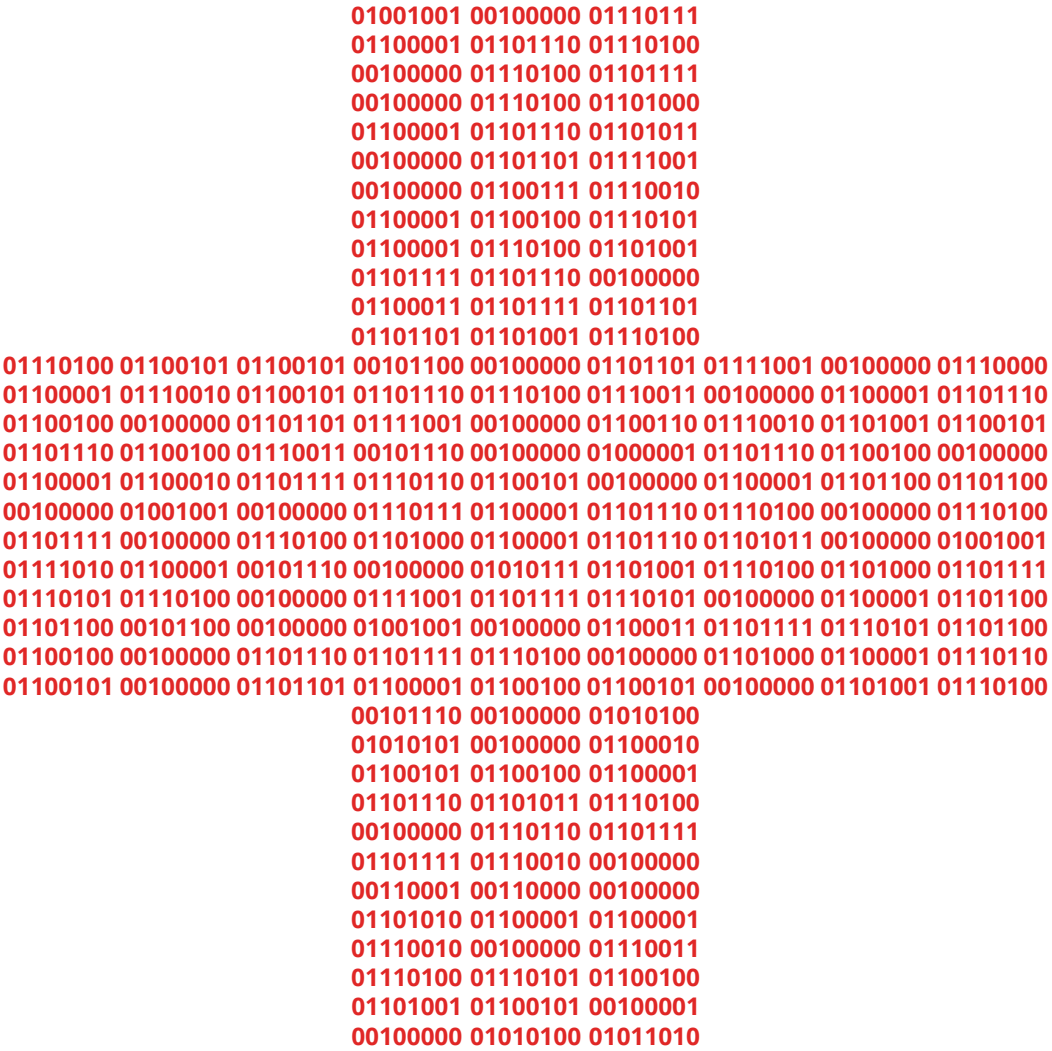
SHIFT HAPPENS

Towards an actionable assessment framework for
Digital Transformation in the humanitarian sector



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TU Delft Delft University of Technology

AN INITIATIVE OF THE NETHERLANDS RED CROSS

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Shift Happens; Towards an actionable assessment framework for Digital Transformation in the humanitarian sector

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510 AN INITIATIVE OF THE NETHERLANDS RED CROSS

Preface

The work now before you, is an accumulation of six months work. I had the opportunity to dive into the world of Digital Transformation in the humanitarian sector. For me personally it was great doing research within the Red Cross, an organisation of social and societal importance. It offered me the opportunity to use my knowledge for a good cause.

This thesis was written in times of Covid-19. The coronacrisis proved to be both a curse and a blessing for this thesis. On the one hand, it forced me to write this thesis while staying at home, complicating brainstorm sessions, interviews, and supervision. On the other hand, it showed the urgency of Digital Transformation, since everybody is now dependent on digital tools to do their jobs.

I would like to express my warmest thanks to my graduation committee. Rolf for always being there when I needed him, his quick replies to my email messages and countless tips for improving my work. Hans for inspiring me and structuring my ideas when I could not do so myself. And Willem, from whom I've learned that language is a precision weapon, for his extensive feedback and his flexibility to join the graduation committee halfway.

Furthermore I want to thank Maarten of 510, who gave me the opportunity to experience the Red Cross firsthand, being a sparring partner and providing numerous contact points for interviews. Also many thanks to the other Red Cross employees for sharing thoughts.

I am also immensely grateful of all the experts with whom I conducted interviews, this research would not have been possible without them. Also many thanks to Iza, Bertjan, Maartje en Marieke for proofreading and providing feedback.

For moral support, I would like to thank my parents and Iza for staying with me, also during times when I stressed out. I also want to thank David and Bas, who over the last two years proved to be the best study buddies I could have imagined.

Lastly, I want to thank the members of 510, for giving me a feeling that I was part of the team, even when everyone was working at home.

TG.J. Ziere
Koudekerk a/d Rijn, August 13, 2020

Executive Summary

The world is transforming, increasingly our societies have become digital societies. The increased use of data and digital tools lead to disruptive or incremental organisational shifts in organisations: a Digital Transformation (DT). This DT is affecting all sectors and provides opportunities as well as threats. Opportunities to differentiate, innovate and grow, but also to become more cost effective. Threats, because in this digital age young start-ups can challenge large incumbents. This research looks into how the humanitarian sector can be helped to go through a DT.

The incentive for the humanitarian sector to go through a DT is that DT comes with a multitude of benefits. There are general benefits to DT, such as: become more cost effective and promote knowledge exchange using digital tools. DT leads to more impact, data-driven decision making helps executives to make better informed choices and DT enables an organisation to match their services with the need of people. Additional benefits specific for the humanitarian sector include: data and digital tools help identify the most vulnerable people that need the most help, DT help attract a new type of professional volunteer and DT stimulate innovation in the humanitarian sector. These benefits renders the two main goals for the humanitarian sector to go into a DT process: First, increased impact: improve disaster response and emergency services, create new and improve other services. And second, increased efficiency: increase the quality and cost-effectiveness of the implementation of humanitarian projects. Given these benefits and goals of DT, it is clear why the humanitarian sector should make an effort to take first steps towards this transformation as is also in line with the new ambition of the International Federation of the Red Cross and Red Crescend.

510, the data department of the Netherlands Red Cross tasked itself to help other, less developed, national Red Cross societies to start their DT. They aid in DT strategy formulation by assessing the status quo of DT for that particular national society. Currently, these assessments are primarily based on the personal experience of Netherlands Red Cross employees. To formalise and standardise this assessment, a validated assessment framework for DT in the humanitarian sector is needed.

Currently, there is no literature available on *Assessment frameworks for DT in the humanitarian sector*. There are frameworks available for the private sector, but no off-the-shelf framework can be applied to the humanitarian sector. The purpose of this research, therefore, is to create a standard, easy to use assessment framework for DT in the humanitarian sector that is well-rooted in scientific literature. To obtain this research goal, the following main research question is formulated:

What should a digital transformation assessment framework for the humanitarian sector consist of, such that it allows for correct, complete and easy assessment, while enabling digital transformation strategy formulation and implementation

This translates to the the following sub-questions:

1. What enables DT in the humanitarian sector?
2. What type of framework methodology is most appropriate for DT assessment in the humanitarian sector?
3. What factors play a role for DT in the humanitarian sector?
4. What does a framework that enables DT within the humanitarian sector looks like?

Literature was used to answer sub-questions 1 and 2, To answer sub-question 3 and 4 theoretical output of a systematic literature review was combined with qualitative, empirical data. The empirical data resulted from semi-structured interviews with 11 DT experts, from both within and outside of the humanitarian sector. These experts are from different backgrounds and represent diverse countries or regions, so that a broad perspective can be presented. The interviews have been transcribed and analysed with ATLAS.ti, specialised software for qualitative analysis.

Currently, there are some scattered attempts at digital innovation in the humanitarian sector, but because of existing barriers this has not yet led to an actual DT. The major barriers for DT in the humanitarian sector are found to be: severe resource constraints, ethical considerations, the complex organisational structure and chaotic crisis situations. Removing the above mentioned barriers will enable DT in the humanitarian sector.

To identify what type of framework methodology is most appropriate for DT assessment in the humanitarian sector, framework-requirements have been formulated. The most important requirements: give adequate representation of status DT, promote strategy formulation, allow for learning, stimulate knowledge exchange, identify value and show DT-barriers. After considering multiple assessment framework methodologies, it was decided to adopt the CMMi-approach. This is a maturity model approach that is well-suited, because it gives an assessment of the status quo, while also providing strategy formulating guidance.

To provide insight into factors that play a role for DT in the humanitarian sector, a combination of literature and expert interviews was used to identify relevant criteria for the humanitarian sector. In accordance with prevailing literature, these factors have been categorised in people, process and technology factors. People factors include leadership, human resources, culture, organisational structure. Process factors were: alignment operations & IT, long term commitment Management, long term commitment network, long term commitment donor, crisis response, Legal issues. Finally, technology factors included both data and digital[1].

The identified critical DT factors were translated into an assessment framework making use of the CMMi Maturity Model approach. This approach defined six maturity levels: Level 0 - Conditional, Level 1 - Basic, level 2 - Structural exploration, level 3 - Professional practices, level 4 - Digital expert, level 5 - Future proof. For each factor and maturity level combination, there is an explanation of what a humanitarian organisation has to comply with, before advancing to the next level. This ensures that national societies can generate an overview where they currently are and what steps to take to advance. To adequately deal with the barriers and increase practical applicability of the framework, separate barrier-overcoming-strategies have been formulated.

The scientific contribution of this research is the identification of new factors that are important for DT in the humanitarian sector. Furthermore it validates factors found in literature for the humanitarian sector. The framework that is proposed is an addition to existing frameworks that are mostly focused on ICT: this framework takes a multi-dimensional approach into account by including also people and process factors. The research conducted in this thesis is in direct response to a practical question: how to stimulate DT in the humanitarian sector. All interviewed experts were convinced that an DT assessment is a great start to translate ambition into strategy. Therefore, in this thesis, emphasis is put on creating something that is actionable and can be practically used.

The aim of this research was to design a correct, complete and easy to use assessment framework for DT in the humanitarian sector. This objective has only been partially achieved, since the framework is not complete, nor will it ever be. But the combination of the framework and the strategies provides insight for an assessor to start the conversation with a humanitarian organisation about what their goals are and how they can achieve them. This should not be underestimated; starting the conversation and formulating a strategy are the first steps towards something concrete. An assessment done with this framework does provide a solid basis for a more long-term support project for DT.

[1]Digital: digital tools that can be used in organisations. e.g. Communication tools or tools needed for data analysis

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Acronyms

BuZa Buitenlandse Zaken. 21

CMMi Capability Maturity Model Integration. iii, 15, 18, 46, 47
COBIT Control Objectives for Information and related Technology. 15

DT Digital Transformation. ii, iii, vi, vii, 1–22, 24–31, 33–35, 37–48, 57, 61, 63

EU European Union. 7, 40

GDPR General Data Protection Regulation. 7, 40, 43

HR Human Resources. 39, 46

ICT Information and Communications Technology. iii, 13–16, 24, 29, 31, 38, 39, 42, 43
IFRC International Federation of the Red Cross and Red Crescend. ii, 3, 8, 9, 11, 12, 21, 30, 39–41, 45, 47
ITIL Information Technology Infrastructure Library. 15

MoT Mangement of Technology. 48
MT Management Team. 27, 29

NGO Non Governmental Organisation. 8
NLRC Netherlands Red Cross. 1, 2, 7, 12, 21, 35, 37, 43
NOS Nederlandse Omroep Stichting. 1

RC Red Cross and Red Crescent. 9, 45
RC Red Cross. 8, 11, 12, 21, 28, 29, 39
RCM Red Cross and Red Crescent Movement. 11, 12
RCNS Red Cross National Society. 12
RCNS Red Cross National Societies. 11, 12, 20, 61

Chapter 1

Introduction

The little town of Solferino, Lombardia, was once the stage of a battle. Here, just a few kilometres south of Lake Garda, the French allied forces fought the Austrian Emperor in the historic 1859 Battle of Solferino. Historic, because of multiple reasons: it was a significant step towards 'Risorgimento': the unification of Italy. It was also the last great battle in which, amid the fighting and only a few kilometres from each other, three heads of state were on horseback: Franz Joseph I, Napoleon III and Victor Emanuel II. Perhaps more important to us now, was what resulted out of the aftermath of the battle.

When the battle came to its end, Mr Henry Dunant visited the battlefield. Witnessing the twenty-three thousand wounded, dying and dead that remained on the battlefield ("Der Feldzug des Kaisers Napoleon III in Italien im Jahre 1859", 1962) made a profound impression on him. He was struck by a battlefield with so many casualties, and no one taking care of the dead and wounded. Upon his return to Geneva, he wrote a book about his experience, *A Memory of Solferino* (Dunant, 1862), which he sent to many world leaders. This lead to the establishment of the Red Cross Movement, of which Henry Dunant is officially considered the founder (ICRC, 1998).

Now, fast forward 160 years. About an hour and a half's drive[1] from Solferino lies Bergamo, the European start of the global corona pandemic. Europa's biggest crisis since the second world war.

The night before this research started within the Netherlands Red Cross (NLRC), the then Minister of Public Health, Bruno Bruins, received a piece of paper during an NOS live broadcast. This piece of paper stated that the first corona infection was a fact. Two weeks later the Netherlands was in an intelligent lockdown and the majority of people was urged to work from home.

It is a crisis that forced us to stay inside, stop meeting friends, keep social distance and other restrictive measures. In this crisis, 60% of the people work from home. 60%, an extraordinary number: almost all jobs that don't require some form of personal contact are being done remotely.

Working, learning, studying from home, it is only possible because personal computers, dedicated software, the internet and the infrastructure around it. Imagine if a crisis like this would have hit the world in the time when the forces of Napoleon and Victor Emanuel were battling the forces of Franz Joseph. Not only would a lot more people have died because of less developed healthcare, but working from home would be impossible. To put it differently, only because of the digital transformation that our western societies underwent, it is possible for us to stay in contact and continue to do our jobs.

The world is transforming, increasingly our societies have become digital societies. This DT is affecting all sectors (Schallmo, Williams, & Boardman, 2017) and provides opportunities as well as threats. DT provides opportunities to differentiate, innovate and grow, but also to become more cost effective (Berman, 2012; Galindo-Martin, Castano-Martinez, & Mendez-Picazo, 2019). There also is a potential increase in information intensity by collecting and using data and increased customisability because of increased agility (Andal-Ancion, Cartwright, & Yip, 2003). Digital tools are useful platforms to stimulate innovation (Westerman & Bonnet, 2015). Digital communication technologies might also promote knowledge exchange within and between organisations (Mosallaeipour, Nazerian, & Ghadirinejad, 2018). Company executives also seem to

[1] Via Google Maps

understand the advantages: they mention creation of new ideas, more reliable results, and faster time to deliver (Harvard Business Review Analytic Services, 2014).

There are also threats, because in this digital age young startups can challenge large incumbents (Sebastian et al., 2017). Failing to follow this trend can result in losing the competitive advantage (Ma & Karri, 2005). Already in 2014, half of 750 company executives thought their companies had lost out on new market opportunities created by technology, because their IT division was too slow to adapt (Harvard Business Review Analytic Services, 2014).

The humanitarian sector also understands the opportunities a DT can provide. The Red Cross Movement adopted *Strategy 2030* in December 2019. In this strategy the Red Cross explicitly expresses its ambition for a DT of the Red Cross Movement (IFRC, 2019). It can be argued that it was about time, because it was already stated in 2013 by Fitzgerald, Kruschwitz, Bonnet, and Welch that 78% of executives in various sectors claimed that pursuing digital change would be crucial for their organisations. It has been shown by that the semi-public sector is prone to lag behind the private sector because of their conservative and bureaucratic mindset (Bloch & Bugge, 2013). As further elaborated by Borins (2002) the semi-public sector is not known for its power to create new innovations and gives the following reasons: (1) there is little/no competitive pressure, (2) imposed rules and regulations can prove to be barriers to innovation and finally, (4) semi-governmental are usually hierarchically structured bureaucracies with a focus on maintaining the status quo. While these are explanations for the reticent attitude of the humanitarian sector, over the last couple of years it can be observed that there are digital initiatives popping up (Winter, 2019).

1.1 Problem Statement

Within the Red Cross Movement, The Netherlands Red Cross (NLRC) is one of the initiators of DT. They have the ambition to use digital means to improve their humanitarian work, pursue new ways of humanitarian aid and enables increased speed, quality and effectiveness of operations (Rode Kruis, 2018). To work towards this goal, four years ago 510 was founded: the first data-analytics department of the Red Cross Movement. One of the ambitions of 510, is aiding other national societies worldwide to formulate and implement their own DT.

A first step in going through a DT is stipulating an ambition and formulating a strategy (Rogers, 2016). Doing this adequately can be difficult, because digital transformation has an influence on multiple parts of an organisation (Matt, Hess, & Benlian, 2015) and it is hard to oversee all the consequences. Therefore, it requires experience. Since 510 has experience, they can help other National Societies with creating a strategy.

Formulating a strategy requires three pieces of information: diagnosis, guiding policy and actions (Rumelt, 2011). This research focuses on diagnosis: how can the as-is situation of national societies be assessed on their current state of DT by 510, the problem owner of this thesis.

Currently, to structure the assessment of the as-is situation, 510 adopted the assessment-framework of American Red Cross (2020). This framework, however, is not ideal as it has multiple drawbacks. The main problem is that the current framework is almost entirely focused on data and technology, omitting other important factors like organisation, people and culture. Therefore, the current assessment framework does not capture the entirety of the organisation and does not allow for (easy) strategy formulation and implementation. 510 only employs one auditor that has sufficient experience to use the current assessment framework. This is problematic because this complicates and slows down an already difficult process: there are 192 national societies that need to be assessed and transformed and one auditor does not have the capacity to assess them all. To streamline and standardise this process, 510 is looking at ways to improve the DT assessment and streamline strategy formulation.

1.2 Research Gap

A literature review shows that multiple frameworks for DT in the public sector exist (BCG, 2020; McKinsey, 2016; Deloitte Switzerland, 2017; Hess, Matt, Benlian, & Wiesböck, 2016; Matt et al., 2015; Becker, Knackstedt,

& Pöppelbuß, 2009; Lahrmann, Marx, Mettler, Winter, & Wortmann, 2011; Grivas et al., 2018; Sanchez, 2017). But none of these have been validated for the humanitarian sector. Because the humanitarian sector has different goals, these conventional DT Frameworks cannot directly be applied. These assessments aim for profit optimisation or look at customer relations. They do not speak the language of the humanitarian sector and cannot cope with its challenges. These findings indicate the need for further research into DT assessment frameworks for the humanitarian sector.

1.3 Research Goal

The previous sections show that there is a need for a balanced, comprehensive and easy assessment framework that also allows for structured strategy formulation. This research aims at fulfilling this need: a practical framework for assessment with a first step towards strategy implementation. With this framework, 510 should be able to assess different national societies to help them with strategy formulation. For the assessed National Society, it should be a first step to kick-start their DT.

On a global level, this research should contribute towards realising the digital transformation goals of *Strategy 2030*. It should provide a validation of the assessment process, so that it can be approved by the IFRC and be used in the global Red Cross network.

1.4 Final Deliverable & Scope

The final deliverable is twofold. The first deliverable is a practical assessment framework. This framework assesses the current status of DT of a particular National Society. It should comprise of the most pressing themes that can make DT in the humanitarian sector a reality. The second deliverable is a set of strategies that can be used, together with the framework, to stimulate DT in the humanitarian sector.

Within the scientific literature, doing a performance assessment is part of performance management. Therefore the scope of this research is defined as: "Creating an assessment framework using performance management to digitally transform the humanitarian sector". This scope asks to apply performance management literature to digital transformation and the humanitarian sector.

1.5 Research Questions

To obtain the research goal of a framework for Digital Transformation in the humanitarian sector, the following main research question is formulated:

> *What should a digital transformation assessment framework for the humanitarian sector consist of,*
> *such that it allows for correct, complete and easy assessment,*
> *while enabling digital transformation strategy formulation and implementation*

This translates into the following sub-questions:

1. **What enables Digital Transformation in the humanitarian sector?**
   (a) What is a definition of Digital Transformation in humanitarian sector?
   (b) What are the benefits of Digital Transformation for the humanitarian sector?
   (c) What are barriers to Digital Transformation in the humanitarian sector?
2. **What type of framework methodology is most appropriate for Digital Transformation assessment in the humanitarian sector?**
   (a) What are requirements for a Digital Transformation methodology the humanitarian sector?
   (b) What framework methodology best suits these requirements?
3. **What factors play a role for Digital Transformation in the humanitarian sector?**
   (a) What are general Digital Transformation factors according to literature?
   (b) What are humanitarian sector specific Digital Transformation factors according to experts?

(c) How do these factors influence influence the Digital Transformation process and what are the implications?

4. **What does a framework that enables digital transformation within the humanitarian sector looks like?**
   (a) What important transformation-components should be integrated in a framework for Digital Transformation?
   (b) What are strategies that stimulate digital transformation implementation in the humanitarian sector?

1.6 Research Approach & Structure

In this thesis, each research question is addressed ed in a dedicated chapter. Chapter 2 provides a definition for DT and contextualises it by showing benefits and barriers of DT, both for general organisations as for the humanitarian sector. A literature review is conducted to answer sub-question 1, it provides a definition for DT for the humanitarian sector and presents the benefits and barriers of DT.

In chapter 3, a list of requirements for the new assessment framework is presented, then a literature review identifies which framework methodologies exist for DT and what methodology best fits the requirements.

Once the first two research questions have been answered based on theoretical work, empirical data has to be collected to provide answers to the two remaining research questions. To structure data collection, a combination of ethnographic and grounded theory research is used, as presented in chapter 4. This mixed-method allows for flexibility such that sensible conclusions can be presented without the strict rules of either research method becoming a constraint (Thomas & James, 2006; Miles, Huberman, & Saldaña, 2014).

To collect this data, semi-structured interviews with experts are conducted to provides insights in critical components of DT. The results of data collection are presented in chapter 5. These results are used to synthesise a new assessment framework in chapter 6. Additional effort is put into designing a framework that allows for strategy formulation and strategies are formulated to stimulate implementation, answering sub-question 4. Finally, the outcomes are discussed in chapter 7 are then used to answer the main research question and derive conclusions and recommendations in chapter 8.

Figure 1.1 provides a visual representation of the research structure and can be used as a reading guide.

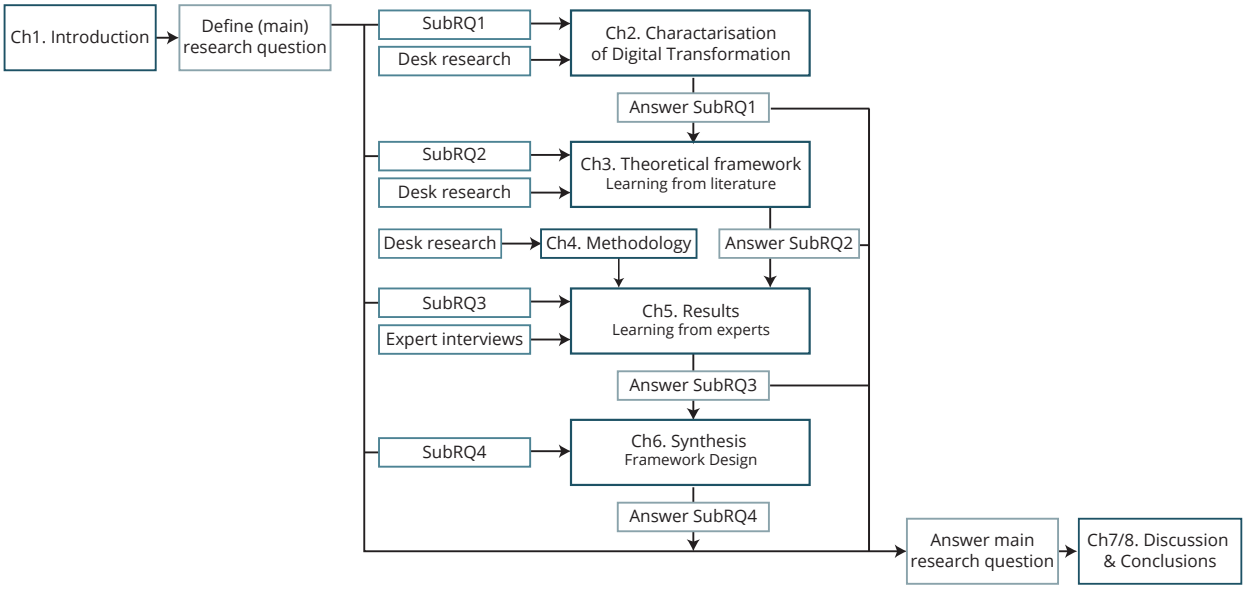

Figure 1.1: Research Structure

Chapter 2

Characterisation of Digital Transformation

This research aims to design an assessment framework to help national societies go trough a DT. This chapter gives necessary context to understand the concept of DT, both in general and within the humanitarian sector. To do this, it provides answers to the first sub question:

1. What enables Digital Transformation in the humanitarian sector?
(a) What is a definition of Digital Transformation in the humanitarian sector?
(b) What are the benefits of Digital Transformation for the humanitarian sector?
(c) What are barriers to Digital Transformation in the humanitarian sector?

To answer research question 1(a), section 2.1 formulates a definition of DT for the humanitarian sector, ensuring that there is a common understanding of the umbrella term DT. Question 1(b) is discussed in section 2.2 and 1(c) in section 2.3. Finally,in section 2.4 a conclusion is provided

2.1 Defining Digital Transformation within the Red Cross

In literature, DT is a broadly defined term, formulated in a variety of ways. To make this term unambiguous, it is important to adopt one single definition and be consistent in applying that definition.

To arrive at a definition that is well-rooted in literature, 35 definitions are extracted from literature, as can be observed in appendix A. Table 2.1 categorises these 35 definitions in four different categories.

By combining the two categories with the most occurrences: *Digital technologies enable business (efficiency) improvements* and *Disruptive or incremental organisational shift to pursue value creation* the following definition is constructed and adopted in this thesis[1]: *"Digital Transformation (DT) is is a disruptive or incremental organisational shift that allows organisations to pursue (new) value creation and enables improvement of (the efficiency of) operations"*.

When this is translated using nomenclature of the humanitarian sector, DT is defined as: *"Digital Transformation (DT) is a disruptive or incremental organisational shift that allows the Red Cross Movement to improve their humanitarian work, pursue new ways of humanitarian aid and enables increased speed, quality and effectiveness of operations"*

[1]The other two categories are included implicitly

Table 2.1: Categorisation of Definitions, *n=35*

Definition	n	Sources
Digital technologies enable business (efficiency) improvements	16	Fitzgerald et al. (2013), Hanelt et al. (2015), Back and Berghaus (2016), Bekkhus (2016), Christoffels (2019), Kane et al. (2016), Clohessy et al. (2017), Heilig et al. (2017), Karagiannaki et al. (2017), Legner et al. (2017), Li et al. (2018), Schwarzmüller et al. (2018), Aguiar et al. (2019), Hess et al. (2016), Korachi and Bounabat (2019), Vial (2019)
Integration of digital technologies in operation	2	Matt et al. (2015), Sanchez (2017)
Digital technologies enable business improvements and provide new opportunities	6	Demirkan et al. (2016), Haffke et al. (2016), Horlacher et al. (2016), Remane et al. (2017), Colli et al. (2019)
Disruptive or incremental organisational shift to pursue (new) value creation	11	Henriette et al. (2016), Nwankpa and Roumani (2016), Andriole (2017), Hartl and Hess (2017), Morakanyane et al. (2017), Paavola et al. (2017), Grivas et al. (2018), Christoffels (2019), Mergel et al. (2019), Voß and Pawlowski (2019), Kidschun et al. (2020)

2.2 Benefits of Digital Transformation

DT provides organisations with a lot of benefits. This section identifies general benefits of DT in section 2.2.1 and the critically evaluates if these benefits also apply to the humanitarian sector in section 2.2.2.

2.2.1 General Benefits

There is great consensus among authors that DT can help companies to become more efficient and cost effective (Ma & Karri, 2005; Berman, 2012; Boyd & Crawford, 2012; Downes & Nunes, 2013; Matt et al., 2015; Westerman & Bonnet, 2015; World Bank Group, 2016; Morakanyane et al., 2017; Yucel, 2018; Mosallaeipour et al., 2018; Galindo-Martin et al., 2019). While endorsing this notion, Yucel (2018) shows that this is not always the case; the added complexity can also make processes more expensive.

Digital communication technologies might also promote knowledge exchange within and between organisations (Mosallaeipour et al., 2018). This allows companies to integrate their processes on multiple levels, stimulating departments to learn from each other and foster innovation (Westerman & Bonnet, 2015). Other components of DT can also encourage innovation, for example: rapid prototyping and hackatons (Downes & Nunes, 2013) and increased agility (Andal-Ancion et al., 2003). These innovations can lead to an increased competitive advantage (Ma & Karri, 2005), more profit (Schwertner, 2017) and to the creation of new business models (Downes & Nunes, 2013).

Downes and Nunes (2013) conclude that this can lead to a larger impact: digital tools come with the potential to reach a greater audience, quicker. Company executives also seem to understand: they mention creation of new ideas, more reliable results, and faster time to deliver as advantages (Harvard Business Review Analytic Services, 2014). Galindo-Martin et al. (2019) lists the possibility of entering new markets and increasing market share as benefits of DT.

Data driven decision making is also an advantage for companies (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Berman, 2012; Matt et al., 2015; World Bank Group, 2016; Schwertner, 2017; Yucel, 2018). Collecting and analysing data can help decision makers to make better informed choices (Matt et al., 2015) and to reduce bias and "gut feeling" decision-making (Brynjolfsson, Hitt, & Kim, 2011; Kim, 2017). Although Kim (2017) also warns for the negative effects: "algorithms built on inaccurate, biased, or unrepresentative data can produce outcomes biased along lines of race, sex, or other protected characteristics". Using more data can also help solving more complex problems (World Bank Group, 2016).

Finally, Yucel (2018) argues that DT is essential to stay relevant in the digital economy. Employees demand better tools (Raia, 2017) and customers demand better tools, services, and public goods (Boyd & Crawford, 2012) and enhanced customer experiences (Westerman & Bonnet, 2015; Berman, 2012), both from the private sector and governmental agencies (Galindo-Martin et al., 2019).

2.2.2 Benefits for the Humanitarian Sector

The general benefits above are not sector specific, but are almost exclusively focused on the private sector. In this section the above factors are applied to the humanitarian sector. In addition, the results from a workshop on DT for the NLRC with main NLRC-stakeholders (n=12) are taken into consideration.

One of the key ambitions of the NLRC is to help the ones that need that the most (Nederlandse Rode Kruis, 2019). In crisis situations and unfamiliar places, it is not always clear who needs aid the most. Data and digital tools can help to identify the ones in need of aid and where they are (Scholz, Knight, Eckle, Marx, & Zipf, 2018). Digital tools also make it possible to offer direct aid, even when a place cannot be reached physically (Donini & Maxwell, 2013).

Since the Red Cross is heavily dependent on volunteers (Hustinx & Handy, 2009), recruitment is an important factor. Millennials are a large target group, because this generation has a strong inclination towards 'having impact', making them very suitable for volunteering (Myers & Sadaghiani, 2010). By becoming more digitally active there is a large potential for recruiting new tech-savvy volunteers (Bannon, Ford, & Meltzer, 2011) that can assist in the DT.

DT also stimulates innovation in the humanitarian sector (Betts & Bloom, 2014) and it provides the humanitarian sector with new ways of giving aid[2]: the use of blockchain for identification purposes (Stevens, 2018), for example. This can potentially help the humanitarian sector to better meet the demand of beneficiaries[3] (Swithern, 2019). Increased agility can help the humanitarian sector to respond to crisis situations, as the 2020 COVID-19 crisis shows (Janssen & van der Voort, 2020). It shows that agile organisations are quicker to respond, if they are also sufficiently adaptive.

2.3 Barriers to Digital Transformation Challenges

DT is highly complex and is associated with multiple barriers (Yucel, 2018). This section identifies these barriers and shows how these barriers play a role in the humanitarian sector.

2.3.1 General Barriers for DT

In literature many barriers are identified, which can be summarised as follows: monetary & technical resources, privacy regulations, ethical considerations, security measures, organisational structure and the lack of a coherent strategy.

In relation to resource barriers, DT needs both short- and long-term investments in people, technology and implementation processes (Nahrkhalaji, Shafiee, Shafiee, & Hvam, 2019). These are costly, therefore a lack of the monetary resources necessary is a big barrier (Heavin & Power, 2018; Yucel, 2018; Roe, 2019). Not having enough money available can lead to another barrier: a lack of technical resources (Heavin & Power, 2018; Nahrkhalaji et al., 2019; Wolf, Semm, & Erfurth, 2018), although this is not always due to a lack of money, a lack of expertise can also be the reason (Hoch, 2017; Nahrkhalaji et al., 2019).

Data collection, analysis and accessibility is a key part of DT (Tiersky, 2017; Bughin, Catlin, Hirt, & Willmott, 2018). There are three barriers that consider data: privacy regulations, ethical considerations and security measures. To tailor a product or service best to the needs of the individual, it is important to know what they want and expect. The more data is collected, the better the estimation of someone's wishes can be (Berman, 2012), but the more privacy someone is giving up (Heavin & Power, 2018). In some countries this is highly regulated, e.g. GDPR in the EU-memberstates (European Union, 2020). These regulations are

[2] As opposed to new business models in the private sector
[3] As opposed to enhanced customer experience in the private sector

an external barrier. Even when such external barriers are not present, ethical considerations can be a internal barrier to data collection (Richards & King, 2014). Furthermore, there always is a trade-off between accessibility and sharing of data and security. One of the main goals of DT is to make access to useful data easier, but security infrastructure should be robust enough to keep unwanted people out (Heavin & Power, 2018; Roe, 2019; Boneva, 2018; Richards & King, 2014). Complex security measures, complicate data access or sharing.

The organisational structure of a company can also be a barrier (Hoch, 2017; Tiersky, 2017; Wolf et al., 2018; Nahrkhalaji et al., 2019; Roe, 2019). Employees of companies may lack the skills needed for a successful DT (Bughin et al., 2018), but may also be naturally change adverse (Hoch, 2017; Tiersky, 2017). A flat organisation is beneficial for DT (Matt et al., 2015; Aguiar et al., 2019), because this increases agility and helps overcoming change adversity. Increasing agility in large organisations may be a challenge in itself, because this requires significant changes to operational practices (Hobbs & Petit, 2017) and culture (Roe, 2019). The lack of a strategy specific for the DT process is considered a barrier by many authors (Matt et al., 2015; Hoch, 2017; Roe, 2019; Schwertner, 2017; Heavin & Power, 2018). This is because DT is a long-term process (Roe, 2019) and it touches many aspects of an organisation (Matt et al., 2015; Hoch, 2017). Therefore, a holistic approach is needed (Heavin & Power, 2018).

2.3.2 Barriers for the Humanitarian sector

Within the context of the RC four major barriers have to be taken into account: resource constraints, ethical considerations, the complex organisation and conflict/disaster in the assessment region.

The first barrier is resource constraints. As the humanitarian sector is donor-based, a lot of the work at humanitarian agencies is project based. This is because donors give money with a specific goal in mind (Nederlandse Rode Kruis, 2019). It is therefore a challenge to find the money for an overhead project like DT. Another resource constraint is local infrastructure: when helping a certain national society through a DT, you are constrained by local infrastructure. These include both internal barriers, such as data literacy of the local workforce and external barriers, like access to internet (Van Den Homberg, Visser, & Van Der Veen, 2017).

The ethical considerations as discussed above also apply to the humanitarian sector (Read, Taithe, & Mac Ginty, 2016; K. Crawford et al., 2013). The humanitarian sector often deals with vulnerable people that often cannot assess the risk of data usage (World Bank Group, 2016), it is a responsibility of the humanitarian sector to handle this very carefully.

The Red Cross Movement has a complex organisational structure (Hustinx & Handy, 2009). A Red Cross association is not an NGO, nor is it a government agency. A Red Cross national society is its own sovereign entity, but has a legally defined 'auxiliary role' for the national government. A national society is legally obliged to provide certain assistance to the home country, which is different in each country (Vermeulen, 2014). Furthermore, each national society is a member of a federation: the International Federation of the Red Cross and Red Crescend (IFRC). Since the IFRC is made up of societies and not businesses, there is no formal hierarchy, complicating global decision making (IFRC, 2020e). Furthermore, the actor network surrounding national societies is nontransparent and scattered (Van Den Homberg et al., 2017; Haak, 2017; van den Homberg, Monné, & Spruit, 2018).

Finally, in crisis situations DT is often not a priority of Red Cross national society leadership: giving (first) aid is, and should always be, a priority within the Red Cross (Rode Kruis, 2018). This can complicate DT implementation in, at least, two ways: (1) people must spend time on a crisis situation and (2) there might be unsafe working conditions for people aiding in the process.

2.4 Digital Transformation Characteristics Conclusions

It was shown that a lot of different definitions for DT are used in literature. To create a common language for the remainder of this thesis, a definition for the humanitarian sector is synthesised making use of 36 different sources of literature. Within the humanitarian sector, DT is defined as: *"DT is a disruptive or incre-*

mental organisational shift that allows RC to improve their humanitarian work, pursue new ways of humanitarian aid and enables increased speed, quality and effectiveness of operations"

As explained in section 2.2, there is a multitude of benefits to a DT: there is an opportunity to become more cost effective, digital tools might promote knowledge exchange, DT can lead to more impact, data-driven decision making can help executives to make better informed choices and DT can enable an organisation to match their services with the need of people.

Additional benefits specific for the humanitarian sector include: data and digital tool can help identify the most vulnerable people that need the most help, DT can help attract a new type of professional volunteer and DT can stimulate innovation in the humanitarian sector.

Section 2.3 showed that there are many barriers that hinder easy implementation of a DT strategy. In general, a main barrier is the lack of resources, both monetary and technical. Another barrier considers a key element of DT, data collection, analysis and accessibility is barred by privacy regulation, ethical considerations and security measures. Furthermore, a rigid, hierarchical organisation with change adverse people is not likely to complete a successful DT. Finally, a lack of a strategy is a barrier: because DT considers the whole organisation a long-term, holistic approach is needed.

The barriers also apply to the humanitarian sector. It is very dependent on donors for its resources, which supply money per project and not for 'overhead'-projects like DT. Because the humanitarian sector deals with very vulnerable people, ethical considerations concerning DT are increasingly important. Furthermore, because the Red Cross is a complex organisation depending on a lot of actors, centralised strategy formulation is difficult. Finally, because the Red Cross operates in crisis situations, often DT is not a first priority for red cross leadership.

Given the benefits of DT, it is clear why the humanitarian sector should make an effort to take first steps towards this transformation, as is also the ambition of the IFRC (IFRC, 2019). But the barriers show that helping the humanitarian sector go through a DT is not easy.

For a national society that want to go through a DT, a strategy is needed that stipulates how the barriers can be overcome to enjoy the benefits. In the next chapter a literature review is presented identifying what methodology can help for strategy formulation.

Chapter 3
Theoretical Framework

Chapter 2 explains and contextualises DT for the humanitarian sector. This chapter addresses the second sub-question:

> **2. What type of framework methodology is most appropriate to stimulate Digital Transformation implementation in the humanitarian sector?**
> (a) What are requirements for a Digital Transformation methodology the humanitarian sector?
> (b) What framework methodology best suits these requirements?

section 3.1 provides background information on strategy formulation, section 3.2 formulates framework requirements to answer sub-question (a). Sub-question (b) is addressed in sections 3.3 and 3.4. It uses literature identify different DT assessment frameworks and selects the framework that best matches the requirements formulated under (a).

3.1 Strategy Formulation Background

Strategy is defined by the *Oxford Dictionary* (2020) as "a plan of action designed to achieve a long-term or overall aim". Strategy is necessary as there is generally limited resources available to accomplish certain objectives (Freedman, 2013), which is indeed a major barrier for the humanitarian sector[1]. Strategy typically entails establishing targets, determining steps to accomplish the targets and deploying resources to execute the steps (Freedman, 2013; Simeone, 2020). According to Rumelt (2011) a good strategy comprises of three components: a *diagnosis* to describe the essence of the challenge, a *guiding policy* that is the combination of an ambition and an indication of how this can be achieved and a set of coherent *actions* to achieve the ambition. Exploring this in detail is outside the scope, but if translated to the topic of this thesis, the following components can be identified:

1. Diagnosis: What is the status quo of DT for a given national society?
2. Guiding policy: What is the ambition and how can DT help achieving this?
3. Actions: What set of coherent actions must a national society take to make the guiding policy a reality.

As explained in the problem statement of section 1.1, the focus of this thesis is on the diagnosis part: assessing the status quo. But it is important that this diagnosis can be used as input to create a guiding policy and a set of actions.

3.2 Assessment Framework Requirements

The goal of this section is to present a concise list of requirements for the to be designed framework. First a visual representation of the entire DT process is given to illustrate what part hereof is included in the scope

[1] As explained in section 2.3.2

of this thesis. Then the goal of DT is formulated by the IFRC and alleged benefits for national societies are commented on. These benefits are translated into goals for the DT-assessment. Both the goal of DT as the goal of the assessment are subsequently interpreted as requirements for the assessment framework in section 3.2.4.

3.2.1 Digital Transformation Process

The process that is currently adopted by National Societies is sketched in fig. 3.1 and further clarifies how the current digital transformation process within humanitarian context (ideally) looks like. The research in this thesis focuses on the assessment and its outcomes. As indicated by the shaded area, it should also help towards formulating a strategy.

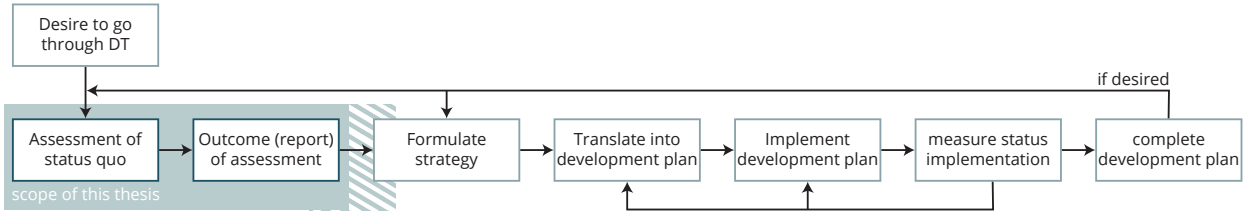

Figure 3.1: DT process, simplified

3.2.2 Goal of Digital Transformation

As explained, the IFRC has identified digital as one of seven transformations that should be guiding the new strategy 2030 of the Red Cross and Red Crescent Movement. In Strategy 2030 (Red Cross Movement, 2019), the IFRC wants to use DT to:

- Harness collective intelligence of RC-network
- Democratise access to information
- Achieve greater efficiency and impact
- Focus on innovative leaders and partners
- Promoting cultures of experimentation and learning
- Use emerging technologies
- Social change and impact
- New functionalities and services
- Enhanced performance

After observing these goals and benefits, it can not only be concluded that these are very ambitious, but also that they are not solely based on increased data analysis practices. It also involves strategic cultural, leadership, learning and social choices. It is therefore that DT should not exclusively focus on *data readiness*.

According to internal research of the RC, the benefits for the RCNS to go through a DT are numerous (van der Veen, 2020), but can be summarised in the following two:

- Increased impact: improve disaster response and emergency services, create new and improve other services
- Increase efficiency: increase the quality and cost-effectiveness of the implementation of humanitarian projects

3.2.3 Goal of Digital Transformation Assessment

Previous section establishes the goal of going through a DT. This section uses that information to define goals for the DT-assessment itself. An important first step is to define the user, since the contents of the framework are dependent on assessor that is going to use the framework. Both the one that performs the actual assessment and the one that benefits from the outcomes. These are two distinct persona, because the first is about the usability of the framework and the second is about ease of implementation of

outcomes. In this phase of the research, focus is on the latter. This *end-user* is the one that is tasked with formulation and implementation of strategy and general (information) management.

3.2.3.1 Why Management as the End User

While the Red Cross and Red Crescent Movement has an overarching goal, RCNS are very diverse in how they try to accomplish these goals. For example: the Netherlands Red Cross has an auxiliary role[2], while the Nepalese Red Cross also operates primary aid services like hospitals and the ambulance service.

Because the operation varies greatly over the different Red Cross National Societies a blanket approach is not possible, and each outcome is different. But since the ambition of the IFRC (section 3.2.2) also puts emphasis on sharing knowledge and promoting learning, it is also important that outcomes can be compared. Therefore a high level approach is chosen.

3.2.3.2 Main Goal

To sucessfully translate the ambition into concrete requirements, first the main goal needs to be established. As explained in previous section this needs to be high-level and applicable to every RCNS. Therefore, the main goal of the DT Assessment is: *Enabling (empowering) a Red Cross National Society to formulate and implement (road map) a DT strategy by providing relevant information.*

3.2.4 Requirements for Digital Transformation Assessment Framework

In this section, information of sections 3.2.1 to 3.2.3 is combined with output from a session together with the client (510). The criteria are categorised using the MoSCoW method (Clegg & Barker, 1994): must haves, should haves, could haves and will not haves. Below, the must haves are listed, other requirements can be found in appendix B.

The must haves for the to be designed assessment framework are:

- Multi dimensional representation of DT
- Allow strategy formulation
- Promote learning: show what is possible by going through a DT.
- Stimulate knowledge exchange of organisation within and outside of the humanitarian sector
- Find out and show where the value is/can be (does not have to be internal, can also be in network).
- Define and show barriers that DT can also erect.

3.3 Overview of Digital Transformation Assessment frameworks

This section shows a structured literature review to identify DT assessment frameworks and critically evaluates them.

3.3.1 Literature Review Approach

The approach of the literature review is shown in fig. 3.2.

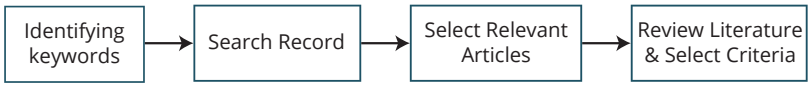

Figure 3.2: Literature Review Approach

Searching for the right literature is both art and science: it is a creative process in which you have to come up and formulate the right keywords and carefully construct the right search statements. Then it is a process

[2]They help with: Emergency Aid in case of disaster, Civic Aid (Ready2Help platform), Event Aid and First Aid

of refinement: changing the search (keywords) along the way to better suit the scope of the research. This section attempts to describe these activities.

Doing a literature review means that a methodical search is being used to find relevant literature published on a topic. To develop a search strategy, the following parts are considered; type and sources, keywords, search statements and recordings.

3.3.1.1 Type and Sources

In doing a literature review, there are several types of information available, but only a few types will be needed based on the topic. The focus of this review is on published, peer-reviewed papers, but to gain a better understanding of the topic, also secondary sources have been used: discussion papers, conference papers, web pages and news papers.

In the first phase of gaining a basic understanding of the research field, Google (Scholar) is used to obtain adequate first glance results. From this search, resulting in millions of hits, only several introductory papers and web pages, that were not chosen systematically, were used. This 'phase' is officially not part of this literature review, but was conducted to gain a basic understanding. This was done before this literature review started, so therefore, no official recordings can be presented.

After this basic understanding was gained, the more traditional sources of literature were used to search for high quality research papers. The main sources used are: Web of Science (search in "Topic"), Scopus (search in "Article title, abstract and keywords") and Google Scholar.

3.3.1.2 Identifying Keywords

The scope is *Performance management assessment for Digital Transformation in the humanitarian sector*. To develop keywords, it was necessary to search for terms that are logical and relevant to this research. In accordance with the scope of this review, keywords have been defined for four parts: "performance management", "digital", "transformation" and "humanitarian sector". These keywords are listed in table 3.1. As can be observed, keywords are selected words and synonyms on the three identified topics of interest. From these keywords, search statements can be constructed making use of the conventions used by major databases.

Table 3.1: Initial keyword identification

Humanitarian Sector	Performance Management	Digital	Transformation
Humanitarian Sector	Assessment framework	Digital	Transformation
Humanitarian Assistance	Performance appraisal	Data	Renewal
Humanitarian Aid	Assessment	ICT	Maturity
	Measure	digitalisation	Change

3.3.2 Selected papers

Table 3.2 gives an overview of the 12 papers that have been selected for review.

From selected papers, two thirds (8/12) come from two fields of expertise: ICT and (business) management. The other four stem from different backgrounds.

3.3.3 Literature Review

The objective of this literature review is to first provide background information by structuring existing literature on performance/assessment management and second, to identify existing frameworks and select relevant assessment criteria.

Many of the selected papers stand united in their belief that literature on performance management for DT is fragmented and inconsistent (Voß & Pawlowski, 2019; Mergel et al., 2019; Vial, 2019; Korachi & Bounabat,

Table 3.2: Selected Papers

Author(s)	Title	Author background
Hess et al. (2016)	Options for Formulating a Digital Transformation Strategy	Management
Matt et al. (2015)	Digital Transformation Strategies	ICT
Henriette et al. (2016)	Digital Transformation Challenges	Management
Mergel et al. (2019)	Defining Digital Transformation	Public Administration
Kidschun et al. (2020)	Development of an organizational structure model as a basis for the assessment of the digital transformation of organizations	Management
Voß and Pawlowski (2019)	Digital Readiness Frameworks - Current State of the Art and Research Opportunities	ICT
Aguiar et al. (2019)	Digital transformation capability maturity model framework	Innovation
Korachi and Bounabat (2019)	Integrated methodological framework for digital transformation strategy building (IMFDS)	ICT
Grivas et al. (2018)	The Panoramic Lens Model	Management
Colli et al. (2019)	A maturity assessment approach for conceiving context-specific roadmaps in the Industry 4.0 era	Production & automation
Sanchez (2017)	Framework to assess organizational readiness for digital transformation	System Dynamics
Vial (2019)	Understanding digital transformation: A review and a research agenda	ICT

2019; Henriette et al., 2016). But also that it is a domain of increasing interest (Matt et al., 2015; Hess et al., 2016; Sanchez, 2017; Aguiar et al., 2019; Vial, 2019). Performance management can be approached from multiple angles. The selected papers are divided in three: ICT, Business Management and other. Below, these categories are discussed.

3.3.3.1 DT From an ICT Perspective

Four papers are written by researchers with an ICT background: Matt et al. (2015); Korachi and Bounabat (2019); Vial (2019); Voß and Pawlowski (2019). This is to be expected since ICT and digital are highly interwoven. Still, the most authors claim that digital transformation is more than an ICT transformation (Xia & Gong, 2014) and was most aptly formulated by Matt et al. (2015): "IT strategies usually focus on the management of the IT infrastructure within a firm, with rather limited impact on driving innovations in business development". This is in line with what was concluded in section 2.1: the definition of DT encompasses more than only ICT: "DT is is a disruptive or incremental organisational shift that allows organisations to pursue (new) value creation and enables improvement of (the efficiency of) operations".

Vial (2019) conducted an extensive literature review on DT using 282 works spanning years 2011-2017 to explain state of the art of digital transformation. Voß and Pawlowski (2019) take a similar approach, but focus more on assessment frameworks for DT. After reviewing a total of 9 assessment frameworks, they identify an important knowledge gap: there seems to be a lack of empirical proof of the effect of different factors influencing the digital transformation change process (Voß & Pawlowski, 2019).

While Vial; Voß and Pawlowski summarise different frameworks and list criteria for assessment, the other

authors in the ICT domain aimed to create new frameworks. (Korachi & Bounabat, 2019) do a literature review to arrive at a framework based on 34 different criteria in 10 different domains. As a starting point, they use the COBIT, ITIL, CMMi frameworks (Korachi & Bounabat, 2019). Frome these, and other frameworks, they select common processes and criteria to synthesise a new framework. The original frameworks are (primarily) intended for the ICT-sector, which means that they do not cover the entirety of DT. In combining them, Korachi and Bounabat have created a broadly applicable framework for the ICT-sector, but since it is based only on ICT, it has some of the same limitations and is therefore not able to cover the entirety of DT.

Matt et al. (2015) try to overcome these limitations by taking a higher level approach. This means their framework is more general. This results in a general framework that is generally applicable, but also less specific: "Independent of the industry or firm, digital transformation strategies have certain elements in common. These elements can be ascribed to four essential dimensions: use of technologies, changes in value creation, structural changes, and financial aspects" (Matt et al., 2015).

Both Korachi and Bounabat (2019) and Matt et al. (2015) only use a literature review as a basis to synthesise their framework. This means that their framework is not practically validated; precisely one of the drawbacks listed by Voß and Pawlowski (2019).

3.3.3.2 DT From a Management Perspective

Authors (Henriette et al., 2016; Grivas et al., 2018; Hess et al., 2016; Kidschun et al., 2020) that approach DT from a management point of view emphasise that digital transformation asks for new business models (Henriette et al., 2016; Grivas et al., 2018; Hess et al., 2016), but also that it "begins with an overarching strategic and cultural change that is carefully tailored to simultaneously address the organisation as a whole" (Kidschun et al., 2020). Unlike the authors discussed above, this approach is broader than just ICT and can be divided in three main parts: a social phenomenon, a cultural evolution and new business models.

It is argued by Grivas et al. (2018) that one of the drawbacks of current models of DT assessment is that external impact is often forgotten. They try to extend these models by including social, economic and environmental factors. That way, influences from and on the external ecosystem (industrial, competition, society, etc.) are also included.

Henriette et al. (2016) and Hess et al. (2016) agree on the fact that DT starts with formulating a clear strategy, but while Henriette et al. only proves that DT “changes the business model of the company”, Hess et al. takes it one step further: they present “a set of strategic questions that managers responsible for digital transformation have to consider. Unfortunately, there are no universal, definitive answers to these questions.”

The most recent article identified in this literature review also explains a new holistic model that “enables the analysis and assessment of value creating organizations by defining nine organizational elements that are crucial for the digital transformation” (Kidschun et al., 2020). It is important to note that the authors claim that this model is applicable to any organisational setting and would therefore also be interesting to test in the humanitarian sector. They conclude their article by stating that: "In a next step, an assessment model that supports organisations in determining the status quo and targeted state on their specific path of digital transformation is to be developed". This is precisely what this thesis aims to accomplish.

3.3.3.3 DT From a Broad Perspective

To present a broad overview of literature, not only papers from an ICT or management point of view have been selected. In this final section, relevant information will be extracted from the remaining articles.

The papers discussed above are mostly focused on the private sector. Therefore, applicability in the humanitarian sector is not always ensured. Since Mergel et al. (2019) explicitly take the public sector as topic of interest, more similarities with the humanitarian sector can be identified. The first important comment of Mergel et al. is that there is no systemic research into how public administration itself is actually experiencing digital change via its own daily activities, which is something that also became clear during the literature search of section 3.3.1. To create a better understanding, they've conducted interviews with public sector

experts. From these interviews they distil reasons for DT, processes to achieve DT and expected outcomes of DT and present them in a framework. A shortcoming of this approach is that it is not prescriptive, only reflective. This means that it is limited in its practical applicability. Also, the experts they've interviewed are seldom able to explain how a fully transformed digital organisation looks like. This shows that there is no end to DT, making it a wicked problem that further complicates the process. They, therefore, conclude that DT is an ongoing procedure that requires regular changes to internal processes (Mergel et al., 2019).

The other authors (Sanchez, 2017; Aguiar et al., 2019; Colli et al., 2019), note the necessity of a more individual approach. This underwrites the presumption that off-the-shelf frameworks cannot freely be applied to the humanitarian sector. Sanchez (2017) claims that in order to understand how an organization can create value from technology it is important to understand the *local* environment. Aguiar et al. (2019) agrees and adds that to achieve validity, a framework must be evaluated in the context of its operation (naturalistic evaluation).

3.3.4 Literature Conclusion

An extensive literature research was conducted to identify the state of art of scientific literature on digital transformation assessments. This chapter discusses the key takeaways of 12 selected papers. From the review a number of conclusions can be drawn:

- DT on itself is a relatively young academic research field.
- literature on performance management for DT is fragmented and inconsistent
- DT Performance management can be approached from multiple angles, of which ICT and Management are predominant.
- DT involves profound changes in organisations and leads to changes in value creation
- There is no literature available for *Assessment frameworks for DT in the humanitarian sector*.
- Multiple assessment frameworks are available, but no off-the-shelf framework can be applied.

From these conclusions, it is rationalized that there is relevance in integrating existing literature to arrive at an DT-assessment framework, but this is insufficient for direct application in the humanitarian sector. It is therefore concluded that the humanitarian sector could benefit from a structured and validated approach on DT-assessment, for which additional research is needed to fill this knowledge gap.

3.4 Selection of Framework Type

Many different performance management models exist. From these, a model must be selected that best accomplishes the goal as formulated in section 3.2.3. Frameworks from the selected papers of section 3.3 are collected. Not every paper of previous sections contains an explicit model, so eight frameworks are up for debate. Paragraphs below discuss form factor and the main use of selected frameworks.

'*The transformation model*' is a model that is proposed by Deloitte Switzerland (2017). It is a checklist consisting of yes or no questions. The main aim of this checklist is to check if a company is ready for a transformation. It can be considered a pre-flight questionnaire.

Hess et al. (2016) propose the '*Key Decisions for a Digital Transformation Strategy*' framework. The aim is similar to the previous framework, it is to test if an organisation is equipped for a transition. This test consists of 11 qualitative questions that an assessor uses to judge an organisation. Furthermore, these questions can also be used for self-assessment.

Yet another framework is proposed by Matt et al. (2015): the '*Digital transformation framework*'. This framework gives a high level overview of DT. It is useful to identify interplay between different dimensions (technology, structural changes, financial aspects, value creation), but is not suitable for an actual assessment.

Both Colli et al. (2019) and Aguiar et al. (2019) mention the use of a maturity framework. Maturity models are "... commonly applied to assess the as-is situation, to derive and prioritise improvement measures, and to control progress" (Pöppelbuß & Röglinger, 2011). In literature, two approaches on maturity frameworks are mentioned: top-down maturity model (Becker et al., 2009) and bottom-up model (Lahrmann et al., 2011). The top-down approach first defines maturity levels on multiple themes, based on assumptions on how

maturity evolves criteria for different levels are established. The bottom-up approach first defines general assessment criteria which are then grouped into maturity levels.

The '*Integrated Methodological Framework for Digital Transformation Strategy Building*' of Korachi and Bounabat (2019) has two main components: 1. Digital strategy building (9 steps), 2. digital strategy evaluation (4 steps). It is a complex combination of multiple other frameworks. It gives direction on how to formulate strategy and create a tailored monitoring system. The focus of this framework is on strategy building.

Grivas et al. (2018) propose the '*Panoramic Lens Model*'. This intricate framework is loosely based on dynamic business model canvas. It can be used to analyse and evaluate trends of an ecosystem as a whole.

The final framework that is discussed is the '*Organisational readiness framework*' of Sanchez (2017). This is a system dynamics model that uses data from a questionnaire as input. It aims at explaining resources, capabilities and management choices necessary to respond to a new environment.

3.4.1 Model Tradeoff

In this section a trade-off is performed of previously discussed frameworks. It scores the frameworks on the requirements defined in section 3.2.4. Furthermore, the frameworks are also rated on use-ability for an assessor. To do this applicability, ease of use and adaptability are scored. All criteria are weighted equally and the information of previous sections is used to assign scores.

Table 3.3: Model Tradeoff

	Performance						Use			
Framework / model	Multi-dimensional representation of DT	Allow for strategy formulation	Promote learning	Stimulate knowledge exchange	Identify value	Show DT-barriers	Applicability	Ease of use	Adaptability	**sum**
The transformation model (Deloitte Switzerland, 2017)	1	0	-1	0	-1	-1	1	2	1	2
Key Decisions for a Digital Transformation Strategy (Hess et al., 2016)	1	0	-1	-1	1	2	2	2	0	6
Digital transformation framework (Matt et al., 2015)	2	2	-1	-1	0	-1	-2	0	-1	-2
Maturity model, top-down (Becker et al., 2009)	2	2	1	0	1	2	1	2	2	13
Maturity model, bottom-up (Lahrmann et al., 2011)	2	1	1	0	2	1	2	2	2	13
Integrated Methodological Framework for Digital Transformation Strategy Building (IMFDS) (Korachi & Bounabat, 2019)	2	2	1	0	2	2	0	0	0	9
Panoramic Lens Model (Grivas et al., 2018)	0	1	0	0	1	0	0	-1	0	1
Organisational readiness framework (Sanchez, 2017)	2	1	0	0	2	2	0	-1	0	6

From the sum of scores in the last column of table 3.3, it is clear that some variety of maturity model would best suit the needs. When only performance is considered, the framework of Korachi and Bounabat (2019) would be the framework of choice, but this framework is needlessly complex. Therefore, it has been decided that a maturity framework is best suited for making a DT assessment. It was explained that maturity

models can be created with two distinct approaches. The main challenge is to identify which approach would suit this research best and how to stimulate knowledge exchange while using a maturity model approach.

In selecting a maturity model, the existing systematic literature review on maturity models of Lacerda and von Wangenheim (2018) is used. This was selected because they compare different maturity models from the perspective of DT. Therefore it is a good foundation for the additional research of this thesis. Their literature review presents two relevant conclusions: most maturity models are build around the CMMi approach by (CMMI Product Team, 2006) and only a few maturity models are validated. These conclusions is supported by others (Von Wangenheim et al., 2010; Tarhan et al., 2016; Pulparambil & Baghdadi, 2019).

For the Red Cross, it is important to have a validated and standardised approach. The CMMi approach fulfils both these requirements: it is a standard approach that is often used for DT assessment and it is validated (CMMI Product Team, 2006). It is therefore decided to use a CMMi approach for the framework design in chapter 6.

Chapter 4

Methodology: Empirical Data Collection

There are many formal methods of collecting empirical data, they can be summarised in 5 genres (Creswell, 2018): "narrative research to explore the life of an individual, phenomenological research to understand the essence of an experience, grounded theory research to develop a theory grounded in data from the field, ethnographic research to describe and interpret the patters in a group and case study research to provide an in-depth understanding of a case."

The research method that is adopted for this thesis is the method of Miles et al. (2014), a well worked-out combination of ethnographic and grounded theory research. This method allows for flexibility such that sensible conclusions can be presented without the (sometimes) strict rules of either research method becoming a constraint (Thomas & James, 2006; Miles et al., 2014). Furthermore, qualitative data is collected with interviews. The method in this thesis consists of the following steps, as based on Miles et al. (2014):

1. Research design
   (a) Formulate research question
   (b) Define the case
2. Data collection
   (a) Method of data collection: expert interviews
   (b) Defining the sample
   (c) Collect data
3. Data Processing & analysis
   (a) First cycle coding
   (b) Second cycle coding: pattern codes
   (c) Analytic memoing
   (d) Assertions and propositions

Since the research questions and the case definition have already been given in chapter 1, this chapter focuses on explaining the data collection in section 4.1 and processing & analysis in section 4.2.

4.1 Data Collection

This section explains how data is collected and it defines the sample.

4.1.1 Method of Data Collection: Expert Interviews

To identify critical factor for DT in the humanitarian sector, expert interviews are held to collect empirical data to validate literature DT factors and identify factors specific for the humanitarian sector. To acquire this data, experts have to be consulted. Therefore, semi-structured expert interviews will be held to identify

relevant criteria for an assessment framework. If the right experts are identified, this is a valuable source of information and allows for rich data collection.

Since the theoretical framework of this research is largely established, the empirical part of this study is focused on identifying specific information. Since it is known what kind of information is missing, the interview can be structured. Still, to not exclude important information beforehand, the interviews are held in a semi-structured fashion.

Doing interviews can be subject to bias (Sekaran & Bougie, 2016). To compensate for this, an interview protocol is used to limit the room for interference (interviewer bias). The protocol used in this study can be found in table 4.1. It starts with a personal introduction, and aims to make sure the interviewer and interviewee share the same definition of DT. Then questions in the following categories are asked: why: what are reasons for DT, what: what objects can be digitally transformed, how: what processes are needed for DT, what are desired DT results and what is the vision for the future. The interview is concluded by summarising and thanking the interviewee.

Table 4.1: Interview Protocol

Section	**Goal(s)**	**Topic(s)**
Introduction	personal introduction interviewer	
	informed consent & start recording	
	research introduction	Motivation for research
General	Understand background interviewee	
	Assess expert status of interviewee	
Definition	Create common language	Agree on definition of DT
Why	Identify reasons for DT	Ambition / vision / leadership New value creation (business model) Willingness to change
What	Identify objects eligible for DT	Processes Services Products Relationships Technology Business Model
How	How do RCNS approach the DT process	Current and future initiatives
	Identify barrieres & enablers for DT processes	Discuss criteria identified in literature Identify new criteria
Results	Results of DT	Outputs of DT Outcomes of DT Impact of DT
Future	Inspiration	Future of DT in humanitarian sector
Closure	Summary Thank you	

While this research does not adhere to classical grounded theory to redesign an interview protocol for each individual interview (Corbin & Strauss, 1990), the proposed interview protocol is somewhat iterative. It is slightly changed as the experience of the researcher increased. Still, the interview topics do not significantly vary. This is a conscious choice; it allows for making conclusions based on on a coherent and complete data set.

4.1.2 Defining the sample: Selecting Interview Candidates

This research is looking for information that only a few experts can provide. According to Sekaran and Bougie (2016) in this case judgement sampling must be used: a sampling methodology in which the researcher chooses sampling units dependent on their own current expertise.

For this thesis is limited time available. Providing a large enough sample that adequately describes the entire population is therefore not possible, harming the generalisability and representativeness of the study. To counter this, sufficient and different types of respondents will be included in the research. The sample will be considered sufficient if saturation occurs: a point when new interviews do not yield additional information (Urquhart, 2012).

The type of respondents that will be interviewed are humanitarian field-experts, red cross data analysts, and coordinating managers form the IFRC. Besides this, interviews will be held with experts that have a lot of knowledge about either digital transformation or change processes. Possible interviewees will first be identified making use of the network of the NLRC and the personal network of the researcher. Additional interviewees will be contacted making use of the network of the first interviewees[1].

To make sure candidates are eligible to participate in this research, they are selected based on affinity with the topic, their expertise and experience, either in the humanitarian sector or digital transformation, ideally both. Focus is therefore on interviewing candidates that hold senior positions and are personally interested in the topic of DT.

4.1.2.1 Selected Interview Candidates

Candidates selected for interviews are presented in table 4.2. As can be observed, 7/11 respondents operate within the humanitarian sector. The other 4 respondents are experts on DT. But also respondents in the humanitarian sector category, their digital experience has been a factor of selection.

Table 4.2: Selected interview candidates

	Organisation	Position	Category	Experience
1	Ortec	Senior Consultant	DT expert	>8 yr
2	IFRC	Data Literacy lead	Humanitarian sector	>3 yr
3	Canadian RC	Vice President Information Services	Humanitarian sector	>3 yr
4	BuZa	Advisor digital development cooperation	Donor	>2 Yr
5	DNV GL	Principal Specialist, Data Services	DT expert	>8 yr
6	American RC	IM Officer	Humanitarian sector	>2 yr
7	Independent Consultant	DT expert	DT expert	>15 yr
8	Lebanon RC	Delegation of NLRC	Assessed National society	>14 yr
9	IFRC	Consultant DT	Humanitarian sector	>3 yr
10	Nepalese RC	Delegation of the Danish RC	Assessed National society	>3 yr
11	NLRC	Founder and head of data department	Humanitarian sector	>7 yr

Section 4.3.1 proves that saturation occurs when these 11 experts are interviewed.

[1] Snowball sampling

4.2 Interview Analysis Approach

To make sense of collected qualitative data, the first step is to perform data reduction. This is done by coding: assigning "symbolic meaning to the descriptive or inferential information" (Miles et al., 2014). There are multiple approaches to do this, but they can categorised in two categories: loose and tight approaches. Classical grounded theory falls within the first category, where codes are induced by the data given (Corbin & Strauss, 1990). The second category uses a predefined list of codes and and doesn't deviate from it.

Both methods have drawbacks: in the loose approach it is often unclear what to look for and in the second relevant information can be excluded or bounded out of context because of a predefined list. To overcome these drawbacks, a middle ground approach is used: a first list of codes is formulated based on the theoretical framework of chapter 3 and this code list is extended with codes identified in the data.

The coding procedure adopted for this thesis consists of two rounds (Saldaña as cited in Miles et al., 2014). In the first round of coding, the goal is to make sense of the raw data, by interpreting the information and assigning (new or existing) labels to blocks of text. In the second round the codes of the first round are categorised and to reduce clutter. The coding process is supported by ATLAS.ti, specialised software for qualitative data analysis.

4.3 Interview Analysis Process

In classical grounded theory, open coding is used to identify main issues and to create a framework for subsequent coding cycles. This approach is used when no literature is available and all information must be extracted from own findings. For this thesis, a slightly different approach was used for two reasons. First, chapter 3 already provides a theoretical framework, from which the main issues have been extracted. Second, from the problem statement and formulation of research question 3, gives sufficient indication of the information needed. From these two sources combined, an initial taxonomy of codes is compiled in fig. 4.1. This taxonomy provides the set of codes that is used for this first round of open coding. All relevant information from the transcribed interviews is categorised.

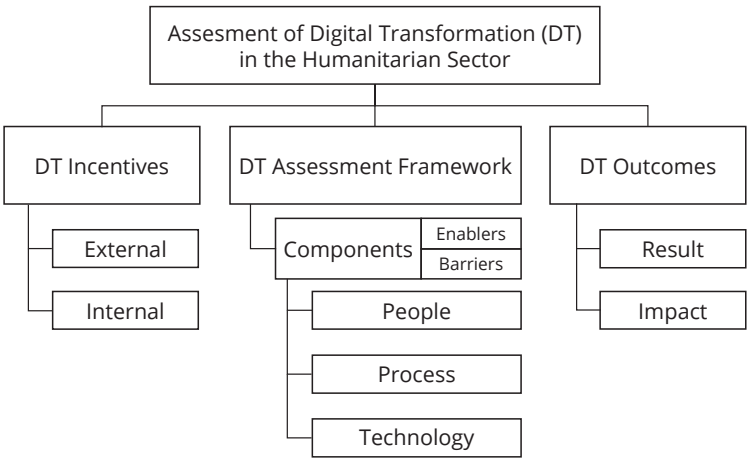

Figure 4.1: Coding Taxonomy

In a second round of coding, axial coding, sub-codes are added to the taxonomy. Because the focus of this thesis is on developing the assessment framework, the focus of this second round is expanding the DT Assessment Framework Components section and assigning sub-codes, which concludes the coding part of the analysis. After the coding is completed, ATLAS.ti is used to create consensus on quotations and discover patterns between codes.

4.3.1 Saturation

In using a qualitative coding with interviews as the main data source, it is important that sufficient data is collected to cover the topic. As explained in section 4.1.2, this saturation occurs when new interviews do not yield new information. In fig. 4.2 it is shown that saturation is ensured, because no significant amount of new codes is added after the 7th interview.

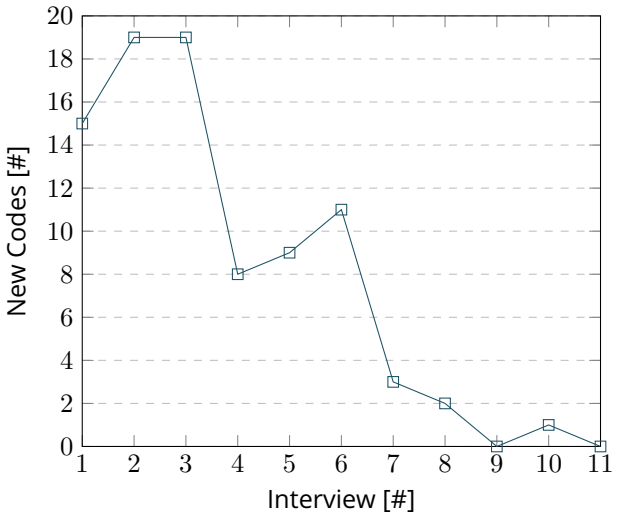

Figure 4.2: Saturation of interviews

Chapter 5

Results: Framework in Humanitarian Ecosystem

The aim of this chapter is to provide insight into how DT looks like within the humanitarian sector and addresses the third research question:

3. What factors play a role for Digital Transformation in the humanitarian sector?
(a) What are general Digital Transformation factors according to literature?
(b) What are humanitarian sector specific Digital Transformation factors according to experts?
(c) How do these factors influence influence the Digital Transformation process and what are the implications?

To arrive at a DT assessment framework, it is important to know what factors play a critical role. To be complete first literature is used to identify general DT factors in section 5.1, addressing sub-question (a). Section 5.2 answers sub-question (b) by validating literature factors and identifying factors unique to the humanitarian sector making use of expert interviews. Sub-question (c) is addressed in section 5.3.

5.1 Literature: General Digital Transformation Factors

The aim of this section is to extract factors that are relevant for DT-assessment from literature identified in chapter 3. Because authors mention a lot of different criteria, they have been categorised in people, process and technology. These categories are commonly regarded as the three main elements for improving organisations (Rocha, Correia, Costanzo, & Reis, 2015; Pope & Butler, 2012; Ghaffari, Gharaee, & Arabsorkhi, 2019; Kao, 2015).

The people category consists of all factors that are relevant for the employees of the company. It is about human resources, but also about leadership and culture (Ghaffari et al., 2019). The process category can be summarised as all activities going on within and outside an organisation that influence the output of the organisation (Rocha et al., 2015). The technology category deals with the the practical use of scientific discoveries (Cambridge Dictionary, 2020), within the scope of this research this means the application of ICT tools. Technology is supported by people and has the potential to make processes more efficient (Rocha et al., 2015) and create new value for an organisation (Hess et al., 2016). Appendix C presents an overview wich factors were mentioned by what authors.

5.1.1 People Factors from Literature

People factors for DT found in literature can be categorised in five categories: ambition & vision, culture, available human resources and actor network. Each of these factors is discussed below.

5.1.1.1 Ambition & Vision of Leadership

Ambition for DT is mentioned as a factor for DT by multiple authors (Matt et al., 2015; Sanchez, 2017; Grivas et al., 2018; Hess et al., 2016; Korachi & Bounabat, 2019; Vial, 2019; Kidschun et al., 2020). There is consensus among these authors that this is the first step towards DT as it serves as input for strategy formulation (Korachi & Bounabat, 2019). Furthermore, for leadership to be able to formulate an ambition it has to have an understanding of what DT entails (Sanchez, 2017).

DT impacts the whole organization and implementation may result in opposition from various parts of an organisation. A clear vision can help overcoming this opposition (Matt et al., 2015) and create a digital mindset within the company (Vial, 2019). A clear vision also helps to overcome other alignment issues, such as having conflicting or unclear goals and responsibilities (Grivas et al., 2018).

A sharp vision also guides in setting priorities. For a successful DT, organisations do not have to become digital leaders or technology producers themselves. It is most important, however, that an organisation can select and effectively use technology (Hess et al., 2016).

5.1.1.2 Culture

DT changes an organisation and its processes. It may destroy jobs by automating processes, but also create new jobs that require different or digital skills (Henriette et al., 2016). Having an innovative culture, with agile employees that can swiftly adjust to change and cope with uncertainty, helps in the transformation (Sanchez, 2017; Matt et al., 2015; Vial, 2019). Multiple authors mention the need for firms to promote a digital culture of risk-taking and experimenting (Vial, 2019; Fehér & Varga, 2017; Warner & Wäger, 2019), especially when DT is far from core business of the organisation (Hess et al., 2016).

5.1.1.3 Available Human Resources

DT "assist employees in performing their jobs more efficiently and to speed up the performance of existing tasks". (Korachi & Bounabat, 2019). But DT also requires that staff has to build upon their analytical abilities to overcome more complex problems (Vial, 2019). While current staff members may have an old-fashioned, less tech-savvy mindset (Colli et al., 2019) and may lack the skills (Sanchez, 2017) to deal with the coming changes, it may be challenging to find new highly skilled staff (Matt et al., 2015). This problem can be overcome by organising training courses or partner with other organisations (Hess et al., 2016).

5.1.1.4 External Actor Network

Schwarzmüller et al. (2018) show that trough DT value creation becomes increasingly decentralised. This asks for clear communication, collaboration and negotiation (Schwarzmüller et al., 2018) to build trust (Lendrum, 2011). When done correctly this can increase the competitive advantage for each partner (Kidschun et al., 2020). Furthermore, as explained above the actor network can be used to acquire new talent or skills (Hess et al., 2016).

5.1.2 Process Factors from Literature

Process factors for DT found in literature can be categorised in four categories: business model, financial resources, customer experience and ethics.

5.1.2.1 Business Model

DT considers the integration of IT in many organisational processes (Matt et al., 2015; Hess et al., 2016; Aguiar et al., 2019; Colli et al., 2019; Korachi & Bounabat, 2019). his can change the business model in two ways: it can change the *nature* of value created or change the way *how* value is created (Hess et al., 2016). This means that changed business models can offer new customer value propositions or transform operations (Berman, 2012). So business models can be either digitally adapted (Aguiar et al., 2019; Kidschun et al., 2020) or deviate significantly from previous core business (Sanchez, 2017; Colli et al., 2019; Hess et al., 2016). The larger the deviation from the core, the higher the uncertainties (Hess et al., 2016).

5.1.2.2 Available Financial Resources

DT can help companies to become cost effective (Ma & Karri, 2005; Berman, 2012; Boyd & Crawford, 2012; Downes & Nunes, 2013; Matt et al., 2015; Westerman & Bonnet, 2015; Matt et al., 2015; Vial, 2019), but the added complexity can also make processes more expensive (Yucel, 2018; Hess et al., 2016), furthermore DT may require high initial investments (Schwertner, 2017). Therefore financial resources can be both an enabler and a constraint (Matt et al., 2015).

Available financial resources can have a paradoxical effects on DT: If a company is under low financial pressure this "may reduce the perceived urgency to act, companies already under financial pressure may have no means to finance a DT" (Matt et al., 2015).

5.1.2.3 Customer Experience

The current digital society changes customer needs (Korachi & Bounabat, 2019) and expectations (Voß & Pawlowski, 2019). Customers are increasingly demanding higher quality standards (Henriette et al., 2016). They expect easy-to-use solutions (Voß & Pawlowski, 2019), more interaction (Sanchez, 2017; Matt et al., 2015) and more value for money (Grivas et al., 2018).

DT has the potential to accommodate to changing customer needs. Digital platforms can be used for greater customer interaction (Matt et al., 2015) and new forms of customer collaboration (Sanchez, 2017). There is a possibility use data analysis of customer behaviour to better tailor products and services (Aguiar et al., 2019; Kidschun et al., 2020). DT can be used to build a closed, strong digital ecosystem, forcing customers to stay within that ecosystem (Hess et al., 2016). And finally, changing the business model can make it possible to enter new markets and attrackt new customers (Henriette et al., 2016; Vial, 2019; Mergel et al., 2019; Berman, 2012).

5.1.2.4 Ethics

Literature is very sparse in discussing ethical considerations for DT assessments[1]. Henriette et al. (2016) mentions it once, without further substantiation. Vial (2019) proposes a research agenda looking into ethical issues considering digital transformation.

5.1.3 Technology Factors from Literature

Technology and its surrounding infrastructure is the starting point DT (Matt et al., 2015; Hess et al., 2016; Henriette et al., 2016; Sanchez, 2017; Grivas et al., 2018; Korachi & Bounabat, 2019; Christoffels, 2019; Voß & Pawlowski, 2019; Colli et al., 2019; Mergel et al., 2019; Vial, 2019; Aguiar et al., 2019; Kidschun et al., 2020).

5.1.3.1 Technology Infrastructure

Technology enables the benefits of DT as explained section 2.2. When deciding on what technology to use in the DT, companies have to make a decision: for certain organisations, the main catalyst of DT is in emerging digital technologies, while in other organisations, the transformation is motivated by market issues, and suitable technology must be implemented to facilitate change (Hess et al., 2016; Matt et al., 2015).

5.1.3.2 Security

Increased use of digital tools and data poses security risks (Colli et al., 2019; Henriette et al., 2016; Sanchez, 2017; Vial, 2019; Kidschun et al., 2020), principally in the area of security and privacy (Vial, 2019).

With data collection expanding rapidly, businesses must ensure that the data flowing intp their information systems are safeguarded (Henriette et al., 2016; Sanchez, 2017; Colli et al., 2019). Both for privacy and intellectual property issues (Kidschun et al., 2020).

[1] A Sopus search of TITLE-ABS-KEY(digital AND transformation AND assessment AND ethics) renders only 14 results, none of which are usable

5.2 Experts: Humanitarian Digital Transformation factors

This section describes the most important components of DT in the humanitarian sector, providing an answer to the second research question of this chapter: What components play a role for Digital Transformation in the humanitarian sector? These components are the main building blocks that will be used when constructing the assessment framework in chapter 6.

This section is structured in accordance with the coding taxonomy and broken down in three distinct parts: people, process and technology. The qualitative data form the interviews is used for two analysis rounds: First, each component is examined and it is explained what factors have an influence on this particular component. Then, per component, the interrelations between influencing factors are visualised in a network and explained.

This section deals with qualitative data, therefore no quantitative substantiation can be given. The transcribed interviews are used to assure conclusions and assumptions based on information of respondents. Appendix D shows how often different factors were mentioned by experts. Please note: if all experts mention a factor it is not necessarily more important than a factor mentioned by only two experts. Still, if there is consensus among respondents, this is noted in the text below.

5.2.1 Digital Transformation Component: People

A key element of DT is to have the right people within the organisation. You need people with the skillset and motivation to carry out the transformation. Many respondents recognised that without the right mindset in place, a transformation is impossible. This section explains the influencing factors that motivate people to take part in the DT in the humanitarian sector.

After analysis, four factors that influence people to contribute towards the goals of DT are identified. Two major factors: *leadership* and *human resources*, and two minor factors: *organisational structure* and *culture*. These four factors are discussed below.

5.2.1.1 Leadership

According to respondents, leadership is an extremely important factor for DT. While previous section showed clear incentives for starting a DT, not all leaders see it that way. Still top-level commitment is an important enabler for DT. Experts indicated that without this commitment, DT has a low chance of success. One of the reasons that experts gave for the absence of top-level commitment is that there is a digital divide: within the Red Cross, the people that hold power are usually long-time humanitarians, the leaders are not necessarily digitally aware. It can be hard to admit that you actually do not understand it. It creates a dependency, you really have to do it together with others that are very good at it. In many cases, this leads to a fear of the topic. If this fear can be taken away and leadership starts to trust the experts and the technology, this is an important enabler. Furthermore, it was stated by respondents that the leaders are not thinking about what is happening in other industries and are strongly focused on humanitarian. Experts believe that leaders in the humanitarian sector need to have more wide angle lens around what is happening globally, also in other sectors.

Another important step in building the trust of leadership is to show them that new technology can actually solve problems that they often encounter. Responsibility for this lie with the IT people, not with leadership. There needs to be a focus on partnering with the business. Understanding what their needs are and then using the knowledge to come up with solutions to help move the business forward.

Finally, experts believe that alignment is important: throughout the organisation, but especially for the ones in charge, the MT. DT is complex, a clear vision and ambition are needed. A clear idea and coherent story of where the organisation is headed, helps to align the MT on what is crucial and formulate shared goals. It also helps to keep an overview of the DT process and the organisation as a whole.

5.2.1.2 Human Resources

A second main factor is the availability of human resources. This is two-fold, you either have to change the mindset of the people currently in the organisation, or you will have to attract new employees, or both. Experts were consistent in their conviction that for a DT to succeed, or even start, human resources are of tremendous importance. Without the right skill-sets and capabilities, nothing will happen. If those skills are not present, there are two choices: acquire new employees or in-house training of current employees. Both options are valid, but have to be balanced.

Hiring the appropriately qualified people is a major part of a successful DT. Hiring is preceded by knowing what people you are looking for: if people with specific skills are required, profiles can developed. Furthermore, it is advised by experts to take digital capacity into account for all new hires, because a DT touches every part of the organisation. A problem for the humanitarian sector is that these tech-savvy people are also in high-demand elsewhere. The humanitarian sector does not have the ability to provide a competitive salary. Therefore it is important that they have their storytelling in order. Telling a compelling story about what you are doing can respond to the fact that people are looking for impact. Having impact can be an important motivating reason to accept a lower salary. Additionally, you can work with volunteers, so people don not have to choose between impact and salary. Mentioned by several experts, the international and local RC-network plays an important role in finding the employees and volunteers with the required skill-set.

Enabling current employees to play a role in the DT is another way forward. There are two main enablers: stirring up enthusiasm and education programmes. According to respondents, cultivating enthusiasm can be achieved by identifying people in the organisation that give the right examples and giving them a podium, showing off best practices, leadership giving them more responsibility and publicly giving them appreciation. The other part is education. Education programmes and training help overcome digital illiteracy and create skills for the future. These programmes can be provided by international and local partners, but also peer-to-peer knowledge exchanges can work very well, as was shown by one of the interviewees.

5.2.1.3 Organisational Structure

Many experts agreed that the Red Cross is vertically organised. This was aptly formulated by one of the respondents:

> *"Right now, the management style is very hierarchical ... in general, they're following an old leadership style that's from 1990s textbooks around management. ... our managers are old school humanitarians, which is beautiful. Again, I have so much respect for the 40 years experience in the field. Their understanding of how to deal with emergencies is fantastic. Their understanding of organisational change, maybe not so much.""*
>
> *- Red Cross Expert*

Respondents concur with current literature: this is not the best management style to stimulate a DT. While literature mostly advocates very agile and self-managing teams, Red Cross experts are more nuanced. They value project ownership and freedom for the teams, but also acknowledge that it works differently for every organisation and that sometimes you will have to start small.

5.2.1.4 Culture

DT is about a culture shift. Due to its potential for change, it can be uncomfortable for some people. Humans are creatures of habit, so there can be an internal push against the digital transformation. Experts believe that changing this mindset is possible, but can take a very long time.

The factor that can enable a changing mindset, according to respondents, is mainly education: by taking away the fear, trust can be build. Also, storytelling is important: you can have the fanciest ideas and the corresponding strategy, but if nobody believes in it, it is not going to go anywhere.

5.2.2 Digital Transformation Component: Process

Having the right people in the organisation is a big enabler for DT, but it is not enough. Another important pillar is process: how to ensure that digital resources are ultimately embedded in that organisation and whether they are organised in the right way to do so. After analysis, again two major and two minor factors that influence the process factor are identified. The major factors are *the alignment of ICT with business needs* and *long term commitmen*t towards the DT process. Minor factors include both *legal* issues and *crisis response*.

5.2.2.1 Alignment of ICT and business

Respondents emphasised the value of ICT for a DT, but also highlighted that ICT does not run the business, business runs the business. In their experience, this often goes wrong. This is understandable, as the IT department often has two roles. On the one hand, they have to deliver hardware for increasingly less money: a cost issue. On the other hand, they have to think about the strategic direction of the company and to invest strategically in ICT, that requires a different set of skills. This requires that business and IT need to collaborate strategically. Still, it is the business that is ultimately responsible for the strategy and the IT department should help them getting this done. To make this work, expectations from both parties should be clear in the beginning.

> *And that's quite important, because often we see in organisations, including the red cross: we all work in silos and we all want to build our own things, develop our own new projects. Whereas maybe there's someone doing exactly the same."*
>
> *- DT Expert*

5.2.2.2 Long Term Commitment

All experts mention the long term nature of a DT. The fact that it is a long process requires long term commitment from all parties involved. The most important parties within Red Cross context mentioned by the respondents are: top-level management, the international Red Cross network and donors.

Top-level management must be heavily involved in the DT process. Due to the long term nature, it is going to need long term allocation of resources. If the MT really want to put DT on the agenda, it needs to be their ambition and priority:

> *"So whoever gets to pull strings has to be on board, right. Because you get a lot of push-back within the organisation. People saying: 'That part of the organisation has spent a lot of money, they've gone in minus for three years. Why are we spending money on that?' You will have to provide answers to that."*
>
> *- DT Expert*

Top-level management also needs to deal with the risk of starting a DT, of which there are many involved. The most important process-risk that was voiced by experts was starting the DT process without a clear strategy. Two reasons were mentioned: First, if you are not working with a strategy, you will have no control over the outcome. This could lead to unwanted consequences like faulty data-driven decision making based on wrong or too little data, creating a digital divide between employees, internal overselling of digital applications, etc. Second, not working towards one clear goal, can lead to everyone doing something different. This can lead to unwanted outputs, budget and planning issues and a less efficient organisation.

Long term commitment of both the international Red Cross network and the donors is critical to DT, because the National Society depends heavily on these two stakeholders. The network is important because the National Society depends on them for support, both from an education as a human resources and staff exchanging perspective. Furthermore, long term funding of the donor is required. Currently, the funding is mostly tied to emergencies. This structure hampers DT, because no money is made available these kind of innovations

5.2.2.3 Legal Issues

Legal issues were mentioned by employees of the Red Cross in Nepal and in Lebanon. In these countries, many processes are paper-based. This means that, when an autograph is needed, there is no way tot digitise this process. The laws of such countries make that there is no legal basis. This constraint has to be taken into account when starting a DT process.

5.2.2.4 Crisis Response

As mentioned by interviewees, the first goal of the Red Cross National Societies is provide aid to the ones in need. Officially formulated by the IFRC their goal is to: "Reduce the number of deaths, injuries and impact from disasters." (IFRC, 2020a). This is the cornerstone of the organisation. Because many Red Cross National Societies operate in disaster or conflict prone areas, often daily operations are influenced by urgent events that require immediate attention. It is the task of DT advocates within the Red Cross Network to persuade management that DT ultimately helps the National Society being able to provide better crisis response.

5.2.3 Digital Transformation Component: Technology

In this section both the use of data and digital tools for DT are discussed.

5.2.3.1 Data

Interviewees agree that data collection is the biggest enabler for a DT. But they also indicate a downside: data collection always involves risk, especially in the sensitive areas (Martijn & Tokmetzis, 2016) in which the Red Cross operates. More specifically, there are two main risks when data collection by the Red Cross is considered: first, maintaining independence and second, the digital divide between caregiver and beneficiary.

Maintaining independence is important to a Red Cross National Society, because this this gives them access to unstable regions, where they would not be allowed if they were affiliated with a third party. Ironically, this access makes them interesting for intelligence agencies:

> *...in these fragile contexts, where there are multiple international actors interlinked with their different interests. So that time digitalisation selling point is very consciously seen. And most of the host national societies who are more neutral, impartial, and independent, they don't want to lose this neutrality, impartiality and independence, because if they are engaged in so much of things, they need a rigorous negotiation with the army, intelligence and other parties to what end this data would be used for why they need this data?"*
>
> *- Red Cross Expert*

Another issue is the condition under which the data is collected. As explained, most of the work the Red Cross is doing, is during disasters or public health emergencies (IFRC, 2020a). It is important to receive consent from the person you are collecting data about. But what if the collection of for example biomedical data is needed in exchange for emergency aid like food, shelter, medicines, etc? If access to basic human needs requires submission of data, this is not voluntary.

As opposed to risks of data collection, there also is a great opportunity for the Red Cross. Experts feel that there are huge amounts of data already available within the Red Cross Network. This data is somewhere, but is often decentralised and hidden to others. If the Red Cross National Societies would adhere to data-standards, some of this data could be shared more easily within the network to unlock the potential. As was mentioned by the experts, the IFRC could play a role in this.

5.2.3.2 Digital

The key take-away that was mentioned by multiple experts was that throwing hardware at a problem does not work. It was aptly summarised in the following quotation:

> *what we need to do is figure out what each national society wants to do, and then work on a work-plan with them, rather than parachute hardware and software at people, which is what traditionally humanitarians have done. And they've done it terribly [...] including Paul Allen, who was one of the founders of Microsoft dumped software and hardware all over the Ebola response to 2015 and it just didn't get used. It ended up at a warehouse."*
>
> *- Red Cross Expert*

An additional quick-win mentioned by respondents was that there is a lot of potential of applying existing tools. Often, currently existing tools are good enough and no new tools have to be developed. The approach should be to understand the needs of that particular National Society and help them solving their problems by implementing available tools.

5.3 Reflection on Identified DT Factors

The main contribution of this research is the identification and validation factors that play a role for DT within humanitarian context. This section evaluates the contribution of the factors identified in interviews (section 5.1) and relates them to the factors discovered in literature (section 5.2).

Table 5.1 shows factors as collected from both sources: factors that were discovered during the systematic literature review and factors that have been mentioned by experts. In the paragraphs below, the discrepancies in factors mentioned by literature and experts will be discussed.

Firstly, when the people factors are compared, it is clear that all factors mentioned by experts, are also mentioned by literature. At first glance, it seems like the experts have noting to add to literature and that they even may be incomplete. This, however, is not the case. While 'internal and external communications' was not explicitly mentioned by experts, it was mentioned that commitment from both the actor network, the donor and internal management was important. Another difference is the 'willingness to change' factor. This was mentioned by experts, but was included in the leadership and culture factors. Therefore it can be concluded that the experts validated all the factors of the literature.

Secondly, more differences can be observed when the process-factors are compared. Actually, if quickly scanned, there seems to be no overlap between literature and factors mentioned by respondents. Sometimes, the cause lies in the naming of factors: 'Actor network' and 'Longterm commitment actor network' are similar. The same is true for 'Available financial resources' and 'Longterm commitment of donors'. To a lesser degree, this is also applicable to 'deviation from the core' and 'crisis response'. For these factors, experts have framed it in red cross context.

While literature speaks about customer experience, this is not mentioned by experts. This might be due to the fact that within the humanitarian sector there are no customers. Within humanitarian context, this factor might be translated to beneficiary experience.

The 'Ethics' factor was mentioned by experts, but mostly when talking about data or data literacy. Based on the data from the interviews, there was little reason to include an ethics factor. Since ethics are important in the humanitarian sector, especially when dealing with vulnerable people, the inclusion of an ethics factor might be considered.

As can be read in the results chapter, new value creation was a desired outcome mentioned by experts. Because the framework of this thesis is mainly focused on assessing the status quo of DT for a national society, it does not deal with outcomes. Therefore it is not included in the assessment framework.

An important factor this research is the alignment of business and IT. For DT it is very important that the ICT department becomes a strategic partner. While this was implied in literature, this research clearly makes explicit. Another important factor that was mentioned by respondents is the legal issue surrounding DT. Literature is mostly about transforming western companies. In countries where good legislation is not obvious, these things have to be taken into account.

Finally, the differences in the technology domain can be attributed to the level of depth. Since the data literacy framework is only about data and technology, it is no surprise that literature and experts mention

less factors.

Table 5.1: Factors of different sources compared

	Factors	Literature	Experts
People	Available human resources	X	X
	Internal/external communication	X	
	Leadership/ambition/vision	X	X
	Organisational culture	X	X
	Organisational structure	X	X
	Willingness to change	X	
Process	Actor network	X	
	Alignment business & IT		X
	Available financial resources	X	
	Crisis response		X
	Customer experience	X	
	Deviation from core	X	
	Ethics	X	
	Legal		X
	Longterm commitment Actor Network		X
	Longterm commitment Donor		X
	Longterm commitment Management		X
	New value creation (business model)	X	
Technology	Data		X
	Data Applications		
	Data preparedness		
	(Data) security	X	
	Technology infrastructure	X	X

Further research on the implications of the identified factors on the humanitarian sector can be found in the next chapter, where the factors are integrated into an actionable assessment framework.

Chapter 6

Framework Design Synthesis & Digital Transformation Enabling Strategies

The objective of this chapter is to formulate an answer to the fourth sub-question. Answering this question results in the final deliverable of this thesis: a framework for assessing DT in the humanitarian sector with accompanying strategies that stimulate implementation.

4. What does a framework that enables digital transformation within the humanitarian ecosystem looks like?
(a) What important transformation-components should be integrated in a framework for Digital Transformation?
(b) What are strategies that stimulate digital transformation implementation in the humanitarian ecosystem?

Section 6.1 explains how the components that have been discovered in the previous chapter are used to create the maturity assessment framework. In section 6.2 different strategies are formulated that explain how DT can be implemented and identify quick wins for the humanitarian sector

6.1 Framework Synthesis

This section uses the maturity model approach that was selected section 3.4. The sections below describe how domains and maturity levels are defined and what components will be used to populate the framework. Because explaining the components of a framework can be abstract and nomenclature can be difficult, the reader is advised to use the final framework as presented in fig. 6.1.

6.1.1 Defining Domains and Maturity Levels

A maturity framework consists of two parts, scoring domains on the vertical axis and maturity levels on the horizontal axis. Sections below explain which choices are made in order to synthesise the framework.

This thesis evaluates DT in three domains: people, process and technology, of which the first two are of main interest. To be consistent, these are also the domains for the maturity assessment frameworks. Therefore the horizontal axis comprises of people, process and technology. Furthermore, the main influencing factors for each of these domains, as discovered in chapter 5, are used as a specification. This helps to user to relate a particular criterion to a specific influencing factor.

For the horizontal axis maturity levels for the three selected domains are defined. To formulate these maturity levels the definitions of CMMI Product Team (2006) are used as a basis. To ensure that less technical people understand these levels, make it less managerial and to create a better fit with the humanitarian sector, the level names and descriptions are changed[1]. Also an additional level is added: level 0. This level checks if the minimum conditions to start a DT process are present. It was a conscious choice to incorporate this in the framework and not list a separate minimum requirement list, because now all information can be consulted in one place.

Table 6.1: Assessment Framework Maturity Levels

Level	Level Name	Description
Level 0	Conditional	Minimum conditions required to start DT
Level 1	Basic	Projects are generally unpredictable, incidental and ad hoc but there is intention of starting a DT
level 2	Structural exploration	Ensured that data & digital projects are structurally started and executed
level 3	Professional practices	Practices are clearly established well known and outlined in standard working procedures
level 4	Digital expert	Operation is optimised. The organisation defines and uses KPIs for managing processes
level 5	Future proof	National society continually adapts to humanitarian needs and is able to sustain or expand its services

Now that these maturity levels have been adopted, the basic layout for the framework is known. Next section explains what assessment criteria populate the framework.

6.1.2 Selecting Assessment Criteria

The previous section lays the foundation for the framework. It explains the domains on the vertical axis and the maturity levels on the vertical axis. The combination of these axes provides a matrix that can be populated with scoring criteria. This matrix with criteria is the first part of the final deliverable: the maturity assessment framework. Before presenting the outcomes, this section explains the process of how criteria are selected and how it is determined where in the framework a certain criteria should be positioned.

The process converting the outcomes of chapter 5 into assessment criteria to populate the framework is characterised as below. This process is repeated for each theme and results in the framework of section 6.1.3.

1. In the first step, the written text of section 5.2 is used for making an assessment of which themes influence this domain and what factors have an effect on these themes.
2. Second, co-occurrence is investigated. This means that it is analysed which factors is often mentioned together with the theme of interest. It is investigated if co-occurring factors play a role for this specific theme by reading through codes and assessment by the researcher.
3. Third, Each time a barrier or enabler was mentioned during an interview this was coded. A list of enablers and barriers is exported for each theme.
4. The fourth step is to critically review all individual codes for this theme to determine which steps are required in which order
5. Finally, the output of above steps is compiled into a the list of factors. This list is categorised and summarised into assessment criteria that are included in the final framework.

[1]Original nomenclature: Level 1: Initial, Level 2: Managed, Level 3: Defined, Level 4: Quantitatively Managed, Level 5: Optimizing

6.1.3 Assessment Framework

The first deliverable of this thesis, the assessment framework, is presented in fig. 6.1. As can be observed, an additional level was added: level zero. For some themes, experts mentioned a minimal requirement before starting the DT-process. Also, extra effort has been put into the first three maturity levels. This is a conscious choice: there was consensus among experts that currently most value for the humanitarian sector lies in National Societies taking that first step. This is mostly due to the fact that National Societies with digital experience (like the NLRC), have bilateral partnerships with less developed countries (IFRC, 2020b), so that is a convenient way to start.

This aim of this framework is to be 80% finished, the last 20% is dependent on the subject assessed. Each subject has nuances in ambitions, local context or even language. This is especially true for levels four and five: you can only quantitatively manage and optimise what has been developed in the levels before.

6.1.4 From Framework to Action

A small portion of the interview with DT experts was spend on discussing assessment working practices. Experts used mostly interviews for assessing organisations, other practices that have been mentioned are workshops, virtual workshops, surveys, code reviews and self-assessment tests. There was consensus among interviewees that the acquiring the data necessary for assessment should be tailored to who is assessed. But to provide an impetus for starting a DT process, a process planning is drafted. In a session together with two DT experts and one Red Cross expert, a DT-project planning was drafted. A concise overview is is presented in table 6.2, sessions are chronologically from top to bottom.

Table 6.2: Draft DT Project Planning

Session	Topic	Approach	Goal
Incentives	Why do we want DT?	Workshop	A well-formulated answer to the why question
Kick-off DT Process	Assessment goals	Workshop	Clear overview of the goal of the assessment
Define goals	Assessment framework	Interviews	Formalise last 20% of assessment framework
	Ambition level	Workshops	Have a good understanding of the ambition
Maturity assessment	DT status quo	Depends on what is assessed.	To score the organisation on maturity (and identify bottlenecks)
	Assessment outcome	Feedback meeting	Alignment most important stakeholders, discuss next steps
Change plan	Priorities and planning	Workshop	Identify how DT must be prioritised and create coherent planning
Stakeholders	Identify stakeholder	Meeting/workshop	Identify who are enabling and obstructive stakeholders
Governance	Responsibilities	Meeting	identify who is responsible for what next steps

As explained above, this is a draft process planning. An assessor has to identify which information is missing and which methods are best suited to acquire the information of that particular assessment.

Domain	Theme	Level 0 - Conditional	Level 1 - Basic	level 2 - Structural exploration	level 3 - Professional practices	level 4 - Digital expert	level 5 - Future proof
		Minimum conditions required to start Digital Transformation	Projects are generally unpredictable, incidental and ad hoc but there is intention of starting a DT	Ensured that data & digital projects are structurally started and executed.	Practices are clearly established well known and outlined in standard working procedures	Operation is optimised. The organisation defines and uses KPIs for managing processes	National society continually adapts to humanitarian needs and is able to sustain or expand its services
People	Leadership	Leadership is receptive to the benefits of DT and willing to talk about it.	Leadership is enthusiastic to start DT and start to think about a vision & ambition.	Leadership is educated on the enablers and barriers of DT and expectations are well managed. Leadership understands that for DT to happen, it should be a priority. A start has been made on a written strategy for DT.	Leadership actively requests and uses data for decision making. Internal and external stakeholders are managed: they are aligned on strategy and operate accordingly. Leadership is an advocate of DT and promotes the use of data and digital in the organisation and provides a podium for best practices. Leadership actively thinks about how DT can make humanitarian aid better.	Leadership requests data or information for policy-making. Leadership monitors the implementation of DT via defined KPIs.	Leadership understand the full potential of DT and uses it to optimise humanitarian response.
	Human Resources	Enthusiasm for DT can be found somewhere in organisation.	The HR department has an idea about what skills and profiles are necessary for DT. Some individual staff members or volunteers in the National Society have required skills. Staff and volunteers share a common definition of DT.	It is clear what human resources the national society is lacking and a strategy to acquire the necessary profiles. There is DT awareness in the workplace.	Additional staff and volunteers are hired or current staff and volunteers are educated to fill pre-established knowledge gaps. Staff understands that DT increases the efficiency of humanitarian aid. A dedicated data-team has been established.	HR quality is monitored through established KPIs. Staff and volunteers have a meaningful contribution towards DT.	Recruitment and selection is focused on optimising digital capabilities.
	Culture		Parties considered are aligned on why a DT has to happen.	There is a common believe in DT and a willingness to change. A (written) cultural change plan is part of the strategy.	The cultural change plan is caried out, leading to an innovative culture that encourages experimenting.	The collective mindset is changed, DT is viewed as an opportunity to increase agility in disaster management. The value proposition towards beneficiaries is monitored.	The national society is fully able to optimise by stimulating incremental and disruptive change, while maintaining adaptability towards the long term strategy.
	Organisational structure		Current roles and responsibilities of departments are clear, but departments work in silos, there is little interaction between departments. Ad-hoc knowledge sharing.	There is interaction between departments, departments work together on enabling DT. Agile principles are adopted in DT-priority departments.	Departments actively work together on DT. Agile principles have been adopted by teams. Multi-disciplinary teams within and spanning departments are established.	Outputs of teams are quantitatively managed.	Fully agile structure to make best use of DT and increase flexibility towards humanitarian crises.
Process	Alignment Operations & IT		There is a willingness of the IT department to cooperate with the humanitarian part. Ad-hoc contact between IT & operation.	IT knows problems of the operation, actively aides in solving these problems together. There is regular consultation between IT & operation.	There is a formal role in the national society that aligns the need op the operation with what IT can offer, making IT a strategic partner.	IT is part of investment discussions and can show effectiveness of DT for humanitarian operations.	IT and operations are fully integrated.
	Longterm commitment mangement		An adequate risk assessment has been performed. Management understands that resources are needed.	Management is committed to a successful DT. Management has a short term strategy for resource management.	DT is a long term priority for the national society. All digital investments should actively contribute towards DT strategy.	Management can use KPIs to monitor effectiveness of investments.	Management is committed towards helping others with DT.
	Longterm commitment network	Exploratory talks between national societies and partners.	Red Cross Partners provide expert advice on DT and corresponding funding. Partners aid in formulating overall DT strategy.	Red Cross partners provide hard- and software and actively support DT. Local partners are identified.	Moderate external partner-support needed. Local partnerships are valuable addition towards DT.	There is a strong connection between the national society and a RC3 (Red Cross Red Crescent Research Centers).	The National Societies works together with less developed national societies to help them with their DT.
	Longterm commitment donors	Some funding is available.	Funding is available, but aid-tied.	Donor understands ambition of DT. Reporting to donors makes adequately use of data.	Funding is not aid-tied. Structural funds for development and maintenance. DT provides new funding opportunities.	Donor actively involved in DT process. New funding opportunities are explored and used.	Donor stimulates DT, not only for a particular national society, but in the entire network.
	Crisis response	A national society is able to adequately respond to crises.	In time of crisis, DT is not on the agenda.	In times of crisis, DT is still on the agenda, but no priority.	In times of crisis, digital tools provide well known solutions.	Digital tools are actively used to make disaster management more efficient and cost effective.	Digital tools can predict crises and they can be prevented.
	Legal		Understanding of legal context of DT and identify what difficulties need to be solved.	Solve or work around legal implications.	Legal implications are no longer a barrier to DT implementation.	Legal implications are no longer a barrier to DT implementation.	Legal implications are no longer a barrier to DT implementation.
Technology	Data		A written data responsibility policy is written. There is ad-hoc data use, but data is only collected by individuals for funding-reports.	Act on data responsibility policy, identify gaps between policy and practice. Data is collected with a specific goal in mind by staff and volunteers. Data sources are identified and meet the needs of the national society. Data-security is managed.	Solve issues data responsibility. Data is collected structurally. Data quality is sufficient. Data standards adhere to universal standards. Data is a valuable asset to the national society. National societies actively participates in national information management working group.	Data-quality and data standards are monitored and active adjustments are made if necessary. Data is used for data driven decision making. Data-analysis has direct operational value.	Data collection and analysis is used to continually improve the national society.
	Digital		A basic IT infrastructure is persent, but there still is a lot of manual labour required.	Readily available digital applications are used for intended purposes. Custom digital applications are created, but developed externally. Some efforts have been taken to automate manual steps.	The IT infrastructure is clearly established: manual processes are automated and remote working is possible. Critical components of humanitarian aid are digitised: digital beneficiary/volunteer registration & database.	Custom applications are developed in-house to increase efficiency. New digital ways of humanitarian aid are developed. KPI monitoring dashboards are developed for quality control. Beneficiary opinion steer direction of DT and national society.	There is a central IT infrastructure that is a solid basis for development and flexibly adapts to needs of national society.

Figure 6.1: Maturity Model Assessment Framework

6.1.5 Framework Verification and Validation

Now that the framework is created, it has to be verified and validated. In the sections below this is discussed.

6.1.5.1 Verification

The requirements that have been drawn up in section 3.2.4 are used for verification. For clarity, only the must-have requirements are verified. Table 6.3 shows and comments on compliance with the requirements.

Table 6.3: Requirement compliance matrix maturity framework

Requirement	Compliance	Comment
Multi-dimensional representation of status DT	✔	The framework deals with three domains: People, Process and Technology. By approach the problem from these three different angles the framework gives a multidimensional overview of DT.
Allow for strategy formulation	✔	Because the framework clearly defines maturity levels, it guides in steps a national society has to take in order to advance to next levels of DT.
Promote learning	✔	Because the maturity levels are well defined, it becomes clear what is important in DT. By reading what is needed to advance to next levels, a national society is guided in what is important to learn next.
Stimulate knowledge exchange	−	The framework itself does not stimulate knowledge exchange, although the outcome of the assessment can be shared among national societies. This can stimulate them to work together on certain problems.
Identify value	✖	The framework does not directly show what value DT has for a national society.
Show DT-barriers	−	The maturity levels indicates some barriers. But strategies to overcome these barriers are not directly in the framework. These strategies will be adressed in section 6.2

✔: compliant, −: partly compliant, ✖: not compliant

From table 6.3, it can be concluded that complies with two requirements, and is partly compliant with three other requirements. It does not comply with the identify value requirement. In retrospect, this is not a well formulated requirement, since this is not part of the status-quo assessment. It is part of the process that starts after the assessment

6.1.5.2 Validation

The original objective was to validate this framework in practice by assessing the DT of the NLRC. Due to Covid-19, no such assessment could take place. Due to lack of time, of both the researcher and respondents, the framework has not been further validated. This is further addressed in section 7.3.

6.2 Formulating Strategies

This section answers the second sub question of this chapter. It presents the second deliverable: general strategies that stimulate digital transformation implementation in the humanitarian ecosystem.

6.2.1 Selecting Strategy Topics

During the interviews, many well intentioned recommendations were mentioned. To structure these, recommendations of experts are used to formulate strategies to overcome the four DT barriers that the humanitarian sector faces (section 2.3.2): resource constraints, ethics, complex organisation, crisis situations.

A DT-theme can be influenced by one or more barriers. Because barriers and themes are very interrelated, a decision was made to only discuss barriers if a relationship is strongly indicated by experts. In table 6.4 an overview is presented on which barriers play a role for what theme. In the next section, per theme strategies are formulated to overcome the barriers.

Table 6.4: Effect Barriers on Themes

		Barriers			
Domain	**Theme**	Resource constrains	Ethical considerations	Complex organisational structure	Crisis situations
People	Leadership Ambition & Strategy	X			
	Human Resources	X			
	Culture				X
	Organisational structure			X	
Process	Alignment Operations & ICT	X			
	Long term commitment management	X			
	Long term commitment network	X		X	
	Long term commitment donors			X	X
	Crisis response		X		
	Legal				
Technology	Data	X	X		
	Digital	X	X		

6.2.2 People Domain Strategies

Leadership ambition is impaired by resource constraints. As explained in chapter 5, available monetary resources are aid-tied[2] and long term funding for overhead projects is exceptional. This makes it difficult for leadership to create budgets for long term projects. Having a good vision and tying DT to all project that allow it, can help overcome this barrier. This is best illustrated with the example of data analytics. Data analytics is a very nice step in digital transformation, because the good returns can be quickly provided. The problem is, if you really want to do decent data analytics, you need a complex and usually expensive system.

Creating such a system with for specific goal and for a single outcome is too expensive. Then the output

[2]money is earmarked for humanitarian crisis purposes

would not be worth the investment. Leadership has a major influence on budget decisions, that is is important that they have a vision. If there is an ambition to start a DT all projects should have two goals: 1. making sure you meet the specific project goal and 2. use the single project enhance the analytics system. Make sure that the current project always adds a component towards a total analytics setup. This way, each time you will be able to answer more questions quicker. This is only possible if there is a good vision and a preconceived plan.

A vision has the potential to change the mindset: If there is a long term plan, you can achieve more structural working practices instead of incidental way of working. If HR is part of the vision, an HR department should not source the people for a specific project, but also keep the entire analytics capabilities up to date. This changes the profile for new hires. Also, you will have to work together with an ICT department for necessary expertise. This increases cooperation and helps in two ways: the department will be more digital and ICT gets a better feeling what is going on elsewhere in the company and can act as knowledge brokers and inspire others. This can lead to a snowball effect: departments inspiring and motivating other departments to actively participate in the DT. This happens when leadership starts making things structural that seem incidental.

HR faces the same challenge as leadership: DT requires a different skill-set and these people are expensive, so it is extremely important to identify what skills are required. The international network can help less developed RC national societies to create skill-profiles for recruitment and selection.

Creating a digital culture is one of the most important things for DT (Warner & Wäger, 2019). Within the Red Cross, there is a deeply ingrained culture of humanitarianism and aid-giving. This is a good thing, since this is the primary function of the Red Cross, but it can also hamper DT of the organisation. There needs to be a balance in short term humanitarian crisis situations and long term change processes like DT. Red Cross organizations have a tendency of abandonment of DT processes in a time of crisis (IFRC, 2020a; CMMI Product Team, 2006). While focus should of course be on helping as much people as possible, one should not abandon DT. Showing best practices can be a strategy to overcome this barrier. If people in the field experience the benefits of DT in their work, this culture and the way priority is given can be changed.

Changing the organisational structure from hierarchical to agile is difficult in the complexly organised Red Cross Movement. It is a worldwide organisation, but each national society is managed locally. This asks for a both global and local approach. It is important that there is a global commitment towards the goals of strategy 2030 and the IFRC should promote knowledge exchange between national societies. But DT can only work if there are sustainable processes in place. It is therefore important that the local sustainability is driven from local actors. National societies should be helped by the international network, but there should be a layer of local partners too. If both local and international partners are actively involved in the process and roles and expectations are clear, this can greatly improve responsiveness of the national society and increase agility.

6.2.3 Process Domain Strategies

The alignment of operations & ICT is indirectly affected by available resources. Resources can become a problem if operation requires expensive tools or extensive processing capacity (Korachi & Bounabat, 2019). So it is more of a resource allocation trade-off than it is a resource constraint, because ICT can still be a strategic partner and try to align the needs of internal stakeholders with available ICT services.

Long term commitment of management, on the other hand, is bound by resource constraints. This is because management is responsible for resource allocation and once budgets are tight, they will have to prioritise. Often, when there is a trade-off between humanitarian aid and DT, the former will be prioritised. This is advisable, but the DT process should not be abandoned. Reserving some of the aid-resources for long-term operation enhancing DT, as explained in previous section, is a strategy to overcome this barrier. It can help to use resource allocation models (Jarzabkowski, 2002), so that this process is formalised and not up for discussion every time that money flows in.

The network that surrounds a national society is important. The involvement of local, national and international partners is an enabler for DT. But these partners can also spend their money once. It is therefore important that leadership of the national society maintains good relationships with partners and manage

their expectations. These partners have to change their mindset as well: they have to be educated on the long term nature of DT and that the organisation of DT processes is different from humanitarian emergency aid projects. Better yet, they could be included in the DT. By making them a direct strategic partner, they can be directly or indirectly made responsible for the success. This stimulates collaboration and can deepen relationships. DT can also require partnerships with new types of partners with other competences than old partners. The first step in identifying them, is to create profiles of what is needed in a partner. Then a network actor scan can help finding those partners (Cunningham & Hermans, 2018).

Funding is the backbone of the humanitarian sector and the red cross: without donors providing money, nothing is possible. Currently, money is often made available for disaster relief or emergency response and not for internal improvement processes like DT. The donor, therefore, has to realise that money is needed on a structural basis and needs to scale with ambition. As indicated by experts, the donor structure of the Red Cross cannot presently accommodate this. One interviewee aptly formulated it:

> *"There's structural dysfunctionalism in humanitarian response, which means that there's tied aid. And response only goes for: Hi, we will fund the front office, not the back office."*
>
> *- Red Cross Expert*

Another issue is that, often, funds are trend-sensitive and therefore not able to sustain funding to bring an innovation into operations. As a consequence, initiatives are ad-hoc and not part of an overall strategy. Both problems can be overcome with educating the donor on what DT entails and can mean for the humanitarian sector. The national societies should open the conversation with their donors and lobby for long term funding for innovation by showing best practices and DT benefits. This can lead to a funding structure that supports a long term change-process.

Another strategy to overcome the resource barrier is to use DT to identify and create new methods of funding. Large tech companies have initiatives to work together with the humanitarian sector to use technology for humanitarian purposes (Facebook, 2020; Microsoft, 2020; Google, 2020). If these resources can be adequately used, this could give an impulse to both the monetary and technical resources at the disposal of national societies.

It was explained in section 5.2.3.1 that DT can help crisis response by using data and digital tools to increase efficiency of emergency aid. That section also explained ethical considerations concerning data collection in emergency context. This has to do with the condition under which the data is collected, it is important to receive consent from the person you are collecting data about. If, during a crisis or disaster, access to basic human needs requires submission of data to a third party, sharing data may not be voluntary. Some countries have mitigated this risk by imposing legislation, for example GDPR in the EU, but not all countries in which the humanitarian sector is operational have such legislation in place. There are three strategies to minimise the risk of unethical data usage in crisis situations. The first is to incorporate a digital responsibility policy. Currently the IFRC is working on a digital responsibility policy for the entire movement (IFRC, 2020c). Secondly, all digital tools used by and designed for the humanitarian sector should, whenever possible, adhere to the privacy principles, for example the 7 privacy by design principles[3] (Cavoukian, 2011) as also adopted in the GDPR (European Data Protection Supervisor, 2018). Finally, employees and especially fieldworkers should be educated on digital responsibility and what in entails.

Legal issues for DT arise when legislation of a certain country is a barrier to implementing DT. An example given by one of the experts is that in some countries a digital signature is not legally valid. This is not dependent on the barriers listed in table 6.4, but on local legislation. Perhaps this is out of the sphere of influence of a national society and it is advised to stay within the boundaries of the law. Especially for the Red Cross, who is dependent on its good relationships with governments.

6.2.4 Technology Domain Strategies

Data collection, storage and processing can be expensive (Yucel, 2018). A strategy to minimise resources is to increase collaboration in the network. Data is collected daily by multiple partners and national societies,

[3] 1. Proactive not reactive; preventive not remedial, 2. Privacy as the default setting, 3. Privacy embedded into design, 4. Full functionality – positive-sum, not zero-sum, 5. End-to-end security – full lifecycle protection, 6. Visibility and transparency – keep it open, 7. Respect for user privacy – keep it user-centric

but not efficiently used (Read et al., 2016). As indicated by an expert, if Red Cross data can be combined with other sources of data and be shared with partners across the network, this would have a tremendous impact. This expert also argued, that to make this a reality, the IFRC should motivate national societies to adhere to a common standard, e.g. the Humanitarian Exchange Language standard (UN OCHA, 2020). Then data can be exchanged within the network. If this is taken one step further, a central database could be used for data storage. A central database with easy accessibility also makes the job of data scientist within the Red Cross also more interesting.

Section 5.2.2 explained the ethical barrier of data collection during crisis response, which is an extreme case. For regular data collection ethics also play a role, but a different one. This is not about involuntary data submission during a crisis, but more on general data sharing practices. Privacy sensitive data should be handled with care and adhere to the same responsibility policies as discussed in previous section.

An ethical barrier surrounding the use of digital tools is the digital divide (Dutch Ministry of Foreign Affairs, 2019; World Bank Group, 2016; van Dijk, 2006): the unequal distribution of access, utilization or effect of digital technology based on personal, geopolitical, demographic, geographical or other criteria (Brown, Barram, & Irving, 1995). DT leads to he increased use of digital tools. If someone does not have access to these tools or does not have the skills to handle them, there are no benefits. It was indicated by an expert there are huge differences in digital access and skills between different national societies. This has two unwanted consequences: first, national societies with low digital literacy profit less form the benefits of DT and second, there is a power difference when it comes to agenda setting. Rich national societies with high digital literacy, have a high degree of influence on the direction of DT within the Red Cross Movement.

Resource constraint limit the ability to buy digital tooling, restricting physical access for Red Cross employees, especially in less-developed countries (van Dijk, 2006), increasing the digital divide. To solve this, accessibility to digital tools must be increased (World Bank Group, 2016). In addition to the strategy explained under section 6.2.2 for budget allocation, this can be done by frugal innovation and low-cost technology can improve access to technology and low-resource dependent software can make use of limited local infrastructure (Ahuja & Chan, 2014; James, 2001). This problem cannot be solved by the humanitarian sector alone, because of the large dependency on local stakeholders and infrastructure (Salemink, Strijker, & Bosworth, 2017).

To solve the other problem, a lack of digital skills, education is important. This too is an objective for both governments and the humanitarian sector. Governments and education institutes could rethink curricula, encourage life-long learning and increase collaboration with the digital sectors (World Bank Group, 2016). The humanitarian sector should focus on education their staff and volunteers. This can by done by making use of the international network: high developed national societies collaborating with less developed national societies to build the necessary competences (Rao, 2005). An other positive development is that IFRC has identified the development of a digital educational program for its employees as a next step in their efforts on DT (IFRC, 2020d).

Chapter 7
Discussion

The aim of this chapter is to discuss and relate the findings of chapters 5 and 6 to the literature review and theory framework of chapter 3. Furthermore, it presents the practical contribution, reflects on the scientific methods used, discusses the limitations of the study and reflects on the research questions.

7.1 Scientific Contribution

Literature showed that DT assessment is mainly approached from two perspectives ICT and management. This research has a broad approach to DT and uses both perspectives. Integrating these perspectives is something that was not done before, with the possible exception of Vial (2019), who does a literature review to show the historic evolution of DT. Albeit showing important factors, it does not explain how the factors can be used to assess an organisation on the status quo of DT. This research extracts DT factors from literature of different perspectives[1]. This research extends this knowledge by using experts, both from humanitarian background and DT background, to validate discovered DT factors and identify new factors specifically for the humanitarian sector. The framework of this thesis divides assessment criteria between people, processes and technology, as is in accordance with the literature (Nahrkhalaji et al., 2019; Rocha et al., 2015; Pope & Butler, 2012; Ghaffari et al., 2019; Kao, 2015). A benefit of adhering to these categories is that the framework of this research can still be compared to other frameworks for different applications (Deloitte Switzerland, 2017; Hess et al., 2016; Voß & Pawlowski, 2019).

No literature reviewed discusses DT specifically for the humanitarian sector. In the preliminary literature review of chapter 2 only two have no single focus on the private sector: Nahrkhalaji et al. (2019) looks at the non-profit sector and (Mergel et al., 2019) looks at the public sector. Both these papers only list challenges of DT and do not look at DT assessment. This research takes the information provided by them to get a feeling for how DT looks like outside the private sector and uses that as input for the assessment framework. While there is no literature on humanitarian DT assessment, there are some authors that have investigated innovation in the humanitarian sector, but this was either too broad and focused on all kind of innovations (Ramalingam, Scriven, & Foley, 2009; Betts & Bloom, 2014) or too narrow by only focusing on one specific application of data (Haak, 2017).

In the literature review of section 3.3.3 multiple authors stated that literature on performance management for DT is fragmented and inconsistent (Voß & Pawlowski, 2019; Mergel et al., 2019; Vial, 2019; Korachi & Bounabat, 2019; Henriette et al., 2016). While this research discussed multiple assessment framework, no structured overview was given. Since the goal of this research was to identify an assessment framework that was best used in the humanitarian sector, framework methodologies have only been scored on pre-set requirements and no systematic overview was presented. The DT research field could also benefit from a structured bibliometric analysis on DT-assessment.

Chapter 3 concluded that multiple DT assessment frameworks are available, but no off-the-shelf framework could be applied for DT in the humanitarian sector. This research combined an existing and validated

[1] see chapter 5

assessment framework methodology (CMMI Product Team, 2006) and critical DT-factors, provided by both literature and experts to fill the knowledge gap. By integrating the validated literature factors and newly found humanitarian factors in an assessment framework for DT in the humanitarian sector, this research uniquely positions itself in literature.

7.2 Practical Contribution and Implication

The research conducted in this thesis is in direct response to a practical question. It was first proven that the benefits DT helps the humanitarian sector to become more efficient and to create new ways to help people. Given these benefits, a framework that helps realising DT is of value. Furthermore, all respondents were convinced that an DT assessment is a great start to translate ambition into strategy. Therefore, in this thesis, emphasis is put on creating something that is actionable and can be practically used. The framework delivered in this thesis can be used to assess Red Cross National Societies help them taking necessary steps towards DT. The language used in the framework is deliberately non-technical, as the end-user is management of a particular national society[2].

An important second practical contribution of this research are the strategies described in section 6.2 that explain how the humanitarian sector could overcome barriers to DT. These strategies are intended to provide sufficient direction for a national society to take first steps. Because the strategies are specifically focussed on the humanitarian sector, a practical contribution is delivered.

The combination of the framework and corresponding strategies provides a tool that humanitarian managers can use to guide formulation of their strategy. It provides all relevant information to empower a Red Cross National Society to take necessary steps towards their own DT. This is fully in line with the goal of the DT assessment as formulated in section 3.2.3.2.

An additional contribution is further specification of nomenclature for the humanitarian sector. DT is an umbrella term. Talking about it can be quite esoteric: what do we actually mean when we discuss it. In this thesis, literature is used to develop a more specific definition for the Humanitarian Sector. Moreover, a conscious decision was made to split DT over the people, process and technology domains, broadening the perception that DT only includes ICT.

7.3 Limitations

The first limitation of this research is due to the research approach that was adopted. In qualitative research it is difficult to ensure replicability, especially when expert interviews are the main source of data. The researcher interprets not only what is said, but also how something is meant by a interviewee. These effects have been minimised by conducting semi-structured interviews and making use of an interview protocol, but they can never be eliminated entirely. Furthermore, because of the GDPR, interviewees have to remain anonymous and the transcripts are not allowed in the public domain. This is mitigated by sharing the transcripts with the research group for internal review.

Another limitation of this study is the generalisability. This has multiple reasons: first, eleven interviews have been conducted. While chapter 5 shows that saturation occurs, research always benefits form acquiring more data. The Red Cross is an enormous organisation, with a lot people that hold expert knowledge. This knowledge could be used to improve this research. Another measure to improve generalisability is to interview people within the humanitarian sector but outside of the Red Cross network. If knowledge and experiences of other humanitarian organisations are added, it would not only enhance applicability but also increase in value.

This research combines desk research with empirical data. As mentioned in section 8.2.2, the original ambition was to validate the results of in a case study at the NLRC. Unfortunately the DT assessment of the NLRC has been postponed, due to the COVID response. This reduces the reliability of the study.

[2] as explained in section 3.2.3.1

A final limitation is the experience of the researcher. With no prior experience in qualitative data collection and analysis, conducting this research correctly proved to be quite a challenge.

7.4 Reflection on Research Questions

The aim of this research was to design a correct, complete and easy to use assessment framework for DT in the humanitarian sector. This objective has only been partially achieved. Considerable effort was put into exposing the factors that play a role in the DT of the humanitarian sector and this gives insight in what steps need to be taken to make DT a reality. Making use of these factors, a framework was constructed. Because it is important that the framework is generally applicable, a conscious choice has been made to leave some room for finalisation, depending on the party assessed. This means that the framework is not complete, but enough for a national society to use it as a strategy guidance tool.

The combination of the framework in its current state and the corresponding strategies should provide sufficient insight for an assessor to start the conversation with a National Society about what their goals are and how they can achieve this. This should not be underestimated; starting the conversation is the first and important step to something concrete. An assessment done with this framework does provide a solid basis for a more long-term support project for DT.

Furthermore, it was shown in this research that the people and process domains are as important as the technology domain. Some experts even went as far as to say that technology was the least important domain for DT. It can therefore be concluded that including these domains is a valuable addition to the existing framework and vital to making DT a reality in the humanitarian sector.

Finally, based on expert advice, the assumption was made that most value for the humanitarian sector was to start with less-developed national societies. This way, the knowledge of the red cross network could be efficiently used. Digitally developed national societies can create a long term project with less developed national societies to work on their DT together.

Chapter 8
Conclusions & Recommendations

This chapter presents conclusions and recommendations based on all the work that has been done. The final section reflects on the link with the Management of Technology study program.

8.1 Main Conclusion of Research

The Red Cross has the ambition to digitally transform (IFRC, 2019). One of the approaches to work towards this goal is to use knowledge of digitally developed national societies to help less developed ones. The problem owner of this thesis, 510, is taking that approach. They are helping national societies by first assessing the status quo of their digital situation and then, if money is available, support them in the transformation process.

The major problem is that there is no standard approach for assessing the maturity of DT for the humanitarian sector. This thesis sets out to solve this problem by constructing a framework for assessment of DT in the humanitarian sector. By talking to DT-experts, both from within and outside of the Red Cross, an attempt was made to find an answer to the main research question:

> *What should a digital transformation assessment framework for the humanitarian sector consist of,*
> *such that it allows for correct, complete and easy assessment,*
> *while enabling digital transformation strategy formulation and implementation*

It was shown that a lot of different definitions for DT are used in literature. To create a common language for the humanitarian sector existing literature is combined. Within the humanitarian sector, DT is defined as: *"DT is a disruptive or incremental organisational shift that allows Red Cross and Red Crescent to improve their humanitarian work, pursue new ways of humanitarian aid and enables increased speed, quality and effectiveness of operations"*

The reason for DT in the humanitarian sector is that DT comes with a multitude of benefits. There are general benefits to DT: there is an opportunity to become more cost effective, digital tools might promote knowledge exchange, DT can lead to more impact, data-driven decision making can help executives to make better informed choices and DT can enable an organisation to match their services with the need of people. Additional benefits specific for the humanitarian sector include: data and digital tool can help identify the most vulnerable people that need the most help, DT can help attract a new type of professional volunteer and DT can stimulate innovation in the humanitarian sector.

Given the benefits of DT, it is clear why the humanitarian sector should make an effort to take first steps towards this transformation, as is also the ambition of the IFRC. But the barriers show that helping the humanitarian sector go through a DT is not easy. Currently, there are some small attempts at digital innovation in the humanitarian sector, but because of existing barriers this this has not yet led to an actual DT.

The major barriers for DT in the humanitarian sector are: severe resource constraints, ethical considerations, the complex organisational structure and chaotic crisis situations.

The goals for the humanitarian sector to go into a DT process are twofold: First, increased impact: improve disaster response and emergency services, create new and improve other services. And second, increased efficiency: increase the quality and cost-effectiveness of the implementation of humanitarian projects. To achieve these goals a strategy is needed.

For a Red Cross national society to be guided towards a DT we need three components: a *diagnosis* to describe the essence of the challenge, a *guiding policy* that is the combination of an ambition and an indication of how this can be achieved and a set of coherent *actions* to achieve the ambition. Translated to the topic of this thesis, the following components can be identified:

1. Diagnosis: What is the status quo of DT for a given national society?
2. Guiding policy: What is the ambition and how can DT help achieving this?
3. Actions: What set of coherent actions must a national society take to make the guiding policy a reality.

The focus of this thesis is on the diagnosis part: assessing the status quo. But it is important that this diagnosis can be used as input to create a guiding policy and a set of actions.

To adequately include the benefits, barriers and goals in the framework, requirements are formulated. The most important requirements are that the assessment framework should: give adequate representation of status DT, promote strategy formulation, allow for learning, stimulate knowledge exchange, identify value and show DT-barriers. If a national society is to go through a DT, they need a strategy that stipulates how the barriers can be overcome to enjoy the benefits.

A suitable framework design methodology is selected that complies with the design requirements. After considering multiple assessment framework methodologies, it was decided to adopt the CMMi-approach. This is a maturity model approach that is well-suited, because it gives an assessment of the status quo, while also providing strategy formulating guidance.

The research conducted in this thesis focuses on identifying main factors that play a role in DT of organisations. These factors have been categorised in three domains: people, process and technology. First, literature is used to gain an understanding of general factors that play a role in DT of organisations. Because no literature was available for DT, empirical research was conducted to determine what factors play a role for DT specifically in the humanitarian sector. Qualitative analysis on expert interview transcripts rendered these influencing factors for DT in the three domains. The most important factors for the people domain were: leadership, HR, culture and organisational structure. For the process domain, the alignment of operations and IT, long term commitment of stakeholders, crisis respond ability and legal issues were discovered as most important influencing factors. Finally, the technology domain comprises of data and digital. These factors are the main building blocks for the maturity framework.

The factors identified in the empirical research phase are used as input for maturity model synthesis. The previously selected CMMi-approach is used to design the framework axes. The domains are on the vertical axis of the framework. The horizontal axis are the different maturity levels, as standardised in the CMMi-approach. Once the axis are created, the framework is populated with the factors identified in literature and during expert interviews. In designing and formulating the framework, management as the end-user was taken into account: there is a focus on the role that management can play in the DT process and language used is deliberately non-technical. This increases the practical applicability of the framework as a strategy guiding tool.

The specific contribution for the humanitarian sector is in the combination of the framework and the strategies formulated to deal with the barriers of the humanitarian sector and overcome them. These strategies advocate, for example, the importance of having and implementing a vision and thinking long term.

8.2 Recommendations

This section is split up between recommendations for the problem owner and recommendations for future research. Practical advice is given to the problem owner in section 8.2.1 and scientific recommendations for future research in section 8.2.2.

8.2.1 Recommendations for Problem Owner

The first recommendation is to keep improving the framework. As substantiated in section 7.4, this framework is not complete. The first step is to merge this research with data-focused framework of the American Red Cross to create a holistic assessment framework that takes good care of all domains: people, process and technology. The framework would also greatly benefit from practical validation. Due to the Corona virus, there was no chance of validating this framework on its applicability in a practical case-study. This framework could improve each time it is used for an assessment. These experiences should be incorporated and codified into the framework in such a way that, in the future, the framework can be used by a variety of assessors.

Another recommendation has to do with the mindset of the assessor. The assessment is not a deliverable on its own, it has to be followed up with a transformation project. There is not only value in the technical expertise of the assessor, but also in her or his managerial and process support. The assessment is a starting point, a conversation starter between the assessor and the assessed. If those parties can align on ambition, vision and strategy, an important step for DT is taken. This is also due to the diverse nature of the Red Cross organisation. The diversity of an organisation or sector is proportional to the attention required for the change process (L. Crawford & Nahmias, 2010). If there is a high degree of diversity, a substantial amount of process is required to align people; both within a national society as different national societies within the Red Cross network.

Finally, it is recommended that this framework is adopted and supported by the IFRC, so that it can be used with their consent and endorsement. This makes it more likely that national societies do something with the outcome and also helps in acquiring funding.

8.2.2 Recommendations for Future research

The main value of this research was stipulated in section 7.4: the main effort went into identify factors of DT in Red Cross context. As identifying factors, enablers and barriers is a prerequisite for framework synthesis, this was a logical first step. For framework synthesis the CMMi approach of (CMMI Product Team, 2006) was adopted. Due to time constraints, there was no deep-dive into this methodology. Therefore, the framework can benefit from additional research that looks into thoroughly applying the well-documented CMMi method and adequately translate the factors into the framework.

As mentioned in the previous chapter, this research was approached from the managerial point of view. If one is to approach DT from the point of view of the beneficiary, the paper by Swithern (2019) would be an excellent starting point for building a theory.

Furthermore, the research done in this thesis could also scientifically benefit from a case-study. This would not only yield practical validation, but also scientific validations: are the factors mentioned by experts really the factors that matter most. It would also be interesting if this framework would be applied to a different organisation within the humanitarian sector, to validate the general applicability to the humanitarian sector. Validation of the outcomes of this research could also be done by checking the importance of discovered factors with a survey among DT experts. In using a survey, the sample could be larger, strengthening the conclusions of this thesis.

This thesis was rooted in literature on digital assessments. During and after the interviews organisational culture was often mentioned. This factor was included in the assessment framework, but it was out of the literature-scope for this thesis. Since it is such an important issue, a recommendation is to also include literature on change management. Not only for the framework itself, but especially for the process after the assessment. Then an organisation must really make an effort to go through the DT.

Finally, a more holistic approach can be used to really identify what DT would mean for the humanitarian sector. This research had a focus on what factors play a role in DT, but the question before that is: how exactly the humanitarian sector can benefit from digital tools and data science? This could shine light on whether or not the motivation for DT as written down in Strategy 2030 is justified and is feasible.

8.3 Link with MoT Program

Management of Technology integrates technology and business, it looks at how organisations can innovate by incorporating technology into their operations. For this thesis, multiple disciplines from the MoT program have been combined: how leadership can be motivated to start a technology change process, how business processes can be optimised with the use of digital tools and how technology can help to move an organisation forward.

The objective of MoT is to train responsible decision makers, professionals and leaders. This can only be partly done in lecture halls and practical experience is vital. Conducting this research within an organisation has been contributing towards reaching this goal.

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Appendix A

Definition(s) of Digital Transformation

Literature is inconsistent in defining Digital Transformation, it can mean a lot of different things. In one of the papers from the literature review, Vial (2019) presents a list of definitions. As can be seen in table A.1, this list is extended with definitions from other papers of the literature review. Finally, these 36 definitions are analysed to arrive at a single definition that is adopted in this thesis.

Table A.1: Digital transformation definitions, based on Vial (2019), extended

	Definition	Source
1	The use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements (such as enhancing customer experience, streamlining operations or creating new business models).	Fitzgerald et al. (2013)
2	Digital transformation involves leveraging digital technologies that enable key industry changes, such as enhancing consumer service or developing innovative business models.	Hanelt et al. (2015)
3	Digital transformation Strategy is a starting point which supports companies in managing transformations resulting from digital technology integration	Matt et al. (2015)
4	Digital transformation encompasses both process digitisation with a focus efficiency, and digital innovation with a focus on enhancing existing physical products with digital capabilities.	Back and Berghaus (2016)
5	Use of digital technologies to radically improve the company's performance.	Bekkhus (2016)
6	Extended use of advanced IT, such as analytical, mobile computing, social media, or smart embedded devices, and the improved use of traditional technologies, such as enterprise resource planning (ERP), to enable major business improvements.	Chanias and Hess (2016)
7	Digital transformation is the profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities brought by digital technologies and their impact across society in a strategic and prioritised way.	Demirkan et al. (2016)

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Table A.1: Digital transformation definition, continued

8	Digital transformation encompasses the digitisation of sales and communication channels, which provide novel ways to interact and engage customers, and the digitisation of a firm's offerings (products and services), which replace or augment physical offerings. Digital transformation also describes the triggering of tactical or strategic business moves by data-driven insights and the launch of digital business models that allow new ways to capture value.	Haffke et al. (2016)
9	[...] a disruptive or incremental change process. It starts with the adoption and use of digital technologies, then evolving into an implicit holistic transformation of an organization, or deliberate to pursue value creation.	Henriette et al. (2016)
10	Use of new digital technologies, such as social media, mobile, analytics or embedded devices, in order to enable major business improvements like enhancing customer experience, streamlining operations or creating new business models.	Horlacher et al. (2016)
11	The best understanding of digital transformation is adopting business processes and practices to help the organisation compete effectively in an increasingly digital world.	Kane et al. (2016)
12	Changes and transformations that are driven and built on a foundation of digital technologies. Within an enterprise, digital transformation is defined as an organisational shift to big data, analytics, cloud, mobile and social media platform. Whereas organisations are constantly transforming and evolving in response to changing business landscape, digital transformation are the changes built on the foundation of digital technologies, ushering unique changes in business operations, business processes and value creation.	Nwankpa and Roumani (2016)
13	Digital Transformation has five domains: Customers, Competition, Data, Innovation, Value	Rogers (2016)
14	Digital transformation is not a software upgrade or a supply chain improvement project. It's a planned digital shock to what may be a reasonably functioning system.	Andriole (2017)
15	The changes digital technologies can bring about in a company's business model, which result in changed products or organisational structures or automation of processes.	Clohessy et al. (2017)
16	It differentiates itself in terms of speed and its holistic nature from previous IT-enabled business transformations.	Hartl and Hess (2017)
17	Transformations within organizations driven by new IT solutions and trends that enable them.	Heilig et al. (2017)
18	Digital transformation includes a strategy implementation that is caused by data-driven perspectives and the implementation of modern business models that create new forms of generating value.	Horlach, Drews, Schirmer, and Boehmann (2017)
19	The use of technology to radically improve performance or reach of enterprises.	Karagiannaki et al. (2017)

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Table A.1: Digital transformation definition, continued

20	Digital transformation are IT changes as a means of automating tasks (partially).	Legner et al. (2017)
21	An organic process which leverages digital technologies and capabilities in order to build value for business models, organizational processes and consumer experiences.	Morakanyane et al. (2017)
22	The use of emerging technology innovations to allow significant organizational and market changes such as enhancing consumer service, streamlining processes or developing new business models.	Paavola et al. (2017)
23	Fundamental improvements in current business models and the emergence of different business models [...] in reaction to the proliferation of emerging technology such as cloud infrastructure, the Internet , social networking and big data.	Remane et al. (2017)
24	The digital transformation presents challenges at several levels, namely in leadership, data governance, global supply chain processes, and in how to integrate technologies to transform the organization.	Sanchez (2017)
25	use of digital technologies to change a business model and provide new revenue and value-producing opportunities	Grivas et al. (2018)
26	Digital transformation highlights the impact of IT on organisational structure, routines, information flow, and organisational capabilities to accommodate and adapt to IT. In this sense, digital transformation emphasises more the technological root of IT and the alignment between IT and businesses.	Li et al. (2018)
27	technological changes particularly affect the design of work [...], i.e. the way in which employees work in organizations as well as the conditions under which they do so	Schwarzmüller et al. (2018)
28	The benefits of digital transformation are very much related to the advantages that digital technologies present to companies. Somehow, companies perform a digital transformation in order to achieve cost reduction, productivity improvement, and innovation	Aguiar et al. (2019)
29	Digital business transformation is disrupting businesses in every industry by breaking down barriers between people, businesses and things, as by breaking these barriers, they can create new products and services, and find more efficient ways of doing business. Digital transformation involves the reshaping of the very context and structure of organisations	Christoffels (2019)
30	Through the enabling of data ubiquity and connectivity capabilities, these provide an increasing number of new possibilities for the development of new products, processes and services	Colli et al. (2019)
31	Digital transformation is concerned with the changes digital technologies can bring about in a company's business model, which result in changed products or organizational structures or in the automation of processes.	Hess et al. (2016)
32	the use of technology to radically improve performance or reach of organizations	Korachi and Bounabat (2019)

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Table A.1: Digital transformation definition, continued

33	Digital transformation is a holistic effort to revise core processes and services of government beyond the traditional digitization efforts. It revolves along a continuum of transition from analog to digital to a full stack review of policies, current processes, and user needs and results in a complete revision of the existing and the creation of new digital services. The outcome of digital transformation efforts focuses among others on the satisfaction of user needs, new forms of service delivery, and the expansion of the user base.	Mergel et al. (2019)
34	a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.	Vial (2019)
35	two factors are relevant: technical progress on the one hand and organisational change on the other.	Voß and Pawlowski (2019)
36	digital transformation is not merely about integrating technologies into business' operations – it begins with an overarching strategic and cultural change that is carefully tailored to simultaneously address the organization as a whole	Kidschun et al. (2020)

Appendix B
Framework Requirements

In table B.1, the requirements for the assessment framework. The must haves are explained in section 3.2.4 and used for verification in section 6.1.5.1.

Table B.1: Requirements for DT Assessment Framework

	Requirement
Must haves	Multi-dimensional representation of status DT Allow for strategy formulation Promote learning Stimulate knowledge exchange Identify value Show DT-barriers
Should haves	No advance knowledge needed to use framework Allow for comparison (to other RCNS and previous self) Quick assessment Intuitive framework
Could haves	Contribute towards other goals strategy 2030 Not hinder (daily) operations Automatic test for errors & error sensitivity Asessment can be done remotely
Won't haves	Multiple languages Help centre / hotline Self-assessment tool

Appendix C

DT Factors from Literature

Table C.1 shows how often a factor was mentioned by what authors.

Table C.1: Factors extracted from existing frameworks

	Factors	Matt et al. (2015)	Henriette et al. (2016)	Sanchez (2017)	Grivas et al. (2018)	Schwarzmüller et al. (2018)	Aguiar et al. (2019)	Colli et al. (2019)	Hess et al. (2016)	Korachi and Bounabat (2019)	Mergel et al. (2019)	Vial (2019)	Voß and Pawlowski (2019)	Kidschun et al. (2020)	n
People	Leadership/ambition/vision	X	X	X	X			X	X	X		X		X	**9**
	Available human resources	X		X		X	X		X	X	X	X			**8**
	Willingness to change	X	X		X				X	X					**5**
	Organisational culture	X	X		X		X	X							**5**
	Actor network		X	X		X								X	**4**
	Internal/external communication						X								**1**
Process	Organisational structure	X	X		X		X	X	X	X		X	X	X	**10**
	New value creation (business model)						X		X			X	X	X	**5**
	Deviation from core	X		X				X	X						**4**
	Available financial resources	X		X					X	X					**4**
	Customer experience						X		X					X	**3**
	Ethics											X		X	**2**
Technology	Technology infrastructure	X	X	X	X	X	X	X	X	X	X	X	X	X	**13**
	(Data) security						X								**1**

If a certain factor occurs more often, it does not mean that it is necessarily more important. This is especially true for the case presented in this thesis, because the field of application is different. The opposite is also true; it might be that a factor that occurs only once or twice may be of tremendous importance in the humanitarian context of this research.

Appendix D

Coocurrence: Enablers and Barriers

This appendix lists the most important enablers and barriers to DT, based on how often a factor has been referred to by experts. Every time a factor is mentioned by an expert, this statement is coded with that particular factor plus an indication if it is a barrier or an enabler. With Atlas.TI a co-occurrence-table is created, table D.1 shows how often a certain factor was an enabler or a barrier and by how many experts this factor was mentioned. For clarity and brevity, only factors are included that have been mentioned by more than one expert.

Disclaimer on Qualitative Data

Table D.1 has been created with qualitative data. If all experts mention something it is not necessarily more important than something said by only two experts. Nonetheless, the researcher believes that it gives *some indication* of how important a factor is. The outcomes of this table are therefore to be used with caution and not without additional consideration.

Table D.1: Enablers and Barriers for Digital Transformation as mentioned by experts, sorted by # Experts

Factor	# of Experts (n=11)	# mentioned as barrier	# mentioned as Enabler
Alignment of internal and external stakeholders (Network)	10	2	10
Enthusiams of Employees	10	2	26
Availability of Data	9	1	17
Digital Illiteracy	9	6	1
Managing expectations	9	5	4
Priority (of leadership)	9	13	10
International and local Network	8	9	37
Long Term Commitment	8	9	19
Strategy / Roadmap	8	0	11
Culture	7	11	9
Donor Commitment	7	10	6
Fear of Digital Options	7	4	1

Leadership/top-level commitment	7	21	30
Showing Best practices	7	0	28
Costs	6	9	2
Organisational Structure	6	8	6
Room for Experimenting	6	1	7
Vision/Ambition	6	3	26
Education	5	12	30
Funding	5	16	19
Human Resources (capabilities employees)	5	9	18
Storytelling	5	0	17
Alignment Business & IT	4	6	22
Internal Politics	4	3	0
Trust in Digital Options	4	2	5
Ownership leadership of DT process	3	3	10
Volunteers	2	0	2