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From promise to practice: humanitarian digital identities in the forced migration context

A qualitative case study on innovative digital identification initiatives in humanitarian settings, with a focus on blockchain

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Forword

After contemplating pursuing a master's degree for almost a decade, I was thrilled when I finally discovered a course at the University of Agder in Norway which allowed me to combine my interest for emerging and digital technologies with the realms of society, politics and ethics.

The process of writing this dissertation has been immensely fulfilling and educational, yet at times also challenging, especially in combination with a full-time job. There are several people who deserve attention for their contributions and words of encouragement along the way.

I would like to thank my supervisor professor Øystein Sæbø for his invaluable advice and guidance. I wanted you to be my supervisor from the first moment I heard you speak about the module 'Politics and Technology' and your line of research at the degree's introduction session. I sincerely hope that I will have the opportunity to work with you again sometime in the future.

I would also like to thank my friends and family. Ingvild Bergom Lunde, who I spent four months in magical, mountainous Lofoten with during the first part of my degree. Linn Charles, a brilliant mind and person. My parents Nick and Claire for all their care. My sisters Lisa, for proofreading all my chapters and providing valuable feedback and insights, and Emma, for always being someone I can turn to. A special thanks to my fiancé Ola, who has been my main source of motivation and support throughout the entire process.

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Finally, I would like to express my sincere appreciation to the study's informants, spread across different corners of the world. Thank you so much for dedicating the time to participate in the study, I am deeply appreciative for your willingness to share your perspectives.

Any errors or omissions are entirely my own.

Kari With

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Abstract

A panoply of different actors are turning to the promises of emerging and digital technologies to address global forced migration and identification (ID) challenges. At the forefront is the humanitarian field, a sector which has become increasingly digitalised in recent years. To explore and adopt novel technologies and solutions, collaborations with private sector entities such as technology firms have become an increasingly common facet of humanitarian action.

The purpose of this qualitative study is to examine humanitarian digital ID solutions in the forced migration context. More specifically, the study seeks to uncover how various sociotechnical elements may impact the delivery of services to forcibly displaced people. To narrow down the focus, the study delves into the empirical use case of blockchain and investigates various actors' perspectives on this technology, as well as key factors enabling and hindering its implementation and effects in this domain. The study draws on work system theory and affordance theory to develop a joint analytical framework. The study makes both empirical and theoretical contributions to the extant scholarship on digital IDs and blockchain in forced migration and humanitarian settings. Empirically, by shedding light on blockchain-aided humanitarian projects and their diverse implications. Theoretically, by proposing how work system theory and affordance theory can be combined to analyse sociotechnical phenomena.

To unpack the significance and implications of digital IDs and the role of blockchain in the humanitarian sphere, the analysis is based on a literature review, 10 qualitative interviews and the application of the study's analytical framework. The interview sample consists of international actors from various humanitarian and technology companies, as well as individuals with in-depth knowledge about digital IDs and forced migration. The study finds that these actors have varying perceptions on the potential, opportunities, challenges and benefits of digital IDs and the role of blockchain. Many of the humanitarian digital ID pilots launched have not progressed into full-scale projects. While there are many different reasons for this, the primary and secondary data suggests that key factors include limited resources and lacking digital infrastructure, connectivity and smartphone access in some of the areas where the initiatives are introduced, as well as the sensitivity and complexity attached to digital IDs.

The findings indicate that there is a continuous need to leverage the affordances connected to emerging technologies in humanitarian digital ID initiatives, while also mitigating and fully understanding the accompanying hurdles and risks. The findings also reveal how blockchain is just one the technologies in much larger sociotechnical ecosystems. Although blockchain functions well in some contexts, there are other instances where different technologies might be better suited. Despite the hype connected to various emerging technologies, the global ID challenge is fundamentally social and human in character rather than technical. Therefore, it requires political and legislative reforms, policy regulations, as well as deliberate decision-making and an adequate understanding of forcibly displaced individuals' needs and situations. While self-sovereign identity solutions are making headway in contexts where individuals are mostly online and already have access to legal IDs, basic rights, public services and mobile devices, there is still progress to be made to protect the interests of vulnerable and forcibly displaced populations located in digitally underserved and low-connectivity settings.

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List of acronyms

AI	Artificial Intelligence
CBA	Cash Based Assistance
CVA	Cash and Voucher Assistance
CSO	Civil Society Organisation
DIGID	Dignified Identities in Cash Assistance
DLT	Digital Ledger Technology
EU	European Union
HDID	Humanitarian Digital Identity
HDID-WSF	Humanitarian Digital ID Work System Framework
IT	Information technology
ICT	Information and Communication Technology
ID	Identification
IOM	International Organization for Migration (IOM)
IFRC	The International Federation of Red Cross and Red Crescent Societies
KYC	Know Your Customer
NGO	Non-Governmental Organisation
PPI	Protected Personal Information
P2P	Peer-to-Peer
SDG	Sustainable Development Goal
UN	United Nations
UNICEF	United Nations Children's Fund
UNHCR	United Nations Refugee Agency
UNDP	United Nations Development Program
WFP	World Food Programme
WSF	Work System Framework
WST	Work System Theory

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1. Introduction

The international community, governments and the humanitarian sector are under increased pressure to respond to the growing number of refugees, asylum seekers and internally displaced people requiring urgent assistance (Madianou, 2019). According to the United Nations Refugee Agency (UNHCR, 2023a), there are currently more than 100 million forcibly displaced people[1] across the globe - the highest number ever registered. The surge in forced displacement is attributed to a myriad of factors, including climate change, Covid-19, high poverty rates, instability and conflicts in countries such as Ethiopia, Afghanistan, Venezuela, Myanmar and Ukraine (UNHCR, 2023a). Disconcertingly, the number and magnitude of emergencies and forced migrants seems to be rapidly increasing, with the recent outbreak of the Israel-Palestine conflict being a grave example of a humanitarian crisis generating mass displacement.

Amid crisis and conflict, many people are forced to leave almost all their personal belongings behind to get to safety. This may include their personal identification (ID) documents such as birth certificates and passports. Whereas some documents may be forsaken in the haste to flee, other records are lost along the way, destroyed to avoid persecution or confiscated by border guards, militia or smugglers (Barbino, 2020; Manby, 2016). Moreover, a substantial portion of the global population have never had these documents to begin with, with an estimated 850 million people worldwide lacking any form of official ID. Most of these individuals live in low-income countries, more than half live in Sub-Saharan Africa and almost a quarter live in South Asia (Clark et al., 2022, p. v). Those lacking official IDs often face a range of obstacles to accessing education, employment, healthcare, welfare services, social protection and humanitarian assistance. They may also be prevented from travelling, exercising their basic human rights and participating in political and social spheres (Clark et al. 2022; Manby, 2016).

Combined efforts to address forced migration and ID challenges

Notably, a growing number of actors are exploring the potential of innovation and emerging technologies to address systemic forced displacement and ID challenges (Cheesman, 2022; Connolly et al., 2022; Lee 2020). As many humanitarian and governmental actors lack the technical expertise and competences needed to develop solutions using emerging technologies, this had led to the growing involvement from private sector actors and the rise of cross-sector collaborations (Skogvang, 2018). Pertinent examples of technologies currently being harnessed in forced migration and identification contexts include artificial intelligence (AI), predictive analytics, social media, big data, biometrics and blockchain (Madinaou, 2019; Molnar, 2020).

Humanitarian digital ID initiatives

Identification processes are increasingly becoming digitised, using an array of new technologies (World Bank, 2019). The systems used to create various credentials and IDs are commonly divided into two overarching categories: foundational and functional identities. Foundational identity, often called legal identity, include the birth certificates, national IDs and passports

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[1] The term 'forcibly displaced' will be applied as an umbrella term in the study to refer to refugees, asylum seekers and internally displaced people who have been forced to move or flee within or across borders. However, it is important to note that there are several differences between these categories of migrants.

issued and recognised by nation states. Functional identity has a narrower scope and includes credentials issued to provide access to specific services (World Bank, 2019). Humanitarian actors are today issuing functional ID solutions for a variety of purposes. Prevalent examples include the creation of digital IDs to establish beneficiaries' eligibility and access to different services and to disburse Cash and Voucher Assistance (CVA[2]) to aid recipients (IFRC, 2023).

With the increased digitalisation of humanitarian assistance and IDs, there is concurrently a growing awareness about the need to safeguard aid recipients' sensitive data, while also providing them with the agency to access, control and selectively disclose their personal identity information. This entails efforts to reduce excessive data extraction and the reliance on centralised databases or third-party intermediaries (Slavin et al., 2021, p. 8). Consequently, the concept of decentralised and self-sovereign identity (SSI) has gained momentum (IFRC, 2023). "SSI is based on the principle that identity should be in the hands of the people" (Terranova, 2022, p. 393) and it is frequently associated with the technology blockchain (Cheesman, 2022).

The use of blockchain for humanitarian digital IDs and CVA

Various UN agencies and humanitarian organisations have already piloted blockchain to provide digital IDs and CVA to forced migrants and other crisis affected communities. However, a polarised debate surrounds the implementation of blockchain-enabled applications involving vulnerable populations (Cheesman 2022; Lee, 2020; Weitzberg et al. 2021). On the one hand, blockchain has been celebrated for its potential to "innovate" and "disrupt" outdated aid models (Haahr, 2017) and enable more efficient and secure humanitarian assistance (Connolly et al., 2022). On the other hand, humanitarian blockchain projects have been denounced for presenting a plethora of ethical, operational and regulatory challenges (Cheesman, 2022; Spahiu, 2021). Yet as Lee (2020, p. 10) points out, "Almost all technologies bring with them inherent benefits and risks." What is often missing are more nuanced accounts and perspectives on humanitarian blockchain projects and their diverse implications (Lee, 2020; Weitzberg et al. 2021). My aspiration is that this study will shed light on exactly this.

1.1. Current gaps in literature and the focus of the study

To date, most research on blockchain has focused on its application to different financial services, when there is in fact a growing need to research how it can be used in humanitarian settings (Connolly et al., 2022). The private sector has not received much attention in scholarly literature concerning blockchain in the humanitarian field, even though it is gaining a crucial role in many operations (Madinaou, 2019). Research and evaluations on the actual impact and implications of blockchain-aided humanitarian projects remains scarce and needs to be explored further (Lee 2020; Weitzberg et al. 2021). Furthermore, studies that "examine how digital identity schemes are taking shape in ways that may be similar—but also profoundly different— across global divides" are needed to better understand this phenomenon and its humanitarian consequences (Martin et al, 2021, p. 5). This study seeks to address some of these gaps by contributing to the burgeoning body of literature on digital ID and CVA solutions for forcibly displaced individuals, as well as the use and implications of using blockchain in this context.

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[2] The term 'CVA' will henceforth be used as an umbrella term in the study for different cash transfer and voucher options disbursed directly to aid recipients and beneficiaries, including cash-based assistance (CBA).

Importantly, blockchain is seldomly used in isolation and is rather a part of evolving social, technical and political systems consisting of many different elements (Crumpler et al., 2021, p. 1). As such, the impact of different blockchain-enabled humanitarian initiatives is contingent on several internal and external factors, including the larger sociotechnical systems which they are embedded into, the surrounding environment, as well as the objectives and capabilities of the implementing actors and the background and situation of the end-users.

1.2. Research questions

The overarching topic of this study is humanitarian digital IDs in the forced migration setting. This will encompass CVA, as this is often an integral component of these ID initiatives. Specifically, the study seeks to examine the following research question (RQ):

RQ: How do sociotechnical elements in humanitarian digital ID systems impact the provision of services to beneficiaries in a forced migration context?

To further refine the study's scope, I delve into the empirical use case of blockchain and explore its implications for the broader topic of interest by asking the following sub-questions (sub-Qs):

Sub-Q1*:* How do various stakeholders perceive blockchain's potential in this domain?

Sub-Q2: What key factors may enable or hinder blockchain's use and effects in this domain?

The study jointly draws on work system theory (WST) and affordance theory to address the research questions from a sociotechnical perspective. A sociotechnical perspective allows for the examination of the intersections between societal and technological aspects, as well as the environment in which a particular system operates (Abbas & Michael, 2023). In the context of this study, 'sociotechnical elements' will refer to aspects such as the collaborations, infrastructures, strategies, processes, regulations and politics underpinning humanitarian digital ID systems. While WST allows for an overview of different components impacting the systems, affordance theory examines how particular actors perceive and use blockchain for specific purposes and how contextual conditions may influence its adoption and outcomes. The study's analysis is based on a literature review and qualitative interviews with 10 relevant actors.

1.3. Structure of the study

The study is comprised of seven chapters. **The first chapter** is the introduction. **The second chapter** consists of a literature review and a brief introduction to key concepts. **The third chapter** outlines the study's theoretical framework and analytical model. **The fourth chapter** provides the methodological steps and ethical considerations guiding the study. **The fifth chapter** presents the research findings. **The sixth chapter** discusses and interprets the findings, based on key themes derived from the analysis, as well as relevant research and theory. Finally, **the seventh chapter** provides conclusions that summarise the key takeaways, implications and limitations of the study, as well as avenues for further research.

2. Literature review

This chapter aims to ground the research questions, elucidate key concepts, synthesise main themes and place the current study into a wider picture. Specifically, **Section 2.1**. will establish the context by expounding upon the concept of humanitarian assistance. This is necessary to grasp the growing significance of innovation, emerging technologies and data in humanitarian and forced migration settings, as outlined in **Sections 2.2. and 2.3.** Then, **Section 2.4.** will describe the distinction between analogue, digital and self-sovereign ID solutions and **Section 2.5.** will introduce blockchain. This will serve to decipher how these concepts are intertwined and connected to the development of innovative digital ID and CVA efforts in the humanitarian sector. Finally, **Section 2.6.** will provide examples of prominent blockchain-aided humanitarian initiatives and **Section 2.7.** will present scholarly studies and divergent viewpoints on the topic.

2.1. Humanitarian assistance

In a world riddled by an increasing number of global emergencies, humanitarian operations endeavour to save lives, reduce suffering and minimise the adverse effects of various types of crises, such as violence, armed conflict and natural disasters (Obrecht et al., 2022). Humanitarian assistance is provided to various affected communities and individuals, many of whom live below the poverty line and in rural and remote locations (Tusiime & Byrne, 2011). This assistance may take many different forms, with CVA being an increasingly used option. The assembly of actors delivering aid today is comprised of the more traditional entities like international NGOs, UN agencies and other philanthropic organisations with humanitarian action as their primary mandate, as well as actors who support these efforts without it being their core function (Obrecht et al., 2022, p. 7). Examples of the latter include government bodies and donors, as well as private-sector entities such technology startups and companies.

2.2. Global challenges and innovation in the humanitarian sector

The 2030 Agenda for Sustainable Development was approved by all UN member states in 2015. It is made up by 17 Sustainable Development Goals (SDGs) and targets, which call all member states into action in areas such as poverty, health and conflict (UN, 2022). Under Goal 16 concerning 'Peace, Justice and Strong Institutions', access to ID is listed as one of the targets, stipulating that every human being should have a legal identity by 2030 (UN, 2022). As a response to the SDGs and the forced migration challenge, different actors are examining how emerging technologies and innovation can be incorporated into disaster relief and humanitarian contexts (Cheesman, 2022; Dimitru, 2020; Ramalingam et al. 2010; Seyedsayamdost & Vanderwall, 2020; Skogvang, 2018; Tusiime & Byrne, 2011). Innovations can broadly be defined as "dynamic processes which focus on the creation and implementation of new or improved products and services, processes and paradigms" (Ramalingam et al., 2010, p. 3).

Innovation in the humanitarian sector can be understood in relation to ongoing debates about the alleged "weaknesses" of humanitarian action, in which considerable criticism has been directed towards the sector's insufficient effectiveness, lack of evidence-based interventions, limited budgets and apparent risk-aversion (Ramalingam et al., 2010; Tusiime & Byrne, 2011). Therefore, many humanitarian organisations turn to the promises of technological innovations

"to improve performance and growth, as well as to enhance accountability, transparency, and visibility" (Tusiime & Byrne, 2011, p. 35). They also increasingly involve technology companies to explore and deploy emerging technologies to deliver efficient and diverse forms of aid (Ramalingam et al., 2010). Examples include the use of drones to deliver medical supplies and food, the use of geospatial information for real-time crisis mapping, the use of AI to predict the impact of disasters and the use of biometrics and blockchain to facilitate and disburse digital IDs and CVA to crisis-affected populations (European Parliament, 2019).

Madinaou (2019) argues that the use of technologies such as AI, biometrics and blockchain in humanitarian and migrant identification processes, as well as the conflicting agendas of stakeholders operating in the humanitarian space, can be analysed through several competing logics. These include: (1) the logic of accountability, "which concerns the ongoing demand for humanitarian reform", whereby technologies are seen to address the sector's alleged lack of accountability (p. 586), (2) the logic of audit, signifying how donors are increasingly demanding evidence that confirms the effectiveness of humanitarian interventions, (3) the logic of capitalism, spurred on by the fact that many private sector and technology organisations have entered the humanitarian field with their own business incentives and interests, and (4) the logic of solutionism, "which refers to the desire to find technological solutions to complex social problems", often without fully grasping them (p. 588). Notably, these technological solutions often extract, store and use large amounts of data. This has led to proclamations about an ongoing "datafication" of the humanitarian sector (Cheesman, 2022; Weitzberg et al., 2021).

2.3. The "datafication" of the humanitarian sector and forced migration processes

Madinaou (2019) posits that the use of emerging technologies to register and identify refugee populations signifies a wider trend of digital transformation in the humanitarian field. It has also been claimed that this trend can be understood within the wider context of "datafication", that is, turning quantifiable data into information which can be analysed (Cheesman 2022, p. 77; Weitzberg et al., 2021, p. 1). Data plays a prominent role in tracking and monitoring forcibly displaced peoples' migration journeys and movements (Molnar, 2020). Latonero et al. (2019, p. 13) present the term "identity data ecosystem" to refer to the large network of actors and technologies used to gather and process migrant data. With regards to actors, the researchers state that key data collectors of migrant data are: (1) governments, including national and local police and security entities, (2) UN agencies and international organisations, including the UNHCR, (3) local NGOs and civil society organisations, (4) private technology sector actors and (5) the media and academics. With regards to technologies, they find that a combination of tools are used to track and collect demographically and personally identifiable data about migrants, including social media sites, drones, satellites, digital cameras, fingerprint machines, biometrics and local and cloud-based servers (Latonero et al., 2019, p. 14).

Many scholars stress the potentially adverse implications of excessive data extraction processes and use of emerging technologies in humanitarian and migration settings (Cheesman 2022; Latonero et al., 2019; Madinaou, 2019; Molnar 2020). This will be further addressed in **Section 2.6.** Yet Latonero et al. (2019, p. 11) underline that even though data collection practices may exacerbate existing inequalities and discrimination, it is important to remember that this very data also provides important insights that can benefit humanitarian operations and the intended

beneficiaries. Furthermore, Weitzberg et al. (2021, p. 1) state that it is important to acknowledge that the aid recipients may experience data collection technologies in a range of different ways and that one should "avoid painting all forms of data collection as inherently invasive or detrimental." That said, it is today widely acknowledged that humanitarian actors involved in collecting personal data from forced migrants should ensure that they have adequate privacy policies in place, minimise the data they gather and consciously evaluate whether the data is essential for delivering services (Latonero et al., 2019; Lee, 2020; Weitzberg et al. 2021). Notably, increased attention is being devoted to solutions that provide aid recipients with more access and ownership to their identity data (Slavin et al., 2021). Research suggests that this is a key reason why digital and self-sovereign ID projects have gained traction in the humanitarian field (Cheesman 2022; Connolly et al., 2020; IFRC, 2023; Lee, 2020; Slavin et al., 2021).

2.4.   The evolution of humanitarian ID initiatives: from analogue to digital and SSI

'Identity' is difficult to define, not least because it is a contested sociological, political and philosophical concept (Cheesman, 2022, p. 138) and it will as such mean different things to different people. Although there exists no universally accepted definition, it can broadly be understood as "the combination of characteristics or attributes that make a person unique in a given context" (World Bank, 2019, p. 11). The term identity is often used interchangeably with identification (ID), which will in this study be defined as a "document, object, or data structure that vouches for the identity of a person through some method of trust and authentication" (World Bank, 2019, p. 216). As already mentioned, it is common to distinguish between foundational and functional ID systems. The first category of systems is often used to issue official IDs that establish a person's legal identity. The second category may create IDs for specific purposes and services within a sector or organisation. The majority of IDs issued by actors in the humanitarian sector today are examples of functional IDs (IFRC, 2023).

Notably, the issuance of IDs to forcibly displaced populations is not a new phenomenon. For instance, an early example of an ID document and travel permit for forcibly displaced individuals was issued in 1922 and entitled the 'Nansen passport'. The Norwegian adventurer and philanthropist Fridtjof Nansen established the passport during his time as High Commissioner for Refugees in the League of Nations. The backdrop for the passport's creation was the displacement and statelessness caused by the Bolshevik Revolution, the Turkish war of independence and the dissolution of the Ottoman empire (UNHCR, 2022a). The League of Nations was the predecessor of the UN and the Nansen Passport was later replaced by the registration and refugee ID cards issued by the UNHCR (UNHCR, 2022a).

Although the issuance of humanitarian IDs to forcibly displaced people has a 100-year long history, the advancement of digital technologies has resulted in ID processes and credentials becoming increasingly digitised and distributed. Just like the term 'identity', **'digital identity'** can mean different things depending on the context and stakeholders involved (IFRC, 2023). The World Bank (2019, p. 217) defines digital identity as "a set of electronically captured and stored attributes and/or credentials that uniquely identify a person." Credentials can be understood as "anything that can enable a person to prove that they are who they claim to be" (Vassor, 2023, p. 8). Examples of different forms of credentials can be found in **Figure 1.**

Figure 1: Examples of credentials. World Bank (2019, p. 157).

Connected to digital identity is the concept of '**SSI**', which is often described as a movement focused on facilitating user-centric, self-owned, self-operated and decentralised identities (Terranova, 2022). The concept of SSI includes core principles such as data minimisation, persistence, portability and the protection of user rights.[3] Numerous digital ID pilots and projects have recently been launched in the humanitarian sector to establish beneficiaries' eligibility for aid and access to assistance (IFRC, 2023). Several of these initiatives have attempted to incorporate SSI principles. While many different technologies are used in SSI solutions, the concept is often closely associated to blockchain (Cheesman, 2022).

2.5. The turn to blockchain

Although it is beyond the scope of the study to provide an exhaustive technical description of blockchain, an introduction to the technology is nevertheless necessary to assess its promises, limitations and implications for humanitarian digital ID, SSI and CVA initiatives in the forced migration context. Blockchain emerged in the aftermath of the global financial crisis of 2007-2008 (Cheesman, 2022; Dumitriu, 2020). It was first conceptualised in the white paper "Bitcoin: A Peer-to-Peer Electronic cash system" by the pseudonymous author Satoshi Nakamoto (2008). From its inception, blockchain's main premise has been to replace central authorities and intermediaries such as banks and service providers (Cheesman, 2022; Connolly et al., 2020).

Blockchain is an example of a digital ledger technology, that is, a shared database of records. The ledgers store various types of structured transactions and digital information in "blocks" of data, distributed across a network of multiple participants and computers, also called "nodes" (Connolly et al. 2022., p. 2). Each new block of information is cryptographically linked together with the previous block in a specific sequence, resulting in a chain of blocks (Barbino, 2020). If the information on a block changes, it becomes incompatible with the previous block. Thus, a block can never be edited or deleted without breaking the cryptography and sequence of the blockchain, making it more resilient towards tampering and security breaches (Lee, 2020). A simplified visualisation of how blockchain works can be seen in **Figure 2.**

Blockchain's infrastructure can very broadly be divided into two main groups: (1) public, permissionless and decentralised blockchains and (2) private, permissioned and centralised (or partly centralised) blockchains. Whereas anyone can anonymously participate and view transactions on a public blockchain, private blockchains are restricted to a selected group of users, whose access is controlled and verified by a central organisation (Dumitriu, 2020).

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[3]See: https://www.selfsovereignidentity.it/the-10-principles-of-self-sovereign-identity-ssi/

Blockchain has been defined by some as an "era-defining" technology that has together with AI, robotics, automation and cloud computing, ushered us from the third industrial revolution, known as the digital age, into the so-called "fourth industrial revolution" (Lee, 2020, p. 4). Blockchain technology has grown exponentially during the last decade and some claim that it may eventually transform and disrupt almost every industry (Dumitriu, 2020, p. 1).
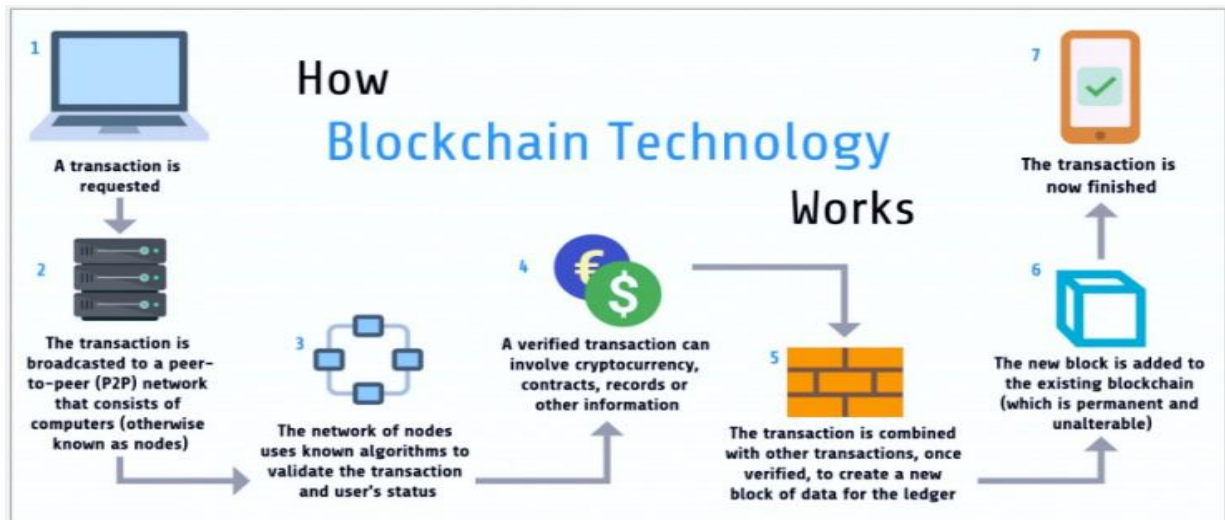
Figure 2: How Blockchain Technology Works. Spahiu (2021, p. 8).

2.5.1. Key properties and features of blockchain

Several properties and attributes are often emphasised in discussions about blockchain (Connolly et al., 2022, Dumitriu 2020; Unite 2018, Spahiu, 2021), including:

(1) **Decentralisation:** no single authority controls, verifies or governs the information on the database. All users instead have access to the same information.

(2) **Distribution:** copies of the ledger, as well as all transactions and changes, are distributed across all nodes and visible to all members on the network.

(3) **Immutability**: information or blocks cannot be tampered with or destroyed. Once a transaction or piece of information is recorded, it cannot be reversed.

(4) **Interoperability:** possibility to use data or information on multiple platforms for different purposes, rather than it being locked into a central database.

(5) **Security:** information is secured through point 1-4, as well as algorithms and cryptography that secure and protect the blockchain network.

By virtue of these properties and attributes, blockchain has been considered to lead to a range of potential benefits for many different industries, including the humanitarian sector. For instance, blockchain's distributed and decentralised features are said to potentially improve coordination between different organisations and facilitate scalable public-private cooperation as new users can easily be added to the network (Dumitriu 2020; Skogvang; 2018). In contrast to traditional databases governed by a central authority, these features may also lead to increased transparency and accountability by allowing every participant real-time access to past

and present transactions (Connolly et al., 2022). Blockchain's distributed nature with multiple nodes in diverse locations may also make the system more resilient to malicious attacks and hacking, as it is challenging to break into the entire system and forge the records (Crumpler et al., 2021, p. 6). Not all aid reaches its intended beneficiaries due to challenges related to fraud and corruption. The immutability feature prohibits the alteration of information. Moreover, cryptocurrencies are increasingly being used to transfer funds directly to specific causes and people, preventing the need for multiple intermediaries and costly conversions (Unite, 2018).

2.5.2. Blockchain humanitarianism

According to Cheesman (2022, p. 45), over 60 different humanitarian blockchain projects are being piloted and developed by UN agencies, international organisations, NGOs, non-profits and private sector actors. Examples of UN agencies that have used blockchain applications for different types of projects include the UN Women, the UN International Children's Emergency Fund (UNICEF), the UNHCR, the UN Development Programme (UNDP) and the World Food Programme (WFP). Use cases include governance, e-voting systems, supply chain, donor assistance, secure land registration, CVA disbursements and digital ID management (Cheesman 2022; Dumitriu, 2020). Additionally, projects have been initiated by humanitarian organisations such as the International Federation of Red Cross and Red Crescent Societies (IFRC), Oxfam and CARE International. grassroot organisations such as the Rohingya Project, as well as private technology companies and start-ups like Tykn, Diwala, Banqu and CryptoSavannah.

Whereas some initiatives are established through large global alliances, others consist of just two or three actors (Connolly et al. 2022, p. 8). For Lee (2020, p. 14), "decentralized technology by definition demands cooperation from not just governments and state actors, but also companies, non-profits, universities, aid agencies, grassroots organizations, and stakeholders from across all sectors and levels of society." In the forced migration and humanitarian context, many of the pilots and projects being developed are centred around the creation of digital and self-sovereign identities. Several of these initiatives also incorporate different CVA elements.

2.5.3. Divergent views on the nexus between IDs, blockchain and humanitarianism

> "For the United Nations to deliver better on our mandate in the digital age, we need to embrace technologies like blockchain that can help accelerate the achievement of the Sustainable Development Goals." *UN Secretary-General Antonio Guterres (2019)*

Numerous scholars stress the potentially adverse implications and risks of excessive data extraction processes and use of emerging technologies in humanitarian and migration settings (Cheesman 2022; Connolly et al., 2020; Latonero et al., 2019; Madinaou, 2019; Molnar 2020). According to Madinaou (2019, p. 585) the "convergence" or combined application of emerging technologies in the forced migration and humanitarian context amplifies the risks connected to each of the technologies used, with "direct implications for the security, privacy, and dignity of refugees." Other scholars describe how the use of emerging technologies for data collection and migration management processes may contribute to privacy risks and breaches, as well as the aiding of surveillance, discrimination and amplification of power inequalities (Molnar, 2020).

In their study on how blockchain-enabled digital identity solutions can be used for the protection of refugees' human rights, Connolly et al. (2022) discovered that while blockchain can effectively support the verification of migrants' digital identities, the primary role of humanitarian blockchain projects seems to be the empowerment of organisations and their specific needs. In her study on two UN agencies' use of blockchain to identify and deliver cash-based assistance at a refugee camp, Cheesman (2022, p. 134) found that blockchain and SSI holds the twofold capacity of offerings new avenues for empowerment and autonomy for refugees, while also serving as a method for organisations, donors and corporate partners to uphold and extend their bureaucratic and commercial influence. Based on interviews with experts and actors involved in humanitarian blockchain projects, Coppi and Fast (2019) comparably found that blockchain aided projects in the humanitarian sector were predominantly shaped by organisational considerations and motivations. They also discovered that many organisations currently seem unsure about how to ensure adequate data protection and privacy in blockchain solutions (Coppi & Fast, 2019, p. 1). Furthermore, Seyedsayamdost and Vanderwall (2020, p. 945) highlight that several contexts lack enabling ecosystems for blockchain, such as sufficient ICT infrastructures and access to phones and stable internet.

Despite the prevalence of both critical and cautionary viewpoints, scholars also highlight that blockchain may have great potential if used appropriately. For instance, "the efficiency, transparency, accountability and security associated with blockchain" may enable efficient methods for creating digital IDs and giving forcibly displaced people access to financial services (Seyedsayamost & Vanderwall, 2020, p. 955). In a study carried out with UN agencies currently using blockchain, many potential benefits either intrinsically or indirectly stemming from blockchain were illuminated. This included the reduced need for intermediaries, increased resiliency and transparency of information, faster transactions and improved collaboration among stakeholders (Dumitru, 2020, p. 19). Moreover, in a report commissioned by the Danish government on the future of development aid, Haahr (2017, p. 24) found that:

> "States and organisations choosing to hold onto a mindset and toolbox of a linear past is in itself a major risk, as major decisions are left to the technological sector when blockchain is one of the most promising new tools for the development and humanitarian space. It can be designed to make the individual the owner of his or her data, which can accelerate delivery on the SDGs."

This chapter has presented key concepts and considered scholarly literature of relevance to the topic of humanitarian digital ID and CVA solutions in the forced migration context. This has included describing the ongoing digital transformation in the humanitarian sector, the evolution from paper-based to digital ID initiatives, the significance of data in migration management and identification processes and the emergence of SSI and blockchain-aided pilots and projects for humanitarian action. To better understand and assess the complex phenomenon of humanitarian digital ID systems and its implications and impact in the forced migration context, a theoretical framework is necessary. This will be presented in the next chapter.

3. Theoretical foundation and analytical framework

"[T]he key to good theory requires not just that we identify key constructs and describe how they are related, but that those constructs and the relationships among them help us explain real world issues" (Volkoff & Strong, 2017, p. 1). Theories allow researchers to explain how they approached their study. In order to enhance the understanding of the empirical material and produce transferable knowledge, it is necessary to apply theory and develop models for the relationship between the topic being examined and the broader context (Skilbrei, 2019).

This chapter is structured as follows. **Section 3.1.** will introduce the sociotechnical perspective and what it entails. **Section 3.2**. will present Work System Theory (WST), developed by Alter (1999; 2013). It is comprised of the Work System Framework (WSF) and lifecycle model and it allows for a valuable understanding of the different internal and external factors influencing an organisation's work systems. Then, **Section 3.3.** will bring in affordance theory, which is the second theoretical lens underpinning the study. Affordance theory examines the interactions between a particular technology or system and the goal-oriented actors using it for specific purposes (Bernhard et al., 2013; Pozzi et al., 2014). It also facilitates the examination of contextual elements influencing the adoption and outcomes of the technology (Volkoff & Strong, 2017). **Section 3.4**. and **3.5**. will address the lack of studies using WST and affordance theory to investigate the topic under investigation, as well as the limits of these theoretical perspectives. Finally, **Section 3.6. and 3.7.** will outline the study's analytical framework. It merges the two abovementioned theories to enable a thorough analysis of humanitarian digital ID and CVA initiatives in the forced migration context, with a particular focus on blockchain.

3.1. Sociotechnical theory

Sociotechnical theory emerged in the 1950s as a response to technologically deterministic viewpoints. These deterministic viewpoints were criticised for depicting technology as an autonomous force determining social development and values and thereby failing to acknowledge society and humans' agency and role in this context (Abbas & Michael, 2023; see also Schatzberg, 2018). Conversely, sociotechnical perspectives offer an equal consideration of social, technical and environmental factors, in which the latter includes elements such as the internal and external "context, surroundings, and conditions" (Abbas & Michael, 2023, p. 4). There exists many different adaptions and variations to sociotechnical theory and it has been applied to various disciplines, including Information Systems (IS) studies (Abbas & Michael, 2023). Strands of sociotechnical theory are also found in WST and contemporary adaptions of affordance theory, as both consider the relationship between societal and technological aspects.

3.2. Work system theory

WST was developed by Alter (1999; 2013) within the IS discipline to better understand sociotechnical work systems within and across organisations, as well as the issues that arise from them. In Alter's own formulation, a work system can be understood as "a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products/services for specific internal and/or external customers" (Alter, 2013, p. 75). WST can be seen as an alternative to "techno-

centric assumptions" that do not sufficiently consider the active role of human participants, or the environment that work systems are situated in (Alter, 2013, p. 94).

Alter (2013) divides WST into two distinct views on systems, namely the static Work System Framework **(Figure 3)** and the fluid Work System Life Cycle Model (WSLCM) **(Figure 4).**
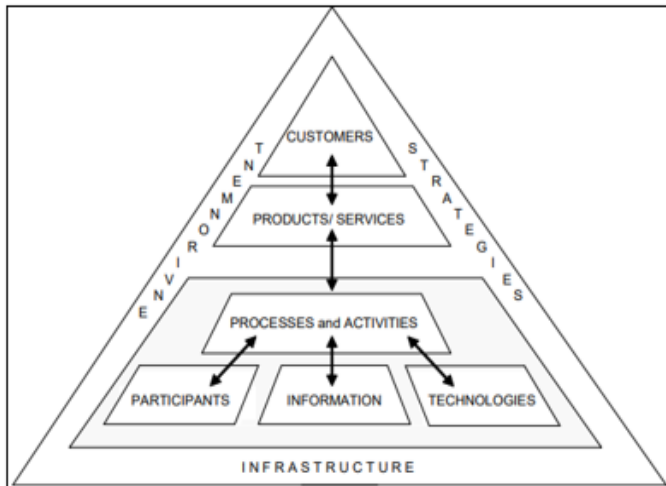
Fig. 3. The Work System Framework (Alter, 1999; 2013)   Fig. 4. The WSLCM (Alter, 1999; 2013)
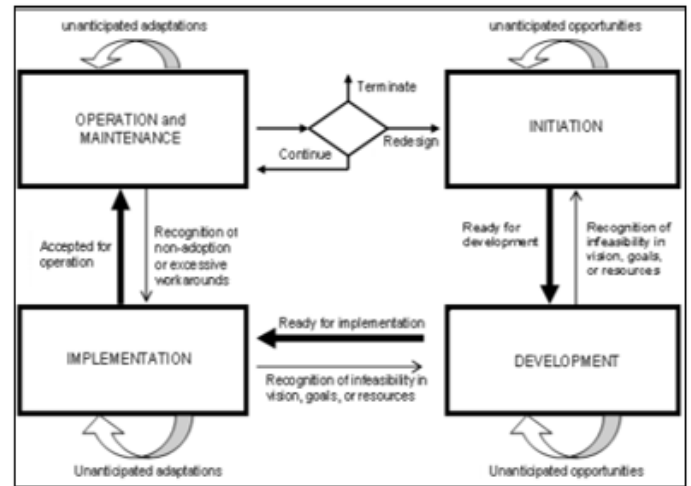
As can be seen in Figure 3, Alter's work system framework (WSF) contains nine different interacting elements, "operating together to accomplish a purpose (Alter, 1999, p. 37). More specifically, the WSF consists of **(1) internal elements**: participants, information, technologies and processes and activities, **(2) partially internal/external elements**: products, services and customers and **(3) external elements:** environment, strategies and infrastructure. These categories of elements will be further detailed in Section 3.7., together with a presentation of the study's analytical model. The WSLCM, depicted in Figure 4, shows how a work system's lifecycle can be divided into four different stages - initiation, development, implementation and operation – and how the system is influenced by unanticipated adaptations and opportunities.

The primary focus of WST has principally been on business management processes and concerns (Alter 1999; 2013). However, it has also been applied to other contexts. For instance, Lindgren et al. (2021) have applied the theory to e-government work systems and practices, a useful adaptation which will be discussed further in Section 3.4. and 3.7. Alter (2013, p. 99) explicitly states that it would be beneficial to compare WST "with other theories and methods to try to develop hybrids" and "identify synergies". In this study, WST, and more precisely the WSF, will be combined with affordance theory to approach the research questions and topic.

3.3. Affordance theory

The concept of affordances can be traced back to the work of ecology psychologist Gibson (1979), who postulated that the objects located within any species' environment provide different opportunities. The realisation of these opportunities or affordances depends on the information available and the way in which a particular actor perceives and interacts with the object (Gibson 1979; Leonardi 2011; Majchrzak & Markus 2012). Gibson's conceptualisation of affordances has been extended to the IS field and the examination of different actors' interactions with technological artefacts and information systems (Pozzi et al., 2014, p. 6).

Building on Gibson's original notion, this research commonly ascertains that a technology's properties does not singlehandedly lead to certain affordances, rather the concept is relational and to be understood as "potential interactions" (Majchrzak & Markus, 2012, p. 1) and "possibilities for goal-oriented action" (Markus & Silver, 2008, p. 622). This means that the affordances emerging from one actor's interaction with a technology might be entirely different from that of another. The theory can be applied to examine affordances at an individual level or to examine entire organisations who perceive and enact upon affordances to achieve different organisational goals (Pozzi et al., 2014; Strong et al., 2014; Volkoff & Strong, 2017).

A number of scholars have developed models for analysing affordances within the IS field. For instance, Bernhard et al. (2013) are often acknowledged for advancing the understanding of the concept by presenting a framework which organises affordances into four distinct sub-concepts or temporal-causal stages: affordance existence, affordance perception, affordance actualisation and affordance effect. Their four-step affordance framework has inspired the models developed by Pozzi et al. (2014) and Wahid and Sæbø (2015), see **Figure 5** below.
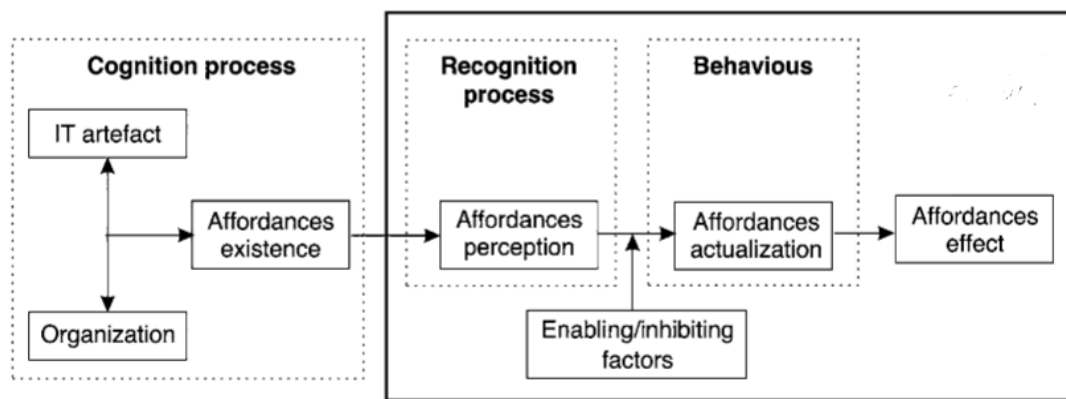
Figure 5: Affordances model inspired by Pozzi et al. 2014 (Wahid & Sæbø, 2015, p. 5).

To elaborate, the first stage of **affordance existence** can broadly be described as a cognitional process (Pozzi et al., 2014), which occurs when an actor first becomes aware of and interacts with a technological object (Bernhard et al., 2013) The second stage of **affordance perception** can be understood as a recognitional process influenced by available external information and the ways in which an actor with certain capabilities and goals perceives and interacts with a technology with particular features (Pozzi et al., 2014). Majchrzak & Markus (2012) highlight that while an affordance describes an action potential, technology constraints refer to the ways in which an actor is withheld from achieving a particular goal when using a technology. **Enabling and inhibiting or constraining** factors influence **affordance actualisation** (Wahid & Sæbø, 2015). This third stage describes the behaviours adopted by different actors after they have perceived an affordance and translated it into action to achieve certain goals (Pozzi et al., 2014, p. 7). Lastly, the stage of **affordance effect** describes how the actualisation of an affordance leads to certain consequences and empirical results (Bernhard et al, 2013).

The previous two sections have introduced some of the key features of WST and affordance theory. Before I present the limitations of these theoretical perspectives, and how the analytical

model developed for the present study seeks to address them, I will briefly outline previous applications of WST and affordance theory to the blockchain context.

3.4. Previous WST and affordance theory studies on digital IDs and blockchain

To the best of my knowledge, there exist no previous studies which apply WST to examine work systems in the humanitarian sector or work systems connected to digital ID solutions. Additionally, at the time of writing, I was unable to identify any studies that apply WST to examine work systems using blockchain as one of the technologies. That said, WST has been adapted to other contexts than business management processes. For instance, Lindgren et al. (2021) expand on Alter's WSF to better understand e-government practices and characteristics. Amongst other things, they change the external elements of Alter's WSF to (1) digital infrastructure, (2) policies and strategies, (3) law and regulations and (4) the social, economic and political environment. This modification usefully provides digital infrastructures with more emphasis when analysing work systems, which is also pertinent for the analysis of digital ID solutions in the forced migration context. Furthermore, their framework contributes to accentuating the significance of the environment surrounding the work systems. Lindgren et al. (2021, p. 515) explain that their e-government WSF incorporates a sociotechnical perspective, which is scalable and that "one can further unpack all elements in the framework to reveal complex structures and phenomena." I will circulate back to these elements in Section 3.7.

Although there is an abundance of studies on affordances within the IS discipline (see e.g., Markus & Silver, 2008; Pozzi et al., 2014; Volkoff & Strong, 2017) there are only a few that address blockchain related affordances (Kewell et al., 2017; Ostern et al., 2020). Existing research on blockchain affordances tends to focus on blockchain's technical features and potential to secure costs savings, profits and increased efficiency (Walport 2016, cited by Kewell et al., 2017, p. 429). However, examining how blockchain affordances are perceived, actualised and lead to certain effects is necessary to understand different organisations and stakeholders' rationale for adopting the technology (Ostern et al., 2020). An exploratory article by Kewell et al. (2017) draws on affordance theory to consider what they coin "blockchain for good", including the technology's potential for supporting the achievement of the UN SDGs. They posit that positive outcomes for global causes may be realised due to blockchain affordances, which offer new philanthropic opportunities. The authors also aptly point out that blockchain is part of a larger ecosystem, consisting of actors who are discovering new affordances when they use the technology in different settings for specific purposes. They suggest that "it will not be very long before companies begin to perceive blockchains as instruments of change" (Kewell et al., 2017, p. 430).

3.5. Limitations of affordance theory and WST

While affordance theory has been claimed to avoid "the limitations of the theories that make simplistic and deterministic assumptions about the effects of IT on human behaviours and organizational outcomes" (Pozzi et al., p. 10), it has also been criticised for its shortcomings. For instance, there is no universally agreed upon definition of affordances or consensus about the models attempting to classify affordances into temporal-causal stages and categories. Rather, there are currently numerous formulations, interpretations and methodologies for

approaching affordance theory (see e.g., Bernhard et al., 2013; Hutchby, 2001; Pozzi et al., 2014; Volkoff & Strong, 2017; Wahid & Sæbø, 2015). It is important to acknowledge that all frameworks and models will unavoidably emphasise some aspects, while disregarding or downplaying others (Abbas & Michael, 2023; Alter, 1999). This is also the case for the WSF.

Lindgren et al. (2021, p. 508) point out that Alter's WSF arguably provides a somewhat "generic and simplistic" model of a work system which is in reality much more complex and influenced by variable contextual issues. Furthermore, as Alter (1999, p. 66) himself points out, WSF "applies most directly when the business process in the work system or information system consists of identifiable steps occurring over time and producing recognizable output." Business processes and incentives are not the primary focus of the current study, but rather humanitarian processes and the impact that sociotechnical elements in digital ID solutions may have on their delivery of services. These processes do not always have clearly defined steps and vary greatly depending on the context in which they are being used. The model therefore needs to be adjusted and supported by additional information to reflect this fluidity.

As already mentioned, Alter (2013) states that WST may beneficially be combined with other theories and that such extensions may contribute to overcoming certain limitations. Similarly, Bernhard et al. (2014, p. 9) claim that other theoretical perspectives may offer complementing perspectives and relevant variables not included in their affordance model.

3.6.   Rationale for merging WST and affordance theory

In the study, I combine WSF and affordance theory to address the research questions and analyse the empirical material. As has been previously stated, the delivery of humanitarian aid and assistance is becoming increasingly digitalised. Humanitarian digital ID and CVA solutions consist of an array of social and technical interconnected elements. Technical aspects include but are not limited to the actual technologies, digital infrastructures, software, data standards and protocols used. These aspects are closely interlinked with and influenced by social aspects, such as the different stakeholders, participants and end-users involved in the systems, as well as the range of decisions, processes and activities facilitating the system's implementation, development, maintenance and provision of services. Consequently, I argue that these humanitarian digital ID systems can be conceptualised as sociotechnical work systems.

I argue that these two models complement each other and work well in tandem. To elaborate, my impetus for combining these two theoretical perspectives is threefold. Firstly, the joint application of WST and affordance theory circumvents some of the limitations that both theoretical perspectives have when applied alone. While the WSF provides a useful and broad overview of sociotechnical elements which may impact humanitarian digital ID solutions and the delivery of services to forcibly displaced people, it does not sufficiently address the different incentives that various actors have when adopting specific technologies within these systems. This is however covered by affordance theory, which allows for an investigation into how a technology like blockchain is perceived and used by various actors to achieve certain organisational goals. However, blockchain is only one of several technologies being used in sociotechnical humanitarian digital ID systems. In this regard, the WSF provides an important overview of other technical and social aspects, as well as the processes and activities taking

place to deliver forcibly displaced individuals and other aid recipients with products and services. Moreover, the WSF addresses influential external factors, such as the surrounding political and economic environment, as well as laws of pertinence to the issuance of digital IDs to forced migrants. That said, WSF does not consider how these elements may either constrain or enable the opportunities arising from interacting with specific technologies in this context or the effects generated by the products and services delivered to the users. Therefore, affordance theory is again complimentary, as it adds this exact insight to the framework.

My second reason for combining the two theoretical lenses is to contribute to the body of research concerned with the application and consequences of using emerging and digital technologies in forced migration and humanitarian contexts. I also aim to add to the empirical evidence on blockchain, digital and decentralised digital ID solutions in contexts with lacking ICT infrastructure. Thirdly, I argue that the amalgamation of the two frameworks provides a comprehensive sociotechnical approach to a highly topical subject matter which has to the best of my knowledge not previously been examined through the affordance or WST lens. The study aspires to advance theory development, by demonstrating how these two theoretical perspectives can beneficially be used together to capture the broad picture of a work system, while also shedding light on the significance of a particular technology within it.

3.7.   The analytical framework of the study

In the present study, I am interested in uncovering and understanding the role of blockchain in humanitarian digital ID and CVA solutions in the forced migration context. Inspired by how Lindgren et al. (2021) adapted Alter's work system framework to focus on e-government work systems, **table 1** presents definitions and examples of elements in what will henceforward be called the Humanitarian Digital ID Work System Framework (HDID-WSF).

The first six elements in the table rely on the definitions provided by Alter (1999; 2013) in his own formulation of the WSF. Importantly, Alter's element 'customers' has been replaced with 'beneficiaries' to describe the forcibly displaced or otherwise crisis-affected aid recipients and end-users of different humanitarian digital ID and CVA initiatives. Moreover, Alter's original external layers have been modified with the elements proposed by Lindgren et al. (2021). The last four elements in the table below are therefore based on their descriptions.

#	HDID-WSF elements	Descriptions	<u>Some</u> examples relevant to HDIDs
1	Participants	The different individuals and groups performing the tasks in the work system.	Stakeholders such as governments, donors NGOs, humanitarian and grassroot organisations, UN and EU agencies, private sector entities and technology companies.
2	Information	The data that the system creates, captures, shares and stores and which participants use in their processes and activities.	Personal identity details, demographic, geographic and biometric data, transaction and credential histories and legal documents.
3	Technologies	The different tools used by the participants in the system, as well as automated artifacts.	Social media applications, biometrics, big data and analytics, databases, web applications, smartphones and blockchain.

4	Processes and activities	The different steps and decisions taken to produce the products and services.	Consultations, surveys, CVA disbursements, registrations, verifications and issuance of digital IDs and credentials to beneficiaries.
5	Product and services	The information, objects and actions that the work system produces.	Food, healthcare, protection and cash services, digital IDs, wallets and vouchers.
6	Beneficiaries	The target group of the system and those receiving the products and services.	Forcibly displaced and other aid recipients or end-users of humanitarian products.
7	Social, economic and political environment	External social, political and economic conditions and circumstances affecting the effectiveness and operation of systems	Migration flows and management systems, geopolitical environment, humanitarian situation, funding mechanisms, public values.
8	Policies and strategies	Organisational and political visions and decisions affecting the work system's performance, scope and delivery of services and products.	Digital transformation and innovation strategies, SSI and digital ID principles, national and international strategies and policies on digital IDs and migration.
9	Law and regulations	Technical, legal and regulatory elements that guide, enable and constrain systems.	Legislations and mandates on migration, data protection and ID management standards, transnational agreements, regulations and international and national norms.
10	Digital infrastructure	Human, information and technical resources that work systems use, often shared with other systems	Beneficiary, migration and disbursement management systems and databases, open-source technologies, shared protocols and public and private blockchain infrastructures.

Table 1: Explanations of elements in the HDID-WSF, inspired by Lindgren et al. (2021)

In addition to the HDID-WSF, the study will apply the affordance model previously shared in Figure 5 in Section 3.3. above. This model was first presented by Bernhard et al. (2013) and subsequently further developed by Pozzi et al. (2014) and Wahid and Sæbø (2015). This model was selected because it provides a comprehensible overview of different affordance stages. In this study, the focus will be on affordance perception, actualisation and effects, as well as constraining and enabling factors. Another reason why this model is used is that its elements are highly compatible with the different elements included in the WSF, as elaborated below.

The **ground level** of Alter's triangular WSF model (depicted in Figure 3 in Section 3.2.) consists of the three elements: participants, information and technology. This level can advantageously be understood in relation to the stage of **affordance perception**, which is comparably concerned with actors, information, goals and technologies. The **second level** of the WSF model deals with processes and activities. I argue that these elements can be understood in relation to the stage of **affordance actualisation,** that is, how these processes and activities enable certain action possibilities, which emerge when various actors interact with technologies such as blockchain to realise their goals. The **third level** of Alter's WSF model is products and services. In this study, this stage will include beneficiaries and it will be examined together with **affordance effects,** that is, the outcomes of the products and services delivered to the end-users of the digital ID initiatives. Finally, the **external layers** of the WSF will be considered along with factors enabling and constraining the actualisation of affordances. A visual depiction of the study's analytical framework can be found in **Figure 6** below.
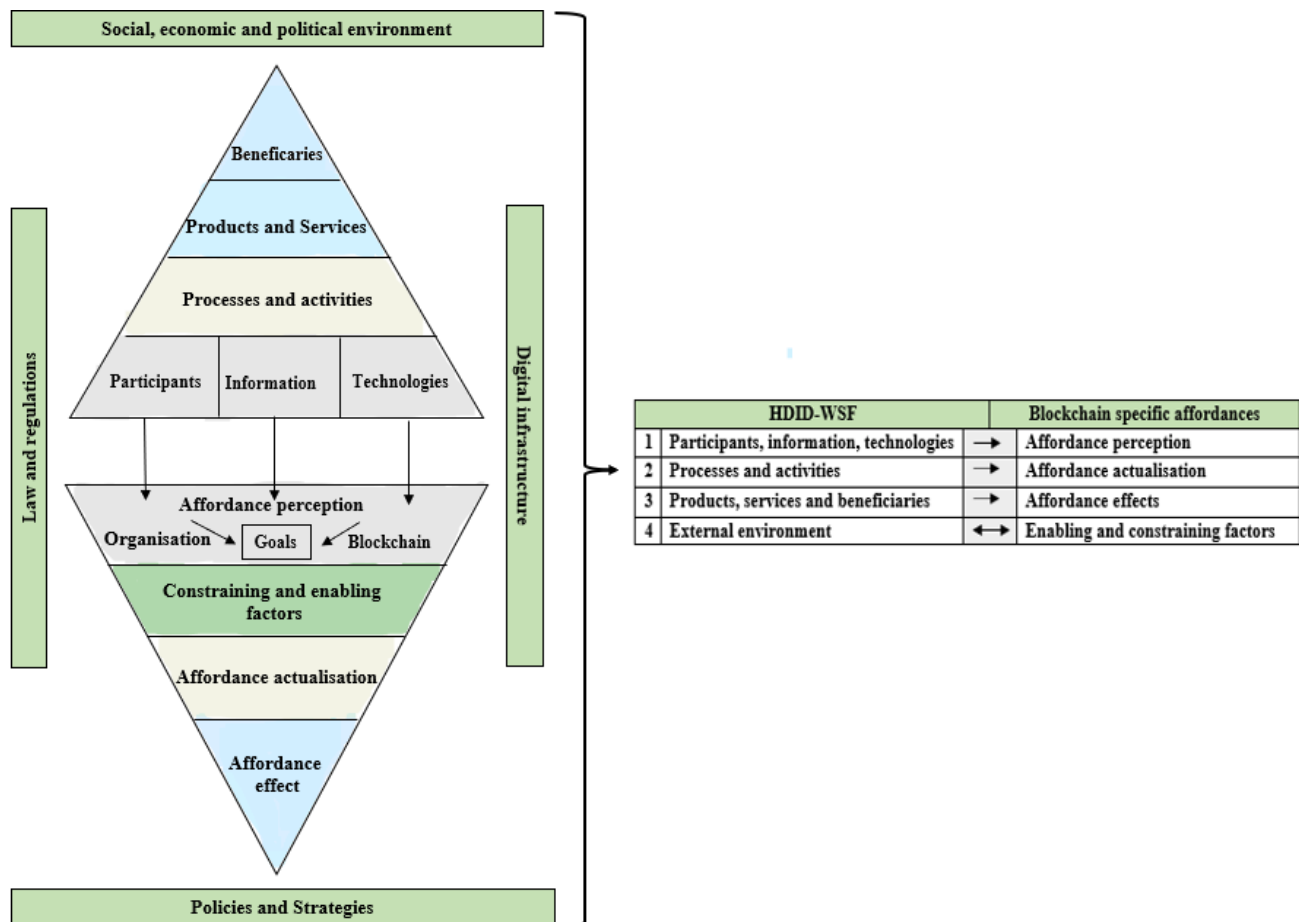
Figure 6: The study's analytical framework, inspired by the WSF of Alter (2009; 2013) and Lindgren et al. (2021) and the affordance models of Bernhard et al. (2013), Pozzi et al. (2014) and Wahid and Sæbø (2015)

It should be noted that the study's analytical framework provides a somewhat static view of humanitarian digital ID and CVA systems when they are in fact intrinsically dynamic and fluid. Additionally, WSF is often used to provide a snapshot of a *single* process within an organisation. Comparably, affordance theory is predominantly used to examine how a *single* actor or organisation interacts with a specific technology, as the concept is considered to be relational rather than general. However, in the present study, the analytical framework will be used to analyse different humanitarian digital ID and CVA solutions implemented by various organisations. This means that many context-specific nuances and features will be lost. However, the analysis of the empirical material will allow for an illumination of the fluidity of these systems and the necessary distinction between similarities, divergences and nuances.

To recap, this chapter has presented the theoretical perspectives grounding the study. The study aims to provide a sociotechnical perspective to humanitarian digital ID and CVA systems in the forced migration context. WSF and affordance theory both facilitate such an approach. Although all theoretical models contain certain limitations, some of these are attended to when they are utilised together. Therefore, the study jointly utilises WSF and affordance theory. The methodological steps taken in the study, including how the empirical material was collected, analysed, interpreted and incorporated into the analytical model, will be presented next.

4. Methodology

Qualitative research methods were deemed most appropriate for examining humanitarian digital IDs in the forced migration context. Such methods allow researchers to place the topic under investigation into a broader social and cultural context, while producing new knowledge and exploring different positions (Skilbrei, 2019). Qualitative methods are particularly suitable for answering research questions about complex phenomena (Richie & Ormston, 2014) and enable insight into people's subjective perspectives and experiences (Hennink et al., 2020).

In this chapter, I will first outline the different methodological steps and decisions underpinning this research project. This includes the research paradigms and design, the strategy, the methods, the interviewee selection and the ways in which the data was interpreted and analysed. The chapter will conclude with a section about ethical research practices and responsibilities.

4.1. Research paradigms

In broad strokes, interpretivism and positivism are two of the main scientific approaches and underlying paradigms of qualitative and quantitative research. Whereas the positivist paradigm is often considered to constitute the firmly scientific approach to research with an emphasis on objective and factual measurements, the interpretivist paradigm "seeks to understand people's lived experiences from the perspective of people themselves" and typically emphasises that "reality is *socially constructed* as people's experiences occur within social, cultural, historical and personal contexts" (Hennink, 2020, p. 15). This approach also guides the present study, as I am interested in the subjective perspectives of actors who are either directly involved in blockchain-anchored humanitarian digital ID and CVA projects, or who have extensive knowledge about the topics of digital IDs and forced migration. The interpretivist paradigm also underlines the active role of the researcher in creating meanings. This necessitates a conscious reflection about the different ways in which a researcher engages with the study's participants, analyses the material and develops theory (Skilbrei, 2019).

It is common to distinguish between an inductive and deductive approach to the relationship between the theory and the empirical material, which generally signifies whether the research process is data- or theory-driven (Skilbrei, 2019 p. 51). In the deductive method, theories and concepts are often the starting point for formulating a research question, collecting the data and interpreting and understanding the material and topic. In the inductive method, on the other hand, the researcher normally starts out with broader and more flexible research questions, which can be revised and further defined during the process. Theory is subsequently developed and linked to the findings after the data has been collected and interpreted (Larsen, 2017, p. 24). I have applied an inductive and exploratory approach to the study, as this allows me to address the research questions, which are intentionally broad to gain an overarching understanding of the developments and perceptions in the field. I wanted to gather multiple perspectives on the phenomenon of digital IDs in the forced migration context and let the empirical material guide which theoretical framework would be most valuable to analyse and interpret the findings. This said, researchers today frequently move between the theory and data material, as well as inductive and deductive reasoning, throughout the research process (Larsen, 2017; Skilbrei, 2019). This was also the case in the present study. I used the inductive approach as a starting

point but carried out a review of previous research and literature early on to gain a broader understanding and explore relevant concepts. Moreover, the research questions were further revised once the theory had been selected and the analytical framework had been developed.

4.2.   The research cycle and design process

This section will briefly outline the research process and design of the study. Yin (2003, p. 20) states that all empirical research has a design, which he describes as "*a logical plan for getting from here to there*, where *here* may be defined as the initial set of questions to be answered, and *there* is some set of conclusions (answers) about these questions." In other words, it is the concrete steps that need to be taken to complete a research process. According to Hennink et al. (2020) the research process can be understood as a circular process consisting of three interlinked parts: the design cycle, the data collection cycle and the analytical cycle. Within the research cycle, deductive and inductive reasoning alternates (Hennink et al., 2020, p. 30). Their model will be applied to describe my own research process.

The design cycle is the first element. At this stage, I identified the topic I wanted to investigate and developed some preliminary research questions. Scholarly literature and previous studies were reviewed to gain a better understanding of the field and to further ground the objectives of the study. I also planned the research methods I would use. Different theoretical frameworks were examined, but in line with the inductive approach I made a conscious decision not to select which theories to use in advance. According to Hennink et al. (2020, p. 27), the tasks conducted in this phase guide the researcher's data collection, yet it is still necessary to return to the design cycle tasks later to make adjustments based on the data collected.

The data collection cycle was the stage in which the interview guide and information letters were developed, the informants were identified and the interviews were conducted. As I carried out the interviews and gained a broader understanding of the topic, the interview questions were slightly revised and new studies were added to the literature review. The data collection process is inductive in that it guides additional data collection efforts in the study and prompts the researcher to make changes based on the empirical material collected (Hennink et al., 2020).

The analytical cycle is the third stage and consists of tasks such as "developing codes, description and comparison, categorizing and conceptualizing data and developing theory" (Hennink et al. 2020, p. 6). These tasks were already started in the data collection phase, in which the interview guides were developed and used to collect data around certain themes. After processing the collected data, I also developed the theoretical and analytical framework of the study, which was used to interpret and analyse the data.

4.3.   Selection of research strategy: the case study

There are many different research strategies in social and information sciences, each with distinctive methods for investigating a topic and collecting and analysing data (Yin, 2003). This study has deployed a case study research strategy to answer the research questions. The case study can be understood as an analytical research strategy where the objective is to generate new and in-depth knowledge about one or multiple cases (Skilbrei, 2019, p. 79). As a research strategy, "the distinctive need for case studies arises out of the desire to understand complex

social phenomena" (Yin, 2003, p. 1) and "to *explore* those situations in which the intervention being evaluated has no clear, single set of outcomes and to arrive at broad generalizations based on case study evidence (Yin, 2003, p. 15, emphasis in original). This point is applicable to the study. The outcomes of humanitarian digital ID solutions for forced migrants will inevitably have wide ranging outcomes depending on a multitude of factors. Yet the aim of the study is not to establish any universal conclusions or claims, but rather to gain a broad and nuanced understanding of some of the key developments and implications surrounding the topic.

"The biggest obstacle to thinking about 'What is a case' is the simple fact that the term case is used in so many different ways" (Yin, 1981, p. 64) This statement is descriptive of my own experience. For instance, it is common to distinguish between single and multiple case studies (Coombs, 2022; Larsen, 2013; Yin 2003). Whereas a single case study is often defined as a study which focuses on a single entity or issue, the multiple case study is used to describe studies where the researcher examines several entities or issues with a goal of comparing them and identifying relationships and common patterns (Coombs, 2022). I found that the study does not wholly fit into either of these categories. I was unable to identify scholarly research which aptly described how to methodologically approach a single case through the perspectives of a diverse network of actors and use cases. I would still argue that this study is best defined as a single case. The reason for this is that it aspires to unpack and shed light on the phenomenon of humanitarian digital IDs through the diverse perspectives of pertinent stakeholders, rather than systematically compare different entities and establish patterns according to for example their size or location. Notably, single cases can still be understood as "implicitly comparative", although not as "explicitly" as in a multiple case (Andersen, 2013, p. 89).

4.4. Selection of methods: literature review and interviews

The research methods selected for any given study have implications for the data collection, analysis and findings (Larsen, 2017). The methods selected for this study were a literature review and qualitative interviews. The study thus consists of both primary and secondary data.

Literature review

The study includes a literature review to present pertinent research and scholarly articles about humanitarian action, digital identity solutions and blockchain in the context of forced migration. The literature review also presents previous studies on the same topic, as this helps to facilitate a broader interpretation, analysis and discussion of the data and findings (Larsen, 2017, p. 97).

I used different databases to carry out the searches, such as Google Scholar and Oria. A combination of different search strings was used, including keywords such as refugees/forced migrants/migrants, humanitarian assistance/humanitarian action and digital identity solutions/ emerging technology/blockchain/SSI solutions. The results yielded from the different searches were subsequently carefully sorted to identify the articles and studies most relevant to addressing the study's overarching topic, research questions and the analysis of the data.

Qualitative interviews

Skilbrei (2019) has expressed that the qualitative interview method provides a gateway into informants' subjective experiences, perspectives and feelings. Qualitative interviews were

considered a suitable method for exactly this reason. In total, 10 informants from different organisations and backgrounds participated in the study (**Table 2**). The interviewees were spread across different continents, with two based in Africa, two in Asia, two in the Americas and four in Europe. This was considered a major benefit, as it allowed for a rich diversity in viewpoints. Diversity was also attained by speaking to people who worked for various types of organisations, ranging from international institutions and UN agencies to technology startups.

#	Organisation/Affiliation	Organisation type	Code
1	IFRC	Humanitarian network of NGOs	A1
2	The Rohingya Project	Grassroot initative	A2
3	Independent consultant, humanitarian blockchain expert	UN agencies and international NGOs	A3
4	Gravity Earth	Tech startup/company	B1
5	CryptoSavannah	Tech startup/company	B2
6	Tech and blockchain entrepreneur	Tech startup/company	B3
7	ID2020	NGO and global alliance	C1
8	Techfugees	Global movement	C2
9	Indepedent ID consultant	International organisations and governments	C3
10	UNHCR	UN agency	C4

Table 2: Overview of informants in the study

Explanation of the codes

All the informants have been assigned a code. The codes beginning with **A** signify that the interviewee works for a non-profit or humanitarian organisation and that they have first-hand experience with humanitarian digital ID and CVA initiatives using blockchain. The codes beginning with **B** signify that the interviewee works for a for-profit technology company or startup and that they have first-hand experience with a humanitarian digital ID and CVA initiative using blockchain. The codes beginning with **C** denote that the interviewee has extensive knowledge about digital ID solutions and/or technologies and forced migration.

Importantly, the interviewees' arguments and reflections were their own and do not necessarily represent the views of the entire organisation. Furthermore, since giving the interviews, a couple of the informants have moved on to new organisations. All of the interviews were individual interviews, except number seven in the table, which was with two people from the alliance.

Time and place for the interviews

The interviews took place between January – April 2023. In addition, some preliminary talks with actors were carried out between October – December 2022. The interviews typically lasted between 45-75 minutes and were conducted using the University of Agder's on-premises Zoom application. Remote interviews may cause certain obstacles in establishing a good connection between the interviewer and interviewee (Skilbrei, 2019, p. 158). However, my experience was that the approach provided me with accessibility and a wide geographical and organisational reach, with actors who have played a role in relevant locations to forced migration challenges. A lot of the interviewees were on busy schedules yet were still able to connect with me online.

Semi-structured format and interview guides

The interviews were semi-structured. Semi-structured interviews often use flexible interview guides, in which questions may be pre-formulated, but the researcher is flexible when it comes to the order of the questions and may ask follow-up questions or add new ones when needed (Larsen, 201, p. 99). This was also the case in the present study. Two separate guides were developed, one for the actors who had been directly involved in a humanitarian blockchain project and one for the actors with extensive knowledge about digital identity solutions. Both interview guides can be found in the appendices. Skilbrei (2019, p. 154) argues that is useful to revise interview guides as the research project progresses and the type of information needed to address the research question and themes becomes clearer. At the outset of the study, I had only a basic understanding about digital ID systems. This understanding was gradually expanded as the research evolved and I gained more knowledge from the primary and secondary sources. Some of the questions were therefore slightly revised along the way, others removed.

According to Hennink et al. (2020, p. 10) qualitative researchers need to be "open-minded, curious, empathetic, flexible and able to listen to people telling their own story." Relying solely on taking notes during the interview may result in certain nuances and details being inadvertently discarded and the researcher becoming distracted (Skilbrei, 2019, p. 158). All the interviews were therefore recorded upon receiving the required consent from the participants.

4.5.   Selection of participants

An important consideration in all qualitative research studies is the data and sample size. Directly connected to this is the concept of 'saturation', which describes the point in which an adequate interview or sample size has been reached and new data no longer provides additional variation or data codes. Saturation depends on many factors, including the research design, scope and aims, as well as the quality of the data collected (Hennink et al., 2020; Skilbrei, 2019). According to Hennink et al. (2020, p. 108), qualitative studies generally have quite a small sample size, in which interviewees have intentionally been selected to enlighten and diversify the topic under investigation. The focus is as such on quality rather than quantity.

Different strategies were used for mapping and selecting participants for the interviews. First, and to get an overview of digital ID initiatives for forced migrants, I assembled information about projects from various sources, including scholarly articles and studies, relevant websites and social media platforms like LinkedIn. Subsequently, potential interviewees were identified and contacted based on their fulfilment of one of the following two criteria: (**1**) involvement in a blockchain-anchored digital ID/CVA initiative for forced migrants or (**2**) extensive knowledge on the topic of digital ID solutions and/or technology and forced migrants. This strategy is referred to as criterion sampling, in which participants are identified and selected upon fulfilling a set of predetermined criteria relevant to a study (Palinkas et al. 2015). Criterion sampling was subsequently supplemented with snowball sampling. This sampling strategy is based on referrals from initial participants to identify new ones (Palinkas et al. 2015). This technique was thus used to get information about other actors I should get in touch with to ensure a breadth in perspectives. 34 actors were invited to partake in the study and 10 accepted.

4.6.   The transcription, coding, analysis and interpretation of the data

The collected data needs to respond to the research questions and the focus of the study. During the data analysis stage of a study, codes are developed and compared, data is interpreted and categorised and theory is developed and integrated into the findings (Hennink et al, 2020). This process contributes to giving the data meaning and allows the researcher to identify patterns and connections (Skilbrei, 2019). The next four sections will describe the data analysis process.

Transcriptions

The interviews were recorded upon the consent of the participants. I made a conscious decision to transcribe each interview shortly after they had been carried out. A benefit of transcribing interviews straight away is that you still have all your impressions from the interviews fresh in mind. Moreover, it allows for a timely revision of subsequent interviews if it is discovered that some questions worked better than others (Skilbrei, 2019, p. 173). To ensure that no nuances were missed or placed out of context, I transcribed the interviews verbatim. However, some of the direct quotes incorporated in the study have received minor adjustments to ensure a more readable expression and minimise instances of for example stuttering or repetition of words.

Coding

Coding is the process in which data is processed and systematised and themes are highlighted and connected. It involves looking for patterns across the material and getting an impression of the larger picture (Skilbrei, 2019). It thus helps researchers make sense of the data. After the interviews had been transcribed, I re-read the material several times to get to know the data.

The transcriptions were uploaded to NVivo, a coding software which supports the organisation, analysis and coding of qualitative data. According to Grønmo (2016, p. 267), there are three different approaches to coding: descriptive codes of the actual and explicit content in the text, interpretive codes which describe the researcher's interpretation or understanding of the content in the text, and explanatory codes, which include the researcher's explanations of conditions in the text. I found the first two types of codes particularly relevant for processing the material. First, I looked for potential codes in the interview guides, such as for example 'blockchain's potential' and 'self-sovereign identity'. Other possible codes were derived from the literature review. Subsequently, I returned to the transcriptions and started identifying new codes. Then, and following the process described by Larsen (2017), codes were grouped into categories and used to identify central themes and connections relevant for answering the research questions. At this stage, identifying and integrating relevant theories also becomes important, as this helps give the material meaning and facilitates placing the data into a larger context (Skilbrei, 2019).

Analytical approach

In parallel to the initial coding and categorisation of themes and patterns in the data, I also developed the analytical framework for the study, as already described in the theory chapter. To elaborate, I discovered that the collected data could beneficially be analysed through the sociotechnical perspectives of WST and affordance theory. These two theories were combined and further developed into the HDID-WSF and affordance theory analytical model.

Interpretation and position of the researcher

According to Skilbrei (2019, p. 174), researchers use at least three different lenses when interpreting and analysing the data material: (1) personal experiences, perspectives and preferences, (2) existing knowledge and (3) academic interpretation traditions. She explains that these lenses may either directly or indirectly influence the components which are highlighted or disregarded in the data material. For instance, the coding and classification process is influenced by the subjective interpretations of the researcher, as well as the literature and theoretical perspectives used (Larsen, 2017, p. 122). My position and interpretations have affected different stages of the research process. For instance, in the data collection phase, I reached out to several of the potential interviewees directly on LinkedIn. My experience was that this provided better result rates than when I contacted them via email. The fact that I have a position within conflict diplomacy may have influenced their willingness and incentive to partake in the study. I clearly stated in the information letter that I was conducting the study in a personal capacity independently of my employer and repeated this at the beginning of each interview. My own personal views, values and academic background in social sciences and humanities will also have affected the design and analytical phases, such as the research questions, the questions included in the interview guides and the analytical framework used.

4.7.   Research ethics

Research ethics encompasses many different aspects. Amongst other things, these ethics concern how a researcher engages with participants, provides information about the study, ensures informed consent, safely stores and processes personal data and ensures confidentiality if the participants wish to remain anonymous in the study (Larsen, 2017, p. 15). Skilbrei (2019) emphasises that research ethics should be a cornerstone in all stages of the writing process. Before conducting the interviews, an application was submitted to the Norwegian Centre for Research Data (NSD) to ensure that that the project was in compliance with governing regulations. The NSD approval can be found in the appendices.

Informed consent

Informed consent is a central aspect of research ethics and it entails that participants are provided with sufficient information about the study and their rights (Skilbrei, 2019). All the participants received an information and consent letter before the interviews were carried out. As it is not always possible to discern whether this has actually been read, I also started each interview by reiterating the main points of the letter. As several of the consent letters were not returned to me, an oral consent was recorded at the beginning of each interview. Some participants asked to receive direct quotes in advance of the thesis' submission and two informants asked to be anonymised.

Confidentiality and anonymity

Researchers need to protect the privacy of participants and uphold confidentiality through for example the secure storage of data records. This is especially important when processing sensitive issues or data (Hennink et al. 2020, p. 71). The content of the present study is not considered to be of sensitive nature or to introduce risks to any of the participants. The personal

names and gender of the interviewees have nonetheless intentionally been omitted from the study to remove identifiable information. Their names were additionally replaced with a code on all the transcriptions, which have been stored separately from the consent forms. In the consent forms, the participants were also asked about their preferences regarding the anonymisation of other personal data, such as their affiliation/organisation and the name of the blockchain project they had been involved in. I have included the name of the organisations and blockchain project when the participants have agreed to this. This was motivated by the desire to enhance the depth and relevance of the findings and underscore the real-world applicability of the study's insights. To ensure confidentiality, I remained the only person with access to the recordings and transcriptions, which will be deleted at the end of the project. The study contains direct quotes from the participants, which means that complete confidentiality cannot be ensured (Hennink et al. 2020, p. 79). However, the quotes arguably increase the study's validity.

Validity and reliability

Validity and reliability are crucial components of the research process. Larsen (2017) expounds that amongst other things, validity concerns the collected data's relevance for addressing the research questions, the trustworthiness of the findings and conclusions drawn, as well as transparency with regards to the steps, methods and decisions taken in the research process. It is common to distinguish between internal and external validity. Internal validity generally refers to aspects such as the validity of the findings in relation to the theoretical framework, as well as the accurate transcription and use of quotes, codes, interpretations and sources (Larsen, 2017, p. 94). External validity refers to aspects such as the applicability of the study to other contexts (Andersson, 2013; Larsen, 2017). Qualitative studies generally aim to transfer and apply findings and knowledge to other cases or contexts. According to Yin (2003, p. xiv), case studies are often claimed to "provide little basis for scientific generalisations." They can, however, be used to make certain analytical and theoretical generalisations (Yin, 2003, p. xiv).

During the transcription, coding and classification stages I made a conscious effort not to skew any of the collected data, or disproportionately weight or overlook certain aspects. However, there is always a risk that incomplete or insufficient accounts about a phenomenon lead to certain misunderstandings or shortcomings (Andersson, 2013, p. 157). I had only a basic understanding about digital IDs in the migration context when I embarked on this study. As such, it may be that certain important aspects have not received enough attention or have been oversimplified. However, an important aspect of qualitative studies is data reduction (Skilbrei, 2019) and I have to the best of my ability attempted to incorporate the main arguments and themes from the interviews and pertinent research on the topic.

The validity and reliability of the findings was in part addressed by consulting 10 different actors about the same topics and by cross-checking key arguments and findings. Connected to this, data triangulation is often considered to be one of the strengths of case studies and it involves the use of several data sources and methods for data collection to better capture different facets (Andersson, 2013, p. 153). This study employed both secondary and primary sources and consists of a literature review and interviews. I would argue that the combined WSF-affordance framework used in this study is transferable to other studies focusing on the sociotechnical significance of particular technologies or systems in contemporary society. The

findings may also contribute to the growing body of research concerning the implications of digital ID technologies and humanitarian blockchain initiatives in the forced migration context.

4.8. Limitations to the methodological approach

The study contains several methodological limitations. For example, given more time, the study's validity could have been further increased by incorporating more research methods, including quantitative methods generating statistics concerning the implementation, growth and trajectory of digital ID solutions in the humanitarian field. The validity of the study could also have been enhanced further by having a larger interviewee sample. The perspectives shared offer only a snapshot of viewpoints and experiences from the humanitarian space, with a particular focus on the perspectives of interviewees from humanitarian and technology organisations. It is thus not a representative sample of pertinent stakeholders, nor either of the breadth of humanitarian blockchain projects in the field. The study therefore does not attempt to provide any encompassing generalisations. Furthermore, the perception of affordances is a subjective process and the ones I have identified in the material may be different from what another researcher or the informants themselves would choose to emphasise.

The main limitation of the interviewee sample is that no forcibly displaced individuals or end-users from the different projects were interviewed. Although their voices are paramount and should remain at the centre of all solutions which they are expected to use, it was a conscious research decision not to include any end-users in the study. Firstly, this would have been dependent on the different organisations agreeing to share their names, which would for privacy reasons be challenging. Secondly, if these individuals were to share any negative viewpoints about the solutions, it could be that this would inadvertently also result in negative consequences for them. Thirdly, the inclusion of end-users to the sample would mean that the sample size would have to be substantially enlarged to incorporate the necessary diversity of viewpoints and adequate consideration of representation in terms of for example intersecting identity categories. Due to the scope and time restraints of this study, this would not have been feasible. That said, there is critical need for more research which includes the voices of forcibly displaced and marginalised individuals.

In short, this chapter has outlined the methodological steps and decisions supporting and guiding the study, including the research design, strategy, methods and ethical considerations. These steps were used to collect, interpret and structure the collected data. The findings derived from the analysis of the interviews will be presented next.

5. Presentation of findings

This chapter will present and describe the findings derived from the analysis of the interviews. The sub-sections of the chapter are structured according to the analytical model applied to the study, previously described in the theory chapter. I combine the WSF with affordance theory and propose that humanitarian digital ID (HDID) solutions can be conceptualised as sociotechnical work systems. To reiterate, these solutions often include a CVA component. In this chapter, findings related to the elements in the HDID-WSF will be presented together with findings pertaining to the identified corresponding stage of affordance theory:

Section	HDID-WSF		Blockchain specific affordances
5.1.	Participants, information, technology	⟶	Affordance perception
5.2.	Processes and activities	⟶	Affordance actualisation
5.3.	Products, services and beneficiaries	⟶	Affordance effect
5.4.	External environment	⟷	Enabling and constraining factors

The findings presented in this chapter will lay the foundation for the ensuing discussion about digital ID solutions in the forced migration context in chapter 6. In that chapter, key themes, patterns and contested areas identified in the findings will be discussed in relation to the study's research questions, relevant scholarship and the selected theoretical perspectives and concepts.

5.1. Ground level of the analytical model

This section will present findings relating to the ground level of the study's analytical model.

HDID-WSF internal elements		
Participants	Information	Technologies
Affordance perception		
Humanitarian and technology actors/stakeholders	External information and goals ⇧	Blockchain
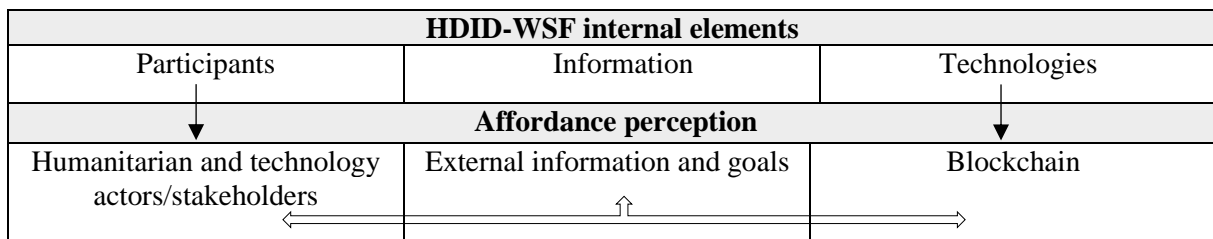
5.1.1. Participants in humanitarian work systems

Participants are the different individuals and groups performing the tasks in a particular work system (Alter, 2013). The findings reveal that a diverse set of participants are directly involved in the development, implementation and maintenance of humanitarian digital ID and CVA systems. A focal theme in the study's 10 interviews was the significance of intra- and intersectoral collaboration. Several of the study's informants highlighted that joining forces enabled a more comprehensive and coordinated response to shared humanitarian challenges. The study's informant from the UNHCR stated that:

> "We would be the first to say that we are not always going to be the experts on emerging tech. We cannot work alone - academia and industry have a crucial role to play to make sure that we are aware of which products are most appropriate for our use-cases, and to help us improve, responsibly." (UN Agency, C4)

Three of the informants were involved in consortia-based initiatives consisting of stakeholders from different NGOs, governmental agencies and the private sector, while a couple of the other

informants were involved in alliances consisting of both public and private sector actors. A connected theme was the growing demand for technological competences:

> "If NGOs have the need, we have some skills in developing these solutions and knowledge that they might not have in-house." (Tech startup, B1)

These quotations highlight how humanitarian interactions with the private sector often emerge due to the specific capabilities that technology providers inhabit. Yet notably, the interviewees also disclosed that a divergence of interests and priorities sometimes arises:

> "[The] humanitarian world is totally different from the business world and unfortunately we are sometimes faced with this problem that someone from the business side comes to us and wants to use our community and audience as future consumers of their project, which is totally different to our values." (Tech and refugee movement, C2)

> "Sometimes, solution providers are mainly thinking about the technology, they're thinking about this thing that they've built […] it becomes part of this bigger sort of ecosystem when it's implemented, that may or may not be operated in an ethical manner." (Global alliance, C1)

Informant A3, a humanitarian and blockchain expert and independent consultant, maintained that a friction sometimes occurred between humanitarian and tech organisations, especially in instances where innovative products were dominated by what the technology investors wanted rather than what the organisations and beneficiaries needed. Another source of friction was when new relationships with technology providers were established at headquarter level and subsequently pushed down to country level and local staff who may have been excluded from the decision-making process. In other cases, A3 and the other informants stated that their cross-sectoral collaborations had been excellent and resulted in a multitude of mutual benefits.

5.1.2. Information and technologies in humanitarian work systems

Alter (2013, p. 80) emphasises that participants in work systems extract, retrieve, transmit and use information in different ways. The findings reveal that in humanitarian work systems providing services to forcibly displaced and marginalised populations, vast amounts of information are captured, created and stored through the use of a diverse set of technologies. Examples provided by the study's informants included information and refugee management systems, data servers, social media sites, smartphones, web-based applications, biometrics, digital wallets and DLTs such as blockchain. Data is captured and stored through these and other technologies to support processes such as registering and managing refugees and other aid recipients, issuing and verifying credentials, monitoring disbursements and reporting results to external stakeholders such as donors and the general public:

> "People don't just ask did the money go to that place, they ask did the people who needed that money get it and how much and when and what was it used for, how do we know that corruption didn't happen, how do we know that people actually got what they needed or not, how do we know when to stop because people are recovering? Answering all those questions requires that additional information." (Independent consultant, A3)

Yet the disadvantages of extensive data collection practises within the humanitarian sector was also raised by A3 and many of the study's other informants:

"The big problem for NGOs in general is that each organisation has their own system to manage their data and they don't want to share anything. So, it kind of frustrates the beneficiaries, because every time they access some type of service from different organisations, they need to give the same information again and again." (Tech startup, B1)

5.1.3. Goals, external information and the buzz around blockchain

Although the exact goals of the different humanitarian digital ID and CVA projects discussed in this study varied, a common denominator was that they were centred around addressing certain entrenched problems in the humanitarian sector. The goals of three of the projects that informants in this study have been involved in are included in **Table 3.**

Project	Identified "problem"	Description and aims
DIGID - Dignified Identities in Cash Assistance[4]	Individuals without official forms of ID are often left out of cash assistance. Kenya and Uganda host large 'undocumented' and forcibly displaced populations.	A consortia-based digital ID and cash assistance initiative consisting of different NGOs. The technical implementation is led by the IFRC. It aims to ensure more dignified cash assistance processes for beneficiaries and give them more ownership to their data. Pilots have been carried out in Kenya and Uganda.
Unblocked Cash[5]	Lack of financial infrastructure and banks in the Pacific region, leading to large 'unbanked' and financially excluded populations.	A consortia initiative consisting of several NGOs, donors and the private sector, led by Oxfam. Unblocked Cash aims to accelerate CVA solutions to remote and crisis-affected communities in the Pacific and beyond. It does not explicitly focus on digital IDs.
The Rohingya project[6]	The persecution, displacement and lack of recognised citizenship for many Rohingyas, leading to their exclusion from basic rights.	Grassroot initiative that aims to improve the social and financial inclusion of Rohingyas and other stateless individuals. The project aspires to empower Rohingyas, many of whom are displaced within or outside Myanmar, through a virtual community and a forthcoming decentralised digital ID solution.

Table 3: Identified problems and connected aims of three humanitarian projects discussed in this study.

The initiatives above were all launched around five years ago at a time when many international alliances and organisations were examining and developing principles on digital IDs. There was also surge of information about blockchain and its potential to innovate humanitarian action:

"In 2017—2018, with the hype of blockchain as a concept, we were not necessarily forced, but because I work in the area of innovation, we were made to really pay attention to how blockchain could solve some of these issues and problems that we have when we provide cash and voucher assistance." (NGO, A1)

The respondent recalled that at the time, they were approached by numerous technology providers who wanted humanitarian organisations to pilot their blockchain solutions for cash assistance. The informant stated that they initially pushed back to avoid accepting a technology that was essentially "looking for a problem". Instead, they wanted to ensure that their problems connected to cash assistance for beneficiaries remained the starting point (A1). The hype generated by blockchain was also commented on by other informants. For instance, A2 from a grassroot organisation found that "it takes a long time to go through what is just hype and proclamations and what people have actually done" and a tech entrepreneur in the study

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[4] https://hiplatform.org/digid
[5] https://www.oxfam.org/unblocked-cash-project-using-blockchain-technology-revolutionize-humanitarian-aid
[6] https://rohingyaproject.com/

maintained that when organisations in the non-profit sector were unable to spend all the funding they had received for a specific project, they got less the next year. Consequently, hype was at times created around certain projects and outcomes to justify and secure future spending (B3).

5.1.4 Affordance perception – humanitarians interact with blockchain and SSI

According to Pozzi et al. (2014), the stage of affordance perception is influenced by available external information. The abovementioned quotations illustrate how the surge of available external information about blockchain influenced some humanitarian organisations' choice to interact with it. In connection to this, Ostern et al. (2020) state that external information can also lead to the replication of efforts made by others. The affordance perception stage is further conceptualised as a recognition process, in which an actor perceives a technology and becomes aware of different action possibilities (Pozzi et al. 2014). This notion is supported by what was found in the interviews. To pursue their project specific digital ID and CVA goals, most of the informants in the study recognised the need to explore innovative technologies. The humanitarian organisations also recognised that in order to leverage the benefits of these technologies, they needed to engage with tech actors. Correspondingly, Bernhard et al. (2013) and Pozzi et al. (2014) argue that affordances arise from the interaction between a technology with specific functions and an actor with specific characteristics and expertise. Six of the study's informants were involved in humanitarian projects which involved a blockchain component. A couple of the informants emphasised how knowledge about certain blockchain properties influenced their decision to use it. Informant B3, a tech entrepreneur, explained that:

> "We needed something that was open for everyone […] and that provided some sort of immutability on the data that we were going to verify. We needed something that was neutral and distributed, global, accessible 24/7 […] a public blockchain fit these criteria." (B3)

Some of the informants also recognised that leveraging these properties and interacting with the technology would allow them to actively pursue their organisational goals. As respondent A3, an independent consultant for a blockchain-based project in the Pacific region, put it:

> "Once I understood what blockchain could do, it really started connecting dots in my mind. You know, that it's distributed and decentralised, and in my head I was like, this is a region where the islands are distributed and decentralised […] I had already started writing out a white paper around the parallels between the challenges in cash assistance, particularly in the Pacific region, and the potential of blockchain technology to address those issues." (A3)

A few of the informants also mentioned how external information about the concept of SSI influenced their project aims and turn to blockchain. Informant A1, who is part of a consortia-based initiative for marginalised beneficiaries in Kenya and Uganda, shared that:

> "We were interested in the concept of SSI. I think that at that time, the promises that were communicated or promoted in terms of giving agency to an individual were principles that we really wanted to see how could be realised in practice." (NGO, A1)

The potential of SSI solutions for forced migrants was also highlighted by tech informant B2:

> "The way the world is designed, everything is hinged around identity - your qualifications, your access to digital and financial services. And when you get out of your jurisdiction, by

virtue of circumstances, you lose that access. If we started building identities that are self-sovereign, that will eventually make it possible with a portability of identity." (B2)

Yet, a focal point for many of the respondents was the difficulty of realising SSI in practice:

"It's not SSI if someone just gives you a card and says this is your self-sovereign identity. So, there's lot of work that is required to get there and the reason I'm saying this is that I find it really discouraging that everyone wants to talk about these end goals that nobody wants to pay for, own or do the hard work to actually get there." (Independent consultant, A3)

Although the informants' perceptions about blockchain and its potential varied, all of them agreed that innovation and new technologies were pivotal in their work. Informant C4 works for the Digital Identity and Registration Section at the UNHCR, a section that is not currently using blockchain. When asked whether they were considering using blockchain in the future to support the digital identity and registration processes for refugees, the informant replied: "We're not ruling it out and my colleagues elsewhere in UNHCR ran a very successful pilot[7] earlier this year." (UN Agency, C4). The informant elaborated that:

"We always have to be mindful though that every dollar spent on innovation is a dollar we're not spending on shelter or assistance, etcetera. So, while there is great potential to bring value through innovation, it needs to be done deliberately and with clearly thought-out purpose. I think that going forward, one of the biggest opportunities for us above and beyond continuing what we're doing, is helping people use their identity as an asset, not just with us in UNHCR, but with other entities, be that UN, NGOs, hosting state systems or the private sector. And any way we can do that, whether that's through some kind of blockchain initiative, through increased functionality of the credentials that we print or through enhanced access to our digital services, would be really positive." (C4).

To summarise, this sub-chapter has presented findings related to the participants, information, goals and technology in humanitarian digital ID and CVA systems. Humanitarian organisations are increasingly collaborating with technology companies on the development of innovative solutions for beneficiaries in a forced migration context. Some such solutions use blockchain technology. The informants' perceptions about the action potential of this technology differed, but several stated that they were interested in tapping into blockchain's properties to support their organisational goals and address certain entrenched challenges in the humanitarian sector.

5.2. Second level of the analytical model

In this sub-chapter, findings pertaining to the processes and activities within humanitarian digital ID systems, as well as actualised affordances will be presented. The main focus will be on affordances related to the use of blockchain.

HDID-WSF internal elements
Processes and Activities
Affordance actualisation
Actions taken by humanitarian and technology stakeholders when they leverage the perceived opportunities of technologies such as blockchain to achieve certain organisational goals

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[7] In late 2022, the UNHCR unit carried out a blockchain pilot to deliver cash-based assistance to individuals displaced by the war in Ukraine, later winning an impact award for their achievements (UNHCR, 2022b)

5.2.1. Processes and activities

According to Alter (1999; 2013), processes and activities take place within a work system to generate products, services and value for its customers. Alter (2013) presents what he calls the 'Work System Lifecycle', which refers to four distinct stages of a system or project: initiation, development, implementation and operation. This study found that blockchain-enabled pilots and projects in humanitarian digital ID and CVA systems follow a similar lifecycle. With regards to the pilots' initiation and development stages, a couple of the informants highlighted that the introduction of new technologies could be described as dynamic learning processes:

> "At end of the day, one of the principles in innovation is really about the learning. We take the learning and try to understand: is it solving the problem first and foremost, and secondly, are we introducing new risks? So, this principle of 'do no harm', because if we are, then maybe we should look for alternative ways to which we can achieve our objective." (NGO, A1)

> "What we discovered was that there's sort of a process of learning. Initially, we put a lot of emphasis on the ID, but that's sort of putting the cart before the horse, because if you create an identity as sort of a standalone tool, then its utility is somewhat less." (Grassroot, A2)

Other activities and processes mentioned by the informants linked to the initiation and development phases of their projects were internal assessments, the production of problem statements and proposals, the commissioning of reports, the procurement of technological solutions, surveys, funding applications, technical design development, training of staff, monitoring, evaluations, simulations, pilots and tests. Some processes were connected to outreach and consultations with other humanitarian organisations, civil society organisations, digital ID alliances, donors, legal advisors, academics, government officials and the actual end-users. For instance, informant A3 explained that before the launch of a blockchain-enabled cash assistance pilot in the Pacific region, a cash feasibility study was carried out in Vanuatu:

> "I think we went to 33 different islands to do surveys with the shopkeepers, men and women in the village, wholesalers, the people who were running the shipment lines between locations, the financial service and remittance providers, you know, all the people interested in the economy in Vanuatu. The intention wasn't for blockchain, it was just let's figure out where cash fits into this context and where it's feasible." (Independent Consultant, A3)

A handful of the informants underscored the importance of understanding the local context and the needs of the beneficiaries, as well as the involvement of the local communities, in their approaches. The processes and activities connected to the initiation and planning stages of the pilots were important steppingstones for the subsequent implementation stage, in which additional activities were carried out. Some examples mentioned by the informants included identifying and registering beneficiaries, creating digital IDs, issuing and verifying different forms of digital credentials and wallets and disbursing aid. During the operational stage of the humanitarian digital ID and CVA projects, the informants stated that there were also a lot of activities connected to their maintenance, such as for example improvements to the solutions, adjustments to the platforms used and consultations with the beneficiaries. The different processes, as well as the solutions and services produced, led to a range of action opportunities.

5.2.2. Affordance actualisation

Affordances arise when an actor interacts with a technology to achieve certain objectives (Majchrzak & Markus, 2012; Pozzi et al., 2014; Volkoff & Strong, 2017). Affordance actualisation can be understood "as the behaviour that the organizations adopt acting on the perceived opportunity for action" (Pozzi et al., 2014, p. 3). **Table 4** provides an overview of the actualised affordances which I identified in the interviews with the informants involved in blockchain-supported humanitarian projects. Some of these affordances are directly related to the use of blockchain, while others are likely equally related to other technologies and efforts.

	Actualised affordances identified in the interviews with relevant examples and quotes
1	**Facilitating alternatives to foundational or legal IDs:**
	Several of the projects provide digital credentials to beneficiaries lacking any form of official ID documents.
2	**Strengthening intra- and intersectoral partnerships:**
	Many of the projects consist of multiple stakeholders, such as consortiums with NGOs, governments, donors and private sector actors, working together on innovative solutions to achieve shared goals.
3	**Leveraging digital IDs to optimise cash assistance:**
	"Almost all the blockchain platforms that I've seen disperse cash generate unique identifiers, which is a fundamental part of how an ID system works. That's already a huge help for delivering cash." (Independent consultant, A3)
4	**Uplifting marginalised communities:**
	"We use blockchain based technology to enable people to get power and ownership over their personal information and their different credentials." (Tech company, B1)
	"We're preserving the Rohingya heritage, […] collective identity and aspects of their community." (Grassroot, A2)
5	**Adapting solutions to multiple use cases:**
	The second phase of DIGID was aimed at leveraging the same decentralised identity technology used for providing cash assistance in Kenya in 2020 to a migration and continued health care context in Uganda and Kenya in 2022 (IFRC, 2023). The Unblocked cash project was initially launched in Vanuatu and later expanded to new countries and contexts.
6	**Automating manual humanitarian assistance processes:**
	"Blockchain is starting to automate practices that were either too slow or too difficult before, or that were kind of the domain of a small group of practitioners […] If you can automate those processes and make them digital, then you're massively broadening the organisations that can engage in the humanitarian space" (Independent consultant, A3)
7	**Increasing accountability:**
	"Because of the immutable property of the blockchain, once that transaction is recorded, it's there and it's not as easily changeable and that was interesting from an accountability perspective." (NGO, A1)
8	**Providing additional security layers:**
	A couple of the informants stated that they were leveraging blockchain's high-security encryption and cryptography. "That security is inherited by any platform that's built on a blockchain. Not that it's fool-proof or un-hackable, that doesn't exist, but it just makes it that much harder for anyone who tries to bring it down." (Tech company, B2)
9	**Innovating CVA and disrupting established payment models:**
	"We're giving financial access to populations unable to access traditional banking services." (A3)
10	**Facilitating the *possibility* of data portability and interoperability:**
	"Digitising identity is one thing, having it portable is another […] If we started building identities that are self-sovereign, that will eventually make it possible with a portability of identity." (Tech company, B2)
	"What DIGID is trying to do is create a solution that will enable easy interoperability and a decentralised storage so that it's easier for humanitarian organisations to issue credentials and verify them." (Tech company, B1)

Table 4: Identified actualised affordances in the empirical material.

It is necessary to clarify some of the concepts included in the quotes above. For instance, the first quote in affordance number four in the above table includes a reference to how blockchain is used to give beneficiaries ownership over their personal information. Importantly, the informants involved in blockchain-supported projects issuing digital IDs all emphasised that the beneficiaries' protected personal information (PPI) was never placed on a blockchain:

> "A huge misconception among academics, scholars and experts today is that they think we're going to register personal data on the blockchain. No, you can never do that! You have a key that opens and authenticates perhaps a vault that contains your first and last name etcetera." (B3)

In other words, the secure data storage is completely off-chain and public or private keys give the beneficiaries and implementing organisations access to specific personal and financial data.

Data portability and interoperability are mentioned in affordance number 10. These are two interconnected yet different concepts. Portability typically refers to an individual's ability to transfer their data from one platform to another, while interoperability refers to the ability of different systems, technologies and organisations to exchange and verify information (IFRC, 2023). In the context of the DIGID project, interoperability encompassed two key dimensions. Firstly, it tested system-to-system interoperability between humanitarian organisations using different technology "stacks" or sets of technologies. Secondly, it tested the ability of humanitarian organisations to recognise and trust the IDs that another humanitarian organisation had issued (A1; IFRC 2023). With regards to the latter point, informant B1 stated that the Red Cross Kenya and Red Cross Uganda carried out a simulation test using volunteers:

> "We tested for interoperability between the two countries, so if one refugee was coming from Kenya and was to use their credential in Uganda, then that would be possible. Because it's hopefully something that we can ensure in the future with different organisations in the ecosystem. The more organisations, the more we can leverage that interoperability layer so that the credential has more power for the refugees." (Tech company, B1)

To recap, this sub-chapter has presented findings pertaining to some of the key processes and activities taking place in the initiation, development, implementation and operation stages of humanitarian digital ID and CVA projects. 10 actualised affordances were identified.

5.3. Third level of the analytical model

This section will present findings related to the products and services produced for forcibly and other aid recipients in different humanitarian digital ID and CVA pilots and projects. Moreover, key identified effects of these systems will be presented. The primary focus will the perspectives of the six informants who have been directly involved in a blockchain supported humanitarian project, but pertinent points from the other informants will also be incorporated.

HDID-WSF partially internal/external elements	
Products and Services	Beneficiaries
Affordance effects	
The outcomes of the products and services provided to beneficiaries within the work system.	
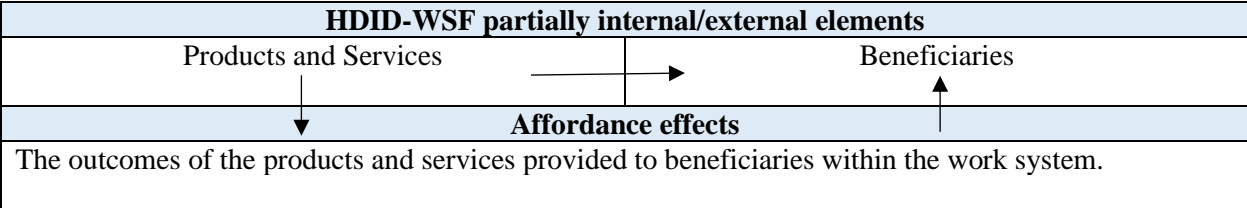
5.3.1. Products and services

Work systems produce different products and services (Alter, 2013). Six of the informants in my study had worked for organisations delivering different services and solutions with blockchain components to forcibly displaced or otherwise vulnerable populations. These informants emphasised the important distinction between foundational and functional IDs:

> "Foundational identities are not the type of identity which we are developing for humanitarian action, it's really more of a functional identity that has a very specific focus, which is how do we ensure that an individual receives humanitarian assistance." (NGO, A1)

An informant from a tech company emphasised that: "the functional IDs are not recognised as official IDs by any governments, they're just recognised within an ecosystem to access different services" (Tech company, B1). The blockchain-aided digital ID initiatives discussed in the study were focused on issuing different types of credentials, such as health records, education certificates and work permits.

The six informants who had been involved in a blockchain-supported project revealed that this technology was used and tested for different purposes. For instance, informant B2 works for the tech company CryptoSavannah. Together with Mercy Corps, CryptoSavannah is planning a two-phased pilot which aims to deliver blockchain-powered solutions to approximately 35,000 refugees and their host communities in Uganda. During the first phase of the pilot, a customised blockchain-supported platform will be used to create verifiable digital IDs to the refugees in the project. These IDs will be used to verify the refugees' eligibility for aid, as well as financial and governmental services. The IDs will also be used in the second phase of the pilot to create blockchain-built digital wallets. Crypto-based aid disbursements will be distributed to the digital wallets and the beneficiaries will be able to either save or spend their funds at participating stores in the local community (B2; Savannah, 2022[8]).

Digital wallets transpired to be a reoccurring product in several of the pilots and projects discussed in this study. In the DIGID initiative, digital wallets and printed cards with QR codes providing access to digital credentials have been piloted to facilitate cash assistance for beneficiaries without access to any legal ID. These wallets are also available through so-called 'Unstructured Supplementary Service Data (USSD) menus, enabling beneficiaries without a smartphone to interact with, modify and share their data. The second phase of DIGID was focused on migrants, with pilots in Uganda and Kenya. In Kenya, the product was used to enable migrant patients to have their basic medical health records stored on their digital wallets, which could be accessed and shared with healthcare providers (AI, B1). The digital wallets were hosted on the blockchain (IFRC, 2023). Digital wallets are also used in Oxfam's Unblocked Cash project. Funds are transferred to beneficiaries' tap and pay e-voucher cards in a stablecoin cryptocurrency. The cards hold the balance of their digital wallets, which can be used to purchase goods and services offered by registered vendors (A3; Oxfam, 2023). Blockchain is thus used to either underpin or support several of the products and systems being produced and cryptocurrencies are increasingly often used to distribute humanitarian assistance.

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[8] See: https://savannah.ug/blog/mercy-corps-ventures-coin-base-and-cryptosavannah-partnership-on-digital-identity-and-cash-transfer-project/

5.3.2. The beneficiaries

As already mentioned, there are today more than 100 million forcibly displaced people worldwide. Several of the study's informants pointed out that forcibly displaced people do not represent a homogenous group, due to the tremendous diversity in their experiences and needs. The term 'forcibly displaced' encompasses multiple different categories of people on the move, such as refugees, asylum seekers, internally displaced people and migrants. Informant C3 emphasised that the status of these individuals impact their rights for protection. The informant elaborated that forced migrants' nationality and the regulations in the country they are seeking refuge will additionally impact their opportunities, constraints and reality. So too do intersecting identity factors, such as gender, race and ethnicity and the stage that they are at in their migration journey. There may be many different reasons why a person is fleeing from their home country, for example violence, natural disasters, poverty and political instability. In connection to this, there are also myriad reasons why a person may lack an ID:

> "It's people in transit, people who have been forcibly displaced that maybe couldn't grab their ID before leaving, people who are stateless, like the Rohingya, and people who do not have the means to be able to obtain state identification […] It's people who just be virtue of being marginalised, living in remote places, being impoverished, have been unable, in their own country for their own purposes independently of humanitarian programs, to get a valid form of identification from their government." (Independent Consultant, A3)

According to Alter (2013), work systems are established to create certain products or services of value for either internal or external customers. In this study, I have replaced Alter's original term 'customers' with beneficiaries. The beneficiaries or recipients in the different blockchain supported projects varied. For example, informant B3 had worked with Syrian refugees in Turkey. Turkey is one of the world's largest refugee-hosting countries, with more than 3.5 million refugees from Syria alone (UNHCR, 2023a). In the DIGID project, the main target group of the first pilot was individuals lacking any form of formal ID. The second pilot focused specifically on migrants, with internally displaced people in Uganda and refugees at two different camps and settlements in Kenya (B1). Both countries shelter many displaced people and Uganda has the largest refugee population in Africa (ACAPS, 2022).

In the Unblocked cash project, which informant A3 is connected to, the focus is on remote and crisis-affected populations in the Pacific region and beyond, who lack access to traditional financial services. Although the project does not explicitly focus on forcibly displaced individuals, some of the aid recipients have been temporarily displaced due to for example natural disasters (A3). The Rohingya project is focused on the stateless Rohingya, many of whom have been forcibly displaced either internally or to neighbouring countries such as Malaysia and Bangladesh due to systematic discrimination and persecution (A2). Whereas some of the blockchain supported pilots and projects were currently serving a few hundred beneficiaries, others had either a present or intended reach of many thousands. As already mentioned, the blockchain-aided humanitarian projects consisted of different processes and activities which produced various digital ID and CVA solutions to beneficiaries. These led to certain affordances and opportunities being actualised, as well as a range of effects.

5.3.3. Realised and potential affordance effects

After actualising an affordance, it leads to certain consequences and results (Bernhard et al, 2013). This stage of affordance theory has to do with what was "afforded by" an actor's use of a technological artifact or system within a particular context (Majchrzak & Markus, 2012, p. 2). Notably, the informants in this study had divergent perspectives on the actual impact and significance of blockchain in the different humanitarian projects. For instance, A1 stated that:

> "There are certain aspects that it is able to address, but I think there's still a bigger question in terms of, is it absolutely necessary or are other options good enough, you know, for the type of work that we do in the humanitarian space." (NGO, A1)

The informant stated that although blockchain had demonstrated certain value for organisations from for example an accounting perspective, the benefits for the end-users were less clear (A1). Informant A2 argued that although their Rohingya initiative had shown that blockchain had many advantageous effects, for instance due to the technology enabling increased security and efficiency, forcibly displaced and stateless individuals' needs were complex:

> "They need immediate solutions and many of the bigger advantages of blockchain would be more attractive in a Western context than someone who is in a survival mode." (Grassroot, A2)

Other informants had a slightly different point of view:

> "I think we're at one of these turning points. Someone coined blockchain and crypto as the 4th industrial revolution and it's very true because it's going to change the way we relate to each other, it already has, and it's going to change who's the boss and who's not." (Consultant, A3)

The informants stressed that it was important not to succumb to narratives proclaiming that blockchain alone could lead to transformational changes for digital ID solutions in the forced migration context, rather they suggested it could have certain advantageous effects within a broader ecosystem. In addition to the abovementioned overarching reflections on blockchain's significance and impact, some more concrete effects were identified, as outlined below.

Reduction of costs, distribution and processing times

Several of the informants pointed out that an effect of using blockchain in different humanitarian projects was that it addressed delays in aid transaction and disbursement times. Traditional aid assistance and disbursement methods often involve multiple financial intermediaries, causing significant delays in delivery times and involving high transaction fees. Blockchain and cryptocurrencies on the other hand, allow multiple donors and organisations to transfer funds directly to the aid recipients at lower costs. According to numbers on Oxfam's Unblocked Cash website (2023), aid delivery time has been reduced by 96%, while distribution costs has been lowered by 75% due to the use of blockchain to deliver cash assistance.

> "Blockchain for CVA has demonstrated value across all of the pilots and organisations that I've seen, researched or heard of [...] [blockchain is] dramatically increasing the speed of delivery and also dramatically reducing the cost. That's so important." (Independent Consultant, A3)

Furthermore, the informant from the Ugandan tech company CryptoSavannah stated that: "the actual expenditure on the blockchain is significantly lower than that of a traditional database"

(B2). The informant also pointed out that blockchain platforms enable lower maintenance costs, with for example bitcoin being an example of a dependable and resilient network that has since its inception "run like clockwork" and never gone off (B2). Other informants stated that blockchain contributed to reducing the registration time of new beneficiaries into their humanitarian programmes and that it also increased their capacity to facilitate the issuance of ID credentials such as work permits, education certificates and health records.

Improved traceability and accountability for donors and organisations

Another effect highlighted by some informants was that the humanitarian blockchain initiatives enable the organisations and their donors to track their donations through management dashboards. The immutable and distributed features of blockchain were seen as increasing traceability and highlighting incorrect transactions being made. According to informant A1, humanitarian organisations traditionally use many different systems and intermediaries for cash disbursement and data management, all of which are subject to manipulation. Blockchain enables organisations to merge some of these systems. As informant A3 put it:

> "The way that blockchain is built allows you to have one system that is doing the work of multiple systems, one platform that is processing and storing transaction history and information and that's also attaching attributes to those transactions. What that means in programme implementation is that your post-distribution monitoring database, registration and financial transactions lists have all been merged into the system and that makes life so much easier."

Furthermore, because of the immutable property of blockchain, transactions recorded on the blockchain cannot easily be changed. Informant A3 underscored that although blockchain supports efforts in identifying exactly how much money had been disbursed and in detecting discrepancies, there were also risks connected to this technology's properties:

> "We need to be very careful about the systems that we are digitising and putting on the blockchain. Because of the immutability piece […] there's a very real risk of digitising systems that have not served people, or systems that have perpetuated inequality, so really entrenching existing problems by putting them on an immutable blockchain." (Independent consultant, A3)

Established uniqueness of identities

Several of the informants pointed out how know-your-customer (KYC) requirements are one of the biggest challenges when it comes to delivering aid to forcibly displaced and vulnerable populations lacking any form of legal ID. Financial institutions are required to adhere to KYC and it involves collecting and verifying information about customers' identities. To address this, some of the organisations represented in this study have explored alternative approaches to KYC. For example, informant B2 from a tech company in Uganda shared that in 2018/2019, some fake refugee IDs had been used to register for SIM cards subsequently used for illicit purposes. This led to the telecommunication regulator banning refugees from being able to get SIM cards, arguing that there was no official way in which these identities could be verified:

> "So that's when we stepped in and said that we can build a system that can capture these identities digitally and allow for digital verification of these identities, because a refugee ID is literally a hard physical letter that is given to them […] So, by digitising that letter, we could reinstate the issuance of SIM cards to refugees." (B2)

Blockchain is in the above example reportedly used to address challenges tied to KYC and lengthy verification processes, while also enabling the establishment of unique and unforgeable digital identities. Three other informants also stated that one of the effects of using blockchain for digital ID purposes was that it allowed for a digital directory over everyone who was issuing digital wallets and credentials. This is connected to the topics of revocation and repudiation:

> "What we mean by that is that a government or whoever is issuing [IDs] should not be able to say we never issued that. They can say this has been revoked, but they shouldn't be able to say that it was never issued. So especially in terms of displaced populations, in cases of war or other upheaval, you don't want whoever is now in power to be able to just blank those out." (C1)

Due to the immutable feature of blockchain, even if a given ID gets revoked, the individual can in theory still show that they previously had a credential issued by a specific organisation:

> "That means that those who are verifying that, it is up to them to decide, do we still want to accept that or trust that as opposed to not being able to validate it." (Global ID alliance, C1)

These last two points are tied the to the already mentioned actualised affordance of enabling the *possibility* of interoperability between humanitarian organisations. Although the feasibility of interoperability and irrevocable digital IDs has reportedly been established, several of the informants stated that these concepts were still somewhat aspirational and that more evidence and actual use cases were needed to determine how these aspects would work in practice.

Guardianship models of SSI and the pilot predicament

A key concept in digital ID discussion is SSI. However, applying SSI in humanitarian contexts remains a challenge due to different constraints, which will be outlined in Section 5.5.5. For example, the DIGID project initially aspired to offer beneficiaries in Kenya a SSI solution, but it was changed to a guardianship model due to various sociotechnical constraints. In such a model, the humanitarian organisation takes on the role as custodians of individuals' ID information or data. That said, the solution still incorporates SSI principles. According to informant B1:

> "It's hard to find the right balance between all the benefits that you can have from a concept like self-sovereign identity but also applying it to the real world. So, to find the best way to manage data in a way where you can verify it and trust it, but also give people ownership over their data, so just finding the right balance. So, everyone is looking at that at the moment." (B1)

Notably, a handful of the informants pointed out that a chronic issue for blockchain-supported humanitarian digital ID and CVA projects was that they did not progress from pilots to full scale projects. Furthermore, several informants highlighted the importance of having a critical awareness about potential risks connected to introducing new digital solutions in contexts with vulnerable populations. For example, the informant from the Rohingya project stated that digital IDs was still very much in flux and that there were several conflicting messages. As a result, they were waiting for a more established system over best practices before fully launching their blockchain-based SSI initiative. A key phrase emphasised in several of the interviews was the ambition to make humanitarian aid processes more dignified for forcibly displaced and marginalised populations, yet as will be discussed in the next chapter this is not easily measured.

To summarise, this sub-chapter has presented findings pertaining to the products and services produced for the forcibly displaced and marginalised beneficiaries within humanitarian digital ID and CVA work systems. As has been described, many of the digital ID solutions are linked to services providing cash voucher assistance to beneficiaries through for example the creation of digital wallets. The beneficiaries of the pilots and projects vary but have in common that they are by virtue of circumstances forcibly displaced or marginalised in different ways. Many of them lack any form of legal ID. The interviewees revealed that there are different factors that enable or constrain the development, implementation and effects of digital ID solutions, especially with regards to the initiatives containing an SSI element. Several of these factors have to do with the surrounding external environment, which will be presented next.

5.4. External elements in the analytical model

This final sub-chapter will present findings pertaining to the external elements influencing humanitarian digital ID and CVA solutions' development, implementation and overall impact.

WSF external elements			
Social, Political and Economic environment	Laws and Regulations	Strategies and Policies	Digital infrastructure
Affordance enablers and constraints			
Factors enabling and constraining the affordances and effects of digital ID and CVA solutions			
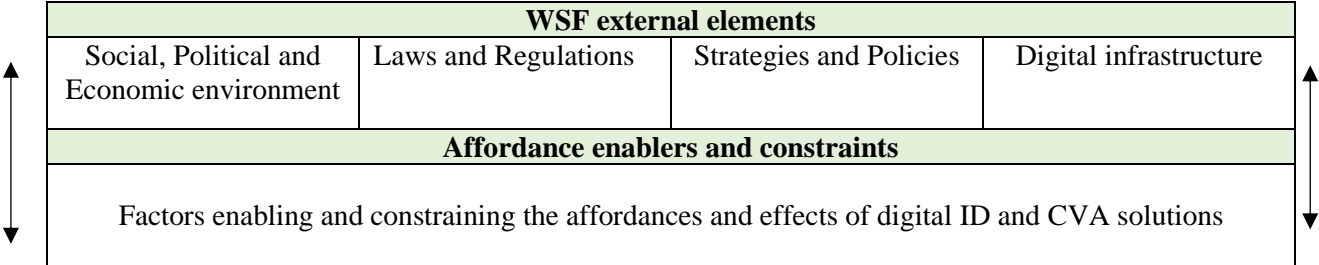
5.4.1. Social, political and economic environment

Alter (2009; 2013) emphasises that the environment a work system operates in affects its efficiency and results. Building on Alter's work system theory, Lindgren et al. (2021) bring the surrounding social, economic and political conditions to the fore. Some examples mentioned by the informants were the political situations in the migrants' home and host countries, social attitudes towards migrants, power imbalances, economic conditions and available resources.

Many of the informants underlined that digital IDs in the context of forced migration was a highly contentious issue, especially in relation to the foundational IDs issued by governments. According to one of the informants, the issuance of legal and civil identity is generally a prerogative of the state (Independent ID consultant, C3). Some informants pointed out that even the UNHCR, who has a mandate to issue refugee IDs, could only operate in a given country upon the request of that country. A handful of the informants shared that they had carried out consultations and briefings with government entities. This was amongst other things done to increase support for their initiatives and to ensure that these were not perceived as efforts to undermine official digital IDs schemes. Informant B2 said that for a project they had done for the telecommunication sector in Uganda, they had been required to get a special permission from the country's national identity regulator and go on record stating that they were not issuing any form of foundational identity. Another informant maintained that official government endorsement was a double-edged sword and that although it was important not to run awry of the government, it was also necessary to avoid becoming beholden to any State.

The informants revealed that in certain contexts, the government functioned as blockers to their humanitarian initiatives. For instance, one informant shared that their pilot in Venezuela has been suspended due to the government's crackdown on cash programmes and interventions by international NGOs in the country. Another informant recalled how the government in Bangladesh had put in cell-tower blockers to prohibit refugees from having cell phones or receiving any form of digital money, including blockchain. A couple of the informants highlighted that there were instances where governments had been accused of implementing insecure or exclusionary national digital ID schemes. Informant A1 shared that the DIGID pilot in Uganda had at first been launched as a digital ID project. However, due to the sensitivity connected to the term 'identity' in Uganda following a criticised national digital ID project implemented by the government, the DIGID team had eventually decided to steer away from the term and instead call it a digital credential project. Connected to this, a few of the other informants stated that they often had to manage the expectations of the beneficiaries enrolled into their digital ID initiatives and stress that they could not provide them with legal IDs.

5.4.2. Laws and regulations

According to Lindgren et al. (2021, p. 514), laws and regulations may govern the output and performance of a work system. The informants in my study mentioned the data collection, protection and privacy mandates that they were required to adhere to, as well as KYC regulations, existing legal frameworks for digital IDs and cryptocurrencies, the importance of consent from both beneficiaries and States, laws on documentation and migration, as well as the principles and protocols underpinning both centralised and decentralised digital ID systems.

Informant B2 stated that there were a lot of territorial and jurisdictional issues when working with digital ID, much of which is connected to the previously mentioned distinctions between foundational and functional, as well as centralised and decentralised ID schemes. Informant C3, an independent ID consultant working with international organisations and governments, stated that the idea of creating a decentralised and blockchain-based legal identity for migrants was highly unlikely: "I mean the challenge is not technical or operational, the challenge is legal." The informant elaborated that it was the legitimate right of a government to remain the central authority for the issuance of legal IDs. Contrastingly, another informant maintained that:

> "[IDs] should not come from this centralised institution who states who you are and what you should do, because that same institution can deny you the right to exist as well. And this is happening today in China, Syria, Iran and many other places around the world." (B3)

Informant B3 also argued that the regulatory space of digital ID in general and blockchain and cryptocurrencies in particular was not often talked about. Regulators, this tech informant objected, were forcing traditional identification methods and barriers on crypto.

5.4.3. Strategies and policies

Internal and external strategies and policies also influence work systems in different ways (Lindgren et al., 2021, p. 514). The findings revealed that for HDID work systems, this may include government policies and regulations on migration, the UN's SDG goal 16.9 concerning the issuance of a legal identity for everyone, different organisations' digital transformation

strategies, as well as various principles and standards on for example data protection and sharing, digital identity management and SSI. Some of the humanitarian interviewees emphasised that digital ID and CVA solutions needed to be developed in accordance with universal humanitarian principles, such as impartiality, independence and 'do no harm'. One of the informants from the global ID alliance ID2020 stated that: "historically we have talked about the concept of good ID, which is privacy protecting, user-controlled, interoperable, persistent and portable" (C1). However, the informant argued, discussions were becoming increasingly nuanced and it was therefore important to recognise that a digital ID does not only entail technological aspects, but also the governance, policies and ethical frameworks that accompany it (C1). Many of the informants stressed that humanitarian digital ID and CVA systems always needed to be considered in relation to the potential risks that they introduced to forcibly displaced and otherwise marginalised people, which should in turn also be reflected in the different organisations' digital technology policies and strategies.

5.4.4. Digital infrastructure

According to Alter (2013, p. 81), a work system's infrastructure includes "relevant human, information, and technical resources, which are managed outside of it, and which may be shared with other work systems." The infrastructure of digital ID solutions typically refers to the underlying technological components and systems that support its functioning and the creation, management and verification of digital IDs. This includes the different datacentres, servers, authentication mechanisms, protocols and cryptographies that are often shared with other systems, institutions and service providers. A central topic amongst the informants was the differences between centralised and decentralised digital ID systems and between private and public blockchain infrastructures.

> "When we talk about [blockchain] infrastructure, I don't think it makes any sense whatsoever to use anything except a public, permissionless network […] the main reason for that is A) philosophical – let's break down power systems! We talk about decentralising development and we have decentralised systems which should be used in a decentralised way. B) it gives you a broader selection of solutions that you can use. And then C) it provides contingencies because the system doesn't rely on you at all. And then lastly, the public, permissionless infrastructure is more conducive to open sourcing and multi-chain usage." (Independent consultant, A3)

Several informants in the study voiced their resistance against using private, permissioned blockchains. For example, the informant from the tech company CryptoSavannah, which is collaborating with Mercy Corps on a forthcoming digital ID pilot for refugees in Uganda stated that: "It will have to be public blockchain because we want to work with open science" (B2). One of the tech entrepreneurs interviewed said that "on a private network you ask permission to innovate but on a public and open network, innovation happens without permission" (B3).

5.5.5. Affordance enablers and constraints

Affordance theory can be utilised to investigate the factors that either enable or constrain the realisation of affordances and their subsequent effects (Wahid & Sæbø, 2015). Majchrzak & Markus (2012, p. 2) state that the concept of affordance constraint relates to the "stumbling blocks" and obstacles prohibiting actors from realising specific goals when using a technology.

Whereas Zammuto et al. (2007, p. 752) argue that affordance theory "recognizes how the materiality of an object favors, shapes, or invites and at the same time constrains, a set of specific uses", Volkoff and Strong (2017, p. 6) emphasise that the perspective also allows for a recognition of the surrounding social and political forces and context. This study has sought to examine the factors that may either enable or hinder the utilisation and impact of HDID solutions for forcibly displaced and marginalised populations, with a focus on blockchain.

Several enabling factors were identified in the empirical material, some of which have been included in **Table 5** together with relevant quotes from the interviews conducted in the study.

Identified enabling factors with descriptions and quotes
1	**Open-source and public blockchains:**
	"We opted for a public network because if we needed help, we could just put on twitter 'hey help me' and you have a thousand developers who will come and help you […] the communities are much larger." (Tech entrepreneur, B3)
2	**On-site presence and expertise about the local context:**
	"Having a ground presence is an advantage because we're not an NGO that operates without a community connection" (A2)
3	**The growing innovation focus in a growing number of humanitarian organisations:**
	"I do think we are set up to support innovation. Colleagues across the organisation and the populations with which we work are encouraged to participate and help shape the implementation of programmes. We have an innovation service and beyond this I believe many colleagues are focused on making sure we continue to improve how we deliver support. I feel we are fairly well connected and supported across industry." (UN Agency, C4)
	"I think blockchain has been around for some time now, so some, although not all organisations are going to know about blockchain. Especially with innovation teams, who we're usually working with, they're more aware of it." (Tech, B1)
4	**The recognition of emerging technology's value is addressing global problems:**
	"The need is the major enabler […] Urgency is important." (Tech entrepreneur, B3)
	"The Rohingya have this enduring statelessness issue […] it's not like Myanmar is going give them citizenship anytime soon, so it's a lingering crisis and therefore there's always that incentive to look at out of box solutions." (Grassroot, A2)
5	**Access and a clear mandate to operate:**
	"Though many UN agencies are humanitarian in nature, we have significantly different mandates. Take UNHCR and WFP, both provide assistance to vulnerable people and share a legitimate interest in identity management as a means to fulfil our respective mandates, however WFP's mission is to end hunger whereas we have a mandate as guardians of the 1951 refugee convention to work with states and register refugees and forcibly displaced people, protecting fundamental rights, advocating for legal protection and helping people rebuild their lives from war and persecution. In many scenarios we hold quite a uniquely privileged position." (UN Agency, C4)
6	**Intra and intersectoral partnerships:**
	Many of the informants pointed to the advantages of multi-stakeholder approaches and intra- and cross-organisational partnerships and collaborations.
7	**Trust and acceptance from the end-users:**
	"They don't have freedom of speech, they don't trust the police, the courts, the lawyers, the judges, in their opinion, those people who hold positions like that are corrupt […] So you have to convince them that no, we have rules here, we have the Geneva convention for human rights, we have laws, we have a good system and there's no corruption here." (B3)

Table 5: Identified enabling factors for innovative humanitarian digital ID and CVA solutions.

This study found that the informants had an easier time identifying constraining than enabling factors for using emerging technology such as blockchain for humanitarian action. Seven key constraints hindering affordance actualisations and the accompanying positive effects of the different humanitarian digital ID and CVA solutions are included in **Table 6** below.

	Identified constraining factors with relevant quotes
1	**Proprietary digital ID and CVA systems:**
	"The existence of proprietary systems in delivery of cash voucher systems, whether those systems belong to private companies or international organisations, has excluded smaller organisations and smaller country teams from being able to use those systems in their own programmes […] NGOs or UN agencies should not own and run software." (A3)
2	**Competitive funding mechanisms and scarce available resources:**
	"Funding is an issue of course. A lot of money goes towards traditional humanitarian relief for example and some of our solutions are more nebulous compared to what development actors are used to." (Grassroot organisation, A2)
3	**Complexity of blockchain and SSI-based solutions:**
	"SSI style solutions are more complicated; they are more expensive and there is currently a high cognitive load on the individuals that are being asked to use them." (Global ID alliance, C1)
	"I think the number one challenge is just the lack of understanding, because SSI as a concept is still very new […] Secondly, is the technical challenge. Building on a blockchain is not simple by virtue of it being a new technology unlike databases that have been in existence for decades. And thirdly are the complexities of dealing with identity." (Tech company, B2)
4	**Lacking connectivity and ICT infrastructure:**
	"Many of the solutions need a developed country infrastructure to be able to run and manage." (Global ID alliance, C1)
	"SSI is highly dependent on smartphones. The beneficiaries that we have and communities that we cater to often live in areas where the is low connectivity […] How does a digital project work in a not so digital space?" (NGO, A1)
5	**Digital literacy and "the digital gap":**
	"I mean it's a real question, can you realistically get informed consent from people without sufficient digital literacy?" (C1)
	"Digital knowledge is a bit of a problem sometimes […] sometimes they get a bit confused." (B1)
6	**Vulnerability of forcibly displaced and marginalised populations:**
	"As a refugee or displaced person, you are super vulnerable and the level of anxiety and stress is super high. Under these circumstances you unfortunately lose your understanding of what's going on." (Global tech and refugee movement, C2)
7	**Displaced populations' distrust towards authorities and international entities:**
	Several of the informants pointed out that the beneficiaries were often worried about how their data would be used.

Table 6: Identified constraining factors for innovative humanitarian digital ID and CVA solutions.

To recapitulate, the external environment surrounding a work system may affect its efficiency, scope and results in different ways. This sub-chapter has considered the influence of external factors such as economic and political conditions, laws and regulations, strategies and policies, as well as the digital infrastructure. Some of these factors contribute to either enabling or constraining the actualisations of affordances and effects. A range of these enablers and constraints are relevant to not only blockchain but HDID and CVA systems in general.

This chapter has presented the key findings from the interviews with the study's 10 informants. The sub-sections of the chapters were structured according to the analytical model selected for the study, that is the combined HDID-WSF and affordance theory framework. The analysis of the empirical material revealed certain key themes and contested areas. This included cross-sectoral partnerships, the hype surrounding blockchain and SSI, decentralised as opposed to centralised solutions, the sensitivity of ID, the challenges connected to realising certain promises and envisioned effects in practice, as well as the implications of implementing online solutions in offline communities consisting of marginalised and crisis-affected individuals. In the ensuing chapter, these aspects and key themes will be discussed in further detail.

6.   Discussion

In this chapter, I will discuss the empirical findings in relation to the study's research questions, the selected analytical framework and relevant scholarly research. To recap, the study's overarching research question (RQ) and supporting sub-questions (Sub-Qs) are:

RQ: How do sociotechnical elements in humanitarian digital ID systems impact the provision of services to forced migrants?

Sub-Q1*:* How do various stakeholders perceive blockchain's potential in this domain?

Sub-Q2: What key factors may enable or hinder blockchain's use and effects in this domain?

I explore these questions through the theoretical lenses of affordance theory and WST. 10 interviews with relevant stakeholders were carried out. Six of the informants were from humanitarian and technology organisations which had been involved in a digital ID or CVA initiative with a blockchain component. Three of these informants worked for humanitarian organisations and the other three for technology organisations. Consequently, the study unveils various stakeholders' unique perspectives on humanitarian blockchain-supported projects and their diverse implications. It will be argued that sociotechnical elements significantly influence the adoption, operation, outcomes and overall impact of these systems and solutions. Moreover, the findings suggest that there is a continuous need to leverage the affordances connected to emerging technologies such as blockchain in digital ID and CVA solutions, while also mitigating and fully understanding the accompanying hurdles and risks. This is especially pertinent in contexts involving marginalised populations, such as forcibly displaced individuals.

This chapter is structured as follows. **Section 6.1.** will summarise the main findings and discuss the ways in which the analytical framework and theoretical perspectives offer insight to the study's overarching topic and main RQ. It will also highlight some dissonances between the analytical framework and empirical material. **Section 6.2.** will primarily focus on the study's Sub-Qs and discuss the respondents' contrasting perceptions on the adoption, use and relevance of blockchain for digital ID solutions in the forced migration context, as well as enabling and constraining factors influencing its affordances and effects. This discussion concurrently serves to address the overarching RQ. Key themes derived from the findings will structure this section.

6.1.   Summary of findings and application of the sociotechnical analytical framework

Madinaou (2019) maintains that the use of biometrics, AI, data analytics and blockchain to register and identify forcibly displaced people signifies a wider trend of digital innovation in the humanitarian field. These technologies, Madinaou argues, should be analysed together as a "technological assemblage", which is influenced by "the social, political, and economic factors in which technologies are developed and used (p. 585). Yet according to Cheesman (2022, p. 51), it is also important to analyse and understand the *distinct* role that blockchain plays within the "humanitarian socio-technical assemblage." In this explorative case study, I have taken this into mind when developing an analytical framework that combines the WSF with affordance theory to examine the impact of digital ID and CVA initiatives in the forced migration context, while simultaneously unpacking the significance, enablers and constraints of using blockchain in this setting. The key findings of the analytical framework are shown in **Table 7.**

Table 7: Findings illustrating how socioltechnical elements, as well as blockchain related affordances, enablers and constraints, impact the delivery of services to forcibly displaced people in the HDID -WSF.

<table>
<tr>
<td rowspan="11">Social, political and economic environment</td>
<td colspan="2" align="center">Strategies and policies</td>
<td rowspan="11">Digital Infrastructure</td>
</tr>
<tr>
<td colspan="2">Beneficiaries: The end-users of the products. Highly diverse groups of displaced and marginalised people.</td>
</tr>
<tr>
<td colspan="2">Affordance effects: The outcomes of the products and services produced for the beneficiaries with blockchain as one of the aiding technologies. Examples of effects achieved in the projects include 1: Reduction of costs, distribution and processing times; 2. Improved traceability and accountability for donors and implementing organisations; 3. Established uniqueness of identities; 4. Guardianship models of SSI. Several of the effects are still not fully known and many pilots are yet to progress to full-scale projects.</td>
</tr>
<tr>
<td colspan="2">Products and services: Functional digital ID credentials (health, education, work permits, eligibility for aid) and CVA services. Prominent examples of products include digital wallets and e-voucher cards.</td>
</tr>
<tr>
<td>Enabling factors
1.Open-sourced and public blockchains enabling the sharing of knowledge; 2. On-site presence and expertise about the local context and needs; 3. Innovation focus in many humanitarian organisations; 4. Cross-sector partnerships; 5. The recognition of emerging technologies' value; 6. Access, clear mandate and acceptance; 7. Trust from end-users.</td>
<td>Constraining factors
1.Proprietary digital ID and CBA systems; 2. Competitive funding mechanisms and scarce resources; 3. Complexity of blockchain and SSI-based solutions; 4. Lacking ICT infrastructure and connectivity; 5. Digital literacy and "the digital gap"; 6. Vulnerability of forcibly displaced and marginalised populations; 7. Displaced populations' distrust towards authorities and international entities</td>
</tr>
<tr>
<td colspan="2">Affordance actualisation: Actions taken by humanitarian and technology organisations when they leverage the perceived opportunities of technologies such as blockchain to achieve certain organisational goals. Examples of actualised affordances include: 1. Facilitating alternatives to foundational or legal IDs for forcibly displaced individuals; 2. Strengthening inter- and cross-sectoral partnerships; Leveraging digital IDs to optimise cash assistance to beneficiaries; 4. Uplifting marginalised communities; 5. Adapting solutions to multiple use-cases and countries; 6. Automating manual processes in humanitarian assistance; 7. Increasing accountability; 8. Providing additional security layers; 9. Innovating CBA and disrupting established payment models; 10. Facilitating the *possibility* of data portability and interoperability.</td>
</tr>
<tr>
<td colspan="2">Processes and activities: Vary depending on whether the project or solution is in an initiation, development, implementation or maintenance stage. Examples of processes within the system include internal assessments, applications for funding, commissioning of reports on blockchain and digital ID solutions, surveys and consultations with end-users, technical design development, evaluations, testing, as well as the selection and registration of participants and the issuance, verification, authentication of digital ID credentials and CBA.</td>
</tr>
<tr>
<td colspan="2">Affordance perception: Humanitarian and technology actors interact with blockchain to address certain challenges and achieve specific organisations goals. Examples of goals include providing beneficiaries with more ownership over the data through SSI principles, issuing digital IDs and accelerating cash assistance.
External information: About blockchain and the promises surrounding SSI influences their perception.</td>
</tr>
<tr>
<td colspan="2">Participants: Humanitarian and technology actors. Other stakeholders: Governments, donors and partners.
Information: Captured, stored and transmitted in system to support processes and produce services. Some data are shared, other are duplicated or kept in siloed systems. Vast amount of data collected about end-users.
Technologies: Include but is not limited to information and refugee management systems, data servers, biometrics, AI, mobile and web applications, SoME, mobile devices and blockchain.</td>
</tr>
<tr>
<td colspan="2" align="center">Laws and regulations</td>
</tr>
</table>

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The combination of the two theoretical perspectives offered several advantages. The application of the WSF provided a broad and holistic overview of the different internal and external elements in humanitarian digital ID and CVA systems. The WSF illuminated the social and technical interdependencies within the systems, as well as the ways in which these influence the systems' output and ability to achieve certain goals. Examples of sociotechnical internal elements in the HDID-WSF include the humanitarian and technological stakeholders and partnerships, the data being extracted, used and distributed and the organisations' policies, practices and processes. Partially internal and external elements include the products and services being created, such as digital ID credentials and wallets, as well as a highly diverse composition of beneficiaries and end-users. The findings of this study confirm the need to develop robust digital solutions that are adequately adapted to the specific contexts within which they are being launched and that are accepted and tailored to the needs of the end-users. Furthermore, the findings show how the external social, economic, political and ethical aspects surrounding the systems may both constrain and enable their effectiveness and durability. Examples of such external elements include funding mechanisms, reporting requirements, KYC regulations and legal and regulatory frameworks on migration and digital ID systems.

Affordance theory was found to complement the WSF by offering a narrower focus on a specific technology within such a work system. In this study, affordance theory dissected how humanitarian and technology stakeholders operating in the humanitarian realm perceive and utilise blockchain in different ways within the broader work system. External information about blockchain and SSI, knowledge about what other actors were doing and a recognition of blockchain's action possibilities led several actors to explore and pilot this technology in their humanitarian projects. Affordance theory allowed for an in-depth exploration of affordance actualisations and effects when the actors interacted with blockchain, such as the reduction of costs and distribution time of CVA and improved traceability and accountability. This perspective also foregrounded some of the enabling factors, such as the growing innovation focus in the humanitarian field, as well as the constraints hindering certain affordances from being actualised. Examples of the latter include lacking connectivity and ICT infrastructure in the rural communities where many of the projects are based and varying levels of digital literacy. These enabling and constraining factors were further understood by considering them together with the external elements of the HDID-WSF.

By merging the two theoretical lenses and applying them together, this study argues that it is possible to better explain the different internal and external aspects shaping the effectiveness of products delivered to forcibly displaced people through different humanitarian initiatives, while also elucidating the significance and implications of using an emerging technology such as blockchain in this context. As will be further dissected in the following sub-chapters, the findings also suggest that the sociotechnical elements and interactions affect the durability of the different initiatives, as well as blockchain's actualised affordances and effects within the systems. Although the analytical framework offered several advantages, it is important to acknowledge that it also had certain constraints, which will be presented next.

6.1.1 Constraints of framework and dissonances between theory and empirical material

Alter (1999, p. 36) aptly highlights that even though models and frameworks may enable researchers to systematically analyse specific situations and "make sense of the world's complexity", they always "emphasise some features of reality and downplay or ignore others." This was also my experience in this study, where the primary and secondary data gradually made me aware that the humanitarian digital ID landscape was much vaster than what I had first envisioned. Digital ID systems around the globe are immensely complex and consist of a multitude of different actors, standards, protocols and components (World Bank 2022c). They are also subject to a continuous cycle of adaptations to changing contexts and advancing technologies. Consequently, this study does not come close to presenting all the elements that make up a particular digital ID system. Instead, it focuses on a limited selection, primarily guided by the informants' insights and experiences, as well as the existing scholarly literature.

To revisit some of the points made in the theory chapter, presenting the findings in one static and combined model may inaccurately give the impression that different digital ID and CVA systems contain the same elements. However, this is not the case, as the different elements greatly vary and are also in constant flux depending on the specific context in which they are launched and the system's stage in the project cycle. Presenting the findings in one combined model also made it unfeasible to compare different humanitarian digital ID and CVA systems in relation to determinants such as their geographical location or size. However, this is as already mentioned not a comparative multiple case study. Rather, my aspiration has been to analyse the complex phenomenon of humanitarian digital ID through different actors' perspectives. To this end, the model provides an overview of key stakeholders' viewpoints, while the selected quotes serve to exemplify some of the key similarities and divergences.

The fact that blockchain is being used in complex sociotechnical ID and CVA infrastructures together with a plethora of other technologies made it challenging to isolate which affordance actualisations and effects were directly linked to the use of blockchain and which were equally attributable to other technological and social elements in the systems. Furthermore, and as has already been mentioned in the methodology chapter, the analysis of the empirical material has undeniably been influenced by my own interpretations and standpoints as a researcher. Therefore, it is important to acknowledge that the affordances which I have identified in the material may be different from what the interviewees or other researchers would highlight.

Lastly, I found that the analytical model and selected theoretical perspectives did not fully capture some of the more intricate points raised by the informants. This included reflections around the decentralisation versus centralisation of ID systems and the ethical considerations connected to launching innovative solutions in contexts involving vulnerable end-users. Although not sufficiently reflected in the model, these elements will nonetheless be incorporated in the ensuing sections, as the analysis revealed that these topics are of importance when discussing the implications of digital ID solutions in the context of forced migration. Now that these constraints and dissonances have been identified, I will turn to the two sub-questions of the study, which focus on the use and significance of blockchain for digital ID and CVA systems. The analysis of the material and presentation of findings allowed me to identify certain key themes, which will be used to structure the following sub-chapter and sections.

6.2. Blockchain's use and significance in digital ID and CVA solutions

This sub-chapter will primarily be devoted to addressing the following sub-questions:

Sub-Q1: How do various stakeholders perceive blockchain's potential in this domain?

Sub-Q2: What key factors may enable or hinder blockchain's use and effects in this domain?

To answer these questions, the next sections will be structured according to significant themes derived from the findings: **6.2.1.** Intra- and intersectoral partnerships: collaboration versus competition, **6.2.2**. Digital IDs: centralisation versus decentralisation, **6.2.3.** The SSI predicament: hype versus reality and **6.2.4**. Ethical considerations: the organisations and beneficiaries. The subsequent discussion will also elucidate the study's overarching RQ regarding the sociotechnical elements influencing the provision of humanitarian assistance.

6.2.1. Intra- and intersectoral partnerships: collaboration versus competition

As the literature review and presentation of findings has already revealed, several humanitarian and technology organisations have actively been exploring the potential of digital IDs for people lacking any form of legal ID. In broad strokes, digital IDs in the humanitarian sector are often geared towards establishing beneficiaries' eligibility for cash or voucher-based assistance, as well as providing access to specific services (IFRC, 2023). The study's informants were generally aligned on the impetus of creating accessible, secure and digital IDs for forced migrants. However, their perceptions on exactly *what* digital IDs in the humanitarian field could and should encompass, as well as the significance of blockchain in this domain, varied.

Affordance theory emphasises that while some affordances may be perceptible for some actors, they may be hidden from others (Ostern et al., 2020, p. 3). This has also been an important observation in the present study, as the findings showed that the technology informants in the study more easily identified emerging technologies and the potential of blockchain than the humanitarians. A couple of the informants with technical expertise emphasised how leveraging blockchain allowed for the possibility to accelerate cash assistance and cut costs, while also increasing the security and resilience of ID systems. The humanitarian informants in this study, on the other hand, were generally more reserved when discussing blockchain's significance and instead focused on how it was merely one technology within a much larger ecosystem. Several of the informants pointed out how humanitarians were dependent on collaborating with technologists to interact with or even fully understand a complex technology like blockchain. This can be seen to confirm how affordances are relational concepts, in which one actor with specific expertise and goals may experience the opportunities arising from the interaction with a technology entirely differently from that of another (Majchrzak & Markus, 2012). Furthermore, business interests and motives inarguably impact perceptions.

A focal theme identified in the interviews was how technologists and humanitarians' interests were at times conflicting in humanitarian digital ID and CVA projects. Correspondingly, Madinaou (2019), builds on the concept of competing logics to describe the intersecting yet conflicting agendas of different stakeholders in the humanitarian field, such as NGOs, governmental agencies and private sector actors. Examples highlighted by Madinaou include

the logic of capitalism, characterised by the rise of private-public partnerships and the many private sector actors entering the humanitarian field with their own business interests, as well as the logic of solutionism, "which refers to the desire to find technological solutions to complex social problems." (2019, p. 588). The concept of 'techno-solutionism' was also mentioned by the study's informants. For example, the respondent from UNHCR working with biometrics stated that they had been accused of techno-solutionism in the past, but countered this by stating that they were never willing to experiment with a technology just for the sake of it and that the turn to innovative solutions was always generated by the genuine need for something to be improved (C4). A tech-entrepreneur in the study emphasised that it was imperative to recognise that forced migration and ID challenges were at the end of the day a human and not a technological problem and that: "if the human doesn't decide to solve it, technology will not come to solve it for you" (B3). This again points to how humanitarian blockchain projects in displacement settings need to be designed and understood in relation to "their social and political context to better assess their relevance and potential impact" (Lee, 2020, p. 10).

Competing logics can arguably also be used to describe the tension that seemingly arises between some organisations. Although several of the informants described the many benefits of sharing best practises and collaborating with other humanitarian organisations when launching innovative projects using technologies such as blockchain, the notion of competition and rivalry was also prevalent in some of their answers. The most renowned humanitarian blockchain project is undeniably the World Food Programme's 'Building Blocks'. According to the Building Blocks website, it is "the world's largest humanitarian use of blockchain project technology" and it has served more than 1 million refugees in Bangladesh and Jordan, disbursed more than 450 million USD in cash-based assistance and saved more than 3 million USD in bank transfer fees due to blockchain removing the need for intermediaries (WFP, 2023). The WFP launched their project in 2017 and UN Women joined in 2019, demonstrating blockchain's relevance for intra-agency collaboration. The Building Blocks website proclaims that blockchain's features allows multiple humanitarian organisations to join the project and coordinate their efforts. Yet notably, some of the informants in my study were somewhat sceptical to Building Blocks, mainly due to WFP using private, permissioned blockchains.

When humanitarian organisations use private blockchains, they arguably become the traditional intermediaries or gatekeepers that blockchain was developed to remove (Seyedsaymost & Vanderwall, 2020). One of the informants in this study shared that when they were designing their blockchain project, they were informed by the Building Blocks team that they were unnecessarily duplicating what the WFP was already doing and that it did not make sense for different organisations to be coming up with different blockchain solutions for cash-based assistance. The informant explained that they were invited to join Building Blocks, but that because it was run on a private, permissioned blockchain in which WFP ultimately controlled the network, they declined as it would prevent them from being able to use their own systems. Contrastingly, another informant in this study was sceptical to the fact that so many different organisations were launching similar humanitarian blockchain initiatives. The informant stated that it could be a waste of money and time and that it was better to have a few well-structured initiatives than multiple small ones, which did not necessarily handle end-users' data sufficiently and which might be shut down as soon as their funding ran out (C3). Similarly, Lee

(2020, p. 14), argues that it would be undesirable if every organisation were to launch their own digital identity initiative and that standardisation with regards to shared specifications and frameworks are needed to ensure sufficient data privacy and regulation across the industry.

To summarise, the findings and previous scholarship suggest that a tension sometimes arises in intra- and intersectoral partnerships. On the one hand, collaboration between actors takes place to enhance the efficiency, reach and durability of innovative digital ID and CVA solutions. Enabling factors in this regard may include sociotechnical elements such as shared standards and objectives, cooperation between actors with different expertise, information sharing and the interoperability of systems. On the other hand, there appears to be a subtle undertone of competitiveness between different actors. The competing logics of capitalism and solutionism (Madianou, 2019), divergent goals and business interests and contrasting perceptions on for example blockchain infrastructures arguably shed light on this dynamic. So do constraining elements such as limited available resources, proprietary solutions, interoperability challenges and siloed approaches within humanitarian work systems. Furthermore, many of the informants underlined the need to tailor and adapt the solutions to the specific contexts and diverse needs of the end-users in different locations. Consequently, a uniform approach is not necessarily preferable and multiple projects are launched. Yet according to an IFRC report, the majority of functional digital ID initiatives launched in the humanitarian sector have remained at a pilot stage and have failed to scale up to full-scale projects (IFRC, 2023, p. 16). This was also remarked upon by several of the informants, especially with regards to SSI initiatives.

6.2.2. Blockchain and SSI: hype versus reality?

Despite the attention blockchain has received, there are still relatively few fully operational humanitarian blockchain initiatives and the precise outcomes of employing this technology for humanitarian aid remains disputed (Cheesman, 2022). A study carried out on the use of blockchain within UN agencies found that "exploring possible uses of blockchain in the abstract, as determined by theoretical assumptions on its potential benefits rather than on evidence-based arguments tested in practice, can be misleading and conducive to a waste of resources" (Dumitriu, 2020, p. 34). The same line of thinking has led Lee (2020, p. 9) and others to state that some organisations' blockchain projects are essentially examples of "hype-without evidence", as so many initiatives remain at a pilot stage "with no clear case studies or documentation about their impact on end users". This study has attempted to address this void by carrying out a qualitative case study on the use of humanitarian digital ID solutions in the forced migration context. I have focused on the empirical area of blockchain and examined specific use cases where this technology has been applied, allowing me to collect primary data on the actual benefits, shortcomings and effects of different initiatives, as well as different stakeholders' viewpoints on blockchain's significance in this context.

A total of 34 actors were asked whether they would be interested in participating in this study. One actor which declined was the WFP Building Blocks team, which is arguably the most notable case study blockchain in a humanitarian context and a prime example of a project that challenges the hype-without evidence claim. Other actors who declined included a handful of NGOs and startups. Moreover, around 15 actors never responded to my enquiry.

There may be several reasons why these actors did not wish to partake in the study. One obvious explanation is that they had other priorities and first and foremost must prioritise their humanitarian missions on the ground. A second possible explanation is that they receive many enquiries about partaking in studies and that many researchers have been highly critical of the initiatives. A third is that there is often a level of confidentiality surrounding some of the projects and they may want to keep intellectual and proprietary data internal to the organisation. A fourth reason that transpired was that several of the startups and initiatives contacted had either become bankrupt or were no longer offering any services. This may reflect the financial vulnerability of some of these initiatives and the challenge in scaling operations. Whereas non-profit initiatives and NGOs may be reliant on funding from for example international agencies, donors and governments, for-profit initiatives need to have revenue and charge for services to remain commercially viable. Several of the discontinued projects' websites do not state that they have been discontinued, nor do they share any information about the reasons why. This supports Lee's (2020, p. 16) argument that organisations deciding to cease their blockchain projects often do so discreetly, which is regrettable as sharing factors contributing to their failures is arguably just as important as broadcasting the elements driving their success.

My experience was that the 10 informants who did agree to participate in this study provided their frank, varied and open experiences and viewpoints on digital ID and CVA solutions in the forced migration context, including their reflections on the benefits and shortcomings of using blockchain. Notably, many informants in my study cautioned against the hype surrounding blockchain, yet still emphasised the necessity of exploring innovative solutions to tackle the challenges posed by forced migration and global ID issues. Although many humanitarian digital ID and CVA initiatives are ended after their pilot stage, others are scaled up to projects.

The Unblocked initiative, which uses blockchain to accelerate cash assistance, was first launched as a pilot in Vanuatu in 2019. Due to its beneficial outcomes and results, it was subsequently piloted in the Solomon Islands, Papua New Guinea, Zimbabwe, Malawi and Venezuela (A3). However, as these pilots are focused on emergency responses and crisis-affected populations, they are often only active for a limited amount of time. Although this does not indicate that they have been unsuccessful, it does suggest that they are not necessarily considered to be suitable for an institutional adoption. DIGID, which is defined as a humanitarian initiative with a blockchain component rather than the other way around, is also looking into possibilities for scale-up and further rollout (A1; B1; IFRC, 2023).

The discussed humanitarian projects with a blockchain element produced tangible affordances and positive effects for CVA. However, blockchain's affordances in connection to digital IDs in general and SSI in particular were more difficult to discern. An informant from the DIGID initiative shared how they had drawn on lessons learned by the Netherlands Red Cross (NLRC), which had piloted a solution with an SSI component in Kenya in 2020. The NLRC had concluded that SSI did not add any extra value or benefit, due to amongst other things the lack of smartphones and digital literacy amongst the end-users. Consequently, DIGID opted for a guardianship model in their digital identity pilots (A1). According to an IFRC report on the same project (2023, p. 15), the guardianship model "increases the security and data privacy aspects of the data but still relies on the issuing humanitarian organisation to guard the data on

behalf of the people they serve." Several of the digital identity projects discussed in this study deployed guardianship models to manage end-users' wallets. Yet according to Crumpler et al. (2021), the potential that blockchain holds to improve end-users' ownership over their ID data and alleviate risks associated with centralised digital ID systems can only be actualised if these individuals possess genuine control, access and proficiency in the technologies being used. Consequently, the authors contend that deploying this technology in locations lacking sufficient infrastructure and regulatory frameworks should be undertaken with a high degree of caution (Crumpler et al., 2021, p. x).

In brief, this section has discussed how many humanitarian digital ID solutions rarely progress from their incipient pilot stage to full-scale projects or operations. This undoubtedly impacts the provision of services and assistance to the different initiatives' end-users, as the products may either be replaced or terminated. The findings and relevant scholarship on the topic suggest that there may be manifold reasons for this. For example, some projects are ended due to entities changing their service or technology providers, while others were always only envisioned to be exploratory pilots and projects with a limited time scope. Furthermore, constraining factors such as the lack of smartphones and sufficient ICT infrastructure or bandwidth in certain locations has meant that some SSI initiatives have been discontinued. Other projects appear to have succeeded, such as the WFP Building Blocks blockchain initiative, which was launched as a pilot in Pakistan and Jordan in 2017 and since scaled up to a fully operational project (WFP, 2023). Enabling sociotechnical factors for Building Blocks' scalability are arguably sufficient resources, a robust network of partners and the delivery of different types of assistance. Despite, or perhaps precisely because of, some of the criticisms the initiative has received, the Building Blocks website emphasises that the blockchain infrastructure is based on open-source software and that the "The network is neutral without a hierarchy of ownership" (WFP, 2023). This notion is connected to discussions about the centralisation and decentralisation digital ID and CVA systems.

6.2.3. Digital IDs: centralisation versus decentralisation

In their study on blockchain affordances in the context of development aid, Kewell et al. (2017, p. 453) state that the global ID challenge is partly attributable to the fact that identity has traditionally been "a centralized phenomenon". They argue that blockchain affordances provide "an alternative approach to building identities from the bottom up", evading the need for central authorities or intermediaries" (Kewell, 2017, p. 434). However, my own findings and studies carried out by scholars such as Cheesman (2022), Connolly et al. (2022), Lee (2020) and Seyedsayamdost and Vanderwall (2020) reveal that there are multifaceted constraints to implementing decentralised IDs solutions and harnessing SSI in the forced migration context.

Political structures, power dynamics and the sensitivity of digital IDs

Debates about the decentralisation and centralisation of identity are closely intertwined with discussions about political structures and power dynamics (Cheesman, 2022; Connolly et al., 2020; Lee, 2020). Most of the informants in my study found it unlikely that foundational ID systems would become decentralised any time soon, as governments typically consider official ID systems to be their sovereign responsibility. One of the informants stated that if SSI becomes

ubiquitous, the mandate of governments and institutions like the UNHCR was going to become seriously challenged, as the power they hold to collect and store identity data essentially enshrines their role as gatekeepers. Cheesman (2023, p. 31) states that while decentralised and blockchain-based ID projects often aim to remove such gatekeepers and enable increased agency and empowerment for end-users, they "do not address the political structures that hamper certain communities' access to financial, health, and social services and mobility." Blockchain based digital IDs, Cheesman argues, "are not a substitute for formal recognition by states, such as refugee status or citizenship" (2023, p. 31). Similarly, Lee (2020) points out that the success of blockchain based ID projects is dependent on the number of other entities willing to accept them. As has already been mentioned, many humanitarian organisations are looking into the interoperability of digital ID systems and credentials. Yet interoperability often remains challenging to implement in practice due to constraining social and technical factors such as the different technologies and systems being used, data and governance regulations, legal confines, opaque political barriers and issues of trust and acceptance (Slavin et al., 2021).

Several of the study's informants shared that they constantly needed to manage the end-users' expectations due to the many connotations attached to the term 'digital identity'. For instance, some of the projects' end-users mistakenly thought they were receiving a legal ID, while others believed they could use their humanitarian ID to receive services well beyond the project's scope. Additionally, some of the informants underlined how they had to avoid moving into the jurisdiction of the authorities in the countries where they were operating, as this could have adverse consequences for their project. Moreover, digital ID remains a contested topic in many countries and certain governments have faced scrutiny and condemnation for their irresponsible implementation of digital IDs, resulting in legal action in for example India and Uganda (IFRC, 2023, p. 16). The sensitivity of digital IDs is therefore a constraining factor in many contexts.

One of the study's informants aptly underlined the importance of recognising that the end-users do not necessarily *want* their data to be digitalised or shared with other entities. When discussing digital IDs for humanitarian action, the power dynamic existing between the humanitarian organisations and the end-users needs to be acknowledged. Humanitarian organisations are typically seen as someone with power because they are the ones providing assistance, and therefore, affected individuals may feel somewhat obliged to provide their data to receive aid (A1). Similarly, Connolly et al. (2022, p. 11) pose the question: "In this environment, in which the refugee's subsistence depends on the humanitarian agency, do refugees really have agency to opt out of this process?" According to the IFRC (2023), end-users in the DIGID pilots had to provide their consent for data to be shared with other organisations and were also able delete their data if they no longer wanted a digital ID. Consequently, the pilots are described as "empowering people with the data they provide and doing this in a dignified manner" (IFRC, 2023, p. 11). Yet for Connolly et al. (2022), the "inherent power asymmetry" in this process means that although blockchain has the potential to support the empowerment of both the implementing organisations and the end-users, a tension often exists between these two objectives. This will be discussed further next.

The empowerment of vulnerable end-users through decentralised digital IDs and CVA

A reoccurring aim of several of the humanitarian blockchain projects discussed in this study was providing a more dignified aid process and empowering the individual end-users. However, the findings are somewhat unclear as to whether this has been achieved. Firstly, empowerment is not easily measurable. Secondly, empowerment is arguably a very subjective experience and can thus only be determined by the individual end-users. Thirdly, although a couple of the projects initially aimed to provide a SSI solution to increase the agency of the end-users, they instead ended up with guardianship models. That said, some scholars have still examined the extent to which humanitarian blockchain projects can be seen to empower forcibly displaced or otherwise marginalised end-users. For instance, Connolly et al. (2022, p. 2) have looked at how blockchain may be used to strengthen the rights of forcibly displaced individuals through the issuance of digital IDs and highlight that "Blockchain, despite the hype surrounding its decentralized architecture, is not intrinsically emancipatory", as its potential to empower its end-users "resides in the politics of its design and implementation." Seyedsayamdost and Vanderwall, (2020, p. 943) have examined different blockchain projects in the humanitarian space and found that they tend to either "recentralize power" to organisations when the projects are built on private blockchains or shift the power into the hands of digital experts and coders with knowledge about how the systems work. This, the authors argue, has an impact on who the blockchain projects empowers and who is left out (Seyedsayamdost & Vanderwall, 2020).

Lee (2020, p. 11) makes the point that "decentralization may increase transparency but does not guarantee the inclusion of displaced people" and that "[t]he focus should not be on moving from centralization to decentralization, so much as exclusion to inclusion." According to Lee, this is achieved though designing inclusive, diverse and participatory blockchain projects. Comparatively, informant A3 in my study argued that the humanitarian sector has a significant opportunity to meaningfully include people who have traditionally been excluded from technology development and implementation on matters ranging from how roads were built to where telephone lines were raised. The informant elaborated that "if you are genuinely interested in developing a decentralised technology in a decentralised way, that encodes more diversity in perspectives and use cases" (A3).

This section has considered some of the ways in which decentralised and centralised identity systems are entangled with wider discussions about political structures and power asymmetries. These aspects affect the development, implementation and acceptance of the different solutions and ultimately also impact the provision of services and assistance to forcibly displaced and otherwise marginalised individuals. Although the objective of empowering end-users ultimately seems to drive some of the innovation efforts around decentralised identities, constraints connected to the sensitivity of ID, governance and legal regulations may also constrain certain developments. That said, shared regulations are arguably crucial to safeguard the end-users and ensure secure and privacy protecting solutions. This has become increasingly important following condemnations about the ethical implications of emerging technologies.

6.2.4. Ethical considerations: the organisations and beneficiaries

The present study has highlighted how emerging technologies such as blockchain are being used by different stakeholders to increase the agency, inclusion and efficient provision of digital IDs and cash disbursement to forced migrants. However, there is a growing body of seminal research on the potential risks connected to testing and deploying digital technologies in settings involving marginalised populations such as migrants (Cheesman 2020, 2022; Connolly et al., 2022; Lee 2020; Madinaou 2019; Molnar, 2020). Madianou (2019) argues that the convergence of technologies such as biometrics, blockchain and AI to register forced migrants has adverse consequences on their dignity and privacy, further amplified by the lack of clear policies on data practices and security. Other issues raised by scholars include the risks of inadequate safeguards, privacy breaches and leakage of sensitive information (Cheesman 2022), as well as the challenges of gaining true informed consent (Connolly et al., 2022; Molnar 2020).

I asked the informants in the study what they perceived to be the greatest challenges connected to using emerging technologies such as blockchain to support digital identity solutions in settings involving forced migrants. Some of the informants raised points such as inherent power inequalities, extensive data extraction, low digital literacy and lacking infrastructures. Others emphasised how risk assessments were an important part of all new technology adoptions and several mentioned the importance of upholding the humanitarian principles. For instance, A3 stated that the fact that the humanitarian sector has these principles embedded in their work means that they are forced to look at aspects such as localisation, inclusion, equal representation and adequate safeguards. "The 'do no harm principle', the informant maintained, "is non-negotiable in humanitarian programs" and demands the responsible use of technology (A3).

Criticisms regarding the experimental use of emerging technologies

A recurring theme in the literature concerning the ethical implications of emerging technologies being deployed in settings with marginalised populations is that they are being used in highly experimental ways (Crawford, 2021; Madinaou 2019, Molnar, 2020). "Treating the refugee camp as a laboratory," Madinaou (2019) argues, "has a long history that can be traced back to colonial regimes" (p. 594). Molnar (2020, p. 1) argues that the experimental use of technology in migration settings may inadvertently "perpetuate harms, exacerbate systemic discrimination and render certain communities as technological testing grounds" (Molnar, 2020, p.1).

While the informants in the study emphasised the importance of mitigating risks arising when using new technologies, some of the informants also challenged some of the discourse on the "testing critique". For example, speaking about blockchain, informant A3 maintained that:

> "First of all, there's always a very homogenous discourse around *those people* and what I take issue with is that embedded in that narrative, is the fundamental assumption that those people have no agency, that those people cannot be more than victims and that's really not fair. People have a choice. Also, the individual on the receiving end using that technology may genuinely be interested in it, or they might be using it because their whole world in broken, like in Venezuela, Afghanistan and in Lebanon, because people could not trust their environment, they couldn't trust the monetary system, they couldn't trust their State." (A3)

Along similar lines, Lee (2020, p. 11) highlight the need to "recognize that displaced people are not simply beneficiaries, but active agents in their environment." Moreover, Cheesman (2020, p. 136) states that refugees enrolled in humanitarian blockchain projects must be recognised as active rather than passive and "generalisable" participants or objects.

A lot of criticism has also been directed towards the increased use of biometrics, which is used to authenticate people's identities through for example the collection of fingerprints and iris scans (Molnar, 2020). The UNHCR extensively use this technology to support their refugee registration processes. According to the study's informant from this agency, the UNHCR have faced criticism for this, yet there is also a lot of misinformation circulating about the systems being used. Consequently, the informant emphasised that a key issue and priority moving forwards is establishing trust and transparency towards the outside world about what they are doing. Other priorities were ensuring that they had robust systems which adequately met their operational needs and had the right level of integrity to anchor refugee identities (C4).

The topic of biometrics was also addressed in an article published by *The New Humanitarian* (2019), in which the former manager for refugee registrations at the UNHCR Karl Steinacker goes head-to-head with the independent consultant and privacy rights advocate Linda Raftree. In Raftree's view, humanitarian action is increasingly being "privatised and digitised", whereby business metrics are given more weight than guiding humanitarian principles. This is relatable to Madinaou's (2019) argument about competing logics in the humanitarian sphere. Raftree stresses the lack of satisfactory protections and shared standards and argues that organisations should be doing more "to enhance affected populations level of agency and decision-making" (The New Humanitarian, 2019). Contrastingly, Steinacker maintains that the ways registrations were managed in the past were considerably less humane and efficient than today. Referring to the refugee crisis following the Rwandan genocide, Steinacker shares that:

> "Registration at the time meant that the police come at night, wake up the population, drive them out of their huts and round them up in purpose-built kennels where children, women and men, the frail and the young, had to sit all day, whether in pouring rain or scathing sun, until the aid workers had filled the last form, handed out wristbands and ration cards, and finished by spraying invisible ink on each and everybody [to show that they had been registered already]."

He infers that "Anybody who was part, or witness, of such degrading procedures welcomed the arrival of biometrics as a much more dignified way of registering people in need" (The New Humanitarian, 2019). This said, it is undeniably imperative to have a critical awareness and understanding about the *new* privacy and security risks connected to technologies such as biometrics and blockchain in the humanitarian and forced migration context and the diverse impact and consequences that these technologies might have on different affected populations.

The beneficiaries of digital ID and CVA work systems

Madianou (2019, p. 543) poses the question: "Digital Identity: Who is it for?" Weitzberg et al. (2021, p. 4) similarly ask: "Whose interests are being served in the frenzy to digitise identity in aid?" These are two timely questions, which I have also asked myself while writing this thesis. In her case study of two UN led humanitarian blockchain projects, Cheesman (2022) found that the projects generally support the interests of stakeholders such as donors, UN agencies and

their governmental partners, while disregarding the priorities of the actual aid workers and refugees expected to adopt the solutions. Based on interviews with experts and actors involved in humanitarian blockchain projects, Coppi and Fast (2019) comparably found that the projects were shaped more by organisational considerations such as reducing intermediaries and facilitating audits rather than the end-users' needs. Many of the identified affordance and effects in this study were also linked to organisational priorities and benefits, with examples including improved traceability and auditing for donors and implementing organisations, as well as reduced processing times. With regards to Alter's WSF and the element 'customers', it could therefore be argued that the implementing organisations rather than the beneficiaries could be placed on top of the triangle.

Although many of the blockchain related affordances and effects I identified in the study were related to organisational benefits, a larger interview sample may have produced different results. Even if some of the affordances are primarily located at the organisational level, these arguably also benefit the initiatives' beneficiaries. For instance, reducing bank transfer costs and facilitating audits means that there will in theory be less opportunities for fraud and that the funds can be sent directly to the target groups. By facilitating alternatives to traditional one-off humanitarian cash disbursements through the issuance of digital wallets and use of cryptocurrencies, the end-users of the different projects potentially have the agency to decide for themselves how and when they want to use the funds they have received. Despite the challenges of implementing SSI in practice, exploring and incorporating SSI elements in digital ID solutions means that the individual is in principle granted more ownership to their data. Nevertheless, the SSI solutions examined in this study still largely rely on custodian models, whereby the humanitarian organisations are responsible for maintaining the beneficiaries' ID data. Furthermore, while digital ID solutions featuring SSI and blockchain components may circumvent some risks and challenges, they simultaneously introduce new ones. In connection to this, one of study's informants questioned whether the beneficiaries actually wanted SSI. Another interviewee argued that SSI might in fact be better suited for Western contexts.

Digital wallets centred around SSI principles have indeed gained attention in contexts where the end-users already have a legal ID and most of the population take internet connectivity, privacy rights and smartphone access for granted. A prevalent example is the digital wallet and Diia app launched by the Ministry of Digital Transformation of Ukraine. It aims to make all government services available online and allows Ukrainians to access a range of digital documents, including their ID card, passport, driver's license and birth certificate. The app reportedly has close to 22 million users and "all digital documents in Diia now have the same legal force as their plastic or paper counterparts" (Ukraine Now, 2023). Several of Ukraine's neighbouring countries recognise the credentials on Diia as valid proof of ID and it has been reported that other countries are interested in adopting and launching their own variants (Grzegorczyk, 2023). According to one of the study's informants, who had first-hand experience with Diia, it is one of the best examples of a well-functioning digital ID, as it provides end-users and forcibly displaced individuals with the necessary portability and security, while also enabling them to decide which information they want to share with different entities and officials. Another interesting example is the forthcoming EU's Digital Identity Wallet (EUDI), still under development, which was explicitly mentioned by a couple of the

study's informants. It aims to facilitate EU citizens' recognition anywhere in the EU and to facilitate access to public services and documents connected to for example travel, health, opening bank accounts and education (European Commission, 2022). Several pilots have been launched by different service providers using a variety of technologies, including blockchain (European Commission, 2023). It is not unlikely that the development of this sort of European initiative for the general population will in time be extended to encompass forced migrants.

In summary, the first part of this chapter has outlined how the analytical model and findings contribute to addressing the study's overarching research question on how different sociotechnical elements in HDID solutions impact the delivery of services to end-users in a forced migration context. The second part of the chapter has discussed findings relating to the study's sub-questions on the significance of blockchain in this domain, as well as factors that enable or hinder its implementation. The sections were structured according to main themes derived from the findings: intra- and intersectoral partnerships: collaboration versus competition; digital IDs: centralisation versus decentralisation; the SSI predicament: hype versus reality and ethical considerations: the organisations and beneficiaries. Although the sections' titles rely on juxtapositions, it is important to underline that these themes are multifaceted and involve a spectrum of dimensions. For instance, while some areas of digital ID systems may be centralised, some of their sub-systems may be decentralised. Additionally, SSI pilots may work well in some cases and fail in others due to a range of context-specific aspects. That said, the titles and discussion demonstrate the existence of social and technical tensions in the systems, as well as the breadth of the interviews' opinions on the significance of digital IDs and use of blockchain in humanitarian and forced migration settings.

7. Conclusion and implications for practice and research

The purpose of the study has been to examine humanitarian digital IDs in the forced migration context. The study's overarching research question concerns how sociotechnical elements in humanitarian digital ID systems impact the provision of services to beneficiaries. The HDID-WSF demonstrated how these systems are not purely technical. They are instead characterised by an intertwinement of human, social, technological, ethical, political and economic factors. The empirical results revealed that pertinent examples of sociotechnical elements impacting the HDID and CVA systems' provision of services include the ongoing digitalisation of the humanitarian sector, different organisations' digital transformation strategies, data protection and management standards, humanitarian and SSI principles, the interoperability between systems, digital ID and blockchain infrastructures, funding mechanisms, as well as the digital literacy and access of the end-users. The study found that these elements influence the initiation, development, operation and lifecycle of the systems, as well as the efficiency, scope, durability, security and acceptance of the products being delivered to the end-users.

The study's sub-questions deal with the role of blockchain in the HDID and CVA systems. The analytical model's integration of affordance theory allowed for an identification of some of the actualised affordances arising from the actors' interaction with blockchain. This included automating manual humanitarian assistance processes, increasing accountability and providing additional security layers to digital IDs. Accompanying effects included the reduction of costs and processing times, improved traceability and guardianship models of SSI. The study found that contextual factors considerably impact the HDID systems and outcomes of blockchain. Key enabling factors include public blockchain infrastructures, the growing innovation focus in the humanitarian field and inter- and intersectoral collaborations. Constraining factors, on the other hand, include proprietary systems, distrust towards international entities and the challenges related to getting digital initiatives to function in areas without the required infrastructure. Some of the constraining factors are not only applicable to blockchain but to emerging and ICT technologies in general when implemented in this domain.

Importantly, the informants' perceptions about the use and effects of blockchain varied. While some of the study's interviewees believed that blockchain's introduction to the humanitarian sector signified a considerable turning point in the field, others argued that the technology's impact on the end-users was difficult to discern and that other technologies may be better suited. The nuances in opinions with regards to blockchain's significance may be shaped by different factors. The most important aspect is arguably the context-specific and direct experiences that the actors have gained through interacting with blockchain in humanitarian and forced migration settings. The interviewees with technology and blockchain positions and expertise were generally more enthusiastic about the technology's properties and impact than the interviewees with strictly humanitarian positions. Other factors explaining the nuances in opinions may therefore include differing business interests, motives and agendas for using blockchain, as well as the interviewees' ability to perceive the technology's action potentials and actual impact on the efficacy of the different digital ID and CVA initiatives.

7.1. Summary of key takeaways and implications for practice

The analysis of the collected primary and secondary material also produced several key takeaways, which in turn have implications for practice and evolving HDID efforts:

Firstly, the value of humanitarian digital IDs is largely considered to be determined by the specific services and opportunities they give end-users access to, as well as the number of other organisations and entities willing to accept them. The collected data suggests that a key challenge connected to HDID systems is ensuring interoperability. This includes system-to-system interoperability and humanitarian organisations' willingness to recognise and validate digital credentials issued by someone else (IFRC, 2023). Currently, beneficiaries are often required to undergo lengthy registration processes to receive aid. Moreover, the digital ID they eventually receive from one organisation may not have any function if the pilot is later ceased, nor is it necessarily recognised by any other institution or service provider. A recommendation for future practice is therefore ensuring more coordinated responses. This will require sufficient resources to test and further develop interoperable solutions, including those which may use blockchain, as well as involvement and investment from different stakeholders (IFRC, 2023).

Secondly, and despite the hype surrounding blockchain and SSI when humanitarian actors first started interacting with the technology around five years ago, the findings suggest that there is a consensus that this technology will not be able to transform the field or overcome systemic global challenges. It is rather one of many technologies being used in sociotechnical HDID and CVA ecosystems, in which societal aspects, policies, legislative frameworks, reforms and deliberate decision-making are ultimately the main determinants of the approach. That said, the empirical results reveal a shared recognition about emerging technologies and innovative solutions' importance in the humanitarian space. Furthermore, the study finds that blockchain and the use of cryptocurrency may enhance CVA efforts. Therefore, an implication for practice is updating certain outdated aid models (Haahr, 2017) and keeping abreast of innovative solutions which may securely and meaningfully be adopted into HDID systems.

Thirdly, a handful of the study's informants shared that many HDID, SSI and blockchain pilots never progress to large-scale or durable projects, a point also addressed in previous research on the topic (Cheesman; 2022; IFRC, 2023; Lee, 2020). There are many different reasons why these pilots do not develop into sustainable and scalable projects, including social, technical, regulatory, economic and ethical constraints. Yet when pilots are abruptly ended, this may have negative impacts on the end-users. It also makes it difficult to measure the initiatives' impact. Consequently, a recommendation for practice is increasing longer-term operations where possible and applicable. Another is openly sharing information about various obstacles and lessons learned with other actors operating in the field. "Knowing why projects fail is just as important as knowing why and how they succeed" (Lee, 2020, p. 16).

Fourthly, the findings and previous research on innovation in the humanitarian sector emphasise how intra- and intersectoral cooperation and multi-stakeholder approaches are essential for addressing global challenges. Humanitarian organisations need to work closely with private sector actors such as technology companies to steer technological development, ensure that humanitarian principles and needs are at the forefront of the solutions being created and that

ethical concerns and risks are duly considered. Furthermore, humanitarian organisations need to collaborate with each other. The prevalence of consortia-based initiatives such as DIGID, Unblocked Cash and Building Blocks illustrates the benefits of joining forces to develop innovative solutions. An important insight from the study is the divergence of interests and priorities which sometimes occur between stakeholders, as well as the connected importance of establishing mutually beneficial relationships. There is also a need to engage with government entities and policy makers, civil society organisations, academics and the beneficiaries.

Lastly, the sensitivity attached to digital IDs in different contexts should be recognised. This includes the sensitivity that it may have in relation to government-led digital ID efforts, as well as the promises these IDs convey to the intended end-users. Several of the interviewees reported that individuals sometimes mistakenly believe that they will receive a legal ID through the initiatives. Around 850 million people still lack such a credential (Clark et al., 2022) and an SDG target is that all people will have one by 2030 (UN, 2022). While HDIDs may provide beneficiaries with a functional ID which gives access to certain rights, services and assistance, it does not hold the same weight or significance as a legal ID. Nonetheless, humanitarian efforts, also those using blockchain and SSI, may be used to advocate the urgent need for ID solutions for forcibly displaced individuals and function as important "steppingstones" for obtaining a legal ID down the line (IFRC, 2023, p. 12; Crumpler et al. 2021; Slavin et al., 2021).

7.2. The analytical model's value and implications for research

The value of combining WST and affordance theory through the development of the study's analytical model was first and foremost that it allowed for a more comprehensive approach to addressing the research questions and topic. The theories are compatible in the sense that they allow for a sociotechnical perspective on the phenomenon of humanitarian digital IDs through the consideration of social, technical and surrounding environmental factors. While the WSF provided the necessary broad overview of sociotechnical elements influencing HDID systems in the forced migration context, affordance theory allowed for an investigation into different actors' reasons for adopting blockchain, as well as their perceptions on the technology's relevance, implications and effects. Although the WSF considers influential contextual and external factors, it does not address how these elements may either constrain or enable opportunities arising from interacting with specific technologies within the system. Affordance theory is therefore complimentary, as it adds this layer to the analysis.

The study makes theoretical contributions to research fields such as information systems studies and science and technology studies. It advances theory development by demonstrating how these two theoretical perspectives can beneficially be used together to capture the broad picture of a work system, while also shedding light on the significance of a particular technology within it. I would argue that the joint analytical framework could beneficially be transferred and applied to the examination of other sociotechnical systems, in which a particular technology and different actors' perception and interaction with it requires special attention.

To the best of my knowledge, no previous studies apply the WSF to examine humanitarian or digital ID work systems. Although there exist many studies on affordances in the IS field, only a few examine blockchain related affordances (Kewell et al., 2017; Ostern et al., 2020). The

study also brings additional perspectives to the research field of migration studies, as it provides evidence on the use of digital technologies in forced migration, humanitarian and low-connectivity settings. Certain gaps in the scholarly literature have also been addressed. This includes the need for research on blockchain's use in humanitarian settings (Connolly et al., 2022), the role of the private sector in humanitarian blockchain projects (Madinaou, 2019), the actual impact and implications of humanitarian digital ID projects (Cheesman 2022; Lee 2020; Weitzberg et al. 2021) and how these are progressing in similar and different ways "across global divides" (Martin et al, 2021, p. 5). The study's interview sample included six technology and humanitarian actors who had been directly involved in humanitarian blockchain pilots in diverse geographical locations, including East Africa, the Middle East and the Pacific region.

Although the analytical model provides a systematic method for analysing work systems and the affordances emerging within it, it also had certain shortcomings. To elaborate, the analytical model provided a somewhat overgeneralised depiction of HDID systems, which are in reality inherently complex and distinct. This aspect was amplified by the fact that I used the model to simultaneously examine a range of initiatives and actors. Although this was a conscious research decision, the analytical model could also be used to examine a particular sociotechnical work system or humanitarian digital ID project, as this would yield more situation- and context specific results. In addition, the process of identifying actualised affordances and effects is a subjective process and other researchers might have emphasised other affordances in the material. Further studies are required to advance the understanding of blockchain affordances in the field. Additional opportunities for further research will be presented next.

7.3.   Limitations and avenues for further research

The study had certain methodological, theoretical and empirical limitations, which have already been discussed in previous chapters. Some of these limitations can be addressed through future research endeavours. For instance, there is a critical need for more research encompassing the viewpoints and experiences of forcibly displaced and otherwise marginalised individuals using HDID and CVA solutions. Currently only a very limited number of studies contain their perspectives (Cheesman, 2022; Lee, 2020). An incorporation of their viewpoints is essential to get a comprehensive picture and a more rounded understanding of the impact of these projects.

The study's analysis of the humanitarian digital ID phenomenon has largely based on the perspectives of humanitarian and technology stakeholders, that is, the providers of the different solutions. However, it would also be valuable to examine and compare other stakeholders' viewpoints on this phenomenon and the significance of blockchain. This includes the perspectives of policy makers and governmental actors, immigration authorities, civil society organisations, host communities, financial providers and other pertinent global institutions such as the International Organization for Migration (IOM) and the World Bank.

Several of the informants mentioned the hype connected to blockchain. It would be interesting to further investigate the extent to which humanitarian actors experience that the use of blockchain, as well as other innovative solutions, provide actual value to their projects or whether they believe that any other technologies would be better suited. Furthermore, even though the empirical results reveal some of the difficulties in realising SSI principles in some

of the contexts in which the humanitarian organisations operate, the SSI movement is also gaining momentum in other locations. Research on the EUID initiative, including how digital wallets are implemented using SSI technology, could provide important insight into the future trends of digital IDs. The EUID initiative could also be compared to the Diia wallet launched by the Ukrainian government, for instance by applying the digital ID WSF developed in this study. It is important to understand the opportunities, risks, enablers and constraints of these sort of sort of solutions, as well as the impact that they have on the end-users. Notably, Diia is being used by many individuals who have been forcibly displaced since Russia's invasion of Ukraine. It is therefore of direct relevance to the topic being examined in this study.

7.4.   Concluding remarks

Today's turbulent global landscape, where millions of people are displaced and lack access to any recognised proof of ID, demands the attention and combined efforts of the international community. A range of actors are exploring and trialling how emerging technologies and innovative solutions can be harnessed in humanitarian contexts. This includes humanitarian and technology stakeholders, who are increasingly collaborating on different innovative initiatives. This study has sought to unpack and better understand the phenomenon of humanitarian digital IDs in the context of forced migration – from promise to practice. The study has unveiled some of the ways in which sociotechnical elements impact humanitarian digital ID and CVA systems' delivery of services to forcibly displaced individuals, as well as dynamics enabling and constraining the use and effects of blockchain in this domain. The findings indicate that there is a continuous need to leverage the affordances connected to emerging technologies in humanitarian digital ID initiatives, while also fully understanding the accompanying hurdles and risks. Blockchain's significance for humanitarian action remains disputed. It seemingly functions well in some contexts for especially CVA, yet there are other instances where other technologies may be better suited. Although digital wallets and SSI principles are gaining headway in contexts where individuals typically possess an official ID document, basic rights, smartphones and internet connectivity, there is still considerable progress to be made before these solutions are adequately adapted to the needs of individuals lacking this sort of access.

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Appendices

Appendix I: Information and consent letter (shortened version)

<div align="center">

Are you interested in taking part in the research project

Blockchain and Forced Displacement?

</div>

My name is Kari With and I am enrolled in the master's degree *Technology, Humans and Society* at the University of Agder (UiA. This master's thesis and research project is carried out in a personal capacity, independently from my employer. This document will provide you with information about the project and what your participation would entail.

Purpose of the project

The overarching theme of this study will be the evolving role of emerging technologies in enabling different forms of digital identity solutions for forcibly displaced individuals, with a particular focus blockchain. Specially, it will seek to investigate how these projects may contribute to improving forced migrants' access to services and humanitarian assistance. It will also examine whether blockchain is perceived to play a meaningful role. Additionally, the study will seek to gather insights and lessons learned on the main constraints and risks connected to the implementation of humanitarian blockchain projects in these contexts.

The research project's primary data will be collected through interviews with relevant stakeholders, such as humanitarian and intergovernmental organisations, non-governmental organisations, start-ups and private tech firms. The project will endeavour to contribute to research that is highly pertinent due to the exponential growth of forcibly displaced people and the connected digital transformations taking place in the humanitarian field.

Who is responsible for the research project?

The University of Agder is the institution responsible for the project.

Why are you being asked to participate?

You are being asked to participate in study because you are either directly involved in the implementation of a blockchain-anchored digital identity project, or because you have expertise and in-depth knowledge about digital identity solutions and forced migration.

What does participation involve for you?

If you agree to participate in this project, this will involve that you partake in either an individual or group interview, depending on your preferences and what we have agreed in advance. During the interview, I will ask you questions relating to your opinions and experiences with humanitarian blockchain projects and/or digital identity solutions. The topics we will talk about will include the background for the project and your involvement in it, desired aims and outcomes, collaboration with other actors if relevant, enablers and constraints to using the blockchain application, as well as perceived benefits and opportunities and/or challenges and risks. The interview will most likely take approximately 45 minutes. Depending on your availability, it may be appropriate to talk longer or schedule a second interview. I will record you answers electronically unless we have agreed otherwise. The recording will be deleted as soon as the project has been concluded. Quotes and main points from the different interviews will be included in the master's thesis. The thesis which will be publicly available on the university's website after submission.

Participation is voluntary

Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

Your personal data will only be used for the purposes specified in this information letter and your personal data will be processed confidentially and in accordance with data protection legislation. All information about you will be anonymised or deleted at the end of the project, which is scheduled to be in December 2023. If you wish to remain anonymous in the research project, your personal data will be replaced with a code. The list of names, affiliation and codes will be stored separately from the rest of the collected data to ensure confidentiality.

Consent form

I have received and understood information about the project *Blockchain and the Forcibly Displaced* and have been given the opportunity to ask questions. I give consent:

☐   to participate in an interview

☐   to an electronic recording of the interview

Details concerning personal data. I give consent to:

☐   to the thesis including my name

☐   to the thesis including my affiliation/organisation (if applicable)

☐   to the thesis including the name of the blockchain project I have been involved in

☐   to the thesis including a reference to my background/nationality

I give consent for my personal data to be processed until the end date of the project, approx. December 2023.

(Signed by participant, date)

Appendix II: Interview guides

INTRODUCTION

1. Please tell me a little bit about your organisation and role.
2. Do digital innovations and technologies play a central role in your field of work?
3. How would you define digital ID?
4. Do the projects you have been involved in focus on functional or foundational ID solutions?

THE HUMANITARIAN BLOCKCHAIN PROJECT(S)

5. Please tell me more about the background for the humanitarian blockchain project(s):
   5.1.1. When was it established?
   5.1.2. Is the project currently in an exploratory, pilot, implemented or completed phase?
   5.1.3. What was the rationale for starting the project? Was there a specific "problem" or issue that you were hoping to address?
   5.1.4. What were the overarching goals and expectations for the project(s)?
   5.1.5. What sort of blockchain solution did/do you use in the project(s)?
   5.1.6. Why did you decide to use blockchain instead of another technology?
   5.1.7. Who are/were the target groups?
   What was your selection criteria for the participants?
   5.1.8. Did/do you collaborate with any other organisations on the blockchain project(s)?
   5.1.9. Did you consult or collaborate with any affected communities, refugees, asylum seekers or displaced people during the different phases of the project?
   5.1.10. Would you say that results of the project align with the initial aims and visions?
   5.1.11. If applicable, what is the next phase for the project (scale-up or complete)?
   5.1.12. Do you envision that the blockchain project can be transferred to other contexts?

ENABLING AND CONSTRAINING FACTORS

6. What were the main enabling factors facilitating the blockchain project?
7. What were the main constraining factors hindering the project?
8. What worked well in the project? If applicable, what were the main challenges?
9. Do you think that the end-users had an adequate understanding about blockchain?

OPPORTUNITIES AND RISKS

10. What would you say are the biggest advantages/benefits with using blockchain-anchored digital identity solutions in contexts involving forcibly displaced migrants?
11. Do you think that digital identity solutions can empower the end-users? If so, how?
12. Do you think that blockchain in humanitarian settings has reached its full potential?
13. Do you think that SSI is a concept that has potential in this context?
14. What would you say are the greatest challenges connected with using emerging technology and /or blockchain to create digital identity solutions in settings involving FDP?
15. If applicable, how do you think these disadvantages or risks could be identified and mitigated?
16. Have you received any feedback from the FDPs on their experience using the technology?
17. Did any of the end-users express concerns or experience difficulties regarding the technology?

CONCLUSION

- Do you have any questions for me?
- Do you have suggestions for other actors you think I should interview for this project?

INTRODUCTION

18. Please tell me a little bit about your organisation and role/background.
19. Do digital innovations and technologies have a central role in your field of work?
20. What is your experience with humanitarian blockchain technology projects? Can you tell me a little more about these projects, their aims and results?
21. How would you define digital ID or identity?

OPPORTUNITIES AND RISKS

1. What would you say are the greatest advantages with using blockchain solutions in humanitarian and development settings involving forcibly displaced people (FDP)?
2. In your opinion, what is important for humanitarian blockchain projects to succeed?
3. In your opinion, do you think that blockchain technology can empower or improve the situation of FDP? If so, in what ways?
4. What would you say are the greatest challenges and risks connected to using blockchain and emerging technologies in humanitarian and development settings involving FDP?
5. In your opinion, do you think that blockchain technology projects in humanitarian settings can in certain cases jeopardize the situation of FDP? If so, in what ways?
6. If applicable, how do you think these disadvantages or risks could be identified and mitigated?
7. What do you think are the benefits and/or pitfalls of public-private blockchain collaborations?
8. Have you received any feedback from FDPs or organisations on their experience with using blockchain technology in humanitarian and international development settings?
9. Do you think that the organisations and end-users generally have an adequate understanding about blockchain?
10. Do you believe that humanitarian blockchain projects' aims and goals generally align with their outcomes and results?
11. In your opinion, what makes blockchain a suitable or unsuitable technology in humanitarian contexts?
12. Do you think that blockchain in humanitarian settings has reached its full potential?

ENABLING AND CONSTRAINING FACTORS

13. In your opinion, what are the main enabling factors facilitating humanitarian blockchain projects? (e.g., cross-sector partnership, digital transformations in field, accessibility etc.)?
14. In your opinion, what are the main constraining factors hindering humanitarian blockchain projects (e.g., ICT infrastructure, funding, complexity of technology, digital literacy skills?)

CONCLUSION

- Do you have any questions for me?
- Do you have suggestions for other actors you think I should interview for this project?

Appendix III: NSD approval letter

Assessment of processing of personal data

Reference number
349050

Assessment type
Standard

Date
20.12.2022

Title
Blockchain and the Forcibly Displaced

Institution responsible for the project
Universitetet i Agder / Fakultet for humaniora og pedagogikk / Institutt for religion, filosofi og historie

Project leader
Øystein Sæbø

Student
Kari With

Project period
15.11.2022 - 31.12.2023

Categories of personal data

- General
- Special

Legal basis

- Consent (General Data Protection Regulation art. 6 nr. 1 a)
- Explicit consent (General Data Protection Regulation art. 9 nr. 2 a)

The processing of personal data is lawful, so long as it is carried out as stated in the notification form. The legal basis is valid until 31.12.2023.

Comment
ABOUT OUR ASSESSMENT Data Protection Services has an agreement with the institution where you are studying. As part of this agreement, we provide guidance so that the processing of personal data in your project is lawful and complies with data protection legislation. We have now assessed the planned processing of personal data in this project. Our assessment is that the processing is lawful, so long as it is carried out as described in the Notification Form with dialogue and attachments.

FOLLOW-UP OF THE PROJECT We will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded.