aims at creating new capabilities in healthcare. One of the projects aims at trying to reduce on the healthcare professionals' work by having the patients share their information on a daily basis in real time. The head of the innovation fund stated that "*patient related apps that are being worked on, require that the patient can manage their sickness. They are given measuring devices like a T shirt that has sensors for Parkinson disease, for example which sends real time information to the doctors about whether the patient swallowed their medication and also the shakiness levels, blood pressure and other measurements*." This is an indicator that there are already efforts to influence the IT governance practices.

For the healthcare organizations it is imperative that the dominant stakeholders work together in order to realize successful digitalization. One of the object leader at one hospital in VGR stated that: "*The region has a model of how to steer the entire IT in the region, I am a part of this and that's my task is for the entire region*". The model in VGR takes into consideration all the technological advancements and therefore puts strategies in place that are able to take advantage of the available IT opportunities within the healthcare organizations. The model was developed through consultation between the managerial, medical profession and IT profession. During consultation, the specifics of IT governance were addressed. Findings revealed that the procurement of health IT systems is done centrally after the managers at the county councils have agreed on standardization issues. This makes the future governing of healthcare IT systems in the region easier thus influencing IT governance practices. The chief standardization officer, corroborated the new procurement procedure and stated that "*we are currently in a phase where we are searching for the future healthcare environment. He added that it is a huge deal which will require a lot of money and will have brand new thinking, covering most domains*". The search requires extensive consultation which involves the three dominant stakeholders (constituting the conflicting logics) and the political management of the region which releases the money. This gives an indication of how conflicting institutional logics influence IT governance practices.

Table 2 below shows the relationship between the antecedents constructs and the dependent variable (ambidexterity)

Antecedents constructs	*Underlying sub-constructs*	*Relationship with dependent variable (Ambidexterity)*
Structuring	*acquiring, accumulating, and divesting*	*Creation of science parks as a way of divesting and collaboration in the process of procuring new IT systems*
Bundling	*enriching, pioneering, stabilizing and integrating of resources to form capabilities*	*Having in place mode 1 (old) and mode 2 (new) systems to work together. Mode 2 systems are purely innovative and mode 1 have valuable old data are made to work efficiently*
Leveraging	*mobilizing, provision of vision and nurturing of innovation*	*The radiologist partnered with GE health and are already sharing images across hospitals increasing efficiency. There is a plan to share other medical information on standardized platforms*

Table 2 Linkage between antecedents constructs and ambidexterity

Discussion and Conclusion

The centrality of IT professionalism is highlighted as well as the benefits accrued from IT investments. The focus was on HIT staff and medical practitioners at the top, middle and operational managerial levels and how evidence from the institutional logics in IT governance challenges the predominantly prescriptive and unilateral IT governance literature (Debreceny, 2013; Xue et al., 2008). Mignerat and Rivard (2009) noted that the implementation success of IT governance is directly influenced by the similar IT arrangements with existing institutions. This study shows that amidst the conflicting logics, success of IT governance is rather fair since the IT arrangement for the healthcare organizations in VGR are similar.

This study used the resource orchestration lens and so an explanation of how resource orchestration is being carried out in VGR is given below

New strategies leading to improved IT governance practices

The independent variables that is structuring and bundling as components of the resource orchestration framework, affect the balancing innovation and efficiency in healthcare organizations. Structuring involves acquiring new systems and this is done in consultation among the three professions. All this starts at the county councils and is later approved at the regional level. This implies that in a few years there will be better IT governance practices as the consultations involve the specifics of governance of IT.

Desire to listen, negotiate and innovate

Those in charge of designing IT governance, do not come up with a "one size fits all" solution. Rather they should be in touch with the key stakeholders in order to tailor IT arrangements in line with the competing logics. Most importantly they should be able to listen, negotiate and in the final analysis innovate. The creation of innovation fund in VGR, is an indicator that there is a desire to innovate. The capabilities through which the healthcare organizations provide superior values must be dynamic, that is requiring constant update (Adner & Helfat, 2003).

The study has shown that in healthcare organizations two logics have been identified as managerial logic and medical professionalism (Boonstra et al., 2017). With the technological advancements and emerging area of digitalization, and using the resource orchestration framework, we note that the two prominent logics have come to appreciate the IT professionalism logic. In practice there were conflicts in the logics but findings from this study show that resource orchestration fosters close collaboration among the logics which will greatly improve IT governance practices.

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An Inquiry into IT Governance in Healthcare Organizations in Uganda

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Abstract. Looking at the world today, various organizations have taken up IT to support most of their work processes. IT can no longer be considered only a support component but has become strategic. Given that IT is ubiquitous, it requires proper governance in order for organizations to derive value and achieve organizational objectives from its use. IT governance is therefore advocated as a necessary means for ensuring the effective and efficient use of IT. Previous literature does not say much about IT governance adoption and enactment in healthcare organizations. In this study, resource orchestration is used as a framework for understanding management strategies for IT governance adoption in healthcare organizations. The study answers the research question, "How are managerial strategies impacting the adoption of IT governance in healthcare organizations". This was done through an interview study of managers, IT workers and policy makers in select Ugandan organizations. The participants in the study were from the private and public healthcare organizations, IT authority and the capital city authority. Findings show that there are informally agreed upon and approved strategies in place for the adoption of IT governance. The contribution is in terms of suggestions of how senior management can enact the strategies and make use of the organization's knowledge based and financial resources to inform adoption of IT governance.

Keywords: IT governance · Resource orchestration · Healthcare

1 Introduction

Information Technology (IT) is now ubiquitous in many organizations and is increasingly considered a strategic resource. IT has played a key role in transforming various industries leading to new business models [1, 2]. IT initiatives rely on funding approved by senior management but at the same time suffer from the limited knowledge of IT investment processes by senior management [3]. IT is seen as an enabler in the effort to attain improved efficiency in the services offered in healthcare [4].

Over the years there has been a growing need to provide high quality health services at affordable cost as well as easier access to medical information for the patients. As a result, hospitals have turned to or are turning to IT to find solutions to these requirements [5, 6]. Most of the hospitals that have embraced IT have implemented integrated IT applications that cut across many functions [7]. The growing

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trend of moving from the traditional healthcare to what is referred to as ehealth has stimulated some debates leading to research focusing on the role IT plays in improving efficiency in healthcare [8].

There has been a notable increase of IT complexity in healthcare organizations [9] which adds to the need for IT governance in these organizations. The increasing level of IT investment and the expected impact on the performance of healthcare organizations demands an active governance stance [10]. There is not much in the previous literature specifically giving information about the state of IT governance in healthcare organizations in developing countries. The definition of control enactment by Wiener [25], gives the motivation for this study in order to understand the interaction between the senior management and those they lead. The aim of this study is to explore the state of IT governance in healthcare organizations in Uganda.

In order to get value from IT governance, board members in organizations should ensure management and organizational structures and processes that sustain the organization's IT in order to extend the organization's strategy and objective [11]. The enactment of control [25] by the board members can potentially realize the desired goals by influencing senior management. In the same vein, the resource orchestration perspective was used to study IT governance in healthcare organizations.

This empirical study was done in select public and private healthcare organizations in order to answer the following research question: "*How are the managerial strategies impacting the adoption of IT governance in healthcare organizations*?"

The contribution of this study offers an understanding of the strategies in healthcare organizations to support IT governance. The rest of the paper is organized as follows; Sect. 2 discusses the relevance of IT governance and describes the theoretical lens. Section 3 describes the method, empirical description of case, data collection and analysis. Section 4 presents the findings and Sect. 5 has the discussion. Section 6 has the implications for research and practices, and Sect. 7 presents the conclusion.

2 The Relevance of IT Governance in Healthcare

Healthcare is paramount to a population's wellbeing and as such becomes a complex industry. There are many ways in which IT can be used to improve the efficiency in healthcare like in the areas of electronic health records (EHR), sharing of patient records and so on. In order to realize efficiency in healthcare using IT as an enabler of the business, requires acquiring new infrastructure among other things. This then points to IT investment and the realization of IT business value.

There is need for emphasis on the transparency and effective governance of IT. What is necessary to achieve this is not getting IT right but rather managing the process.

There are various definitions for IT governance [12, 15, 16] and for this study, the definitions by [13] and [14] are adopted, since they give a precise meaning of IT governance. Van Grembergen [13] defines IT governance as "the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT". Peterson [14] defines IT governance as "the distribution of IT

decision making rights and responsibilities among enterprise stakeholders, and the procedures and mechanisms for making and monitoring strategic decisions regarding IT". The IT governance framework is made up of structures, processes and relational mechanisms as depicted in Fig. 1 adapted from De Haes and Van Grembergen [15].

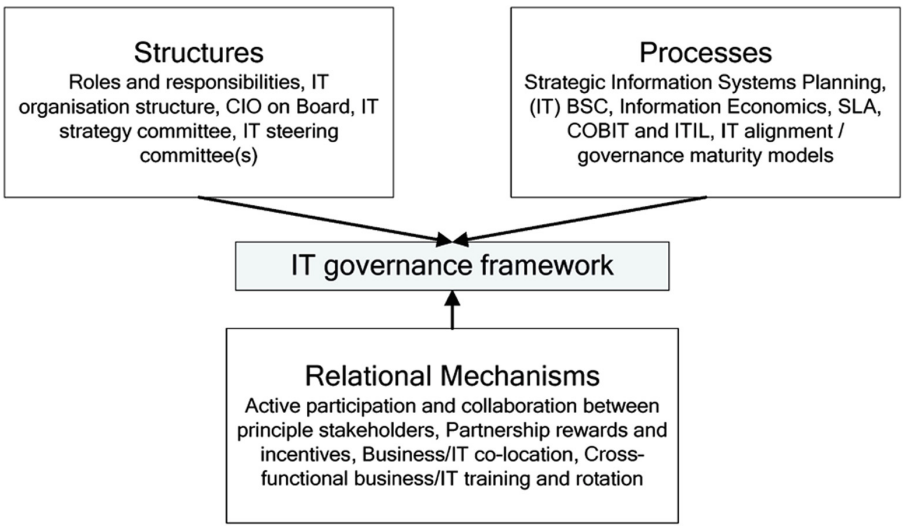

Fig. 1. Element of IT governance framework adapted from De Haes and Van Grembergen (2006)

2.1 Structures: Roles and Responsibilities and IT Department

IT governance has been prevalent in three modes over the years, namely; the centralized IT governance modes, the decentralized IT governance mode and the organizational IT governance mode.

The centralized IT governance mode is about the corporate IS taking on responsibility to deal with the infrastructure, its use and project management. The main thing in this mode is the business strategy since there is no IT strategy. It is referred to as a business monarchy [15], where the IT department does not act independently of senior management.

The decentralized IT governance mode is about the divisional IS and line management taking on authority. The authority can be played differently for IT [16]. There is localization of governance rights with each business leader who acts autonomously depending on the needs and with his own budget [15].

The organizational IT governance mode bundles both the corporate IS and the business units and undertakes the responsibility for the IT activities [17–19]. This approach makes use of the multi skilled teams and cross functional liaison with the developed strategy. This makes the formulation, analysis and implementation a more fluid process [20].

There is diversity in the choice of approaches mentioned above since organizations are different. In order to manage the required change, IT governance requires the implementation of structures. The success of these structures lies in the ownership of the stakeholders involved. The new governance structures need to come along with better costs, results, and lower risks.

The purpose of IT governance is to manage and achieve structures that are core to business success and trust by the board in order to realize the strategic goals in a competitive manner. This involves the management team having control over cost and investment alongside accountability as well as maximizing the capability of the IT selected to provide support to the clinicians and administrators in a hospital. When all the stakeholders are working together, there is trust and ownership of the structure and its related process [21].

2.2 Processes: Planning and Monitoring

In the earlier days, as a requirement for IT governance, each business had to identify and establish its own procedures and processes in order to manage the flow of information related to the initial proposals, business plans, documentation and approval processes for IT investments [15]. IT governance has been guided by the gating process over the years while handling projects. Lately, there had been development of various frameworks like COBIT, ITIL among others that are being used in the implementation of IT governance [17]. All these available frameworks today aim at having the projects realize the organization's strategy.

2.3 Relational Mechanisms: Role of IT Departments and the Frameworks

The type of the organizational setting will determine the success of the mechanisms which also depends on the governance approach taken on by the organization. The mechanisms go a long way in facilitating collaboration and cross function business/IT training. This is helpful in that if we have an expert whose powers are seemingly being usurped due to the new structures as pointed out earlier, so that we can have mediation through these relational mechanisms to help avert such scenarios.

The IT department in conjunction with the human resources department is central in the implementation of the strategic IT management across the organization. In order for the IT department to handle this well, it requires frameworks which were discussed earlier in Subsect. 2.2. People are key to attaining integrative effort and therefore must be trained to make the lateral dimension their focus [22]. With the relational mechanisms in place, the focus now remains on how to effectively manage IT governance and also sensitizing the stakeholders on the deployment of the methodologies.

The next section describes the theoretical lens to help understand the IT governance practices in healthcare organizations in Uganda.

2.4 The Resource Orchestration Framework

The resource orchestration framework (ROF) [22] is used as an analytical lens to explore how healthcare organizations are adopting IT governance. The ROF has three main components that can potentially support control enactment in healthcare organization as they work to adopt IT governance.

The ROF (Fig. 2) addresses issues not previous considered and these include the organizational breadth (scope of the organization), depth (managerial levels within the organization) and the life cycle. The empirical study was done amongst some of the healthcare organizations in Uganda focusing on the managerial levels in the organizations and how they affect resource orchestration actions during the realization of IT governance.

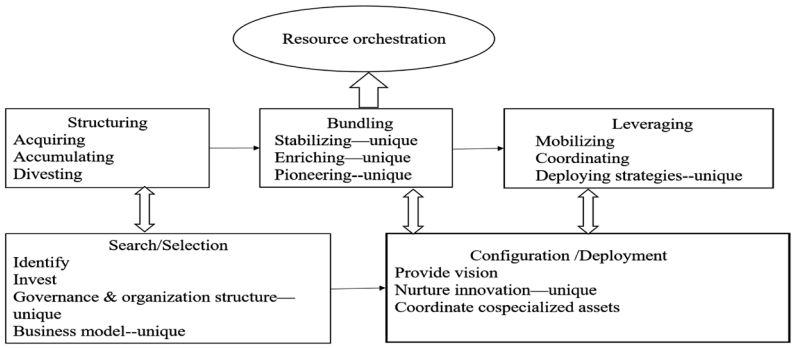

Fig. 2. The resource orchestration framework (Adapted from Sirmon et al. 2011)

3 Method

3.1 Empirical Selection and Description of Case

The study was conducted mainly in Kampala, the capital city of Uganda, which is in the central region. Uganda is among the developing countries trying to adopt the use of IT in many areas including healthcare. Healthcare organizations have adopted the use IT in the form of health information systems and mobile apps. This has brought about some disruption which calls for IT governance in order to realize value for the IT Investments. Interviews were also done in the eastern region of Uganda in Mbale at the regional referral hospital and the western region of Uganda in Fortportal at the regional referral hospital. The choice of Kampala hospitals was mainly because they are private hospitals considered to be with the state-of-the-art equipment and therefore use IT in their processes. In other words, the private hospitals are considered to be the pace setters. In order to get an understanding of what goes on in the public sector, the two regional referral hospitals in the east and west of the country were selected.

3.2 Data Collection

Data was collected from key stakeholders who mainly included health IT professionals and administrators. In depth interviews were done with 11 informants. 4 out of the 11 informants were administrators who advise senior management on key IT investment decisions while others are policy makers, and the rest of the informants were health IT professionals. The interviews were around issues of governance of IT in healthcare and lasted between 45–60 min. The intention was to explore how administrators and IT professionals enact IT governance in their organizations and whether there is a national IT governance plan for healthcare.

In addition to interviews, secondary data was collected from websites and documentation shared by some of the informants. Those interviewed were requested to suggest other potential interviewees as external interviewers can have difficulty in identifying the right informants (Table 1).

Table 1. Informants interviewed showing organizations they work for and their designations

Organisation	Designation of person interviewed
Uganda Catholic Medical Bureau	Head IT
Nsambya Home care	IT Manager
Nsambya Hospital	Systems Administrator
Rubaga Hospital	IT Head
Kampala Capital City Authority	Manager Medical Services
Mbale Regional Referral Hospital	IT Officer
Fortportal Regional Referral Hospital	IT Officer
International Hospital Kampala	IT Head
Ministry of Health	Commissioner
National Information Technology Authority of Uganda	Director e-government services
National Information Technology Authority of Uganda	Health Lead

3.3 Method of Analysis

For the analysis, themes were developed using the ROF. Systematic coding across the data set was done and this helped in coming up with the initial codes. Using the ROF, the following categories emerged; coordinating, enriching, pioneering, acquiring, accumulating, nurturing of innovation and divesting of resources. Repeatedly listening to the transcribed interviews and interview notes helped in developing the results as viewed from the resource orchestration lens.

4 Results

In this section, the findings are presented using some components of ROF.

4.1 Structuring

Most of the healthcare organizations that participated in the study are in the process of acquiring and improving their IT infrastructure. There are minor improvements on existing infrastructure (accumulating). Some have divested both the software and hardware and have new software and hardware that suits the requirements of the organizations.

Many of the healthcare organizations are using the rudimentary method of recording patient records in books and on cards. This has its own issues of privacy of the patients' records and at the same time the patients may lose their books, which means that at each visit they have no records. This makes it hard to do a good assessment of the patient. Subsequently, these and other issues have led to the adoption of IT by implementing Health Information systems (HIS). Table 2 below shows some of the systems in use in both private and public hospitals and whether they are standalone or integrated in the various organizations.

Table 2. Showing the IT systems available and whether they are standalone or integrated

Organization	Types of systems	Integrated/Standalone
Alpha	Electronic Patient Record (EHR), radiology, billing, pharmacy	Over 50% integrated
Omega	Hospital Management System (HMIS), lab system, billing	Heterogeneous integrated systems
Beta	Uganda Electronic Medical Record (UgEMR), pharmacy and lab system,	Standalone
Nano	Billing, pharmacy and lab, patient records	30% integrated
Gamma	District Health Information Systems (DHIS2), UgEMR, HMIS	Standalone

[a]Pseudo names are used for the names of the organizations in the table

The table above shows the IT systems available in the hospitals. Most of them are standalone. This probably shows that the IT value from the systems is not yet optimal. There is need for complete integration, which requires support from the board to fund the IT budget as stated by one of the health IT staff: "*The board approved the integration of Clinic Master with the ERP system currently in use. This is one way of aligning the IT with the business to realize value for the IT investment and the strategic objectives of the organization*."

In order to realize smooth sharing of information among the existing standalone systems, the necessary infrastructure and software have to be procured. Training of both the IT staff and the end users should take place after the implementation. This requires a lot of support from senior management and the board. One of the IT staff stated that: "*There are many challenges as we move towards realization of the integration process and these include, infrastructural changes, bureaucracy in getting new infrastructure, non-IT savvy clinicians and insufficient training for both IT staff and end users.*"

Generally, structuring is happening mainly in the private hospitals where the management at all levels is keen to support the use of IT. As for the public hospitals, they are still tied to DHIS2 which focuses on aggregate data from all districts in the country. This clearly shows the need for an IT infrastructure procurement plan for health information systems in health centres at all levels in the country. Speaking to an IT officer at a regional referral hospital, he stated: '*In the current state, we have no IT team, we rely on services of the outsourced IT company. This is mainly because we literally have no IT network in place. There are just a few standalone computers that are used for various tasks in the hospital.*'

In the private hospitals, the board and senior management have given the necessary support by approving the roll out of the health information system to the entire network of clinics. The customized HMIS is operational at the Nano headquarters and will be rolled out to the clinics network in a year's time.

4.2 Bundling

The integration of resources to achieve improvements to existing capabilities as well as extending and creating of new capabilities is evident. In one of the private not for profit (PNFP) hospitals, there is an ongoing effort to improve the existing capabilities of the health information system (HIS). In its current state, it serves only the clinicians and the top management. The IT support staff stated that: '*Streamline was designed by the doctors and they did not involve other stakeholders like patients. In terms of performance, it is good for the doctors but not good for the patients.*'

The IT support staff advised top management that it is imperative that the existing HIS be modified to involve and serve all stakeholders. This was work in progress and should be operational now.

In the case of public hospitals (state owned) the ministry has embarked on enriching the current capabilities by adding the health management information system (HMIS). However, for this to happen there must be an appropriate governance structure and infrastructure in place. In support of this the Commissioner in the ministry of health stated: '*There are different patient information systems that don't 'talk' to each other. For proper system integration, there is need for a national health facility master list that is coded, infrastructure that can facilitate the use of systems at the health centre level and regional referral hospitals. Ultimately, an appropriate governance structure is necessary.'*

At the Nano hospital which is private, efforts are underway to do minor improvements to existing capabilities. This is through the upgrading of their customized HISs after acquiring better hardware and software. The IT manager at Nano hospital stated that: '*Originally the hospital (headquarters) was using Navisionattain ver 3.6 and has now upgraded to MS Dynamics Nav 2016 (ERP) which had been customized to include patient handling. The clinics still use Navisionattain but Nav 2016 will be rolled out in a year's time.*'

At Omega hospital, bundling efforts have met challenges that include bureaucracy in the procurement of IT infrastructure, clinicians that are not IT savvy, insufficient training of staff both clinical and IT in regard to IT systems and the security of patient records. The IT officer at Omega stated: '*As the IT team we advise management on*

what needs to be in place to improve the efficiency of the systems in place. They have been supportive and approve our requests. The challenge though is that the procurement takes ages and so affects the entire process. After implementation of the new systems, only a few IT and clinical staff are trained to handle the new systems. This affects the systems performance as it will not work at its optimal level.'

At the Alpha hospital, they have ClinicMaster for the patient records and Navision to handle the accounts and inventory. The hospital director requested that there is seamless flow of information between the two systems. The project to do the integration of the two systems is underway and was midway as stated by the IT officer at Alpha Hospital: '*The hospital management in the bid to realize improved efficiency run to IT in the form of a HIS. The outcome was procurement of ClinicMaster and Navision. After a while management requested for the integration of the two systems. The project was approved and is now close to completion.'*

Overall there is a drive to improve the existing capabilities as well as creating new capabilities in most of the private hospitals as a way to tap into IT.

4.3 Leveraging

There are practical issues and managerial strategies that are in place to realize efficiency from the use of IT. Most of the private hospitals' boards and senior management have projects in place and are willing to support them to succeed. They monitor the progress of the projects as part of their roles. This was evident at the Alpha hospital where the IT officer stated: '*The board and senior management agreed on financing a project to realize the integration of ClinicMaster and Navision. The objective for this was to have seamless flow of information between the two systems. This is expected to improve the efficiency of the hospital as they serve their clients.'*

The IT manager at Nano hospital stated that there are no IT governance structures. However, he added that there was an IT audit report which recommended among other things the deployment of IT governance tools and implementation of IT projects in a timely manner. The IT manager at Nano hospital stated: '*At the moment we don't use any IT governance frameworks but these are planned for after the audit. These are some of the recommendations following the IT audit. The board takes keen interest in the recommendations made and oversees their implementation.'*

Beta home care which is part of Omega hospital is looking to fully use the UgandaEMR system in order to track and monitor patients in any part of the country. The UgandaEMR is a medical records system that is in use in over 340 sites in Uganda and mainly deals with HIV treatment. The Beta home care being an HIV treatment centre is keen to make the most of the UgandaEMR as stated by their IT officer: '*In collaboration with development partners, we are in the process of having UgandaEMR to help us in the monitoring of the following aspects of the patients; demographics, vitals for the patient and viral loads. With UgandaEMR we will be able to track patients in any part of the country.'*

In the current state, there are literally no HISs in the public hospitals. The Ministry of Health (MoH) relies on information from the DHIS2 that is provided by the district health Officers (DHOs). The DHIS2 Tracker is an addition to the DHIS2 platform and is mainly for sharing critical clinical health data across multiple health facilities.

However, if it is to be used at a national level as an HIS for the case of MoH, it has to be combined with more advanced electronic medical records as stated on the DHIS2 website: '*The aim of the DHIS2 tracker is not to become an advanced electronic medical record system to support clinical care, but to be a basic transactional system easy to set up and that it builds on an existing and proven platform with available technical capacity.'*

Typically, there are efforts in hospitals involving a sequence of processes that shall lead to the use of IT to improve service delivery in hospitals.

5 Discussion

The research findings show that the various managerial levels are not supporting each other as they seem to have different agendas. Synchronization of the resource orchestration actions is important if value for IT investment is to be realized. According to [23], there is need for senior management to be involved concurrently at all stages of the process of resource management, and at the same time consistently scanning the outside surroundings for relevant prompts about change.

A majority of respondents stated that their organizations did not have a clear IT governance structure in place e.g. IT steering committees, IT strategy committees, COBIT, ITIL, etc. Based on the responses it seemed like some of these things were on paper but not implemented. Furthermore, due to the unclear IT strategy, the IT structures and processes (Fig. 1) are not clear or nonexistent in many of the healthcare organizations. Again, IT outsourcing in the public health care organizations, affected the IT investments decisions. Without IT structures and unclear IT processes in place, it is a barrier to effective IT governance [24].

Healthcare access is still low given the number of health centres and regional referral hospitals in place vis-a-vis the population. Public health facilities are deficient of drugs and basic equipment to do diagnosis and laboratory tests. The use of IT is extremely low and health records are written in books carried by the patients and so they can get destroyed or misplaced easily. Also, a patient can use three books each for a specific health facility in order to acquire as much available free drugs. This then does not give an accurate picture of the number of patients treated since there is a duplication. IT systems could reduce the duplication and also help develop an accurate health record of patients.

6 Implications for Research and Practice

The study gives insight for possible research on how value for IT investment can be realized in a setting without well-defined IT governance structures. Then in practice, how to put in place an effective EHR could provide accurate information of patients who move from health facility to facility in terms of diagnosis and prescription. In conjunction with MoH also come up with an IT system that can be used to monitor the distribution of drugs between the national drug authority and the hospitals.

7 Conclusion

The state of IT governance (ITG) in healthcare organizations in Uganda has been noted as below par. Many of the healthcare organizations have it on paper and have never gone an extra mile to do the implementation. Having ITG mechanisms in healthcare organizations could support the adoption of IT in healthcare organizations. Managerial teams in healthcare organizations need to support the development of electronic health records (EHR) that can be shared amongst both the private and public healthcare organizations. EHRs could bring into play, storage of accurate information about the patients in terms of diagnosis and prescription. The study showed that in the private hospitals, all the managerial levels (top, middle and operational) are involved in the IT investment decisions which follows the hierarchy until a final decision is taken. Other benefits could be improvements in the areas of IT strategy planning and formation which could in turn lead to improved IT governance structures. Finally, with proper IT governance structures in place, there is likely to be easier IT adoption in healthcare organizations leading to better and improved healthcare service delivery.

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Ambidextrous IT Governance Enactment in Healthcare: A comparison between the Swedish and Ugandan setting

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Abstract

IT Governance is advocated as a necessary pre-requisite for effective digitalization by research and practice alike. Despite this, there are but few studies of IT Governance in the healthcare sector, and even fewer on the enactment of IT Governance. This paper reports on a comparative case study of a Swedish and Ugandan setting on the enactment of ambidextrous IT governance within healthcare. Ambidextrous IT Governance is perceived as governance designed to balance targets of efficiency and innovation, and the study is informed by the resource orchestration logic. The findings show a set of challenges and opportunities in both settings such as complexity in the sharing of information in the Swedish setting and the possibility to leapfrog in the Ugandan. Furthermore, the ambidextrous balancing point and aspired shift differed significantly between the two settings, where the Ugandan setting wanted to re-balance toward exploitation and the Swedish setting toward exploration. The paper concludes with a discussion and a call for future research on ambidextrous IT Governance.

Keywords: IT Governance, Resource orchestration, enactment, ambidexterity

1. Introduction

The digitalization of society is ushering in new directions for organizations and individuals alike. Core to the notion of digitalization is the parallel utilization of digital technologies for increased efficiency and increased innovation, with new operating models introduced in parallel with continuous enhancements of efficiency [1,2]. Within healthcare, notions such as Healthcare IT (HIT) and e-health initiatives have a long tradition [3,4], and the development is expected to continue [5]. With the increased digitalization of healthcare, new challenges emerge concerning how technology should be organized, managed and governed [2,6]. In order to support the digitalization of healthcare, it is imperative that we have the right IT governance mechanisms in place.

The extant literature has identified IT Governance as a pre-requisite for not only organizational success, but also effective, continued digitalization [9]. In this vein, IT Governance refers to decision rights and accountability framework for encouraging desirable behaviours in the use of IT [8], further explicated as a combination of processes, structures and relational mechanisms.

Traditional IT Governance has, however, been criticized for a tendency of bureaucratization and IT function myopia [10], as well as not amply addressing the organization's parallel needs for efficiency and innovation [11]. This need has been studied within the literature concerning organizational ambidexterity, here understood in line with [12] & [13] as the parallel attainment of exploitation and exploration. Resource orchestration [30] is an emerging stream that has the potential to extend the understanding of resource-based theory (RBT) by explicitly addressing the role of managers' actions to effectively structure, bundle, and leverage organization resources.

Recent additions to this stream of research have called for an increasing dynamic perspective to ambidexterity, i.e. that it is not a stable, fixed state but a continuous configuration of balancing [14,15]. From the dynamic perspective, IT Governance in healthcare needs to move away from only having the senior managers make the key decisions and designing organizational solutions to also empowering the operational managers so as to involve them in the development of ambidextrous strategies, i.e. designed with the intent of dynamically balancing exploitation and exploration. Some IT Governance scholars have posited that senior managers take the central role in designing organizational solutions like structural separation or contextual integration of the exploratory and

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exploitative tasks [16]. On the other hand, [15] state that operational managers use configurational practices to constantly adapt and align to their initiatives' organizational contexts. This allowed them to cope with the persistent tensions in their daily activities which are as a result of simultaneous pursuit of exploitation and exploration. They make the assumption that the senior executives' design choices coupled with organizational systems and processes of the operational managers complement each other in the bid to achieve ambidexterity. The research is guided by the following research question:

How is ambidextrous IT Governance enacted in healthcare organizations in different economic development settings?

This study contributes through comparing two settings where the ambidextrous balancing point between exploitation and exploration is expected to differ, and through offering a unique account of how ambidextrous IT Governance is enacted, operationalized through a resource orchestration lens. The paper is organized accordingly, section 2 discusses the theoretical background, section 3 the method, section 4 results from the study and section 5 is the discussion of the findings and the conclusion.

2. Theoretical Background

2.1. IT governance and Ambidexterity

The pervasive use of IT as a crucial support for the sustainability and growth of business, creates a critical dependency on IT that demands for a specific focus on IT governance [7,17,18]. The digitalization of healthcare has been laden with difficulties in the past [19]. Given the increased pressure to control and monitor costs as well as IT investments making a significant portion of organizations' budgets, effective IT governance is seen as a vital means to ensure returns on IT investments and improve organizational performance. IT governance has been portrayed as a necessary element of successful digitalization in the sense that it is concerned with IT project selection and prioritization issues and how the authority for resources and the responsibility for IT are shared between business partners, IT management and service providers [8,20]. Healthcare organization thus need to take IT governance seriously in order to facilitate the digitalization of healthcare.

Effectively realizing IT governance requires a set of IT governance mechanisms to encourage the congruence with organizational mission, strategy, values, norms, and culture [21,22] which in turn promotes desirable IT behaviours and governance outcomes. An organization's IT governance mechanisms are often indicative of the sophistication of its management capability—both IT and business [3,10]. Solid IT and business relationships can be considered as one way of realizing successful digitalization. This is because of the trust and shared understanding between the IT and business executives.

IT governance mechanisms can be looked at alongside the lines of ambidexterity research. Studies on ambidexterity focus on the assumption that senior managers are the main decision makers who set the direction, design organizational solutions to address tensions and guide organizational implementation of these solutions [23,24]. These studies portray the operational managers as less influential and peripheral implementers, who are meant to explore or exploit, but are not necessarily involved in the development of ambidextrous strategies and the design of ambidextrous organizational solutions. This view was deemed inaccurate by [25] where they found that operational managers play a proactive role in initiating ambidextrous strategies. Zimmermann et al's [25] argument holds for healthcare organizations in which decision-making cuts across the many stakeholders in healthcare. As such they assume that ambidexterity is a result of senior executives' design choices together with actively shaped organizational systems and processes by the operational managers. Zimmerman et al [15] state that operational managers in successful initiatives used three activities (configurational matching, configurational contrasting and configurational exposure) to adapt and align their initiatives' organizational contexts. The matching and contrasting activities were mainly used to pursue the objectives of ambidexterity in the product while the exposure practice helped in the integration across the various domains.

Since ambidexterity in an organization takes a long time to develop, most of the studies indirectly assume an optimization logic. Organizations that maintain their ambidextrous orientation learn from experience and thus improve their ability to balance exploitation and exploration and this may result into superior long-term gains [26]. Despite the static ambidexterity perspective, the larger exploration/exploitation debate has benefited from dynamic contributions. Formal models of exploration and exploitation [27] build on [12] original model of exploratory choices, exploitative choices and feedback from these choices. Organizations are expected to choose from a set of policy alternatives in formal models while facing uncertainty with regard to each alternative's payoffs [27]. When organizations choose between exploiting

existing knowledge and exploring new knowledge, they lessen the uncertainty with regard to their available choice set [14].

Ambidextrous IT governance enactment brings into play the collection of activities that are carried out in relation to IT governance configuration. This calls for deliberate effort to ensure control in a behavioural role so that individuals working on IT projects for this case in healthcare act in a way consistent with organizational objectives [28]. Previous research on IT governance had its focus at the corporate level [29] on issues to do with structures, processes and relational mechanisms and these were focused on a static perspective. However, Luger et al [14] develop a dynamic perspective on ambidexterity by clarifying the contingent nature of the ambidexterity/organization performance relationship and by the integration and extension of the ambidexterity and formal modelling perspectives on ambidexterity. Organizations can achieve ambidextrous IT governance by performing a set of actions. This study adopts resource orchestration, an emerging research stream which has the potential to extend the understanding of resource-based theory (RBT) by explicitly addressing the role of managers' actions to effectively structure, bundle, and leverage organizational resources.

2.2. Resource Orchestration

Resource orchestration involves structuring the portfolio of resources, bundling of resources to build capabilities and leveraging capabilities in the market place [30]. Structuring includes acquiring, accumulating and divesting of resources, which may involve procuring new resources, improving the existing or decommissioning some resources. Bundling on the other hand is about stabilizing, enriching and pioneering of the existing resources in order to get the best out of the resources. Last but not least Leveraging involves mobilizing, coordinating and deploying of resources. This involves having multidisciplinary teams that can work together to realize the organization's strategic objectives. In healthcare where there are different stakeholders that include clinicians, health IT staff among others, resource orchestration is one approach that can enable coming up with resource-related actions that can inform enactment of ambidextrous IT governance in healthcare organizations. Work on resource management distinguishes between the processes of structuring, bundling, and leveraging from the actual resources being managed [31]. Thus, the processes of resource management refer to what Kraaijenbrink et al [32] call "managerial capabilities." In essence, managers on all levels engage in structuring, bundling, and leveraging processes with the purpose of effectively utilizing the organization's resources to reach an objective such as entering and successfully competing within target markets. This is supported by the empirical tests by Ndofor et al [33] and the results show that managerial actions mediate the resource-performance linkage, thereby providing support for the manager's role in creating a competitive advantage. The actions of the managers must simultaneously address capability strengths and weaknesses in order to realize a competitive advantage [34].

3.Method

The study involved dual case studies in two different settings. The rationale behind selecting two different settings was to find comparable case studies where the environmental dynamics differed, since this is regarded as a contingency variable within organizational ambidexterity studies [35,36,37]. According to previous findings, an organization acting in an environment signified by a higher degree of dynamism would need to have a higher emphasis on exploration rather than exploitation [38]. The case study approach was used since it is suitable to study phenomenon in real life context where there is no control of the events that are happening in the healthcare organizations in the different settings [39]. The study done in the Swedish case was carried out in the Västra Götland Region (VGR) in Sweden's second biggest city Gothenburg. VGR was selected on the basis that it is a relatively big organization with 55,000 employees and is a driving force for development in western Sweden [40]. The region collaborates at many levels with academia, the private sector and other public sector organizations.

The study in the Ugandan case was carried out in the capital city Kampala and in two upcountry towns namely Fort portal and Mbale. The capital city was chosen because it is host to the National referral hospital and most of the healthcare organizations both private and public that provide healthcare services. The two upcountry towns were chosen as they are host to regional referral hospitals and so are considered the first point of contact for most patients who require specialised treatment. The healthcare organizations in the capital city and upcountry towns have clinician training schools (Academia) and also work closely with other medical bureaus that provide healthcare support services. Being the flagships of healthcare in the country, they are considered to have adopted the use of health IT.

In the developed economy context, data collection was carried out in two phases. In the first phase selection of suitable online secondary sources of data and newsletters regarding healthcare initiatives in VGR was done. In the Ugandan case, data was collected from key stakeholders who mainly included health IT professionals and administrators/policy designers. In-depth interviews were conducted in both settings. In the Swedish case, there were 10 informants while in the Ugandan case there were 11 informants (Table 1). In addition to interviews, secondary data was collected from online sources.

Table 1 Informants interviewed in both settings

Swedish context		Ugandan context	
Organization *	**Designation of person interviewed**	**Organization ***	**Designation of person interviewed**
Black	Project Head	Omega	Head IT
Yellow	Area IT Manager	Beta	IT Manager
Red	IT strategist/ Radiology	Alpha	Systems Administrator
Blue	Strategist and Enterprise Architect	Gamma	IT Head
	Strategic Architect	Phi	Manager Medical Services
	eHealth Expert/Radiology Nurse	Delta	IT Officer
	Head Care Digitalization/ Retired Medical Doctor	Theta	IT Officer
	Digitalization Strategist	Lambda	IT Head
	Chief Standardization officer	Kappa	Commissioner
Green	Programme Manager PICTA	Epsilon	Director e-government services
			Health Lead

*Names of organizations in table are pseudo names

The interviews focused on issues of governance of IT and resource orchestration activities in healthcare and were conducted following an interview guide. They lasted between 45- 60 minutes. All interviews were recorded and transcribed. A single coder used Thematic analysis [7] for data analysis. In the analysis multiple coding was done focusing on thematic similarity and theoretical coding which helped discover the core category that identified the primary research theme. This framework was used because it focuses on the managers' resource-related actions and how these actions influence organization outcomes such as value creation and the development of competitive advantage.

4. Results

The results are presented using the resource orchestration framework by highlighting the resource orchestration activities in the two settings.

4.1. Structuring

Structuring refers to the portfolio of resources. IT involves acquiring, accumulating and divesting of an organization's resource portfolio [30]. Findings show that there is a plan to divest old and acquire new IT systems in the Swedish case. Currently, accumulation of resources is what is happening while the planned divesture and acquisition of resources is in plan. The reason for this is that some of the old systems have a lot of information that is useful but are not compatible with the new systems and therefore are not able to share information with other systems as stated by the strategist and Enterprise Architect; "*We are trying to build Gartners bimodal—mode 1 getting old systems to work right now that is maintenance. The systems from the 80s have to run and cannot shut down so we have to have the backups and the mode 2 we have the innovation mode. Which is close to what you are looking for*." In order to have the old systems share information with the new systems, APIs have been developed in order to have news systems pick information from the old systems though it is not sustainable. There is need for standardization in order to guide the procurement of new healthcare systems that can work together with the financial and administrative systems as further stated by the strategist and Enterprise Architect; "*Up until now this has not been done in the architectural way it is only done by getting some money and some people start some project like Sahlgrenska which sometimes doesn't work. So much of my work right now is strategy looking 5 years ahead and trying to start the right things*." In the Ugandan case, there has not been

much in terms of health IT systems and thus acquiring of new systems is possible without a lot of challenges. The issue though is that the financial resources channelled towards this effort are minimal and the acquisition of health IT systems is likely to take a long time. In the Swedish case, county councils have the financial resources to procure what is deemed necessary as opposed to the Ugandan case where the central government has to cater for all the districts in the country and healthcare is not prioritized. As mentioned earlier that lack of sharing of information in the Swedish case has brought about the need for the county councils to work together and share information. This is specifically in the case of a patient who may fall sick when they are away from their resident county council. Currently they have to print out their medical records as they go and visit the primary healthcare facility. This is one of the issues that needs to be addressed with digitalization. The standardization officer in the Western Region of Sweden in support of county councils working together noted that they have developed an information model to help in the interoperability: "*A lot of people in healthcare in Sweden and many countries are as well are so reluctant to buy one system but they don't realise what they are buying. They are buying and inheriting an information model that will cause them a lot of trouble when it comes to interoperability because they can't change it. But the step we took is we put the most effort in defining our information model, how the data should be structured. By doing that it is simpler to connect our systems to other systems*."

On the part of divesting, the VGR region of Sweden are on course to get rid of the old systems and replace them with new systems seamlessly built into the core system. This was corroborated by the IT strategist and he stated "*The next step which we are about to take is to throw out a lot of older systems and reset the healthcare IT with a new core system for general healthcare. Speaking of the diagnostics part of this, I am not sure that we shall exchange the current systems not all of them like for example X-ray we have well-functioning infrastructure but for Laboratory there must be some kind of change*".

In the Ugandan case, the private healthcare organizations that have some health IT systems in place have embarked on *accumulation*, to grow the health information systems network in public healthcare organizations over the country. This is to improve on service delivery so that wherever a patient goes to seek medical assistance within the networked healthcare organizations, they can get help as their medical records will be accessible. The IT manager of one of the private healthcare organization stated that "*Information sharing is easier within the network of healthcare organizations—right now MS Dynamics Nav2016 is being used at the headquarters but will be rolled out to the rest of the clinics which are using Navision attain*". Much as there are efforts to get the different healthcare organizations systems connected to share information, there is a challenge of bureaucracy in the procurement of new infrastructure required for many of these projects and non-IT savvy clinicians who are supposed to use the system. The health IT officer in support of this stated that "*in the bid to realize the sharing of information amongst the various systems comes the need for infrastructure changes which requires approvals and procurement and these processes can be rather long and then later after the implementation has been done, there is need to train the clinicians on the use of the health information system.*"

In the Swedish case, we see exploitation of actions on the old systems in order to have a clear patient history to help the younger health professionals deliver the necessary treatment and services. At the same time, we see exploration actions especially in so far as having the older and newer systems working together. It calls for innovative ways to have information shared amongst the two systems. Getting the older and new systems to share information suggests enactment efforts in the Swedish case. The other efforts include procuring of new systems that are complaint to an already agreed upon information mode so that there are opportunities to exploit and explore resources in the organizations. The efforts mentioned are considered ways of enactment of ambidextrous IT governance.

In the Ugandan case, given that there are few health information systems which are being adapted and installed in the public the health centres, there are also private health facilities that have their own health information systems. Standards are being worked on to enable sharing of information amongst both the public and private organizations and this suggests there are IT ambidextrous enactment efforts.

4.2. Bundling

Bundling refers to the integration of resources to form capabilities. This involves stabilizing, enriching and pioneering with the goal of building capabilities [30]. In the Ugandan case *stabilizing* activities were noted in the form of improvement of some of the already existing systems by exploiting all the functionality to improve service delivery. This will reduce on the costs incurred by some patients as they move from their places of residence to come to Kampala. The IT head of one of the private healthcare organization stated that "*The UgEMR will*

be able to track patients in all districts in the country. This we think will help us achieve our 90-90-90 strategy whereby those who were unable to travel to Kampala to carry out tests or collect their ARVs will now be able to access all these services in their home districts".

In private healthcare organizations there are IT systems that are focused on the clinical, accounting or inventory and these are standalone systems. To realize improved efficiency, there is need to have the systems share information. This is an example of *enriching* where the current capabilities are extended. This will make it easier to monitor a patient from the time they come into the hospital until the time they leave after treatment. *Enriching* activities in this case have seen the top management of the private healthcare organizations push for the integration of the existing systems so there can be seamless flow of information between all or most of the available systems. The IT officer at one of the private healthcare organization stated that "*The board gave a period of one year to have the accounting and medical records systems share information to enable more transparency in the monitoring of the patients as well as the revenue streams. Furthermore, the board asked the IT department to write a paper on how ICT aligns with the business*".

For the Swedish case bundling activities were noted and these were mainly in the areas of *enriching* and *pioneering*. Many of the county councils appreciated the need to work together in order to improve their efficiency in serving the patients. This was evident in the way county councils in a given region agreed to procure systems with the same standards in order to share information. This is something that it has not been happening. A patient who needs medical attention out of their county council has to print out their medical records and share them with the physician. With standardized systems this will be solved as stated by the standardization officer "*We know how our information is structured. And that is why we could easily not just connect but we could also show the benefits for the patients. It has been happening for the last 12 years in VGR*.".

The IT strategist in corroboration of the issue to do with standardization of systems stated that "*In the last two to three years there has been a change and we are in the process of buying this core system, and for the core system itself, the top management has put down their foot and said we have to do it properly and this will change the way we deliver hospital IT in the region. There are some goals we should achieve and those we should not and what systems we must get rid of*."

Furthermore, an innovation fund was created in Western Sweden to fund innovations that can lead to better delivery of health IT. The political leadership of Västra Götland Region (VGR) apportioned money for that cause and a call was sent out with the aim of attracting ideas for innovation. This is a pioneering activity given that it creates new capabilities. The head of the innovation fund stated that "*For the first time we have this opportunity and the politicians have approved 20M SEK this year (2017). We had 177 applications and 39 projects emerged successful. It is not a scientific project but an innovative and developmental project. The county wants to support innovation in the region*.". This project will also create some stabilization and enrich the health service delivery process.

4.3. Leveraging

Leveraging involves a sequence of processes to exploit the organization's capabilities and taking advantage of specific market opportunities. It includes *mobilizing, coordinating* and *deployment* of capabilities to create value. It includes a sequence of processes to exploit the organization's capabilities.

In the Swedish case, a plan is underway to procure a core system which should comply with the information model that was developed to enable sharing of information. There are *coordinating* activities where the leaderships of the different county councils meet regularly to devise ways of reforming the capability configurations to create value. *Mobilizing* activities involve having a plan that indicates how to achieve the implementation of the core system in the next 10-15 years as it provides a vision for the capabilities needed to form the needed capability configurations. In this regard, the standardization officer stated "*The step we took is we put the most effort in defining our information model, how the data should be structured. By doing that it is simpler to connect our systems to share information.*"

This will require *coordination* which is already in progress given that there is now collaboration amongst the county councils. There are also efforts in VGR to use clusters which are their strength to integrate capabilities and at the same time deploy. These clusters are multidisciplinary and the specialists from various sectors come together and meet in their areas to agree on how best ICT can be used to improve efficiency. The clusters are ways of *deploying* capabilities in order to exploit capability configurations formed by the *coordinating* processes. In line with this the ICT department head in Gothenburg area stated that "*The areas of strength in Gothenburg are not the organizations. The areas of strength require us to go back to the masters. The*

basic idea is that there should be in West Sweden at least one meeting place and one cluster initiative or organization for each and every area. I don't believe in one big IT cluster because ITs are broad and it can become diluted so we need to have a critical mass for each of the area. Therefore, for each area we need to have an organization where people meet, and we have almost succeeded on this."

The governance of health IT in VGR requires streamlining in order to support the realization of the leveraging activities. The available funding to the county councils offers them the prerogative of procuring or implementing whatever they want. This creates a scenario where there seems to be different systems but in actual sense, they are the same but named differently. Thus, as stated by the Strategic Architect, governance of IT is key "*The various hospitals developed their own codes in informatics. When there is need to share the same data, there is a lot of work and a lot of it is IT but also people are key. For example, if there are three professors with different opinions, there it comes to governance. It is not about money because you could pour out money but it does not really help. You may develop your own systems but if each of the professors developed their own system there, we would not harvest the fruits. I think that is one thing that is the problem in the whole of Sweden.*"

Governance of IT from the RO perspective is seen as *mobilizing* which aims at providing a plan that should be followed through to realize the intended outcomes and this contributes to the efforts of enactment of ambidextrous IT governance.

In the Ugandan case, leveraging activities in the form of *mobilization* are happening and there are plans geared towards forming the vital capability configurations but the challenge comes in at the implementation. It is affected by a number of factors including but not limited to the inadequate finances, the bureaucracy in procurement of systems and lack of the will to realize the plans on paper. At the national level, an eHealth working group that constitutes of key stakeholders is in practice. This can be considered as *deployment and coordination as well*. At the organizational level, the board and senior management were in support of each other to see the success of the strategic plan. The IT officer at one of the private healthcare organizations stated that "*The board affects the decision of management. If the two are in conflict, it is very likely that plans will not be realized. Another IT officer stated that in order to realize the plans, there is need for new infrastructure but again bureaucratic red tape in the procurement process ends up affecting the implementation.*"

Furthermore, *coordination* in terms of bringing together key stakeholders to agree on the best way to deliver health services was evident in the Ugandan case. An eHealth working group was setup and its membership comprised of people from the Ministry of Health (Health professionals), the National Information Technology Authority of Uganda (NITAU) and Academia. The eHealth working group is working out policy guidelines that will guide the operations of the health IT in the country. The health Lead at NITAU stated that "*When people have any innovation in health IT, they never consult with NITAU but they go to Ministry of Health which grants them the permission to do whatever they have proposed. Overtime this has led to duplication of the same applications subsequently leading to a ban. With the eHealth group there can be consultations among the eHealth group membership before granting permission to implement any proposed innovation*."

In terms of deployment, the Ministry of Health has taken advantage of the District Health Information system 2 (DHIS2) which is available in most of the health centres in the districts of the country. This has improved on the reporting of health-related concerns from the districts on a monthly basis. This *enriching* effort extends current capabilities to benefit the health centres. These include the number of patients treated in a given month and for which ailments they were treated, and the cases and outbreaks of diseases among others. This helps the ministry in planning for the various districts based on the information they get. At the same time it leads to the avoidance of sending unwanted drugs to certain districts as different districts all have their own unique challenges. The commissioner in charge of Health Information Management systems stated that "*With the DHIS2 we have been able to get timely information from the health centres in the districts. This has equally supported the planning process as the technocrats are well informed about what is happening in the various parts of the country. As the Ministry we can then place the right order with the National Drug Authority and National Medical Stores*."

IT governance is concerned with the decision rights and accountability framework to achieve desirable behaviour in the use of IT. This description of IT governance suggests that the resource orchestration (RO) perspective is capable of supporting the enactment of IT governance. Using the RO framework, various activities aimed at exploitation and exploration of the existing resources are happening in the healthcare organizations in the two settings.

5. Discussion and Conclusion

The study using the resource orchestration perspective highlighted the different resource orchestration actions carried out by healthcare organizations in order to enact ambidextrous IT governance.

Table 2 Summary of the different resource orchestration actions (challenges and opportunities) in the two contexts

Resource orchestration actions	Developed context	Developing context
Structuring	Procurement process is underway for a standardized healthcare IT system with information sharing among the different healthcare organizations in the region Procurement of more IT systems to incorporate IT in areas whose processes were not digitized.	Procurement of basic health information systems Getting to incorporate IT in key processes of the healthcare organizations
Bundling	Use of APIs in order to get critical health records from the old IT systems into the new IT systems Creation of new capabilities in the region by for example adopting a new information model Supporting innovations from individuals of startups through the science parks	Use of appropriate technology to report outbreaks given the low digital base Registration of patients and storing their records to replace the rudimentary methods of writing in books
Leveraging	Bringing together the different specialist clusters in the region and tap into their professionalism as a way of planning for the future Piloting of the different initiatives that are outputs from the science parks	Encouraging the clinicians to adopt the use of IT in their processes Having a team to coordinate the various processes in the organization to realize the strategic objectives

As noted in previous literature [1,41], IT Governance has displayed a tendency for increased focus on efficiency over time partly due to bureaucracy and formalism being a function of time in large organizations [42,43]. Hence, the Swedish setting, with its longer track-record of computerization and its larger installed digital base has geared itself into a position where innovation is not supported by the formal control. This explains the increased demand for shifting the emphasis away from efficiency towards innovation.

In contrast, the Ugandan setting displayed a lower degree of formal control, resulting in a tendency to focus on innovation at the expense of efficiency. A smaller installed digital base, results in easier development and adaption of new solutions, since there is a limited legacy environment to take into account, i.e. less complexity. The strained economic situation in the developing setting makes efficiency gains necessary, whereas we saw initiatives such as the "ban on innovation" being pushed by legislation. Hence, the developing setting displays a contrary stance to the developed setting, in their aspiration to shift the emphasis away from innovation towards efficiency.

On the basis of this, the findings point to a central difference in terms of how ambidextrous IT Governance is enacted in the two different settings. Previous research hypothesizes that the difference in necessary focus on innovation versus efficiency is contingent upon the level of dynamism in the external environment [13,15], yet the findings add to a different interpretation to this relationship. The Ugandan setting is invariably more dynamic than the Swedish one, with more political and geo-political turbulence in place, in parallel with a major

revamping of the healthcare system itself. At the same time, it has little of the institutional inertia present within the Swedish setting, with a strong installed base of existing solutions acting as deterrents to change. This offers the possibility to further nuance ambidexterity research in two major ways.

First, the assumption that in a dynamic environment, focus on efficiency is meant to attain a certain level of efficiency. This suggests that in the Ugandan setting, if sufficient efficiency is not attained, the organization is not in position to shift its emphasis more towards innovation.

Second, findings point to the issue that the enactment of ambidextrous IT Governance is contingent upon the historical development of governance structures, processes and relational mechanisms [22]. With the increased formalization over time comes an increased tendency to shift the ambidextrous balance towards innovation. This tendency is endogenous in character, and hence challenges the assumption of a direct relationship between the ambidextrous balancing point and environmental dynamism. The shift towards an increased focus on innovation may suggest the effect of either environmental changes or increased/affirmed internal inertia due to formalization of controls [44]. Hence, the casual relationship assumed in the literature is warrant for additional inquiry. Future research should be directed towards better understanding the intricate process of dynamic ambidexterity. As proposed in this paper, the perspective of IT Governance enactment may prove a fruitful avenue through which these issues may be approached.

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Ambidextrous Policy: cross-country comparison of policies for the digitalization of healthcare

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Abstract.
Healthcare constitutes a fundamental challenge in the ongoing digitalization of society, in part due to its complex, integrative and critical nature. With healthcare regulated through national policies, we posit that the said policies need to afford a parallel facilitation of exploitation and exploration, i.e. being ambidextrous. This study explores how healthcare policies in Sweden and Uganda are positioned in terms of ambidextrous balance. Through a content analysis of a selection of national policies, the study finds that policies regarding IT are identical in terms of ambidextrous balance in the two institutional environments, whereas policies regarding digital healthcare/eGovernment display a distinct difference with Uganda being more focused on exploration than Sweden. In terms of the general healthcare policies, Uganda stands out with a sole focus on exploitation, while Sweden has a mix of exploitation and exploration. On the basis of these findings, we discuss the implications of different balancing points to the continued digitalization of healthcare in the two national settings, and present our conclusions in terms of propositions for the future study of ambidextrous policy for the digitalization of healthcare.

Keywords: Policy, Digital healthcare, Ambidexterity.

1 Introduction

The digitalization of society involves a dual aspiration of increased efficiency on the one side, and, new operating models and means of value-creation on the other[1]. As such, digitalization is laden with connotations from both operational excellence and disruption and innovation. This dual perspective on digitalization is core to much of the extant literature on digitalization[2].

In viewing digitalization as the parallel strive for exploitation and exploration, there is a growing body of literature utilizing findings from the field of organizational ambidexterity to study digital initiatives [3]. Organizational ambidexterity, here understood as the organization's ability of parallel attainment of exploitation and exploration [4],

mirrors the dual characteristics of digitalization. From this, organizational ambidexterity becomes a relevant perspective for new insights in the study of the digitalization of society[5].

As societies increase their digital intensity, few sectors are left unaffected. This holds true also for healthcare, where digitalization has been advocated as a means for enhancing quality while simultaneously reducing cost [6]. Given that healthcare constitutes one of the most complex and critical practices in society [7], it is often highly regulated through national policies[8]. In this study, we regard policies as a collection of principles, rules, and guidelines formulated or adopted by an organization to reach its long-term goals, typically published in a booklet or another form that is widely accessible [9]. Policy designs have been recognized as a field of study since the 1950s, though in the early 2000s there was still a dearth of research available [10]. Recent findings highlight the necessity for more intently studying policies related with digitalization, such as digital government [11].

By bridging the fields of policy and organizational ambidexterity, the objective of this study is to contribute to the emerging literature on digital policies, through applying an ambidexterity perspective in the comparison of two national healthcare systems.

On the basis of the rationale above, this study is guided by the following research question: *How can the study of policy for the digitalization of healthcare be informed through an organizational ambidexterity perspective?*

The research question is answered through a cross-country comparison of healthcare policies, where said policies are analyzed in terms of ambidextrous balance in order to derive propositions for future studies of digital policy.

This paper is organized accordingly: After this brief introduction, the precursory findings of the study are presented, along with the theoretical framing where ambidexterity is proposed as an analytical lens for studying policy. This is followed by a presentation of the results, with individual accounts of the Swedish versus Ugandan setting, along with a summary and initial comparison. After this, the discussion of the findings by relating them to previous studies in order to theorize on the role of ambidextrous policy in digitalization is done. Finally, the implications and limitations of the study are presented along with calls for new research.

2 Precursory findings and theoretical framing

2.1 Digitalization and the need for ambidexterity

There have been numerous attempts at describing the evolution of digitalization. In early work by [12] the technology is seen to evolve from automation through information to transformation. In more recent work, Nardi and Ekbia [2] take a socio-materiality informed perspective and describe the shift in agency, from automation, to augmentation to heteromation.

As these two examples show, digitalization and digital technologies are laden with both evolutionary and revolutionary characteristics. Digitalization has two parallel consequences. First there is the automation of menial labour, with the intent of increasing

efficiency through economies of scale. Second, there is the introduction of new operating and business models, where digital innovations bring new opportunities for value creation and revenue generation through economies of scope. In the wake of primarily the second of these, we see auxiliary consequences such as increased democratization, transparency and empowerment, as well as the emergence of their antitheses[13].

With digitalization comprised of two parallel activities (exploitation and exploration), it also comes with the necessity for organizations to be able to handle both activities at the same time. Previous research has referred to this capability as organizational ambidexterity[14], and there are numerous studies of both its impact on performance [15] and how to achieve it[16].

The identified need for organizations to handle two sides of digitalization in parallel also holds true for government actors in the design of policies that direct the digitalization efforts within healthcare. The policies themselves should be instrumental for both sides of digitalization, and hence ambidexterity becomes a necessary characteristic of policy.

2.2 Studying policy in the digitalization of healthcare

Organizations in nearly all sectors are aware that they need to adapt to the changes that come from time to time as a result of digital innovations[17]. In as much as some of these changes can be disruptive, the ability of many of the organizations to adapt is affected by institutional arrangements and patterns of decision making and governance. Digital innovations have created a nexus of developments that have the capability to disrupt our society and so governments need to put in place mechanisms to handle any possible problems that may arise (ibid). Governance thus requires that governments foresee and develop sound policies to help in the management of the new innovations.

Technology has created ample opportunities for government to improve their services and to innovate. Adapting to changes is something that governments are taking on [18]. What is clear is that governments and policy makers cannot leave the digital space ungoverned. However, getting to understand the core government functions that include providing public services and infrastructure, formulating and implementing public policies, promoting economic growth among others is important—and this counts for both the physical and digital worlds[18].

2.3 Investigatory framework

Core to this study is the conceptualization of ambidexterity as activities directed towards exploitation or exploration [4]. In line with [19], we regard exploitation as activities related to the exploiting of existing opportunities to achieve efficiency. Exploration, is regarded as activities related to the exploring of new opportunities towards innovation. In line with Teece [20], we refer to exploitation as efficiency, and exploration as innovation, whereby ambidexterity becomes the capability of dynamically balancing parallel activities of efficiency and innovation.

Following Luger, Raisch [21] and Zimmermann, Raisch [22], this implies that we regard ambidexterity as a continuous process rather than a steady state. Through this dynamic perspective, balance is not static but continuously evolving. As noted in the literature, the level of innovation is contingent upon the dynamism of the (outside) environment[23]. Hence, organizations acting in a highly dynamic environment will need

to display a higher level of exploration than organizations acting in non-dynamic environments[21]. On the basis of these definitions, we develop a method for assessing the current ambidextrous balancing point from secondary material such as policy documents supported by the findings from [24] that content analysis holds great potential for studies of ambidexterity.

3 Method

The study was done in two settings with varying levels of dynamism in their institutional environments. The rationale for this selection was related to the underlying assumption within organizational ambidexterity that the level of dynamism in the environment impacts the optimal ambidextrous balancing point [15], with high dynamism being linked to a higher emphasis on exploration than in lower levels of dynamism. Dess and Beard [25] define environmental dynamism as the rate of change and the degree of instability of the environment. Rapid change, short product life cycles, and processes of creative destruction are typical characteristics of dynamic environments. Sweden is deemed as a developed economy with a longer track-record of automation and its larger installed digital base couple with a stable political and geo political environment. As such Sweden was selected as an example of a country with lower level of institutional dynamism. Uganda is deemed as a low and/middle income (LMIC) country with a low installed digital base and rather unstable in regard to the political and geo-political environment. As such Uganda was selected as an example of a country with higher level of institutional dynamism.

Sweden has aspired to be the best country in the world in utilizing the benefits of digitalization [26], and the level of digital maturity is high[27]. Uganda on the other hand struggles with quality issues in its healthcare system[28], and as a nation has a lower level of digital maturity.

With the intent of studying existing policies, the data collected in this study was secondary in the form of existing policy documents at the national level in each country. In both settings, the policies were searched and downloaded from the websites of the ministries (or bodies) of Health and IT in the respective countries. The policies used were then categorized into IT, digital/e-government and healthcare (general) polices. For Uganda, the healthcare policies were developed by technocrats and key stakeholders following empirical research with the different stakeholders both in health and IT. The digital/e-government policies were developed by government institutions partly due for the need for legislation to prosecute digital offenders.

The IT category represents policies that govern the operationalizing of ICT services, the digital/e-government category represents policies that provide frameworks for transformation of government processes through the use of ICT to improve internal efficiency, service delivery to citizens, business and community participation. In the Ugandan context, the policies used in the IT category were The National IT policy, The Transition from IPv4 to IPv6 policy, and the NITA-U Regulations 2016. For the digital/e-government category, the policies used were The National Electronic government

framework, Electronics Signatures' Act, Electronics Transactions' Act, Computer Misuse Act and Access to Information Act. And for the healthcare (general) category the policies were the National Medicines Policy and the National Oral Health Policy.
For Sweden, the documents included both legislative documents such as the patient data law, as well as strategies, visions and roadmaps for achieving increased digitalization in healthcare. The policies were designed by both legislators, associations for public healthcare providers, the offices of the government and healthcare regions.
An inductive categorization of the policy documents was conducted. This resulted in three categories and a distribution of policy documents as seen in Table 1. All collected documents in Sweden were in Swedish, whereas the documents in Uganda where in English. A total of 26 (16 versus 10 in Sweden and Uganda respectively) policy documents were collected, displaying an expected difference in the level of policy formalization in the two settings.

Table 1. Overview of sample data

Category	# Sweden	# Uganda
IT	5	3
Digital healthcare/ eGovernment	9	5
Healthcare (general)	2	2
Total	16	10

Following [24] and their recommendation for future research into ambidexterity, we used the selected policy documents as a basis for calculating the ambidextrous balance through content analysis. On the basis of March [4] and Uotila et al (2009), we use the associated words (and search strings) as seen in Table 3.
Using the search strings, we identified the number of word counts associated with exploitation versus exploration in each policy document in order to arrive at a percentage in terms of balance. In other words, identifying 10 occurrences of exploration and 30 of exploitation in a document meant the balance was calculated to 25% exploration and 75% exploitation. We also calculated the mean balance in each category, as well as the total for each country. The frequency analysis was done through the qualitative analysis software Nvivo. In order to reach a more nuanced understanding of the policies intent when lifting the constructs of exploitation and exploration, a second round of thematic coding of the identified accounts related to exploitation vs exploration was conducted. The result showed that exploitation and exploration are coupled with a plethora of second-order constructs in the three categories (characteristics, pre-requisites and effects).

Table 2. Words in wordcount and rank (Swedish in parenthesis)

Exploitation	Exploration
Refinement – Refine* (förädl*)	Search – Search (sök*)
Choice – Choice (val*)	Variation – Variation (varia*)
Production – Producti* (produkti*)	Risk taking – Risk taking (risktagande)
Selection – Select* (selekt*)	Experimentation – Experiment*
Implementation – Implement*	Flexibility – Flexib*
Execution – Execut* (exekver*)	Discovery – Discover* (upptäck*)

Efficiency – Efficien* (effekt*)	Innovation – Innovati*

In terms of validity, the use of March [4] and his explicit identification of words associated with exploration vs exploitation safeguards this. Keeping as close to the possible foundational source of exploration and exploitation was important, with the only change being the aforementioned equation of efficiency vs innovation with exploitation vs exploration [29]. As noted by [30], the issue of semantical validity is also central when conducting content analysis. A choice was made to assess this through proxy, by relying on previous findings where March [4] conceptualizations of exploration vs exploitation were used [24].

In terms of reliability, there have been numerous examples of studies that have used coding and scoring of words with reliable results in the past[31], and hence these deem the method to be reliable.

As a final step in the analysis, propositions were derived logically from our findings. The rationale for not presenting these as core conclusions lies in the relatively limited empirical material utilized (26 policies from two empirical settings), where the statistical generalizability of our findings is deemed as limited. In line with the research question, we utilize this study as a means to identify how organizational ambidexterity can inform the study of policies for the digitalization of healthcare, and hence the propositions are seen as the main contribution.

4 Results

4.1 Sweden: Exploitation for Exploration

The main focus in the policies related to IT, digital healthcare and healthcare (general) is that of exploitation rather than exploration (average of 81% vs 19%). Out of the three different types of policies, the policies related to IT are the ones with the highest bias toward exploitation (84%). On the basis of this, we conclude that the area of IT is still primarily focused on exploitation rather than exploration, whereas the other policy areas are more open to address issues of exploration. Despite this, we can see that ambidextrous balance of Swedish policy is primarily geared towards exploitation.

For the second round of analysis, we identified 38 second-order constructs related to exploration and exploitation or both. The majority of identified characteristics are associated with either solely exploitation (7/13) or both exploitation and exploration (5/13). The only characteristic unique to exploration is Relevant, i.e. the idea that exploration needs to be associated with a high degree of relevance. In regards to prerequisites, only participation is shared between exploitation and exploration. No other pre-requisites are identified for exploitation.

In terms of effects, exploitation is as would be expected related to internal issues such as decreased costs and rationalization, as well as improvement. Exploration, on the other hand is related to a mix of internal and external forms of development, growth and competitive advantage. This differentiation between the internal focus of exploitation vs the external focus of exploration places more emphasis on system-effects of

exploration rather than exploitation. It is expected that exploration leads to the development of industry, the increased competitive advantage of the nation and economic growth, as well as development of software, business and new processes. From this perspective, exploration entails a plethora of expected results, making it significantly harder to assess than exploitation.

4.2 Uganda: Exploration for Exploitation

The main focus in the policies related to IT, digital healthcare and healthcare (general) is that of exploitation rather than exploration (average of 77% vs 23%). Out of the three different categories of policies, the policies related to Healthcare are the ones with the highest bias toward exploitation (100%). On the basis of this, we conclude that the area of Healthcare is still primarily focused on exploitation rather than exploration, whereas the IT area is open to address issues of exploration and the digital healthcare focus is more on exploration. Despite this, we can see that ambidextrous balance of Ugandan policy is primarily geared towards exploitation.

For the second round of analysis, we identified 31 second-order constructs related to exploration and exploitation or both. The majority of identified characteristics are associated with either solely exploitation (8/10) or both exploitation and exploration (5/10). The only characteristic unique to exploration is Comprehensive, i.e. exploration needs to be associated with all sectors namely health, banking, procurement, education, commerce etc. In regards to pre-requisites, both participation and partnerships are shared between exploitation and exploration.

In terms of effects, exploitation is as would be expected related to internal issues such as decreased costs and reduction of the bureaucratic red tape, as well as deliberate strategies to build trained ICT human resource which is interpreted as continuous personal development. Exploration, on the other hand is related to a mix of internal and external forms of development, growth and competitive advantage. This variation between the internal focus of exploitation vis-à-vis the external focus of exploration puts emphasis on system-effects of exploration rather than exploitation. Exploration is normally expected to lead to the development of industry, the increased competitive advantage of the nation and economic growth, as well as development of software, business and new processes.

4.3 Comparison

From the results, there are distinct differences between the ambidextrous balance of the two compared countries. In the Swedish setting, there is a relative alignment between the three different forms of policy. Healthcare and Digital Healthcare policies are completely aligned in terms of ambidextrous balance, whereas IT policies display a somewhat higher skew toward exploitation rather than exploration. In the Ugandan setting, there is no sign of alignment between the three forms of policy. In terms of the general Healthcare policies, these are completely skewed towards exploitation (100%), whereas the Digital Healthcare policies display an almost even balance between exploitation and exploration (46% vs 54%). The IT policies are primarily focused on exploitation (81%).

Comparing the two settings, we see that they differ in terms of alignment vs mis-alignment between the different forms of policies. In addition to this, the Ugandan setting

displays a higher focus on exploration in terms of policies for Digital Healthcare, but a lower focus on exploration in terms of policies for General Healthcare.

5 Discussion

On the basis of the findings in this study, the discussion focuses on developing five propositions intended to guide future research into ambidextrous policy. With this study being one of the first to target policies for digitalization from an ambidextrous perspective, we believe that this is valuable for future research. Propositions are presented and and not conclusions since we acknowledge the necessity for additional studies in order to falsify or prove them.

In terms of the IT policies and the identified alignment between the two settings, we see this as an effect of IT policies being subject to isomorphism. As noted by Magnusson and Bygstad [32] and Gregory, Kaganer [33], there is a tendency within IT Governance practice to fall subject to mimetic behaviour. The configuration for governing IT, as well as the policies that guide the said configurations should display contextual contingencies, yet as the findings show they do not. The effect of a potential mis-alignment will become visible in the effectiveness of the IT policies. On the basis of this, the following propositions are posed for future research:

Proposition 1a: The ambidextrous balance of IT policies will display isomorphic traits between dynamic vs stable institutional environments.

Proposition 1b: There will be a difference in the effectiveness of IT policies in dynamic/stable institutional environments.

In regards to policies for Digital Healthcare/eGovernment, the findings identify sharp differences between the two settings. With Uganda being more focused on exploration than exploitation, Sweden is still primarily focused on exploitation. We interpret this in light of recent findings from the study of the constraining aspects of digital heritage [34] and the phenomenon of technological leapfrogging [35]. Uganda has only recently begun an investment into a digital infrastructure for healthcare[28], whereas Sweden has a long tradition of digitization. Hence, there is a significant level of path-dependency involved in digital healthcare in Sweden, where new solutions are associated with significant costs for integration and potential sunk costs of the existing infrastructure. Uganda does not, comparatively, have a strong digital infrastructure and is hence freer to utilize emerging technologies. Thus, they will have more opportunities for leapfrogging, making exploration more relevant than exploitation. On the basis of this, the following proposition is posed for future research:

Proposition 2: Digital Healthcare/eGovernment policies in dynamic institutional environments will focus more on exploration than in stable institutional environments on account of leapfrogging (inherent characteristics of digital technology).

In terms of Healthcare (general), the findings showed a reverse phenomenon, where Sweden was more focused on exploration than Uganda. Uganda was completely focused on exploitation rather than exploration. This is interpreted in light of a lower level of general maturity within healthcare in Uganda than in Sweden. Sweden is ranked as one of the leading nations in the world in terms of the quality of their healthcare, and have for a long period of time been able to invest in assuring economies of scale and

high levels of exploitation. Uganda, on the other hand, has not had the opportunity of consolidating its resources and achieving exploitation. Hence, the complete focus on exploitation in general healthcare policies in Uganda is deemed as a cap on exploration and risk, since reaching a sufficient level of exploitation is necessary. On the basis of this, the following propositions are posed for future research:

Proposition 3a: Healthcare policies in dynamic institutional environments will to a higher extent strive for exploitation than in stable institutional environments.

Proposition 3b: Healthcare policies in dynamic institutional environments will avoid exploration, until reaching a sufficient level of exploitation.

In addition to these propositions related to policies, we also believe that our study offers insight into general organizational ambidexterity theory. First, the findings summarized in propositions 3a and 3b indicate the relative simplistic assumption in organizational ambidexterity that the primary contingency for ambidextrous balance is environmental uncertainty[36]. According to [37], the higher the degree of environmental dynamism an organization faces, the more it needs to spend on exploration rather than exploitation. The findings suggest that there are threshold values for exploitation which need to be met before exploration is considered an option. If the organization does not have a sufficient level of exploitation, then exploration is not deemed relevant. From this, we further propose that the level of development as displayed by the nation, in itself is a valid contingency factor for ambidextrous balance. This leads to the following proposition:

Proposition 4a: Optimal ambidextrous balance is not a sole function of the level of dynamism in the institutional environment.

Proposition 4b: Optimal ambidextrous balance is contingent upon the status of development in the country.

For future studies, these two propositions lead to a necessity to nuance the function of optimal balance. Here, we see promising signs from studies informed by the punctuated equilibrium theory [33], where an organization is expected to shift balance between certain semi-steady states. Further research into the role of the status of economic development, and a nuancing of contingency variables for optimal balance (temporary) is hence called for.

This study has two main implications for practice. First, organizations should carefully assess the alignment of ambidexterity between their strategies and the policies governing them. Second, as noted by Zimmermann, Raisch [22], the enactment of ambidexterity is done by front-line managers. Hence, managers should consider not merely the ambidextrous balance, but also the actual enactment of ambidexterity.

This study has two main implications for policy. First, digital policy-design should utilize the findings and method of this study to inform future design decisions. If policy is supposed to facilitate digitalization and the attainment of benefits from digitalization, policies need to be designed to facilitate the parallel activities of exploration and exploitation. On the basis of this, the method used in this study could inform future digital policy-designs for healthcare through offering a manner in which candidate policies could be analyzed before finalization and propagation. Second, given the relative level of misalignment between the different types of healthcare policies in Uganda, we believe that policy makers could benefit from analyzing existing policies in respect to

their ambidextrous balance. As noted in the extant alignment literature [38], misalignments on policy levels will have negative repercussions for operations.

The study has two main limitations. First, the empirical selection of two countries such as Sweden and Uganda will invariably lead to issues of comparability. Despite comparisons of policy documents from different countries being fairly common in previous research[39], we acknowledge that the role of policy documents may diverge in the two settings. This makes the potential value of comparisons laden with limitations. Second, the elicitation of ambidextrous balance from policy documents may be regarded to contrast with the mentioned perspective on ambidexterity from Zimmermann, Raisch [22]. What we are able to identify in this study is merely a snap-shot of the existing balance, and the study offers no insight into the potential balancing practices present in the two settings. This will be necessary to study through more longitudinal studies of the policy documents, or through other methods.

6 Conclusion

This study focused on investigating how the study of digital policies for healthcare can be informed through an organizational ambidexterity perspective. In the cross-country comparison, we contribute through identifying significant differences in ambidextrous balance between both countries as well as between different types of policies. On the basis of this analysis, we present seven propositions to guide future research on digital policies for healthcare.

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