Success and failure of ICT for economic development (ICT4EcD) projects in the Global South: Scoping review of underlying factors

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Abstract

Information and communication technology for economic development (ICT4EcD) initiatives in Global Southern contexts encounter numerous challenges that can hinder the achievement of stated project objectives. Available evidence suggests that these projects tend to end in failure more often than success. This scoping review identified the factors from the existing literature that can contribute to the success or failure of such initiatives. The study employed the Joanna Briggs Institute (JBI) scoping review methodology to identify and analyse 20 articles. The following seven interconnected factors were identified as contributing to project success: collaboration and partnerships; careful policy and planning; contextual understanding; capacity-building and sustainability measures; a community-centric approach; appropriate design and alignment; and incremental implementation. The seven factors contributing to project failure were identified as: a lack of contextual understanding; policy and planning deficiencies; inadequate capacity-building and sustainability measures; resource and dependency challenges; a lack of user participation; harmful power dynamics; and a limited socio-cultural understanding. The findings reveal the multiple complexities at play in ICT4EcD initiatives in the Global South, with success factors and failure factors often interconnecting and thus potentially counteracting each other. Also revealed is the critical significance of contextual understanding in determining whether a project succeeds or fails. While the presence of contextual understanding is not a guarantee of project success, its absence tends to exacerbate multiple negative factors, increasing the likelihood of project failure.

Keywords

information and communication technology (ICT), ICT for development (ICT4D), ICT for economic development (ICT4EcD), Global South, success factors, failure factors

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1. Introduction

Information and communication technology for development (ICT4D) projects in general have faced numerous challenges and limitations, leading to their failure or underperformance (Rahaman, 2020). Research evidence indicates that ICT4D projects tend to fail more often than they succeed, with little change in the rate of failure over time (Smith & Lie, 2023). There is complexity in the broader context within which ICT4D projects in the Global South are implemented, arising from the interactions and competition among actors, agencies, and agendas of political, public, private, civil society, and foreign and global players. The context of each country matters because it presents a unique and complex configuration of historical, political, socio-economic, and external influences that shape the evolution and impact of ICT4D initiatives in ways that are often different from the dynamics observed in developed nations (Andoh-Baidoo, 2017; Njihia & Merali, 2013). The notion of the importance of context is not new. More than two decades ago, Heeks (2002) argued that the failure of ICT4D projects was linked to a "design–actuality gap", where there is a mismatch between the ICTs and the local user context. To this day, ICT4D projects continue to struggle with adequately taking context into account (Pyram, 2024).

It is also important to recognise that what defines success or failure in ICT4D projects depends on the stakeholders' priorities. What may be considered successful in one project may not apply to another, due to differences in project objectives (Montequin et al., 2014; Uys & Pather, 2020). In this article, success in ICT4D projects is characterised by achieving the project's specified goals. Conversely, failure occurs when the intended goals are not achieved. ICT4D is a dynamic and multifaceted social process that involves interactions between individuals, organisations, communities, and digital technologies (Zhang et al., 2021). Therefore, the adoption of digital technologies alone is insufficient to achieve sustainable development outcomes (Marais, 2011). That said, ICT4D is founded on the belief that ICTs can enhance various aspects of life, from reducing poverty and boosting economic development to promoting democratic governance (Avgerou, 2010). In this respect, ICT4D initiatives could catalyse social transformation that advances the economic and social progress of underserved communities by creating new business opportunities and promoting innovation and entrepreneurship (Abubakre & Mnkansi, 2022).

However, it is important to note that while some researchers view ICTs as the path to rapid growth through technological improvement, others believe that ICTs may harm developing countries, potentially hindering their progress (Gholami et al., 2010; Masiero, 2022; Rothe, 2010). Researchers have therefore expressed interest in understanding how ICTs can contribute to development, rather than solely examining their prevalence or adoption rates (Masiero, 2022; Zhang et al., 2021).

The focus of this article is on success and failure within ICT4D projects focused on economic development—a project category that we have chosen to call ICT4EcD—in the Global South. ICT4EcD projects aim to transform an economy by integrating digital technologies to enhance labour productivity, employment, income, market access, and the population's standard of living (Ding et al., 2021; Panth, 2020). The focal point of this scoping review is ICT4EcD initiatives in the "Global South", which refers to regions in Latin America, the Caribbean, Asia, Africa, and Oceania, characterised by disparities in access to digital technologies and information (Dados & Connell, 2012; Odeh, 2010).

This article identifies the elements that influence success and failure in ICT4EcD initiatives, and pinpoints crucial factors that underpin the success and failure of these projects in the Global South. Key factors can serve as a basis for understanding what influences project success or failure. This can lead to the identification of best practices for those working in developing nations, contributing to the overall advancement of ICT4EcD and ICT4D projects in the future. The following two research questions were posed:

- RQ1: What factors contribute to the success of ICT4EcD projects in the Global South?
- RQ2: What factors contribute to the failure of ICT4EcD projects in the Global South?

2. Methodology

The study followed the JBI scoping review methodology. Scoping reviews are generally understood as a form of evidence synthesis that systematically surveys and outlines the range of research available on a specific topic, field, concept, or issue. They can also be used to explain important terms found in the literature and to highlight the main features or influencing factors associated with a given concept (Pollock et al., 2024). Scoping reviews can therefore be used to identify and clarify characteristics or factors related to a field of study (Munn et al., 2018; Pollock et al., 2024), to provide future guidance (Pollock et al., 2024), and to inform both policy and practice (Munn et al., 2018). In this article, we aim to inform future practice in ICT4EcD projects by learning from past initiatives.

First, the eligibility criteria (keywords) were determined, after which a three-step search strategy was followed.

Eligibility criteria

Tables 1 and 2 present the keywords identified—using the population, concept, and context (PCC) framework—for each research question.

Table 1: RQ1 keywords identified via the PCC framework

RQ1: What factors contribute to the success of ICT4EcD projects in the Global South?		
	Keywords	**Alternatives**
Population	ICT4D projects, Global South	information and communication technology development projects, developing countries
Concept	success factors	determinants of success
Context	economic development	digital economy

Table 2: RQ2 keywords identified via the PCC framework

RQ2: What factors contribute to the failure of ICT4EcD projects in the Global South?		
	Keywords	**Alternatives**
Population	ICT4D projects, Global South	information and communication technology development projects, developing countries
Concept	drawbacks	factors influencing failure
Context	economic development	digital economy

Three-step search strategy

Database search

The first step involved searching online databases, namely Wiley, EBSCOhost, ScienceDirect, and Google Scholar. These databases were selected based on their extensive collection of published articles in the domain of ICT4D. Where possible, the same search string was used across all four databases. A search string was compiled for each research question (Tables 3 and 4).

Table 3: Initial and altered search strings for RQ1

Initial search string	("ICT4D projects" OR "Information and Communication Technology for Development projects") AND ("economic development" OR "digital economy") AND ("success factors" OR "determinants of success") AND ("Global South" OR "developing countries")
Altered search string	("ICT4D projects" OR "Information and Communication Technology for Development projects") AND ("economic" OR "economy" OR "rural") AND ("success factors" OR "determinants of success") AND ("Global South" OR "developing countries")

Table 4: Initial and altered search strings for RQ2

Initial search string	("ICT4D projects" OR "Information and Communication Technology for Development projects") AND ("economic development" OR "digital economy") AND ("drawbacks" OR "factors influencing failure") AND ("Global South" OR "developing countries")

Altered search string	("ICT4D projects" OR "Information and Communication Technology for Development projects") AND ("economic development" OR "economy" OR "rural") AND ("factors influencing" OR "failure") AND ("Global South" OR "developing countries")

For RQ1, the initial search string in EBSCOhost yielded 17,985 results. Several limiters were applied to narrow the result set, including source types (academic journals) and subjects (developing countries, digital technologies, and economic conditions in developing countries), resulting in 175 relevant results. For RQ2, the initial search string in EBSCOhost yielded 191 relevant results.

Refinement of search results

The second search step used filters to refine the search results. Table 5 details the inclusion and exclusion criteria employed. Articles based on healthcare and education were excluded from the scope of research because these factors do not directly influence economic activities enabled by digital technologies.

Table 5: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Articles written in English	Articles not written in English
Articles published between 2010 and 2023	Articles published before 2010, unless seminal*
Articles published before 2010 that explain various concepts relevant to the study	Articles based on healthcare
Seminal articles	Articles based on education

* Seminal articles are those with more than 100 citations and relevance in this study

Backward reference-searching

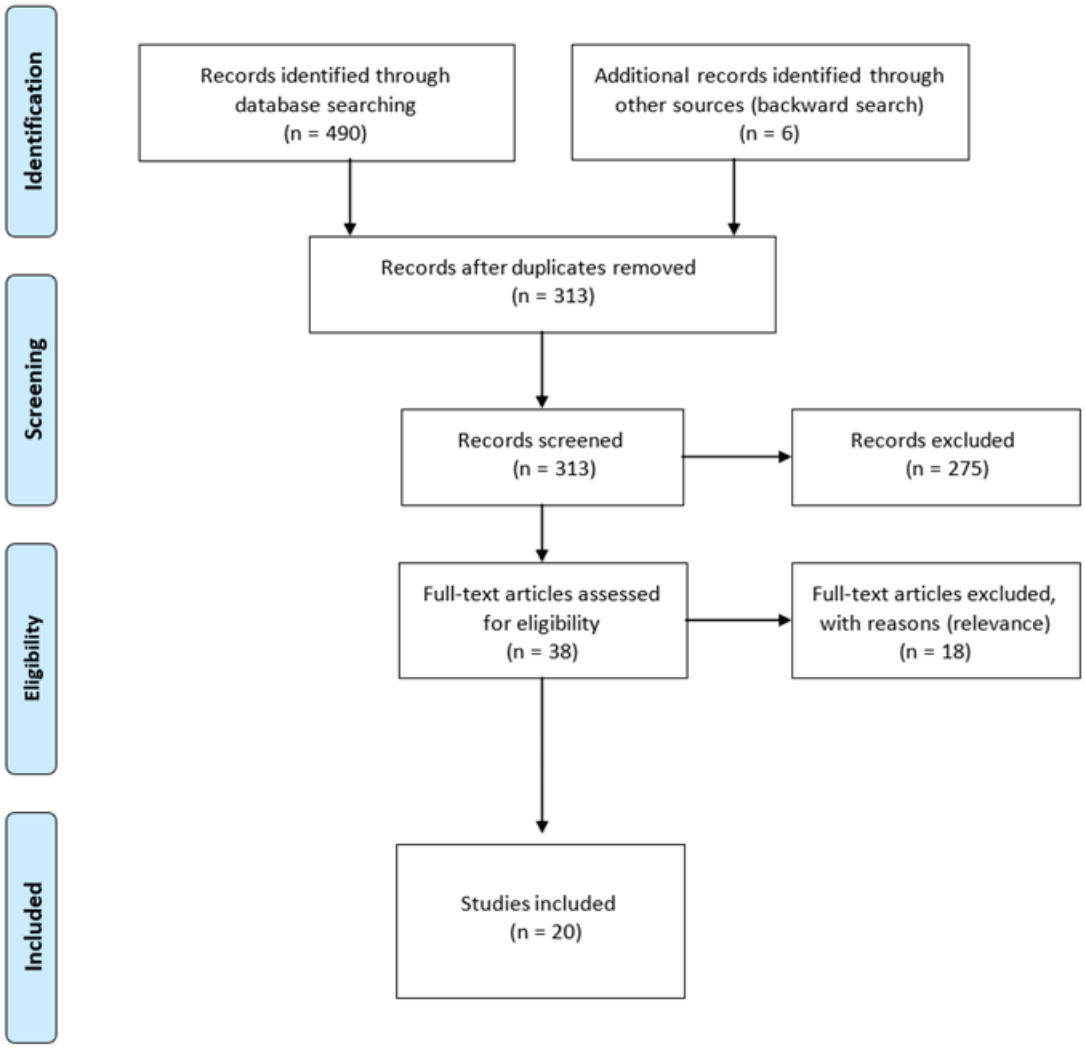
The third search step comprised searching the reference lists of identified articles for additional sources.

Process overview

Figure 1 provides a PRISMA-ScR overview of the process used to select the sources of evidence. The figure outlines the process followed, from sourcing articles from databases to refining and reducing the corpus to the final 20 articles included in the scoping review.

The identification of the articles was subject to limitations and was not an exhaustive process. Only four databases were used, and article-accessibility restrictions at the university where the review was conducted may have resulted in additional aspects related to the study not being included in the findings. Furthermore, not all ICT4EcD initiatives are documented in academic publications. However, it is still possible to learn valuable lessons regarding the factors that contribute to success and failure in ICT4EcD initiatives from the articles accessed through this scoping review.

Figure 1: PRISMA-ScR flow diagram for the scoping review process



Data mapping

After compiling the PRISMA-ScR diagram, the final 20 articles were analysed. Table 6 sets out the data items used to classify and summarise the findings from the included articles.

Table 6: Definition of data items

Data item	Definition
Author(s)	The individual(s) who wrote the study
Year	The year in which the study was published
Author origin	The country/location where the author(s) originate(s)
Country(ies) of research	The country(ies) where the study took place
Title	The title of the article
Aims/purpose	What the study aims to achieve
Key findings	The key findings that relate to either RQ1 or RQ2
Keywords	Significant terms or phrases provided by the author(s)
Success theme/s	The success-factor theme/s extracted from the findings related to RQ1
Failure theme/s	The failure-factor theme/s extracted from the findings related to RQ2

Data analysis

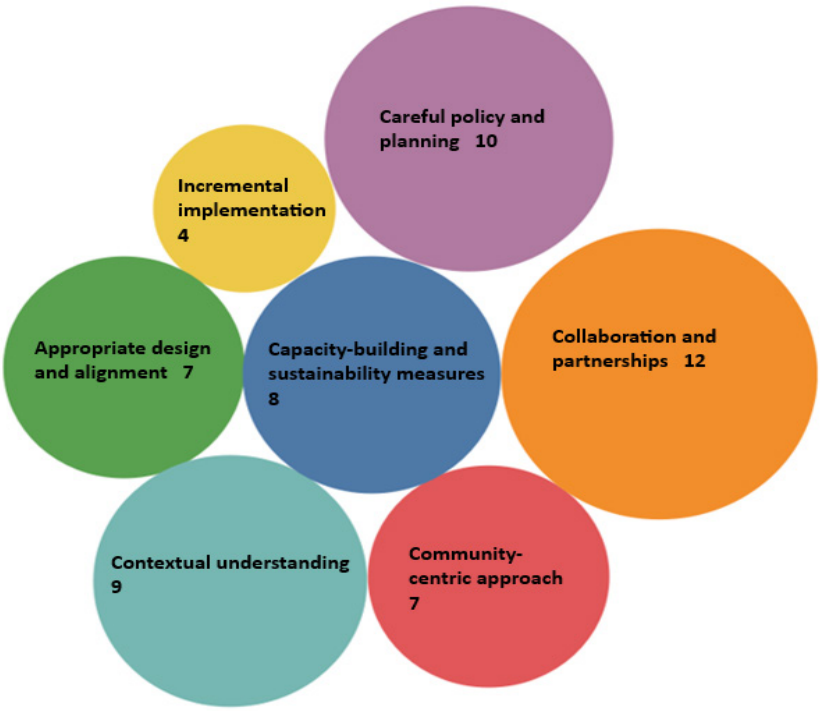
The data analysis employed thematic analysis to organise and analyse patterns (themes) in the data (Clarke & Braun, 2017). The core purpose of thematic research is pattern recognition, which involves finding recurring ideas, concepts, and experiences that may appear across readings. The coding stage of the analysis involved identifying extracts of significance in relation to the two research questions and generating initial codes. As more data were analysed, the codes were further refined for improved meaning. Once all the data had been coded, related codes were grouped into themes describing the success and failure factors of ICT4EcD projects in the Global South.

3. Findings

Factors contributing to the success of ICT4EcD projects in the Global South

Figure 2 provides a graphical representation of the success factors and their prevalence in the literature, as determined through thematic analysis of the 20 items in the corpus.

Figure 2: Success factors, and their prevalence, in the literature



Collaboration and partnerships

This success factor refers to the collaboration of various stakeholders to leverage collective resources for ICT4EcD initiatives (Abila et al., 2013). This includes the involvement of multiple stakeholders, such as the government, NGOs, foreign investors, and private–public partnerships (Abila et al., 2013; Hosman & Fife, 2008; Khumalo, 2019; Manara, 2015; Marais, 2011; Pade-Khene et al., 2011; Ting & Yi, 2013). This is a hybrid governance approach that rests upon communication, transparent and accountable partnerships, and considering communities as project stakeholders (Blake & Garzon, 2012; Heeks, 2010; Hosman & Fife, 2008; Kuhl, 2018; Mamba & Isabirye, 2015; Reijswoud, 2009).

Careful policy and planning

This success factor involves creating strategic plans and policies to guide the implementation of ICT4EcD interventions in a manner that complies with legal requirements and broader development objectives (Mamba & Isabirye, 2015). This includes carefully planned projects (Ting & Yi, 2013), measurable targets and timeframes (Hosman & Fife, 2008), and clearly defined and communicated ICT4EcD policy, strategy, and project objectives and goals (Hosman & Fife, 2008; Mamba & Isabirye, 2015; Pade-Khene et al., 2011; Ting & Yi, 2013).

Contextual understanding

This success factor involves being aware of the technological, social, cultural, and economic environment in which ICT4EcD initiatives are deployed, allowing solutions to be tailored to the unique realities faced by different regions (Manara, 2015; Nuseibeh et al., 2019; Reijswoud, 2009). This involves a customised development model within the local ICT4EcD context (Diga, 2013; Heeks, 2010; Pade-Khene et al., 2011). This is achieved through an understanding of contextual SWOT (strengths, weaknesses, opportunities, and threats) profiles (Nuseibeh et al., 2019). Contextual understanding depends on understanding the needs of communities (Kuhl, 2018; Kyem, 2012; Marais, 2011; Reijswoud, 2009), an awareness of the local political context, and national development programmes (Pade-Khene et al., 2011). In addition, contextual understanding is informed by an understanding of various cultural and social considerations, such as historical conditions that shape the behaviour and attitudes of communities, as well as understanding the environment for feasibility (Kyem, 2012; Manara, 2015).

Capacity-building and sustainability measures

This success factor refers to ensuring that communities are equipped to use ICTs effectively over the long term (Abila et al., 2013; Kuhl, 2018; Mamba & Isabirye, 2015; Nuseibeh et al., 2019). This includes creating a sustainable and enabling environment, meaning building complementary infrastructure, such as telecommunications and transportation facilities, as well as making additional investments in roads and market outlets (Abila et al., 2013; Kuhl, 2018; Mamba & Isabirye, 2015; Nuseibeh et al., 2019). This factor is ensured through appropriate training for the target community, enabling them to acquire the necessary skills to repair technical faults without relying on external personnel (Pade-Khene et al., 2011). Additionally, skills development should be provided for income generation and technology maintenance (Manara, 2015). An important aspect of capacity-building and sustainability is that projects are integrated with national development programmes for long-term viability and support (Marais, 2011; Pade-Khene et al., 2011). Capacity-building and sustainability are also ensured through projects that have economic self-sustainability via the creation of services that demonstrate utility in everyday life to encourage adoption as well as integration of ICT into economic activities (Heeks, 2010; Hosman & Fife, 2008; Kuhl, 2018; Kyem, 2012; Mamba & Isabirye, 2015; Pade-Khene et al., 2011).

Community-centric approach

This success factor emphasises active engagement with the local community. It recognises the agency of communities and considers them active partners in the implementation and development of technology (Kyem, 2012). The fundamental aspects of a community-centric approach include, but are not limited to, understanding and meeting the needs of communities by addressing specific and genuine requirements (Diga, 2013; Heeks, 2010; Khumalo, 2019; Marais, 2011; Pade-Khene et al., 2011). This is achieved by creating and implementing designs that are sufficiently aligned with local realities and focus on local, demand-driven needs (Diga, 2013; Heeks, 2010; Khumalo, 2019; Marais, 2011; Pade-Khene et al., 2011). A community-centric approach involves using a bottom-up approach, which emphasises the knowledge and insights of communities, instead of a techno-centric approach that relies on external or top-down directives (Hosman & Fife, 2008). A community-centric approach also entails using suitable technology for the community and promoting the development of local content (Hosman & Fife, 2008; Mamba & Isabirye, 2015; Pade-Khene et al., 2011; Reijswoud, 2009). Another sub-theme relating to a community-centric approach is user participation, which is the inclusion of users in the design and implementation of ICT solutions (Diga, 2013). This inclusion is dependent upon relating to communities as active agents of change, encouraging active participation in the adoption of technologies to shape how technology is used, as well as the participation of community target groups in the project and design process, community buy-in, and active local participation (Diga, 2013; Kyem, 2012; Manara, 2015; Pade-Khene et al., 2011).

Appropriate design and alignment

This success factor relates to the creation of ICT solutions tailored to the local context and user needs, particularly in terms of usability and technical viability, to address specific challenges (Diga, 2013; Heeks, 2010; Mamba & Isabirye, 2015; Marais, 2011). This is achieved through the local alignment of project designs with community needs and realities (Heeks, 2010), understanding user needs to inform design (Mamba & Isabirye, 2015), designing maintainable infrastructure (Khumalo, 2019), and designs that find a middle ground between technical and social systems (Atinaf et al., 2020).

Incremental implementation

This success factor involves the gradual and iterative implementation of ICT solutions, enabling learning, adaptation, and improvement over time in response to feedback and evolving user needs (Kyem, 2012; Mamba & Isabirye, 2015). This is done through the use of pilot projects to determine scalability (Hosman & Fife, 2008), incremental implementation of ICT equipment, familiarisation of community members with ICTs (Mamba & Isabirye, 2015), and gradual evolution of technological-adoption expectations to fit the needs and challenges that occur at different stages of development (Kyem, 2012).

Factors contributing to the failure of ICT4EcD projects in the Global South

Figure 3 provides a graphical representation of the failure factors and their prevalence in the literature, as determined through thematic analysis of the 20 items in the corpus.

Figure 3: Failure factors, and their prevalence, in the literature

Lack of contextual understanding

This factor is a failure to grasp the environment in which ICTs are being deployed, such as projects being undertaken with no understanding and consideration of local realities (Blake & Garzon, 2012; Boateng, 2012; Chipidza & Leidner, 2019), design–reality gaps due to techno-centric approaches that overlook human aspects, leading to poor design and implementation (Atinaf et al., 2020; Heeks, 2010; Khumalo, 2019; Marais, 2011; Ting & Yi, 2013), and neglect of socio-cultural developments in pursuit of economic growth, resulting in a misunderstanding of user perceptions, faith, and relations that determine communities' use of technologies (Abila et al., 2013). A lack of contextual understanding is due to "multiple ontological complexities" at play, such as human, technical, and physical elements in diverse interrelationships across social, economic, political, infrastructural, and ecological dimensions (Blake & Garzon, 2012, p. 2).

Policy and planning deficiencies

This failure factor refers to policies or plans that are implemented in a manner that leads to misdirected efforts and a failure to meet development goals. Policy and planning deficiencies are characterised by an absence of comprehensive plans for ICT4EcD adoption (Kyem, 2012; Nuseibeh et al., 2019), poorly formulated policies and unclear project objectives (Khumalo, 2019), ambiguity in project requirements and objectives (Abila et al., 2013), and a lack of policy continuity (Ting & Yi, 2013). This theme is also characterised by a lack of law enforcement and legislation, as well as poor legal frameworks (Diga, 2013; Nuseibeh et al., 2019).

Lack of capacity-building and sustainability measures

This failure factor arises from the initial adoption of ICTs as the sole focus in projects, without sufficient resources allocated to developing local capability beyond the initial stages (Manara, 2015). This would include creating a sustainable and enabling environment, building complementary infrastructure, and making additional investments such as roads and market outlets (Abila et al., 2013; Kuhl, 2018; Mamba & Isabirye, 2015; Nuseibeh et al., 2019). Another aspect that affects capability and sustainability is a lack of skills and training. Community members often lack the necessary skills and expertise to operate or maintain technology, which can lead to misuse and/or underuse, hindering the intended progress of ICT initiatives (Thapa & Sæbø, 2016). This theme stems from communities having a lack of skilled and competent ICT personnel and human resources (Chipidza & Leidner, 2019; Manara, 2015; Reijswoud, 2009; Thapa & Sæbø, 2016), limited capacities and capabilities of the rural population (Abila et al., 2013), limited funding for training (Ting & Yi, 2013), a high level of illiteracy (Boateng, 2012), and failure to provide training opportunities (Hosman & Fife, 2008).

Resource and dependency challenges

This failure factor refers to the fact that ICT4EcD projects can be hindered by a lack of infrastructure, including electricity, equipment, and Internet access, resulting from limited telecommunication/connectivity and grid electricity infrastructure, as well as challenges related to affordability (Abila et al., 2013; Boateng, 2012). Resource and dependency challenges also relate to inadequate funding and support, characterised by a dependency on external sources of funding for financial and technical resources, as well as weak infrastructural bases (Chipidza & Leidner, 2019; Khumalo, 2019; Reijswoud, 2009; Ting & Yi, 2013). A lack of partnerships and collaboration also contributes to this theme. Limited collaboration between different stakeholders, including governments, NGOs, and local communities, can lead to misdirected efforts and inefficient use of resources. This is characterised by the inability to share costs of investments and risk due to a lack of partnerships with local organisations (Hosman & Fife, 2008; Kyem, 2012), a failure to build relationships with local government (Marais, 2011), and a lack of consensus between stakeholders in relation to their roles and responsibilities (Khumalo, 2019).

Lack of user participation

This failure factor occurs when users are not involved in the design and implementation processes, which often results in low adoption rates and resistance to ICT tools. This is characterised by a lack of user participation (Abila et al., 2013; Boateng, 2012; Mamba & Isabirye, 2015; Thapa & Sæbø, 2016), limited community buy-in—thus services or tools are not fully used despite being freely available and functional (Abila et al., 2013; Boateng, 2012; Khumalo, 2019; Manara, 2015), and a lack of public interest in participation (Thapa & Sæbø, 2016).

Harmful power dynamics

This failure factor stems from power imbalances and poor governance, which make it challenging to distribute technology fairly and employ it effectively, leading to unfair access, misuse, and project failure. This is characterised by practitioners adopting a foreign development rationality not suited to the context of developing countries (Kyem, 2012), a lack of effective governance and collaboration structures (Khumalo, 2019), inefficient and wasteful spending (Ting & Yi, 2013), and abuse of power, including project champions with too much influence (Thapa & Sæbø, 2016).

Insufficient socio-cultural understanding

This failure factor refers to a lack of understanding of social structures, cultural norms, or values, which results in resistance to, or rejection of, technology (Kyem, 2012). For example, there can be insufficient understanding of local perspectives and beliefs, which includes practitioners adopting a rationality for development that is alien to African belief systems, not sufficiently understanding local perspectives, and failing to recognise the disruption of social practices and established traditions due to the introduction of new technology (Kyem, 2012). Other cultural and social considerations that are often overlooked include language barriers (Boateng, 2012; Chipidza & Leidner, 2019), cultural clashes (Chipidza & Leidner, 2019), and a lack of knowledge and skills due to factors such as race, gender, and class (Abila et al., 2013).

4. Analysis

Factors contributing to project success

The success of ICT4EcD projects depends on several potential factors that can affect project outcomes. Collaboration and partnerships among various stakeholders are a cornerstone of successful initiatives, as they maximise the expertise and resources available by pooling partner resources, ensuring stable funding, and contributing to successful projects (Abila et al., 2013; Khumalo, 2019; Nuseibeh et al., 2019). When multiple partners collaborate, a comprehensive approach can be adopted that effectively addresses social, economic, and infrastructural issues concurrently. The combined efforts of partners result in the integration of diverse perspectives and resources, enabling collective efforts to address issues.

Additional themes that influence the success of ICT4EcD projects include policy and planning, contextual understanding, capacity-building, and sustainability. Policies and proper planning ensure that projects have clear objectives and timeframes, which is crucial in keeping projects within scope and budget. Contextual understanding is important because "technologies only have a chance to be effective if they are well suited and appropriate to the needs, expectations and limitations of the environments in which they will be applied" (Reijswoud, 2009, p. 3). Capacity-building and sustainability are crucial factors for the success of ICT4EcD initiatives, as they ensure the continued success of projects and the functionality of ICTs even after the initial implementation phases have lapsed (Kuhl, 2018; Mamba & Isabirye, 2015).

Furthermore, a community-centric approach to ICT4EcD design and alignment, as well as incremental implementation, are also important themes that influence success. A community-centric approach in ICT4EcD is crucial because aligning with a community's priorities yields ICT4EcD initiatives that are relevant, effective, and inclusive. A community-centric approach is deeply connected to contextual understanding, as understanding the context in which a particular community exists, as well as the community's cultural and social aspects, is an important way to tailor solutions that resonate with their realities. A community-centric approach also relies on user participation, which is a crucial factor influencing the success of ICT4EcD projects. ICT4EcD initiatives require participation from all groups within a specific target community, allowing them to provide technological innovations that benefit all groups, are relevant to their needs, and are tailored to their contexts (Marais, 2011). Design and alignment are important as they ensure that ICT solutions are tailored to fit cultural, social, and local contexts effectively, and incremental implementation is an important factor influencing success as it allows for adaptation and learning, and for reducing risk and cost through testing and refining ICT solutions from the initial stages (Hosman & Fife, 2008).

Factors contributing to project failure

The failure of ICT4EcD projects in the Global South is attributed to a multitude of factors. The findings indicate that a lack of contextual understanding is the most prevalent theme that influences the failure of ICT4EcD projects. A lack of contextual understanding leads to solutions that fail to meet user needs, exhibit low adoption rates, and foster resistance to technology. ICTs that are mismatched with the realities of communities lead to misalignment, reduced effectiveness, and lower acceptance of technologies (Diga, 2013; Hosman & Fife, 2008).

Additional themes contributing to the failure of ICT4EcD initiatives are policy and planning deficiencies, a lack of capacity-building and sustainability, and resource and dependency challenges. Policy and planning deficiencies lead to ambiguity in project requirements, resulting in poorly formulated policies and unclear objectives. Ambiguity in project requirements stems from a lack of contextual understanding of the intricacies of the environment in which the ICT4EcD takes place. Ambiguity in project requirements can lead to poorly formulated policies due to a lack of clarity, resulting in policies that are misaligned with the goals of the development initiatives. A lack of capacity-building and sustainability measures results in projects that cannot sustain themselves in the long term, often leading to project failure (Manara, 2015; Marais, 2011). This theme is also heavily influenced by a lack of skills and training, which hinders the effective deployment of ICT solutions.

Resource and dependency challenges hinder the progress of ICT4EcD projects due to funding shortages and a lack of necessary infrastructure. For example, the Abila et al. (2013) research on fish marketing in Kenya highlighted how challenges with telecommunications networks and electricity impacted the project's implementation. This challenge can also be a result of a lack of partnerships and collaboration, which is a factor that positively impacts projects when present. Collaboration among stakeholders is essential for the successful implementation of ICT4EcD initiatives; projects that do not prioritise this tend to find that their efforts are redundant and inefficient (Abila et al., 2013).

Lack of user participation, harmful power dynamics, and insufficient socio-cultural understanding can also influence the outcome of ICT4EcD projects. A lack of user participation leads to design–reality gaps, poorly formulated policies, and unclear project objectives. When community members are not involved in ICT4EcD initiatives, a contextual understanding of the community cannot be formed, resulting in a mismatch between the technologies and the community's realities. Furthermore, harmful power dynamics lead to the disruption of collaborative efforts, which in turn impedes efficient resource allocation, ultimately resulting in project stagnation (Blake & Garzon, 2012). Another factor heavily influenced by a lack of contextual understanding is insufficient socio-cultural understanding. When cultural and social considerations are not adequately taken into account, social structures, cultural norms, and values tend to be overlooked, which can result in users' and communities' resistance to or rejection of technology (Kyem, 2012).

Interconnections between factors

The factors influencing the success and failure of ICT4EcD interconnect with and influence one another. A single factor in isolation does not determine the success or failure of an ICT4EcD initiative. Instead, factors either work together in harmony or in discord to influence the outcome. This can have a cascading effect, which is characterised by a change in one factor that has an impact on other factors. When multiple factors influencing success align positively, the likelihood of project success is amplified. For example, when a project successfully involves the community through user participation, this, in turn, fosters a better contextual understanding, which positively impacts the design and alignment of technology to the context, resulting in technological solutions that are appropriate for the context.

In contrast, a negative alignment of factors compounds the potential for project failure. For example, a lack of contextual understanding can lead to policy and planning deficiencies, which in turn can affect user participation due to technologies that are misaligned with local realities. Another example is a lack of user participation, which can result in a limited understanding of context and an impact on cultural and social considerations. This occurs when the different dynamics within communities are not taken into account, resulting in the rejection of ICTs and ultimately leading to project failure.

The above examples illustrate the interconnectedness of factors influencing success and failure in ICT4cED initiatives, as well as the existence of feedback loops whereby positive factors can reinforce other factors that contribute to success, and negative factors can perpetuate factors that contribute to failure. The analysis of these themes and the multiple complexities at play reveals the presence of a seemingly key factor underpinning the success and failure of ICT4EcD projects in the Global South: contextual understanding.

The key factor: Contextual understanding

Contextual understanding refers to an awareness of the technological, social, cultural, and economic environment in which ICT4EcD initiatives are deployed, allowing solutions to be tailored to the unique realities and challenges faced by different regions (Manara, 2015; Nuseibeh et al., 2019; Reijswoud, 2009). Figure 4 highlights the importance of contextual understanding, informed by the analysis of factors influencing success and failure. The factors presented are contextual understanding, collaboration and partnerships, community-centric approach, capacity-building and sustainability, policy and planning, incremental implementation, and design and alignment. These factors are interconnected, illustrating

how all aspects of ICT4EcD projects are interdependent and cannot be viewed as silos. This is especially evident in the revelation of multiple complexities, which reveal how factors influencing success and failure reinforce and build upon each other to positively or negatively impact the outcome of ICT4EcD initiatives. This highlights the need to consider comprehensively the factors influencing success and failure. However, particular attention should be given to contextual understanding, as reflected in Figure 4 and highlighted in pink.

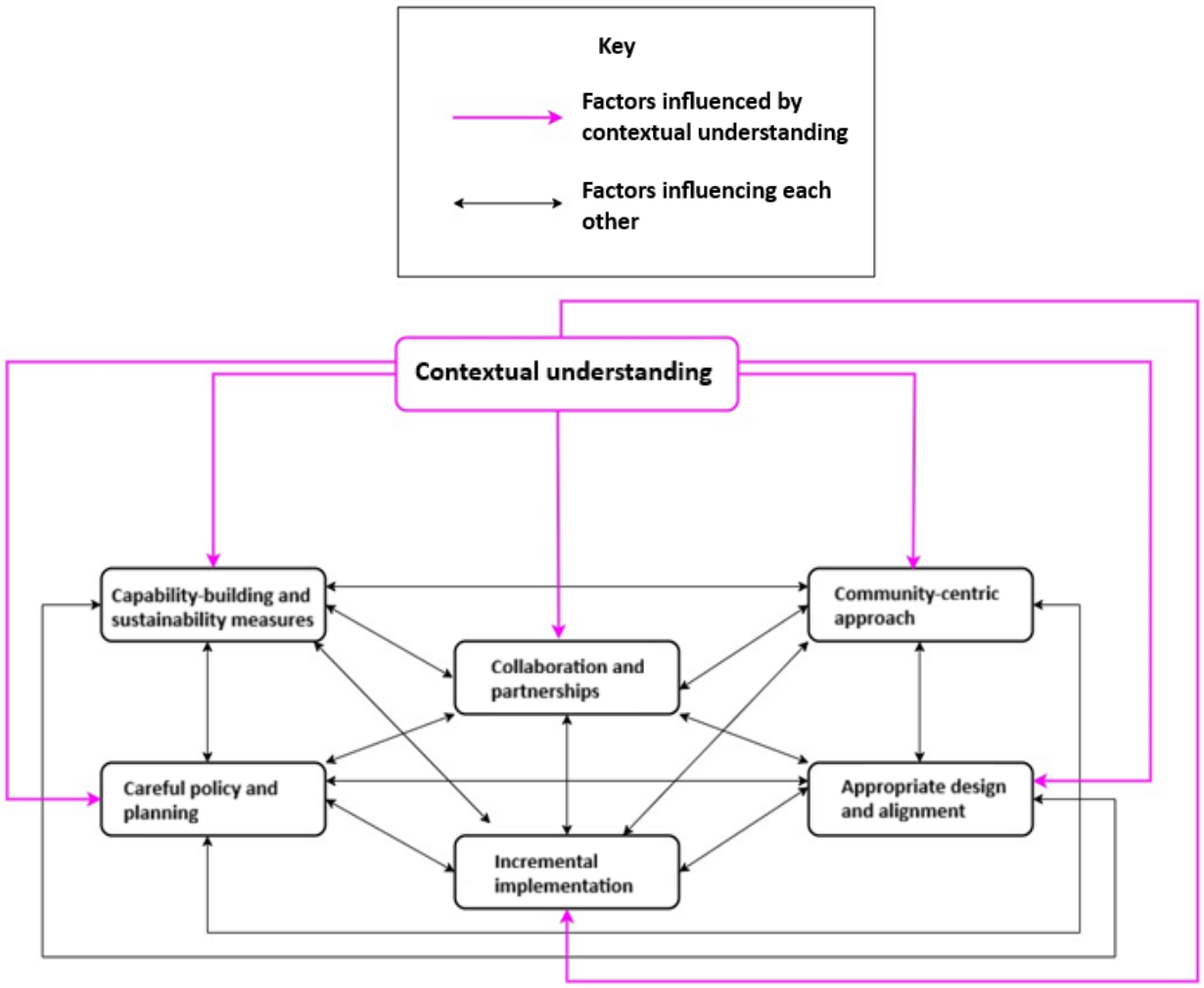
Contextual understanding emerges as the key factor that influences success and failure. The themes, shaped by an understanding of the context, exist in relationships where they both affect and are affected by one another. Not only is contextual understanding the factor that underpins the factors influencing success and failure, but it is also the factor upon which the cascading effect begins. For example, a community-centric approach revolves around meeting the needs of communities, creating designs aligned with local realities, emphasising the knowledge and insights of communities, and relating to communities as active agents of change. A community-centric approach involves acknowledging the uniqueness of each community and working within its specific context to create positive developmental change. However, without a contextual understanding, the aspects that underpin a community-centric approach cannot be achieved. When there is a lack of contextual understanding, the unique needs, values, and dynamics of communities are overlooked, leading to misguided interventions and designs that are misaligned with local realities. This also highlights the need for contextual understanding in the design of appropriate technologies that align with the needs and lived experiences of communities. Without a contextual understanding, it is impossible to determine what defines appropriate technological solutions for local realities, resulting in misaligned designs and unclear project plans and objectives.

Contextual understanding also informs capacity-building and sustainability. The skills and training that communities need, as well as the complementary technological infrastructure necessary to ensure sustainability, can only be informed through an understanding of the local context. This contextual understanding helps to identify the necessary skills, resources, suitable programmes, and support systems required to sustain ICT initiatives beyond the implementation phase. This is especially true for projects that are purposed to have economic sustainability. A contextual understanding is necessary to determine how ICTs can generate income for specific communities and to identify existing economic activities that can be enhanced by the introduction of ICTs, which in turn positively influence capacity-building and sustainability. Contextual understanding is also important when incrementally implementing ICTs, as it provides project managers with insight into which ICTs to implement during pilot phases, the specific challenges in particular contexts that could impede ICT4EcD initiatives, and how to account for them in project design.

Contextual understanding informs which partnerships are necessary for pooling expertise and helps to identify the resources required to support ICT4EcD initiatives. For example, strategic partnerships cannot be formed if ICT4EcD teams have not taken the time to understand which agencies, such as government organisations, NGOs, and private companies, exist in that context and how to approach forming partnerships with them. In addition to this, understanding a community's context helps to identify the human, financial, and infrastructural resources available to inform strategies for managing scarce resources and countermeasures for addressing problems such as inadequate funding.

Figure 4 does not explicitly depict contextual understanding as a factor that contributes solely to project success or failure. This is because contextual understanding is a multifaceted factor that can be viewed as two sides of a coin. On the one side, it is an important aspect influencing the success of ICT4EcD projects; on the other side, a lack of contextual understanding compounds the factors that contribute to the failure of ICT4EcD projects. Contextual understanding was the third-most prevalent factor, as identified in the literature, contributing to project success (Figure 2). In contrast, a lack of contextual understanding was the most prevalent factor identified in the literature as contributing to project failure (Figure 3). Based on this order of prevalence, it can be argued that while contextual understanding will not guarantee project success, the absence of such understanding will generate a strong predisposition to project failure, to some extent by compounding other negative factors.

Figure 4: Roles played by contextual understanding



5. Conclusion

The project success factors identified across the 20 studies included in this scoping review can serve as guidelines for developing best practices to be followed in future ICT4EcD projects, aiming to achieve the desired project outcomes. In addition, the factors identified as contributing to failure allow ICT4EcD project teams to learn from past mistakes and avoid unfavourable results. Of particular note is the cascading effect among the various success and failure factors in ICT4EcD projects, where different factors work simultaneously to either compound success or exacerbate failure. Therefore, multiple factors should always be taken into consideration before ICT4EcD projects begin. These complexities, along with a contextual understanding being a critical factor influencing success and failure, reveal the need for transdisciplinary approaches when designing and analysing ICT4EcD projects.

We acknowledge that the literature items included in a scoping review cannot be considered exhaustive. However, scoping reviews remain helpful in identifying relevant factors that influence research and guide future implementation (Pollock et al., 2024). This study has highlighted the finding that contextual understanding is a key factor underpinning the success or failure of ICT4EcD projects. While this may seem an obvious requirement, especially given that the importance of contextual knowledge and the match between technology and user context was highlighted as far back as 2002 by Heeks, the evidence presented in the literature examined suggests that such understanding is not always sufficiently present in ICT4EcD initiatives. The one generalisation that can safely be made about ICT4EcD initiatives is that the context of each project is unique and *matters*. Imposing solutions from the outside should be avoided; instead, learning from the wisdom and experience of the communities into which technology is being introduced is encouraged (Masiero, 2022). This is a crucial learning point for those involved in ICT4EcD project initiatives, emphasising the need for a contextual understanding to be the cornerstone upon which all future ICT4EcD (and in fact all ICT4D) projects should be built.

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Data availability statement
This research is based on a scoping review. The scoping review process is described in the article to facilitate replicability. All articles included in the review are cited in the article's References section and mapped in the Appendix.

AI declaration
Grammarly was used in the production of this article to improve both grammar and spelling.

Author contributions declaration
N.Z.: investigation, formal analysis, data curation, visualisation, writing – original draft.
I.S.: conceptualisation, project administration, supervision, writing, review and editing.

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Appendix: Mapping of the 20 literature items

No.	Country / countries Author(s) (year) Article title	Aims/purpose	Key findings relating to research questions	Keywords	Success factors	Failure factors
1	Kenya Abila et al. (2013) Using ICT for fish marketing: The EFMIS model in Kenya	The objective of this research is to explore the Enhanced Fish Market Information Service (EFMIS), a project designed "to enhance fish trade and incomes for the fisher community by improving access to market information" in Kenya's Lake Victoria. The report discusses EFMIS, an ICT pilot project "focusing on its design, achievements, impacts, and implementation challenges".	**RQ1**: The need for stakeholder participation; clear role identification and collaboration (they brought together several institutions from government, NGOs, community-based fisheries organisations and the private sector); ideal and supportive conditions such as reliable telecommunication networks, transportation facilities; additional investments such as roads and market outlets **RQ2**: Telecommunication networks and electricity not well provided; issues relating to infrastructure, connectivity, accessibility and affordability; limited capacities of the rural population; socioeconomic and cultural factors (lack of knowledge and skills due to race, gender, and class); the service not being fully used despite being available and functional; resource limitations affecting expansion plans; diverse information needs which the project could not cater for; lack of cooperation by stakeholders (fish processing and exporting industry)	EFMIS fish ICT Lake Victoria	Community-centric approach Collaboration and partnerships Capacity-building and sustainability measures	Resource and dependency challenges Lack of user participation Lack of contextual understanding

2	China Ting and Yi (2013) ICT policy for the "socialist new countryside"—A case study of rural informatisation in Guangdong, China	To provide an "in-depth examination of institutional issues in rolling out advanced information services (such as the Internet) in rural China" through a case study in Guangdong. These experiences from Guangdong help to identify several systemic issues that hinder the success and continuity of such initiatives.	**RQ1**: careful planning; stable funding support; clearly stipulated goals and schedule **RQ2**: limited funding in other areas of the province leading to projects being carried out where funding is solid—this affected accuracy of database information and crippled training programmes; "inefficient and wasteful spending resulting from interdepartmental rivalry; lack of policy continuity and institutional learning; lack of accountability and credible measurements; central planning resulting in gap between services and local needs"; no explicit funding for rural ICT (inadequate budget allocation); lack of access to computer training and skills	Rural informatisation China Universal service Digital Divide	Collaboration and partnerships Appropriate design and alignment	Policy and planning deficiencies Lack of contextual understanding Harmful power dynamics
3	Ghana Boateng (2012) The role of information and communication technologies in Ghana's rural development	To highlight the challenges hindering the realisation of ICT's role in Ghana's rural development that need to be addressed before the full potential of ICTs can be achieved. The article also provides recommendations on how the government and other development agencies can address these challenges.	**RQ2**: Unavailability of electricity; lack of ICT equipment; high level of illiteracy; lack of ICT personnel; issues with internet access; user acceptance; local content (unavailability of instructional manuals in local languages and issues translating technical terms to local languages due to the multiplicity of languages in Ghana)	ICT Rural development Ghana		Resource and dependency challenges Lack of user participation Lack of contextual understanding Lack of Capacity-building and sustainability measures Insufficient socio-cultural understanding
4	Nepal Thapa and Sæbø (2016) Participation in	To understand the processes by which Participation in Development happens and to inform how sustainable ICT4D projects can be created through the use of a "case analysis of a project in Nepal called the Nepal Wireless Networking Project" (this project enabled jobs, education and telemedicine through enrolling and mobilising participants).	**RQ2**: Paternalistic role of development professionals; over-reporting development successes due to the lack of inclusion of external stakeholders; hard-issue biases (the initiator of the project became preoccupied with infrastructural issues instead of project championing—this shines light on the absence of IT competent personnel being a significant issue); "pressures for immediate results; lack of public interest in involvement (indigenous groups had limited knowledge of the importance of ICT and were therefore less involved in the design of the ICT infrastructure)"; gate-keeping by local elites (highly respected project champions having too much influence)	participatory development (PD) actor network theory (ANT) social capital (SC) ICT4D Nepal		Lack of user participation Lack of contextual understanding Harmful power dynamics Lack of Collaboration and partnerships Lack of Capacity-building and sustainability measures

5	Literature review Chipidza and Leidner (2019) A review of the ICT-enabled development literature: Towards a power parity theory of ICT4D	To address the inconsistency in theorising how, or why, development outcomes do or do not occur following the introduction of ICT4D. This is achieved by addressing the limitations related to the meaning of development that emerge from the literature and by proposing a new theory in the context of ICT4D.	**RQ2:** Culture clashes among stakeholders (i.e. researchers, donor agencies, multinational corporations and intended beneficiaries); resource challenges (i.e. inadequate financial resources, weak infrastructure bases, weak technical skills and funds); ignoring the potential input of beneficiaries; language barriers	No keywords provided		Insufficient socio-cultural understanding Resource and dependency challenges Lack of contextual understanding Lack of Capacity-building and sustainability measures
6	Literature review Blake and Garzon (2012) Boundary objects to guide sustainable technology-supported participatory development for poverty alleviation in the context of digital divides	To address the issue of ICT benefits not reaching those who are most impoverished. This is achieved through boundary objects, which are "combined to provide a comprehensive framework for sustainable technology-supported participatory development" aimed at alleviating poverty. This framework provides a straightforward, "step-by-step approach to planning, implementing, and evaluating ICT4D projects".	**RQ1**: "reduction in information search and transaction costs; improved communication within supply chains, resulting in individual enterprise benefits and overall market efficiency" **RQ2**: multiple ontological complexities at play: human, technical, and physical elements in diverse interrelationships in social, economic, political, infrastructural, and ecological dimensions; "disconnection between academic scholarship and the needs of communities; an overly utopian and zealous belief in the role that ICTs play in development"; investigation of "ICT" in isolation from "development"; digital divides; implementation without considerations of local realities of the context; projects being unable to address different types of inequalities	No keywords provided	Careful policy and planning Collaboration and partnerships	Lack of contextual understanding Resource and dependency challenges
7	Literature review Heeks (2010) Do information and communication technologies (ICTs) contribute to development?	To map "out the intellectual roots of the emerging sub-discipline of 'development informatics'". The editorial provides a summary of good practices "drawn from experiences of success and failure", calling for practitioners and policymakers "to incorporate impact assessment as part of good practice".	**RQ1**: Design: ensuring that designs are sufficiently aligned to local realities; governance: drawing on the strengths of multiple actors; sustainability: ensuring sustainability from an economic and socio-political perspective	ICTs development informatics value chain empowerment capabilities impact assessment	Community-centric approach Contextual understanding Collaboration and partnerships Capacity-building and sustainability measures	

8	Literature review Kyem (2012) Is ICT the panacea to sub-Saharan Africa's development problems? Rethinking Africa's contentious engagement with the global information society	To discuss failures "in technological innovation" and explore ways that sub-Saharan African "countries can manage ICT deployment to stimulate sustained adoption and poverty alleviation".	**RQ1:** understanding the needs of communities; "recognition of historical conditions and rules that shape behaviour and work arrangements in particular societies"; viewing communities as active agents of change; integration of ICT into economically viable activities; gradual evolution of technological adoption to fit the needs and challenges that occurred at different stages of the development **RQ2**: Practitioners adopt a rationality for development that is alien to African belief systems, leading to a misunderstanding of local perspectives, disruption of social practices and established traditions due to the introduction of new technology, an emphasis on economic growth to the total neglect of socio-economic development, and an absence of plans to guide ICT4D adoption	cultural competency economic development ICT instrumental rationality sub-Saharan Africa technology transfer	Contextual understanding Community-centric approach Incremental implementation	Insufficient socio-cultural understanding Policy and planning deficiencies
9	South Africa Mamba and Isabirye (2015) A framework to guide development through ICTs in rural areas in South Africa	"To produce a framework to help guide the contribution of Information and Communication Technologies (ICTs) to the development of rural areas" through the use of "a case study research project evaluating two rural ICT cases to determine how the success rate of ICT4D projects can be improved".	**RQ1**: incremental implementation of ICT equipment; incremental familiarisation of community members with ICT; precise goal determination; partnerships with government; economic value; enabling environment; the use of appropriate technology; understanding user needs **RQ2**: poorly formulated policies; ambiguous requirements; techno-centric view overlooking human aspect; lack of user participation; design–reality gaps; poor project management; lack of skilled human resources; lack of sustainability measures; lack of contextual understanding	ICT4D Alice Regeneration Project Siyakhula Living Labs Project developing countries framework	Incremental implementation Careful policy and planning Collaboration and partnerships Capacity-building and sustainability measures Contextual understanding	Policy and planning deficiencies Lack of user participation Lack of contextual understanding
10	Palestine Nuseibeh et al. (2019) What can be controlled: Actionable ICT4D in the case of Palestine	To identify the factors that can motivate or inhibit ICT opportunities in a developing country from growing a sustainable economy. An ICT4D decision framework is built upon "that provides a three-dimensional view based on (1) key factors (e.g. infrastructure, policies), (2) the ICT supply chain, and (3) stakeholders (e.g. industry, government, academia)".	**RQ1**: a country's wealth; promotion of ICT investments; facilitation of foreign investment; building complementary assets such as telecommunications and education; coordination among stakeholders; bottom-up approach; a focus on factors that can be controlled; understanding of the country's context and SWOT profiles **RQ2**: lack of country-level agenda and plan; "outdated intellectual property rights protection; lack of law enforcement; lack of legislation regulating e-services and electronic commerce"	contingency theory control theory controllable and non-controllable factors decision-making developing economies global IT ICT4D Palestine	Careful policy and planning Capacity-building and sustainability measures Contextual understanding Collaboration and partnerships	Policy and planning deficiencies

11	India Hosman and Fife (2008) Improving the prospects for sustainable ICT projects in the developing world	To address the issue of sustainability through partnerships in ICT projects through the Sri-Lankan-based pilot project, and to shed light on important critical success factors that can be applied to future ICT4D projects.	**RQ1**: planning for the long-term sustainability of projects by "focusing on wants, needs and characteristics of local communities" (services that demonstrate utility in everyday life to encourage adoption); considering residents as project stakeholders ("societal norms, literacy levels, employment options, factional/religious/ ethnic sensitivities, government openness"); forming partnerships to carry out projects; using locally appropriate technology; using public–private partnerships as business ventures to give parties an incentive to be involved; "clear objectives; transparent agreements; measurable targets and timeframes"; using pilot projects to demonstrate scalability; using a bottom-up approach **RQ2**: solutions that do not meet local needs; failing to provide training opportunities; lack of partner participation (unable to share costs of investments and risk)	No keywords provided	Contextual understanding Community-centric approach Collaboration and partnerships Careful policy and planning Incremental implementation Appropriate design and alignment	Lack of contextual understanding Lack of capacity-building and sustainability measures Lack of collaboration and partnerships
12	Literature review Marais (2011) An analysis of the factors affecting the sustainability of ICT4D initiatives	To analyse trends that "show how sustainability issues have changed from requirements for external support" from government "or funding agencies, to self-sufficiency-based economic viability".	**RQ1:** focus on needs; designing appropriate technology solutions; effective partnerships; addressing issues of accessibility; "framework for continued viability beyond the initial period of funding"; initiating projects that amplify already successful development efforts; focus on the human dimension **RQ2:** failure to learn from previous initiatives; little attention on how initiatives can become self-supporting; failure to design context-appropriate technology; lack of partnerships with local organisations; failure to build relationships with local government	ICT4D sustainability human scale development development through enterprise	Collaboration and partnerships Appropriate design and alignment Capacity-building and sustainability measures Community-centric approach	Lack of contextual understanding Lack of collaboration and partnerships Policy and planning deficiencies Lack of capacity-building and sustainability measures Harmful power dynamics

13	South Africa Pade-Khene et al. (2011) Sustainable rural ICT project management for developing countries: Investigating the Dwesa and RUMEP projects	To examine "project management practice for rural ICT project sustainability with the intent of adapting the traditional project life cycle to propose a rural ICT project life cycle (RICT-PLC)" that is sensitive to the critical success factors of sustainability.	**RQ1**: simple and straightforward project objectives; holistically approaching the project; using ICT to "enhance existing rural development activities; cultivating an influential project champion; incorporating socially excluded groups; awareness of specific ICT policy influencing the project; an understanding of the local political context; participation of community target groups in the project process; focusing on local-/ demand-driven needs; building on local information and knowledge systems; appropriate training and capacity building; facilitating local content development; motivation and incentives for ICT job placement in the community; focus on economic self-sustainability; encouraged local ownership; building local partnerships; choosing appropriate technology; building on existing public facilities; ongoing monitoring and evaluation of the project"	project management rural development ICT technology sustainability	Careful policy and planning Capacity-building and sustainability measures Community-centric approach Appropriate design and alignment Contextual understanding Collaboration and partnerships	
14	Multiple case studies in Africa Reijswoud (2009) Appropriate ICT as a tool to increase the effectiveness in ICT4D: Theoretical considerations and illustrating cases	To develop a hypothesis that ICT4D projects only become successful when adapted to local conditions through an illustration using "mini-cases in the ICT for Development context in Africa". This is done to propose a "preliminary theory of Appropriate ICT along the lines of existing theories in AT and Systems development".	**RQ1**: The use of appropriate technology – "technologies have a chance to be effective if they are appropriate to the needs, expectations and limitations of the surroundings in which they will be applied"; local communities need to be addressed as the primary stakeholder; "key guiding questions for Appropriate ICT Development" need to be used **RQ2**: high dependency on developers of the solution; unavailable resources (financial and human)	ICT4D hardware design software design Africa appropriate technology	Contextual understanding Community-centric approach	Lack of contextual understanding Resource and dependency challenges Lack of capacity-building and sustainability measures
15	Literature review Heeks (2002) Information systems and developing countries: Failure, success and local improvisations	This article "presents evidence that, alongside the successes, many information systems in developing countries can be categorised as failing either totally or partially. It then develops a new model that seeks to explain the high rates of failure".	**RQ2**: failure due to a "design–actuality gap" due to a mismatch between systems and the local reality of users	developing country information system evaluation implementation failure		Lack of contextual understanding

16	Brazil Kuhl (2018) Developing and applying a smart city for development model: the case of COR in Rio de Janeiro	The main objective of this study is to find out how innovative "city initiatives should be designed in order to have a positive impact on development in developing countries, with a special focus on Latin American ones". The article "provides a framework that may support policymakers in recognising the opportunities and threats underlying extant or further smart city initiatives that aim to foster the development of the respective developing country". The article also sheds light on critical success factors that lead to the development of smart city for development (SC4D) initiatives.	**RQ1**: initiatives that are "backed by both national and local sustainability, infrastructure, human capital, services, apps, and data; bottom-up approaches; citizen participation; a fit with both the national and the local culture; Governance: stakeholder relations are in the centre of this dimension – required is collaboration, leadership, participation, public–private partnerships, communication, data-exchange, service and application integration, accountability and transparency; People and communities: the needs of individuals, groups, and communities must be met; participation, partnership, communication, education, accessibility, bridging the digital divide and focusing on the quality of life are factors to be considered; Economy: the major driver of smart city initiatives; they aim to create jobs and businesses, develop the workforce and improve productivity; Built infrastructure: the presence of a functioning ICT infrastructure includes the protection against security and privacy threats, an adaption of the IT systems to make them compatible and integrated, as well as the control of operational costs to keep them from skyrocketing; Natural environment: how natural resources are managed has a direct impact on sustainability" and liveability	ICT ICT4D smart city development capability approach	Appropriate design and alignment Careful policy and planning Contextual understanding Capacity-building and sustainability measures Collaboration and partnerships Community-centric approach	
17	South Africa Manara (2015) Factors affecting sustainability of ICT4D: A case study of mobile-cinemas in rural South Africa	"The purpose of this research was to investigate whether the provision of mobile technologies to micro-entrepreneurs can lead to the development of new business models that will support the sustainability of the businesses they develop". A research project named Mosaic 2B, referred to as "Cinema-in-a-Backpack", was used as a case study. This project aimed "to empower rural communities in South Africa through mobile technologies that enhance the socio-economic livelihoods of micro-entrepreneurs".	**RQ1**: contextual understanding of environment for feasibility and available infrastructure ("core requirements: connectivity, low-cost devices" that were funded so that micro entrepreneurs "did not incur any costs when sourcing equipment", user interfaces, electricity; technological sustainability (durable equipment, portable, flexible, easy to maintain); institutional sustainability (the buy-in of key actors that play a pivotal role in the implementation of the project and ensuring livelihoods "can be continuously improved through capacity building") **RQ2**: social sustainability (lack of long-term community buy-in); "economic sustainability, referring to the capacity of the project to generate enough revenue to meet its maintenance and operational costs" (income sufficiency levels were low); unavailability of technical support	No keywords provided	Contextual understanding Appropriate design and alignment Collaboration and partnerships	Lack of capacity-building and sustainability measures Lack of user participation

18	Literature review Khumalo (2019) Mapping the landscape of sustainability in ICT4D: A systematic literature review	The purpose of this study is to identify and understand the aspects that can enable or hinder sustainability in ICT4D within the context of developing communities. The research proposes a framework that illustrates the "critical elements that require consideration in ICT4D implementations, as a means to enable the realisation of sustained socio-economic benefit for local livelihoods".	**RQ1**: understanding and managing "all stakeholder motivations, expectations and relationships; formulating, communicating, and agreeing to stakeholder roles and responsibility to ensure accountability; local community buy in; demand-driven ICT4D that reflects the needs of the subject community; local people inclusion; local social and economic benefit realisation; ICT4D impact monitoring and evaluation; ability for ICT4D to adapt to evolving people needs; need for financial self-sustainability; local capacity building"; clearly defined and "communicated ICT4D policy and strategy"; promotion of "local ICT4D ownership; committed and knowledgeable leadership; environmentally friendly ICT4D; increased social network and inclusion of socially excluded groups" **RQ2:** "lack of intended social, economic, and environmental development and benefit realisation; inadequate or lack of structure; inability of ICT4D to be financially sustainable; lack of consensus between stakeholders in relation to their roles and responsibilities; inadequate required skills and support; poor design and implementation of policy strategy; poor ICT4D management controls; lack of committed knowledgeable leadership; lack of community involvement and user buy in"	No keywords provided	Community-centric approach Collaboration and partnerships Appropriate design and alignment Careful policy and planning Contextual understanding Capacity-building and sustainability measures	Lack of user participation Policy and planning deficiencies Resource and dependency challenges Insufficient socio-cultural understanding Lack of collaboration and partnerships Harmful power dynamics