

Makoza, Frank

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## **Leveraging Distributed ledger technology in Unified beneficiary registry system of Malawi: A Task-technology fit Theory perspective**

Frank Makoza  
Cape Peninsula University of Technology  
Department of Entrepreneurship & Business Management  
Cape Town, South Africa

Email: fmakoza@gmail.com

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### **Abstract**

*Social cash transfer plays a critical role in supporting vulnerable communities to overcome poverty and shocks in Malawi. Digital technologies are integrated in social cash transfer to improve operations and deliver value to citizens. This paper analysed the potential use of distributed ledger technology (DLT) in unified beneficiary registry (UBR) system for social cash transfer in Malawi. The study used concepts from Technology-Task fit theory to understand social cash transfer tasks and characteristics of UBR system using secondary data. The findings showed that DLT may enhance the functions of UBR in supporting data sharing in a decentralised manner, maintaining transparency and accountability in transactions, supporting electronic payments, improving security, and addressing issues of infrastructure. The study highlights the significance of training and compliance with legal and regulatory frameworks. The study contributes towards understanding of the use of DLT in social protection programs in the context of developing countries. The paper suggests recommendations for practitioners and areas of further research.*

**Keywords:** Distributed Ledger Technology, Blockchain, Unified Beneficiary Registry, Task-Technology fit Theory, Social Cash Transfer, Malawi.

## 1. Introduction

Social cash transfer program has received attention among government departments, policymakers and development partners in Malawi. The country is prone to natural disasters and risks due to climate change, pandemics, rapid population growth and slow economic growth (Dewa, Makoka & Ayo-Yusuf, 2023; Ngalawa & Vieg, 2011; Siachiwena, 2023). Social cash transfer is believed to one of the effective ways of supporting the vulnerable members of communities to overcome poverty, shocks and participate in activities that can support economic growth (Chinsinga, 2009; Ntata, 2010). The vulnerable members of communities are supported through grants in form of cash to improve their household income, ability to purchase basic needs, access to agriculture input subsidies to become food secure, access and attendance of education and enhancing access to health services. Cash transfer programs require identification of beneficiaries and collection of personal information, data processing, transmission and storage; and payment/disbursement of funds through cash, vouchers and mobile money (Coppi & Fast, 2019; Wong, Blankenship, Harish & Urpelainen, 2022). Hence, integration of digital technologies is significant in cash transfer programs.

The study focuses of the case of Malawi that introduced social cash transfer program in 2005 (Chinsinga, 2009). Despite constraints in financial resources, Government of Malawi (GoM) and international development agencies prioritise digital technology investments (Makoza, 2024; Makoza, 2023). The aim is to integrate digital technologies in public services processes and programs that addresses poverty, vulnerability and absence of basic infrastructure (Chirchir & Faruq, 2015; Makoza, 2021). In 2017, the country introduced Unified Beneficiary Registry (UBR) to support social cash transfer that target the most vulnerable members of communities in the country (Lindert, Andrews, Msowoya, Paul, Chirwa & Mittal, 2018). UBR implementation attracted many stakeholders, and current arrangements for data sharing, access and accountability have limitations (Ahmad, Faruq & Chirchir, 2015). DLT has emerged as a database technology that can address some of the problems of the UBR system. DLT has the capabilities to store data across a network. Scholars and practitioners suggest that DLT can improve information sharing, improve speed of transactions and enhance governance (Hrga, Capuder & Zarko, 2020; Smith, Macauslan, Butters & Tromme, 2011).

Studies on DLT use in social cash transfer programs have received attention among scholars (Coppi & Fast, 2019; Devereux & Vincent, 2010; Wong, Blankenship, Harish & Urpelainen, 2022). However, to the knowledge of the author, there no studies that have been conducted to understand how DLT can be used in UBR system for social cash transfer program in Malawi. The study attempt to address this knowledge gap and respond to the call for more studies on technologies in social cash transfer (Devereux & Vincent, 2010; Gentilini & Omamo, 2011; Sepulveda Carmona, 2019). The study is guided by the research question:

- *How can distributed ledger technology leverage the universals beneficiary registry system in supporting social cash transfer program?*

To answer this question, the study drew concepts from Task-technology fit Theory (Goodhue & Thompson, 1995). The study highlights opportunities on use of distributed ledger technology in social cash transfer to deliver value to citizens and data sharing among stakeholders. There are also areas that may need to be considered in UBR system when

integrating DLT including security for electronic payments, collaboration and data management.

The rest of the paper is presented as follows. Section 2 presents the background to the study. Section 3 summarises the theory informing the study. Section 4 highlights the research methodology used in the study. Section 5 summarises the findings of the study. Section 6 discusses the findings from the study and conclusions drawn from the study.

## 2. Background to the study

### 2.1. Defining social protection

Social protection is a process where government and development agencies support vulnerable members of society e.g. children, households, the youth, the elderly and people with special needs to overcome challenges of poverty and improve their wellbeing (Chinsinga, 2009; Mwanza, 2021). Social protection can take many forms because they target beneficiaries at different levels e.g. individuals, households and community. Social protection can also include promotion of access to education, health, housing, water, sanitation and income (Berner & van Hemelryck, 2021). Gentilini and Omano (2011) suggest three perspectives of social protection and they include labour policy and insurance, safety nets and social services. As can be seen in Figure 1, safety net comprise transfers and subsidies that can be implemented through programmes for cash transfers, vouchers, supplementary feeding, public/community works (Gentilini & Omano, 2011).

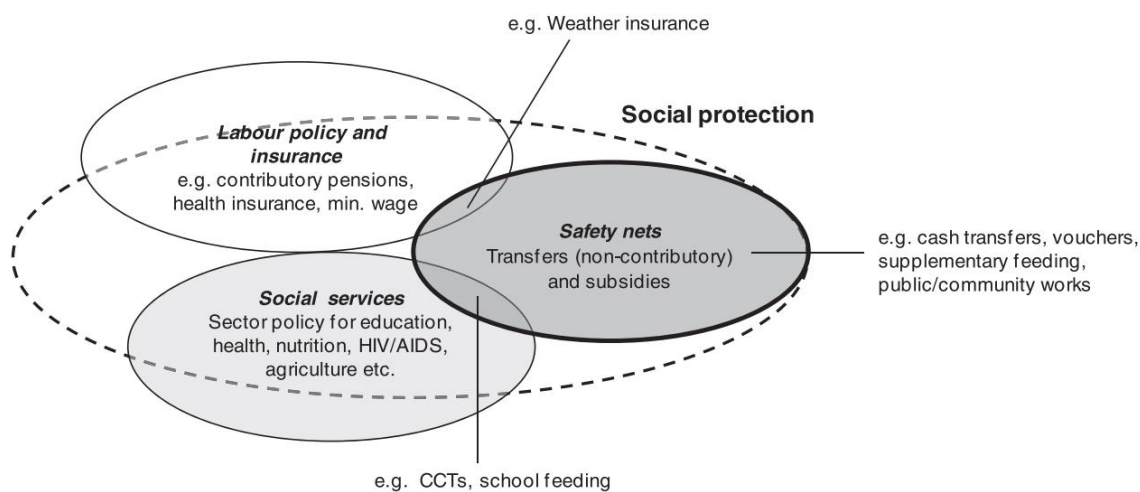


Figure 1: Summary of categories of social protection programs (Gentilini & Omano, 2011)

The study will focus on cash transfers because they involve many parties. The program activities can be data intensive to support decision making, achieve operational efficiency, accountability and transparency (Vincent & Cull, 2011; Smith, Macauslan, Butters & Tromme, 2011; Berner & van Hemelryck, 2021). Cash transfer programmes begin with targeting where socio-economic challenges are identified and the number of vulnerable members of communities is established. Enrollment is conducted to select eligible beneficiaries in affected communities. Registration involves collection of information of the selected beneficiaries e.g. biographical data and socio-economic data. Different programs are introduced where cash

transfers are used to support the registered beneficiaries. Payment is made where cash is transferred to the beneficiaries through bank account, vouchers, mobile money or through cash (Wong, Blankenship, Harish & Urpelainen, 2022). Overtime, it is expected that the beneficiaries will graduate from the system and new beneficiaries will be identified and enrolled. The process can vary depending on the context (Chirchir & Faruq, 2015; Chirwa, Dorward & Matita, 2012).

## **2.2. Benefits and challenges of social cash transfers**

There are benefits of cash transfer programs. One of the benefits is that the programmes help government and development partners to directly reach vulnerable individuals or communities to overcome poverty, hunger, diseases and shocks (Mwanza, 2021). Vulnerable members of societies that are experiencing risks and uncertainties or have experienced shocks can be assisted through social protection programs to recover and improve their well-being (Chinsinga, 2009; Ntata, 2010). Social cash transfers also stimulate cash circulation in the local economies where individuals can improve purchasing power to buy products and services. Cash transfer programs support inclusion of members of households to participate in decent work that can improve their livelihoods. Other countries have implemented health, water and salination initiatives in communities through social cash transfer programs (Adato & Bassett, 2009). Social cash transfer also provide access to small loans for individuals that do not have access to formal leading institutions e.g. commercial banks. The individuals may join village saving groups and access loans (Miller & Tsoka, 2012).

In some cases, social cash transfer programs do not always deliver the expected outcomes because of challenges (Mwanza, 2021). These include limited resources, dependence on donors, more time spent on planning and administrative activities, limited sustainability, absence of policy to guide the programs and limited capacity to mobilise local resources (Chinsinga, 2009; Hemsteede, 2023; Salifu & Kufoalor, 2024). African governments have limited capacity to generate local financial resources to support the delivery of social cash transfers. Hence, the government rely on support from donors to finance social cash transfer. Consequently, there is donor dependence among African governments (Hemsteede, 2023). Where fundings is provided, there has been limited impact on changing the lives of the beneficiaries because the resources are spent on planning and administrative activities in the implementation agencies of government. Lack of effective social cash transfer policies fail to guide implementation agencies in supporting graduation of social cash transfer beneficiaries (Berner & van Hemelryck, 2021).

In developing countries, social cash transfer do not cover all members of society because of limited resources (Basurto, Dupas & Robinson, 2020; Chinsinga, 2009). The situation require governments and development partners to produce means of identifying and recruiting beneficiaries. However, the process is often difficult due to cultural, political and economic factors (Ngalawa & Vieg, 2011; Siachiwena, 2023). The process of identification can be problematic if beneficiaries do not have identification documents. In some cases, there are biases in the selection of beneficiaries where close relations of those in political leadership are selected. Further, some politicians use cash transfer programs as a campaign tool to lure communities to vote them into power (Siachiwena, 2023). In African setting, most cash

transfer programs target rural communities because of their income status. The rural communities fall under village chiefs, who sometimes decide who will be selected to be the recipient of social cash transfer program (Basurto, Dupas & Robinson, 2020). Further, identification, disbursement, targeting and targeting measures are also challenging social cash transfers (Ahmad, Faruq & Chirchir, 2015; Dewa, Makoka & Ayo-Yusuf, 2023). Another challenge is that governments, humanitarian organisations and international development partners willing to assist social cash transfer beneficiaries run separate registers. This is resulting in duplication of efforts, limited harmonization of programs and missing some of the most affected and vulnerable people (Barca, 2017; Vincent & Cull, 2011).

Scholars have pointed out that technologies can also support to address some of these challenges (Gelb & Mukherjee, 2020; Smith, Macauslan, Butters & Tromme, 2011; Wong, Blankenship, Harish & Urpelainen, 2022). There is growing literature that highlights the use of digital technologies in social cash transfers. For instance, studies of use of digital technologies to identify cash transfer beneficiaries (Chirchir & Faruq, 2015; Sepulveda Carmona, 2019), other studies on mobile payments (Vincent & Cull, 2011; Smith, Macauslan, Butters & Tromme, 2011) and some studies on databases (Berner & van Hemelryck, 2021; Wong, Blankenship, Harish & Urpelainen, 2022; Devereux & Vincent, 2010). UBR system is an example of a custom application that is used to provide a single source of information from communities to ensure effectiveness and accuracy of identification and targeting of cash transfer beneficiaries in Malawi. UBR system can be used to identify beneficiaries in many programs including emergency response programs, agriculture subsidy programs, cash transfer programs, education programs and nutrition and food security programs (Ahmad, Faruq & Chirchir, 2015).

The recent advancement in fourth industrial revolution (4IR) digital technologies and increase in data generation are supporting digital transformation in many aspects of work, life, leisure and services (Kibe, Kwanya & Nyagowa, 2023). DLT are perceived to be among the next transforming technology that will change the way businesses and government deliver its services to citizens (Mavilia & Pisani, 2020). There is growing literature that is addressing the use of distributed ledger technology in context of social protection (Gelb & Mukherjee, 2020; Yoshino, Schloesser & Taghizadeh-Hesary, 2021) and humanitarian programs (Coppi & Fast, 2019; Coppi, 2021). Despite valuable contribution of these studies, research on use of DLT in the context of African countries (e.g. Malawi) has received less attention. The current study is motivated to address part of this knowledge gap.

### **2.3. Distributed Ledger technologies**

Distributed Ledger Technology (DLT) is *“a novel and fast-evolving approach to recording and sharing data across multiple data stores (or ledgers). This technology allows for transactions and data to be recorded, shared, and synchronized across a distributed network of different network participants.”* (Krause, Natarajan & Gradstein, 2017:7). DLT uses a distributed database where records (ledger) are stored at multiple locations unlike a centralized database where records are stored on a single location and accessed from different nodes. In DLT environment, records are validated by the nodes (devices connected to the network) throughout the network before changes are made. Hence, DLT allow consensus, immutability, trust,

transparency and secure transactions (Hashimy, Treiblmaier & Jain, 2021; Treiblmaier, 2019). Nodes in a DLT verify the transactions and all nodes have access to the details of the transactions. DLT allow mutability, meaning that when transactions are recorded on the ledger they cannot be modified and deleted (Treiblmaier, 2019). Hence, the system is more secure and maintains transparency where all members in the network are able to see the details of every transaction (Krause, Natarajan & Gradstein, 2017).

DLT can be permissionless and permissioned systems (Krause, Natarajan & Gradstein, 2017). Permissionless or public distributed ledger allow network nodes to access and update data in the process of reaching a consensus on new transactions. Permissioned or closed distributed ledgers have one central entity to grant access to nodes when verifying new transactions before they are added to new blocks. Only pre-defined members can join the permissioned distributed ledger network (Hrga, Capuder & Zarko, 2020; Krause, Natarajan & Gradstein, 2017). Figure 2 summarises examples of distributed ledgers.

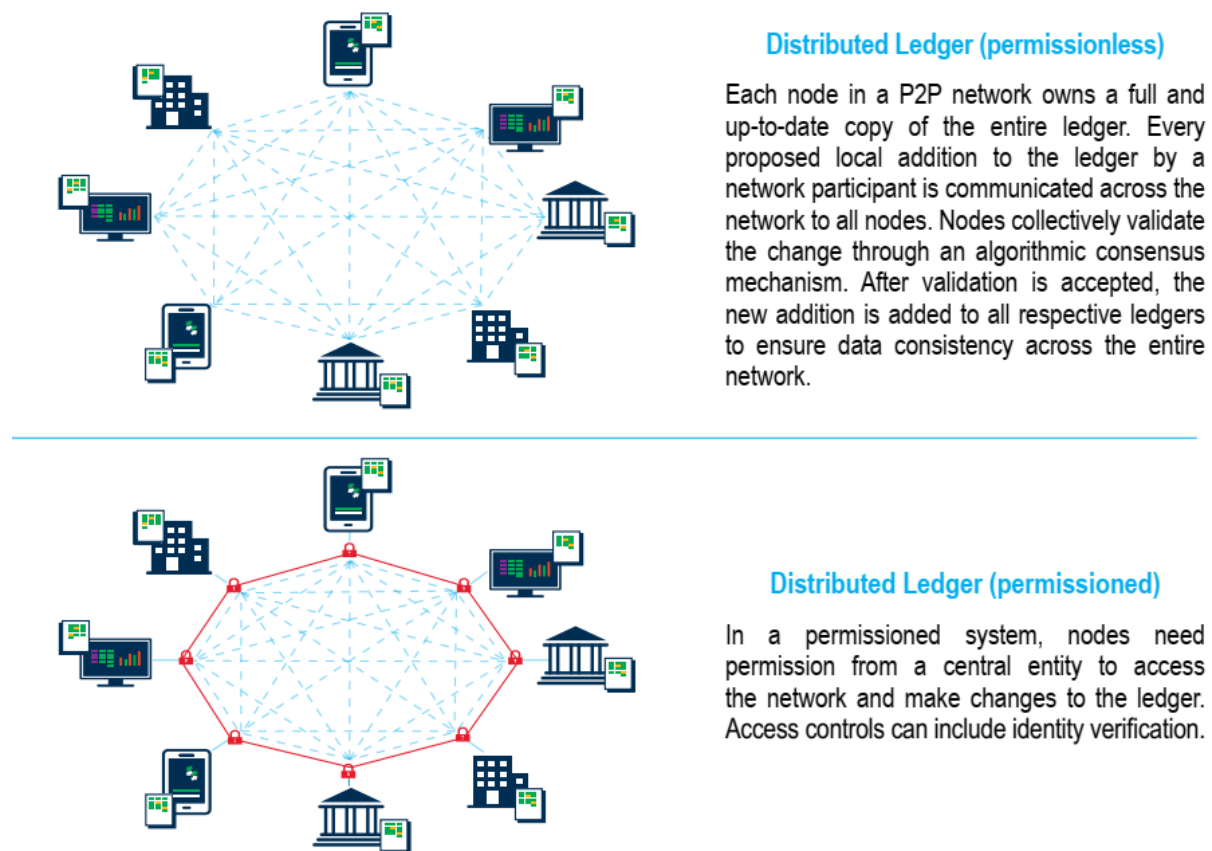


Figure 2: Types of distributed ledgers (Krause, Natarajan & Gradstein, 2017)

One of the popular uses of DLT is blockchain technology used for storage of data in blocks (Dwivedi, Amin & Vollala, 2020; Natarajan, Krause & Gradstein, 2017). This arrangement support transparency in verifying transactions, decentralisation where there is no single authority over control of data, encryption where data is secured using advanced cryptography techniques and consensus where blockchains uses proof of work to verify new transactions before they are added to the network as new blockchains. The blockchain maintain anonymity



of users where users can use pseudo names when processing transactions. Examples of applications for DLT are Ethereum, Hyperledger, MultiChain, OpenChain, HydraChain, Polkadot, Algorand, Holochain, Voltron, etc. (Chhabra, Sultanov, Wilson, Maceachern & Salamina, 2020; Soltani, Zaman, Joshi & Sampalli, 2022).

DLT are now being used in systems for supply chain management, record keeping systems, healthcare systems, cybersecurity systems, financial transactions settlement systems, voting systems etc. (Berner & van Hemelryck, 2021; Deshpande, Stewart, Lepetit & Gunashekar, 2017; Shabsigh, Khiaonarong & Leinonen, 2020). Figure 3 summarises the uses of applications of blockchain technology applications.

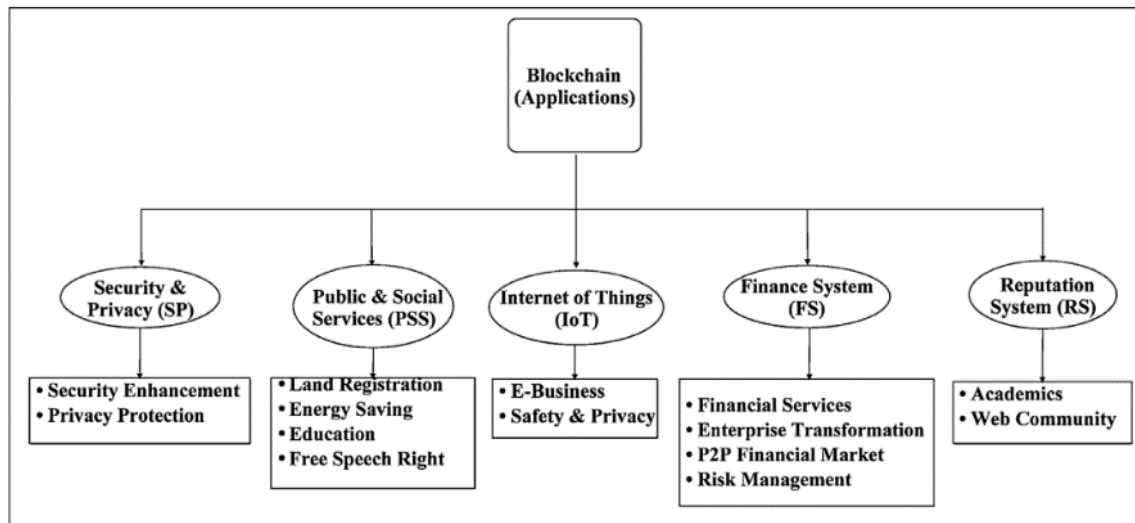


Figure 3: Summary of uses of blockchain (Dwivedi, Amin & Vollala, 2020).

As can be seen in Figure 3, blockchain can be applied in many areas of organisations and communities. Advantages of using DLT over ordinally database systems include support for decentralisation, greater transparency, cost reduction, efficiency when transacting, enhanced security, (Hrga, Capuder & Zarko, 2020; Deshpande, Stewart, Lepetit & Gunashekar, 2017). DLT allow transactions to be verified by all nodes in the network and there is no central control over transactions. All parties in the network verify transactions making the process more transparent (Coppi, 2021). Further, records in the network can be verified using more advanced encryption techniques making the security of records. DTL in payment systems support direct transactions between parties and eliminate the need to go through intermediaries thereby reducing cost of transactions (Shabsigh, Khiaonarong & Leinonen, 2020). Further, the transactions are faster than manual or paper-based systems (Deshpande, Stewart, Lepetit & Gunashekar, 2017; Natarajan, Krause & Gradstein, 2017).

There are also issues that can affect the implementation of DLT. These include lack of maturity, speed of transactions, integration challenges, cybersecurity threats, governance, lack of technical skills and expertise, data ownership and jurisdiction, regulatory vetting, limited know-your customers and customer due diligence, privacy issues and high energy consumption (Coppi, 2021; Krause, Natarajan & Gradstein, 2017; Hrga, Capuder & Zarko, 2020;



Treiblmaier, 2019). In some cases where the network is large, verification of transactions in the nodes may take long because all participants require to participate in the verifications process. Distributed ledger technologies may not be compatible with legacy database systems e.g. in organisations that are using centralized databases. Further, there can be challenges in terms of data ownership if public ledgers are used for systems that relate to private organisations (Krause, Natarajan & Gradstein, 2017; Deshpande, Stewart, Lepetit & Gunashekar, 2017). Distributed ledger technologies allow anonymity and know your customer (KYC) regulations can be difficult to implement in cases of public or permissionless distributed ledgers. There are also concerns of high energy consumptions where for the systems that are designated to verification and run the distributed ledgers (ASTRI, 2016). Some countries in Africa do not yet have legal frameworks to guide how distributed ledger technologies can be regulated to address issues of data protection, ownership and jurisdiction (Coppi, 2021; Hrga, Capuder & Zarko, 2020; Treiblmaier, 2019). These issues must be taken into consideration when implementing distributed technologies in the context of social cash transfers.

### 3. Theoretical perspective: Task Technology Fit Theory

Task-Technology fit theory (Goodhue & Thompson, 1996; Jeyaraj, 2022) is used to understand adoption of information technologies. The theory proposes that technology assist individuals to accomplish a task. Users attitudes and social norms towards technology may affect their performance in their tasks. Furthermore, users satisfaction can influence their performance in a task. Positive outcomes are achieved when there is a match between task and technology (Parkes, 2012; Spies, Grobbelaar & Botha, 2020). Thus, tasks and technologies can interact to produce output. The key concepts of the theory are task characteristics, technology characteristics, task-technology fit, utilization and performance outcomes (Goodhue & Thompson, 1996; Parkes, 2012). These are summarised as follows:

- **Task characteristics:** individuals and organisations use technologies to perm tasks. The tasks may have different characteristics depending on complexity, difficulty, user behavior, interdependencies etc. (Jeyaraj, 2022; Larsen, Sorebo & Sorebo, 2009)
- **Technology characteristics:** users view technology as tools used to perform a task and achieve the desired goal. Technologies may also include hardware, software, data and policies and services that are available to support users to perform their tasks and achieve their goals (Jeyaraj, 2022; Parkes, 2012).
- **Task-technology fit:** is the degree to which technology supports users or a group of users to achieve their tasks. Here, the abilities of users, the nature of tasks and functionality of technology are significant. A gap in these elements can lead to task and technology mismatch and failure to achieve better performance. (Larsen, Sorebo & Sorebo, 2009)
- **Utilization:** is behaviour of users in the actual use of technology to complete their tasks. The actual use of technology can vary depending on the tasks, e.g. some users can use technology more than others. In some cases, use of technology in a task can be voluntary or mandatory. Hence, the frequency of using technology can vary. Other factors that can affect technology use include social norms, habits and context conditions (Goodhue & Thompson, 1996; Parkes, 2012).

- **Performance outcomes:** is the result that come about from performing tasks using technology. When there is better performance, users master their tasks and use technology correctly and achieve better performance. In some cases, worst performance can create opportunities for users to learn how to use technology better in their tasks and improve their performance (Goodhue & Thompson, 1996; Spies, Grobbelaar & Botha, 2020).

It was necessary to appropriate Task-Technology fit theory (Goodhue & Thompson, 1996) to the context of the study for a number of reasons. First, activities in social cash transfer programs have wider implications because of many stakeholders e.g. government agencies, humanitarian organisations, international development agencies, politicians and policy beneficiaries (Chinsinga, 2009). Further, governments are custodians of the cash transfer programs, and they implement policies, strategies or processes and laws to support the execution of the programs. These are integrated with other government processes and policy programs e.g. identification and registration of citizens become part of legal requirements for every citizen (Lindert, Andrews, Msowoya, Paul, Chirwa & Mittal, 2018). Hence, performance of social cash transfer attract attention of members of society (Barca, 2017). The study will attempt to understand the key activities of cash transfer programs. Second, distributed ledger technology is distinct where it is used in a collaborative context and in decentralized processes involving many users. Previous studies have understood task-technology fit theory at individual level and concentrated on users behavior and organisational settings (Gelb & Mukherjee, 2020; Sepulveda Carmona, 2019). The current study extend the understanding of task-technology fit theory in collaborative environment among government agencies and cash transfer stakeholders.

## 4. Research methodology

### 4.1. Data collection and analysis

The study used qualitative research approach (Thomas, 2021) to understand the potential use of DLT in UBR system for social cash transfer programs. The case of Malawi was purposefully selected because the country was classified under low-income economies with socio-economic challenges (Yeboua, le Roux & Cilliers, 2023) and had been running a social cash transfer program since 2005. Case study supported understanding of the context of the study and how DLT can used UBR system (Sadeghi Moghadam, Ghasemnia Arabi & Khoshshima, 2021). Malawi was an information rich case in the context of Africa (Thomas, 2021). The study used purposeful sampling to select secondary data including reports and government policy documents. The following criteria was used (a) Reports that were from cash transfer implementation agencies (b) Documents or reports that contained information that was relevant to the study (c) Documents or media reports that covered the period between 2005 and 2024. Media reports were also included in the corpus to triangulate multiple perspectives of issues and points presented in the policy documents and reports (Bowen, 2009). Table 1 summarises the data that was sourced from implementation agencies and online news websites.

Table 1: Summary of documents analysed in the study.

ID	Document title	Source of document
#1	Assessment of Malawi's proposed unified beneficiary registry and information management system for social protection in Malawi (2015)	Ministry of Economic Planning and Development – Malawi Government
#2	A stakeholder-driven review of the design and implementation of Malawi national social support programme (2012-2016)	Ministry of Economic Planning and Development – Malawi Government
#3	Rapid social registry assessment: Malawi's unified beneficiary registry (UBR) (2018)	World Bank Group
#4	Phalombe unified beneficiary registry report – process, challenges, lessons & follow-up actions (2019)	Food and Agriculture Organisation of the United Nations (FAO)
#5	Addressing lifecycle vulnerabilities of beneficiaries in the Malawi social cash transfer programme (2020)	United Nation Children's Funds (UNICEF)
#6	Mid-term review of the Malawi national social support programme II (2018-2021)	Ministry of Economic Planning and Development – Malawi Government
#7	Malawi social cash transfer programme strategic plan (2022-2027)	Ministry of Gender – Malawi Government
#8	Unified beneficiary registry strategy (2022-2026)	Ministry of finance and economic affairs – Government of Malawi
#9	National social support programme II (2018)	Ministry of Economic Planning and Development – Malawi Government
	<b>Online news</b>	<b>Website address</b>
#10	Nyasatimes	<a href="http://www.nyasatimes.com">www.nyasatimes.com</a>
#11	Nation Malawi	<a href="http://www.nation.mw">www.nation.mw</a>
#12	Times Malawi	<a href="http://www.times.mw">www.times.mw</a>
#13	Mtukula pa khomo – Ministry of Gender, Community Development and social welfare	<a href="http://www.mtukula.com">www.mtukula.com</a>

The collected documents were stored in electronic format on a single repository. Content analysis (Erlingsson & Brysiewicz, 2017) was used to analyse the data. Qualitative data analysis software was used to analyse the data and supported moving to and from text in the documents. In addition, qualitative data software (QDA Miner) supported creation and reorganizing codes, categories and themes. The process began with reading the documents several times to be familiar with the data. The documents were also read to note key important points that were relevant to the study. Later, the text in the documents were assigned to codes. These were groups together into categories. After revisions, the groups were assigned to themes. We used constructs from Task-technology fit theory to have a manageable scope of analysis. The researchers were open to possibilities of new categories and themes emerging from the data. The process was iterative and at the end a report was produced to address the objective of the study (Lindgren, Lundman & Graneheim, 2020; Thomas, 2021).

#### **4.2. Case description: Social cash transfer in Malawi and use of UBR system**

Malawi is located in the Southern Africa and has a population of about 21.1 million people (World Bank, 2024). The majority of the population, about 80% percent reside in rural areas and their main activity is subsistence agriculture. The rural farmers depend on rain-fed agriculture where they grow crops for consumption and surplus is sold to meet other financial needs e.g. clothing, transport, medical expenses, school fees and agricultural inputs (Ahmad, Faruq & Chirchir, 2015; Siachiwena, 2023). Due to the effects of climate change caused by deforestation and environmental degradation, some areas in Malawi experience frequent droughts and floods (Dewa, Makoka & Ayo-Yusuf, 2023; Ngalawa & Vieg, 2011; Yeboua & le Roux & Cilliers, 2023). Further, rapid population growth is creating access to land for farming problematic. The challenges are resulting in low agricultural production, food insecurity and inability to deal with other shocks. The impact of low productivity in economic sectors such as trade, tourism, mining and services are contributing to low domestic revenue generation (Yeboua & le Roux & Cilliers, 2023). The government is not able to meet service delivery services targets, and the situation is affecting many citizens including the vulnerable groups. For instance, recent estimates indicated that about 4.4 million people (about 22% of the population) were vulnerable to food shortage (SMP, 2024). These include women, youth, children and the elderly.

The Government of Malawi (GoM) is attempting to address social challenges of the ultra-poverty for the most vulnerable communities (e.g. people without regular income and without means to earn income through work) (Chirchir, & Faruq, 2015; Siachiwena, 2023). There is collaboration between government ministries and departments, international development agencies, non-government organisations, faith based organisations and private sector organisations in supporting vulnerable communities and address poverty (Miller & Tsoka, 2012; Mwanza, 2021). In 2008, GoM developed the National social protection policy, and its objective was to address poverty and enhance social protection. The policy was implemented through a social program that targeted 28,000 households in 7 districts. In 2012, the government introduced the Malawi national social support program I (2012-2016) as an operationalization of the National social policy of 2012. The program attempted to mobilize funding, coordinate social support programmes and improve capacity. The program implementation include the following activities: social cash transfers, school meals, public works, village savings and loans groups and micro-finance. The program targeted 25,849 households in 2014 and reached 71, 053 households in 2015. The expansion of the program included integration of management information system for social protection. In 2018, the Malawi social support program II (2018-2023) was introduced following the approval of National social welfare policy of 2018. The number of targeted households was 279,744 in 2019 (de Arruda, 2018; SMP, 2024).

Over the years, digital technologies have been integrated into social protection programmes to achieve effectiveness and efficiency (Devereux & Vincent, 2010; Smith, Macauslan, Butters, & Tromme, 2011). For example, the social protection management information system and other databases were integrated in the program to support recording of beneficiaries, grievances process, monitoring compliance, recording of completed and outstanding activities (Lindert, Andrews, Msowoya, Paul, Chirwa & Mittal, 2018). In 2017, the

universal beneficiary registry was rolled out to support identification and registration of cash transfer beneficiaries. Biometric national identity was also integrated in the program following mass registration in 2019. Mobile payments are also being used to support payments to cash transfer beneficiaries (Ahmad, Faruq & Chirchir, 2015; Vincent & Cull., 2011).

## **5. Research findings**

### **5.1. Task characteristics**

The Government of Malawi and development partners (e.g. International Labour Organisation, The World Bank, Iris Aid, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and United Nations Children's Fund) worked together towards addressing social challenges related to food security, poverty, vulnerability, effects of climate change and healthcare. These challenges were addressed through the social protection programmes locally known as *Mtukula pa khomo* (improving households). The cash transfer program was chosen for analysis because it was considered to be an information rich program that engaged many stakeholders including government departments, donors, international philanthropy organisations, non-government organisations, faith based organisations, banks and mobile network operators. Government departments roles were implementing the programs through departments and coordinating the program activities. The Government of Malawi implemented unconditional cash transfers to vulnerable members of communities including orphans, widows, the aged, people living with disabilities and the youth. In some cases, the beneficiaries were also families that were affected by shocks such as harsh weather conditions e.g. floods, cyclones and droughts. These were identified through village development committees and community Chiefs. The information gathered at village level was delivered to the district registration officers who recorded the information to the beneficiary database. Other tasks of Government were mobilizing resources from donors, budgeting, coordinating activities with development partners, disbursement of funds to beneficiaries and ensuring that there was transparency and fairness when dealing with vulnerable communities. In some cases, faith based organisations are involved in supporting vulnerable communities. Table 2 summarises the activities for social transfer programs.

Table 2: Summary of social cash transfer programs related tasks.

Task	Description	Example of statement
Needs identification	Identifying the needs of beneficiaries and assessing the number of people who were vulnerable in communities	"... the Malawi Vulnerability Assessment Committee (MVAC), which is currently conducting this year's food insecurity assessment to generate numbers of people that will require humanitarian food assistance" (#10)
Partnerships	Collaboration between government agencies, development partners and non-government organisations.	"Recently, government formed a consortium with international nongovernmental organisations—UK Aid, Oxfam and Save the Children" (#11)
Budgeting	The process of allocating resources to cash transfer programs according to the targeted beneficiaries	"Allocations on selected social protection programs show an increase to K228.5 billion in 2021/22 from K214.3 billion in 2020/21 indicating that social protection allocation has increased" (#11).
Identification	The process of establishing the identity of people who can benefit from the cash transfer program	"Identification and registration of those accepted onto a programme (i.e. the beneficiaries)" (#1)
Registration	Recording of personal information for people identified as beneficiaries of cash transfer programs	"Registration of applicants, using either a census or on-demand method <sup>2</sup> for targeting and registration" (#1)
Coordination	Establishing relationships with different stakeholders that work in the cash transfer program	"... players in the social protection sector are pushing for a well-coordinated implementation of social protection programmes nationwide" (#11)
Cash disbursement	The process of paying out money to the cash transfer beneficiaries	"Producing lists of those who should receive payments and the level of payment that should be given" (#1)
Cash transfer	Payment of cash to address the needs of beneficiaries	"Social cash transfer programmes enhance household purchasing power, increase savings and investments among the beneficiary households which acquire assets such as livestock using cash transfers." (#11)
Grievances	Address any challenges in the processes that affect the beneficiaries	"Management and monitoring a grievance process or monitoring compliance with conditions" (#1)
Mobile money payments	Payment of money to beneficiaries using mobile device	"Apart from receiving social cash transfer through Airtel money, the beneficiaries will be able cash out instantly via their agents." (#10)
Data collection	Collecting information about the activities of cash transfer	"Identifying those who should be removed from a programme when no longer eligible or because they have died" (#1)
Governance	Ensuring that tasks for cash transfer are carried out in a transparent manner and promote accountability to minimize moral hazards	"Notifying programme managers when different processes have happened or should happen e.g. when a payment is due or when beneficiaries are due to exit" (#1)

Policy/reforms	Changes in government strategies for cash transfer to address limitations and improve the well-being of beneficiaries.	<i>“conducting the assessment of social protection programmes which will culminate into a comprehensive report to be submitted to government for policy actions and to redesign programmes to make a difference” (#11)</i>
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As can be seen in Table 2, there was diversity of tasks in the cash transfer program and some tasks required collaboration of cash transfer program stakeholders. For instance, beneficiary registration requires government officials in implementation agencies at district level; local chiefs at village level; government officials, non-government organisations and international development agencies at national level. Tasks for cash disbursement were performed by officials from implementation agencies, mobile money agencies, mobile services providers and banks. Government officials and legislators were engaged in tasks related to policy development, reforms and governance. Figure 4 summarises some of the cash transfer program stakeholders.



Figure 4: Summary of cash transfer program stakeholders

There were digital technology systems that were used in social cash transfer to support the activities of the stakeholders. A social protection management information system (MIS) was implemented to support the tasks and related activities of the social cash transfers:



*“To support its programme operations, SCT has put in place a MIS. The MIS has working modules for data entry, eligibility assessment computerisation using a proxy means test, recording of complaints and grievance, monitoring of compliance with conditions, processing of payments (for manual as well as electronic payments) and reporting.” (#1).*

SCT MIS was a web based application that supported the sharing of information and access of various government departments at different levels e.g. from village and district levels and national level through the line ministries (e.g. Ministry of Agriculture and Ministry of Gender and Social Development). The MIS supported diverse programs including public works programs, village savings and loans; and school feeding programs. However, not all organisations that were collaborating with government agencies in the social cash transfers used SCT MIS as they had their own systems. Other collaborating organisations used their own information systems including electronic spread sheets and paper based filling systems to record and process data for the cash transfer program.

## **5.2. Technology-characteristics and context of social cash transfer**

The nature of tasks in the cash transfer program required technology that would support collaboration of different partners. For example, government implementation agencies required technology that would facilitate, capturing information of beneficiaries and sharing information e.g. Ministry of Finance, Economic Planning and Development as custodians of the cash transfer programs collected information about beneficiaries and shared the information with Ministry of Gender and Social Development and Ministry of Agriculture for operational purposes. The characteristics of the tasks were also in line with the mandate of each implementation agency. For example, activities for social cash transfer emerged from the Social Support Policy of 2012. Further, the government agencies collaborated with donors to produce systems that supported management of information and led to development of universal beneficiary registry:

*“As part of improving the social protection management information systems, the Government of Malawi in conjunction with ILO and UNICEF commissioned a dual assessment of the existing SP MISs and a proposed UBR that unifies the targeting efforts of current Malawian Social Protection programmes” (#1)*

Among the challenges that necessitated the development of UBR were difficulties in sharing data where government and development partners used different systems e.g. manual systems versus computer based systems. Another problem was differences in data structures which made the process of data sharing and reporting time consuming. Further, the performance of some systems that provided information into the SP MIS e.g. Microsoft Access Databases of NRB at district level had bugs and were not very stable (#1). The capacity to capture, store and provide access to external parties (e.g. village and districts to report births and deaths) was also challenging. There were issues of double counting at village level where electronic village registers were piloted. Other partners institutions that used mobile networks in rural communities e.g. Baobab Point of Care faced connectivity challenges resulting in data being stored at multiple locations. Another problem was ownership SCT MIS where the consultant developed the application, owned the source code and hosted the application online. This meant that the government had limited control over enhancements

to the system. The Ministry of Education also housed a Microsoft Access database that had manual data migrations and required more effort from users to complete some of the tasks. Table 3 summarises the difference sources of data that was used in the universal beneficiary registry.

Table 3: Summary of data sources for UBR

Organisation	System	Potential data for UBR
Ministry of Economic Planning	SCP MIS	Recording and consolidation of information to determine the number of beneficiaries
Ministry of Education Science and Technology	Education MIS	Beneficiary identification data for pupils in school feeding programs
Ministry of Agriculture	FISP MIS	Beneficiary identification data for farm inputs program
Baobab Health	Point of care	Beneficiary identification data for patients in health facilities
Care Malawi	SAVIX MIS	Beneficiary identification data for access to village saving schemes
World Bank	COMSIP MIS	Beneficiary identification data for access to village savings groups
Ministry of Health	DHIS	Data on access to health centres and facilities in each district
National Registration Bureau	NRB MIS	Beneficiaries identification data in relation to birth and death

UBR system was developed to address the problem of multiple registers in social cash transfer programs. UBR system consolidates data from existing databases (both manual and electronic), ensuring that social cash transfer data was accurate, without duplicates and stored in a central registry. The collected data was used to support primary activities of subsequence programs. Next section summarises the features of UBR system and how DLT may enhance the operations of social cash transfer.

### 5.3. Technology fit

UBR system was a database system aimed at integrating data from various social protection registers and providing information to support the activities of stakeholders in the social protection sector in the country. UBR system focused on improving social support programs in all the 29 districts of the country. The function of UBR system was summed up in the following statement:

*“The UBR is a national platform used for entering, storing, accessing and sharing of household data for the implementation of social support programmes in Malawi” (#4)*

UBR system facilitated registration of beneficiaries, data storage and querying and production of reports. The data collection process involved actors at community, district and national levels and the collected information was shared with other partner institutions using Application Programmable Interface (API):

*“Data transfer between the UBR and SCTP’s Management Information System (MIS) was piloted, certified, and achieved in March 2018 with the Application Program Interface (API)” (#4)*

UBR system recorded beneficiaries using a unique identifier of beneficiaries. Hence, National Identification (ID) was integrated into UBR system from the NRB MIS. Further, the collected data comprise demographic and socio-economic information that was used in the various social protection programs. Figure 5 summarises the different components of UBR system architecture.

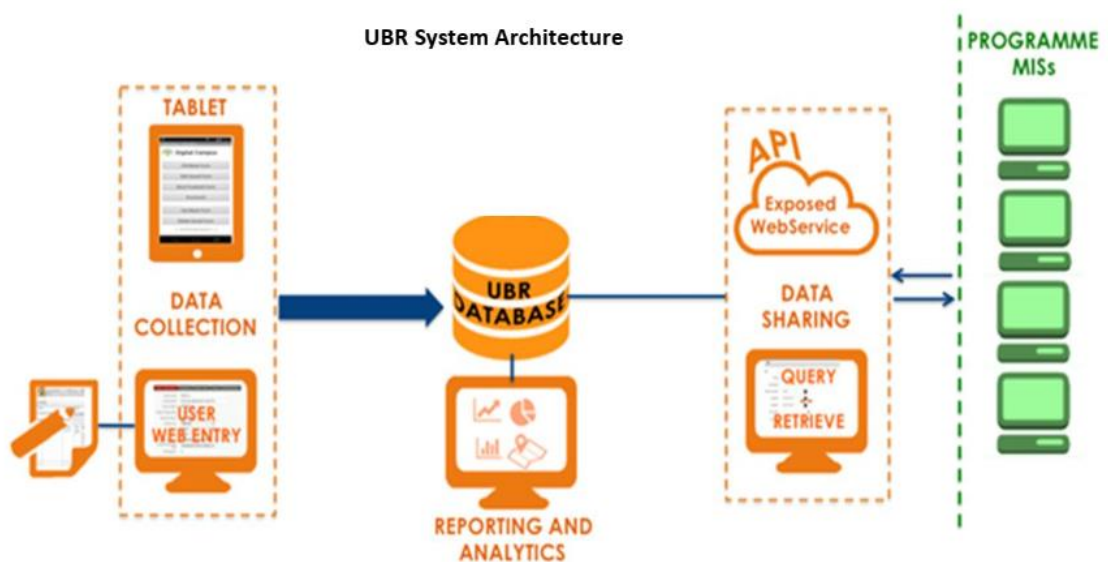


Figure 5: Summary of UBR system architecture

As can be seen in Figure 5, the UBR architecture required use of scalable database, internet connectivity, mobile technology support and capabilities for integration. Hence, cloud computing was used. Data was collected using tablets and laptops at village level and validated at district level where checks were conducted to ensure that data was logical and without duplicates before being saved on the database. Open Data Kit was used to ensure controls and maintain audit trails and transaction logs to support administration and oversight of the system. However, the information was stored in a cloud and connected to the database:

*“The UBR is a web-based information system with a back-end database to maintain household information. Exchange of information with other information systems is facilitated through web services” (#1).*

Such an arrangement supported better data collection (e.g. using tablets or laptops from different locations and later upload the data to the server) and access to the stored data with minimal downtime. The system had a web application that supported queries and generation of reports. Data sharing capabilities were present in the application:

*“Web Services or APIs are used to extract data from the UBR database by the user programs according to the Data Sharing Protocols and the specific program eligibility criteria” (#1).*

Furthermore, there was fair consideration in data governance to ensure that the system continues to operate and maintain system controls:

*“The UBR has a logging functionality that records all activities of the subjects and for anomalous behavior or activities. Moreover, the system keeps audit trails, documentation of technical specifications, and processes for regular back-up and archiving. Nonetheless, data protection and access controls would be enhanced with the formal structuring of staff, roles and responsibilities—and segregation of duties” (#1).*

As noted in the statement, there were security concerns of the database and ownership of the data stored outside the country using the cloud computing setup:

*“The UBR is hosted on a cloud platform in Germany for database and web servers, with a local server replicating data from the cloud to serve as back-up and for strategic control over data. This local server has sufficient capacity even for next UBR rollout phase” (#1).*

The local server was not protected as noted in the following statement:

*“Finally, the local server is not currently protected with a firewall or any intrusion-detection mechanisms. Although these risks are contained, given that exposure of the local server is limited,” (#1).*

This had legal implications in data use in terms of data governance and regulation. Where data may not be secured enough and when compromised can be misused affect the social cash transfer beneficiaries. The current laws and regulations in Malawi were silent on issues of data jurisdiction in cloud computing setup. For instance, existing social protection legal frameworks were not adequately addressing issues of data governance:

*“A formal legal standing would help formalize the UBR and clarify its objectives, purpose and uses. It would also provide the UBR with jurisdictional and operational independence from user programs. This is important to support the integrity and security of households’ information.” (#1).*

There was a suggestion for adoption of data governance framework and such framework could draw from technology related laws of the country (e.g. Electronic Transaction and Cybersecurity Act of 2016 and Data Protection Act of 2024) and best practices and standards in the telecommunications industry (e.g. Control Objectives for Information and Related Technologies or International Data Management Body of Knowledge). Another challenge was limited internet bandwidth that affected rural and remote users in processing data: *“Moreover, internet bandwidth is limited, particularly outside Lilongwe.” (#1).* These few examples of technical issues demonstrated the need for more robust solutions to ensure enhance the performance of UBR system. Figure 6 summarises UBR integrated information management.

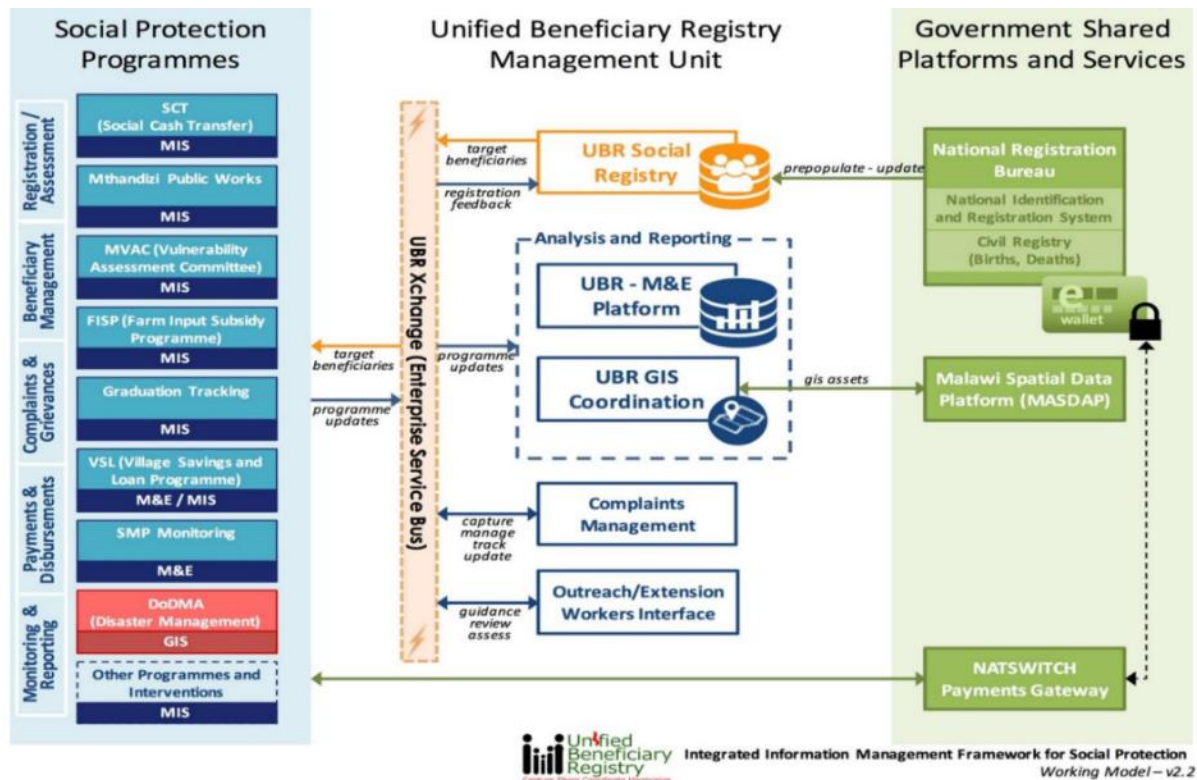


Figure 6: Summary of UBR integrated information management

It was interesting to note that UBR system had components for Geographical information systems and an Electronic Payment system. The GIS platform was used to gather information of areas where the information was captured. The information was useful for developing humanitarian programs for communities in response to shocks or disasters. E-Payment system supported secure and fast methods of cash payment to beneficiaries. The e-payment system was implemented in collaboration with mobile network operators. This arrangement supported the distribution of cash payments to beneficiaries using mobile money services of Airtel and Telecon Network Malawi Limited (the two main mobile network operators in the country).

#### 5.4. Potential utilization of Distributed Ledger Technology

As summarised in Figure 4, the main activities of UBR system can be categorized into registration, beneficiary management, complaints and grievances, payments, monitoring and reporting. The scalable database that was hosted in the country with backup system in the cloud supported the access to applications and information using web services and APIs. There was collaboration of actors and stakeholders in use of the UBR system.

DLT can be integrated in UBR System to support decentralisation, consistency and scalability. UBR System was running on PostgreSQL and supported integration with Open Data Kit. These capabilities can be enhanced with blockchain system that supports management of data. Blockchains are decentralized and can support organizations or stakeholders to join the network of UBR System. As a decentralized system, data can be transferred to the different nodes in the network without any central control making the data

more secure, accessible and improving trust among the network actors. Further, the new organisations or actors may act as validators of new data that can be added to blocks. Different data types can be supported in a blockchain, and data access can be faster with low latency using the existing data stored in the cloud.

Consistency relates to access and recording of data in a blockchain database. With a blockchain based UBR system, data can be read from multiple nodes at the same time. This means that different nodes in the UBR system will be able to write and read the data through queries at the same time and get similar results throughout the network. Algorithms or smart contracts can be used to prevent double spending and support consensus among the nodes. Scalability may support performance of the UBR system when the number of nodes or peers increase, and new computation resources are added to the network. Furthermore, system performance should be high to promote efficiency and low latency in cases where internet bandwidth is limited. In cases where there is a failure, DLT keep a record of all transactions in the network and the transactions can be easily traced. Other features of UBR system e.g. electronic payments can be supported in the blockchain system. The payment process can be digitized and automated to support efficient transactions. Payments can be executed at specific times when transactions are concluded e.g. processes of verifying beneficiaries and the transactions that happens at the end of the month. There are possibilities to integrate with other payments such as central bank digital currencies and cryptocurrencies.

Security was one of the issues of UBR system that was raised. DLT offers value added security features that protect the identity of users. In addition, DLT can support creation of a criteria that users have to meet before they can be added to the network. Smart contracts also support interaction and relationship between nodes in the network. The smart contracts can also be used to protect payment transactions against fraud. Various activities in the network can be managed through approval process. UBR system can benefit from the DLT to enhance its security and preventing anyone from modifying data without approval or data validation.

## **5.5. Potential performance impact of DLT**

DLT has the potential to enhance the performance of UBR System. Some of the noticeable areas for performance include the number of registered beneficiaries, programs that are integrated with the system, data quality and institutional and legal frameworks supported. With integration of various systems, UBR system managed to register 1,165,160 household members in 28 districts of the country in January 2025 (#13). Using UBR system data, about 291,290 households were engaged in social protection programs including social cash transfers. Cash transfers of about MK16 billion was delivered to the beneficiary households through e-payments and cash (#13). One of the advantages of using e-payments for the beneficiaries was cost of travel to receive the payments: *“Receiving these payments via phone will help us save money that we previously spent on transport. Now, we can use that money for other needs”* (#11). Nonetheless, issues of exploitation also emerged in use of e-payments:

*“... vulnerable children and elderly beneficiaries of the Cash Transfer Programme in Thyolo district are falling victim to exploitation amidst the transition to an E-Payment system... Senior Chief[Y] exposed the alarming trend of relatives withdrawing funds from the beneficiaries’ mobile accounts without their consent” (#10).*

This may mean that there was a need to enhance the processes in the e-payments for social cash transfers to ensure that beneficiaries received their money. DLT may address issues relating e-payment through integration of blockchains to maintain privacy of transactions.

There were improvements in data quality because of the UBR system, where stakeholders had accurate data that was used in planning and oversight of the programs. One official comment on the quality of data: *“With this we see a decrease in inclusion and exclusion errors where people who were not supposed to benefit and now left out and those intended to benefit are included” (#11).* Further, quality data supported resolving complaints from the beneficiaries: *“We also see less complaints in terms of biases. This is something that is ongoing and once fully implemented we hope it will ensure all these challenges are completely eradicated” (#11),* thus quality data supported the operations of the programs emerging from the use of UBR system. There were statements suggesting issues of data collection related to training and awareness that could affect the quality of the data. For example, there were reports of lack of training:

*“... we sometimes blame enumerators for poor data, but the genesis of quality data collection begins with the trainers. If you properly train and lead the enumerators, the data will be of high quality.”(#11).*

Training was crucial to ensure that the staff engaged in data collection had the necessary skills to ensure that they were able to effectively perform their duties. DLT technologies could support the process of identity (e.g. verification of users to grant access and perform different roles including proposer, asset issuer, auditor or validator), data validation to ensure that the collected data was accurate and accessible to stakeholders and used in their activities.

## **6. Discussion of research findings and conclusion**

This study set out to analyse how DLT can leverage the use of UBR system in supporting social cash transfer program in the context of Malawi. The findings showed that DTL can enhance the use of UBR system in social cash transfer program in efficient process for registration of beneficiaries, sharing of data among stakeholders, improving transparency and accountability among network actors and improving payment systems. Previous studies have demonstrated similar benefits of using DLT in healthcare, supply chain systems, financial services and voting systems (Berner & van Hemelryck, 2021; Dwivedi, Amin & Vollala, 2020; Deshpande, Stewart, Lepetit & Gunashekar, 2017). Specific contributions of benefits of DTL in supporting UBR system are discussed in the subsequent paragraphs.

Our case showed that the UBR system operated on a decentralized multi-level (e.g. village, district and national levels). While other studies demonstrated the application of DLT in collaborative environment (Dwivedi, Amin & Vollala, 2020; Hrga, Capuder & Zarko, 2020; Coppi & Fast, 2019), the study highlights the specific nature of tasks were collaborative at the three distinct levels in the context of a developing country. DLT have the potential to enhance



the tasks of data collection in a transparency manner among the participants of the cash transfer program. These factors are crucial to for social protection programs in the context of African countries so right beneficiaries are selected, public resources are not wasted, and cash transfer programs are inclusive (Coppi, 2021; Gentilini & Omamo, 2011).

Further, the case demonstrated the potential of DLT to enhance transparency and accountability in activities for using UBR system. While the UBR system had features for supporting authentication, authorisation, access logs and audit trail etc., the findings showed that with validation (as a key distinct feature of DLT) can improve the processes and securing the records using encryption (Natarajan, Krause & Gradstein, 2017). The process of sharing of data within the nodes can eliminate the need for having a centralized process. This may improve trust among the parties in the cash transfer program where records will be shared to all nodes, thereby guaranteeing access to information. In addition, all nodes in the network can have updated information all the time (Krause, Natarajan & Gradstein, 2017). Updated information is crucial in a social cash transfer program to support evidenced based decisions on social cash transfer activities and assist vulnerable beneficiaries on time (Gelb & Mukherjee, 2020; Salifu & Kufoalor, 2024).

Another interesting finding was issues related to data management when using UBR system in consideration of legal and regulations of the context of Malawi. UBR system generated personal data that required to be protected and managed to uphold standards for data integrity (Sepúlveda Carmona, 2019). The study demonstrated limited evidence in terms of following regulations from the recently enacted legislation e.g. Data protection Act of 2024. Although the act provide guidance on the role of Data controller in dealing with cross-border transfer of personal data, regulations specific to context of cloud computing services and their variations in arrangements are not outlined. Further, there was limited details on adhering to industry best practices for data governance and management. Other studies have raised the need for standards when implementing DLT which the UBR systems can integrate (Deshpande, Stewart, Lepetit & Gunashekar, 2017).

The study highlighted the use of mobile money payment in social cash transfer that was beneficial to the stakeholders. However, security issues were reported. Other studies demonstrated that DLT helps to secure payments and reduce transaction costs because of few third parties in transaction processing (Krause, Natarajan & Gradstein, 2017; Mavilia & Pisani, 2020). Further, DLT can provide real time settlement information for payment transactions and regulatory oversight (Shabsigh, Khiaonarong & Leinonen, 2020). Integration of DLT in UBR system can support financial inclusion because some of the social cash transfer beneficiaries remain unbanked (Makoza, 2022). Nonetheless, financial regulations (e.g. Know Your Customer) and Anti-money laundering legislation may need to be enforced in the payment component of DLT and use cryptocurrencies to prevent fraud and protect social cash transfer beneficiaries (Shabsigh, Khiaonarong & Leinonen, 2020). DLT can be implemented as a private distributed ledger to minimise some of these risks (Natarajan, Krause & Gradstein, 2017).

The study showed that Task-technology-fit theory can be used to describe task requirements and characteristics of technology and how they affect performance in a system

(Spies, Grobbelaar & Botha, 2020; Larsen, Sorebo & Sorebo, 2009; Jeyaraj, 2022; Goodhue & Thompson, 1995). In the study, the tasks related to social cash transfer were outlined in detail and the technologies behind UBR system were noted. Our contribution is understanding the potential of DLT to improve both the activities of social cash transfer and the capabilities of UBR system. More specific to the context of cash transfer program in a decentralized context, task-technology-fit theory can be enhanced to include collaboration, data management and secure payment transactions (see Figure 7).

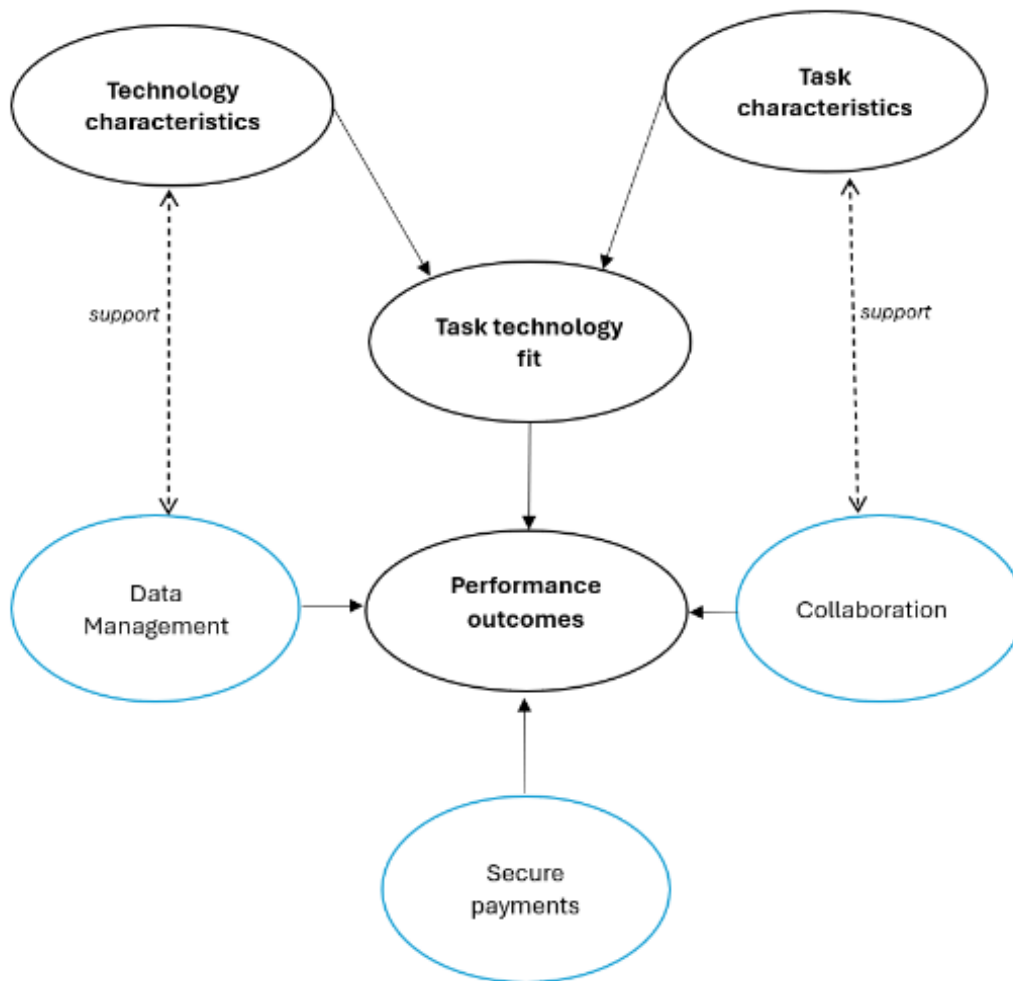


Figure 7: Summary of proposed changes to Task-Technology fit.

As can be seen in Figure 7, the assumption are that collaboration in social cash transfer program where UBR system is integrated with DLT use can significantly support information validation. Furthermore, use of smart contracts and efficient processing of transactions where actors or nodes are connected from multiple levels (Deshpande, Stewart, Lepetit & Gunashekar, 2017; Parulava, 2017). Data management ensure that the data that is collected is protected from unauthorised access and used for the intended purposes. Hence, data management standards can be enhanced in the UBR system using DLT. Examples of such standards include having service level agreements with cross-border service providers when implementing cloud computing services to promote data protection and data sovereignty

(Coppi, 2021; Natarajan, Krause & Gradstein, 2017). Secure payment is the process of preventing unauthorised access to data and preventing fraud and loss to the cash transfer beneficiaries and other organisations participating in the program. Security also extend to protect the hardware and software as infrastructure of DLT that can support the UBR system (Chirchir & Faruq, 2015; Coppi & Fast, 2019). Therefore, issues related to cybersecurity, Anti-money laundering and identification of users may affect the overall performance of cash transfer program (Parulava, 2017; Shabsigh, Khiaonarong & Leinonen, 2020).

The study was exploratory in nature and provided the basis for further research on the topic. For instance, from the findings related to Data Management, studies can be conducted to assess the effectiveness of legislation (e.g. Electronic Transactions and Cybersecurity Act 2016 and Data Protection Act of 2024) in supporting the operations of new technologies like DLT and blockchain. Another potential area of further study is the readiness of financial technology (FinTech) sector and regulations (RegTech) in supporting private DLT for public services. The study makes the following recommendations to practitioners and policymakers on improving cash transfer program in light of DLT (a) improving on technical capacity and training of technical team in advanced technologies e.g. Blockchain, Artificial Intelligence, Cryptocurrencies, Data analytics and Cybersecurity (b) continuous training of users of UBR system at different levels e.g. village, district and national level (c) introducing legislative reforms to address issues related to new technologies e.g. Cloud computing and digital payments (d) promote best practices and standards of data management e.g. procedures for data security and stewardship, data quality, regulatory compliance and training.

In conclusion, the study has explored the use of DLT in UBR system for cash transfer program in the context of Malawi. Using concepts from Task-technology fit theory, the study has demonstrated that DLT can improve the functions of UBR system. The decentralized nature of UBR system use can be enhanced where data can be validated and shared among the network nodes. The process of validation may also improve transparency and accountability. The study suggest three constructs to the task-technology fit theory: data management, collaboration and secure payments. These can be validated in further studies. The study contributes to literature on the use of DLT in the context of developing countries.

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