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Harvesting Digital Service Results

A Systematic Cross-Case Analysis

Central Contracting Evaluation – Main Report

Conducted by the GIZ Evaluation Unit and external evaluators commissioned by GIZ

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Evaluation report

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Executive summary

Review object and objectives

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is investing considerable resources in furthering digital transformation. This includes the development and application of digital technologies in service delivery and promoting further digital transformation by, *inter alia*, enhancing digital ecosystems, supporting regulatory frameworks, and digital policies, promoting the development of digital skills and digital capacities at individual and organisational levels, and supporting the advancement of digital public goods across domains and sectors, in close cooperation with partners across the globe. GIZ's commitment to digital transformation is also reflected in the premise of the Digital by Default (DbD) approach, according to which digital components should be supported whenever appropriate.

GIZ's global portfolio currently encompasses more than 500 active projects with digital service elements – and the number is rapidly increasing. In a context where the use of digital technologies is becoming ever more widespread and common in development work, there are many questions to be answered if development work and project implementation are to be successful. These questions include:

- How (widely) are the Principles for Digital Development embedded and applied in current practices?
- In what ways and to what extent do digital interventions contribute to the outputs and outcomes of development projects?
- What unintended consequences are commonly associated with the implementation of digital interventions?
- What factors are important to facilitate the use of digital technologies and what are the critical barriers that need to be overcome from the perspective of practitioners in the field?

The evaluation project Harvesting Digital Service Results (HDSR) was launched in 2019 to support GIZ's roadmap process for digital change. It comprises four components, one of which is a cross-case analysis of projects involving digital interventions in 11 countries and one region. This report presents the findings derived from that cross-case analysis, the aim of which was to generate systematic data and conduct empirical analysis of the use of digital interventions across a wide spectrum of services implemented by GIZ. It offers a systematic and aggregate perspective on a set of predefined results (output, outcome and impact), as well as selected helping and hindering factors. By highlighting and discussing the (potential) effects of digital interventions, as well as relevant factors that influence the successful implementation of digital projects, this report directly contributes to:

- GIZ's ability to document, monitor and communicate its achievements in digital service delivery, and
- continuous improvement of the DbD approach and the effective rollout of digital interventions in the future.

Review questions

To achieve the stated aim of generating systematic data on and empirically analysing the use of digital interventions in services implemented by GIZ, five research questions were formulated:

- To what extent did the digital interventions adhere to digital principles?
- To what extent did the digital interventions contribute to the development outputs and outcomes targeted by different projects? What important helping and/or hindering factors can be identified regarding the effective implementation of the digital interventions?

- To what extent did the digital interventions contribute to wider digital transformation?
- To what extent did the digital interventions trigger any unexpected negative consequences?
- How can the Digital by Default (DbD) approach and the effective rollout of digital interventions be further improved?

Design and methods

The cross-case analysis component of the HDSR project used a comparative research design. Digital projects operating in 11 countries plus the states of the Central American Integration System (SICA) were selected for analysis, representing a diversity of country contexts, policy sectors and types of digital interventions. This evaluation further applied a multi-method design, which combined various techniques of data collection, such as a standardised online survey, structured focus group discussions and different modes of data analysis, i.e. quantitative descriptive analysis, content analysis, Qualitative Comparative Analysis.

Findings

To what extent did the digital interventions adhere to digital principles?

All in all, it is apparent that use of the Principles for Digital Development is, on average, well established in the everyday practice of GIZ. However, there is still considerable room for improvement regarding both digital principles, such as using open standards, open data, open frameworks, etc. and single aspects belonging to these principles, such as considering the needs of marginalised groups (design with the user). During the focus groups, only three out of nine discussions explicitly mentioned the Principles for Digital Development as a useful framework for mitigating potential challenges and/or negative (unintended) consequences. Whether or not this indicates a general lack of awareness remains unclear, but pushing for greater awareness of the Principles for Digital Development framework seems to be warranted.

To what extent did the digital interventions contribute to the development outputs and outcomes targeted by different projects?

The data from the survey and focus group discussions indicate strong agreement concerning the contribution of digital interventions to improving information, raising digital awareness and digital capacity, as well as efficiency and effectiveness. In both the focus groups and the survey, these four outputs and outcomes were consistently among the top five results mentioned in terms of how digital interventions can make major contributions. The data collected show that the contribution of digital interventions was rated mainly positively with regard to the informational and procedural components of service delivery. Evidence from the survey and the focus groups also matches with regard to facilitating accountability and improvements in services – which were ranked in the middle – and with regard to the contribution of digital interventions to furthering participation, inclusion and sustainability, which was ranked at the bottom end. The contribution of digital interventions to innovation, transferability and scalability also ranked at the lower end. This ranking was standard across different contexts and supported by evidence from the survey and the focus groups. The evaluation was ambiguous regarding the improvement in exchange, coordination and cooperation between relevant stakeholders, and whether or not digital interventions and their benefits can be sustained over time.

What important helping and/or hindering factors can be identified regarding the effective implementation of digital interventions?

The analyses show that digital capacity development plays a crucial role in effective digital interventions. This primarily pertains to developing and facilitating digital skills among stakeholders and supporting a sufficient digital infrastructure, but also to enabling access to digital technologies.

Depending on the results to be achieved, however, proper digital capacities might not be enough, but they represent the necessary prerequisites to adopt digital interventions. In addition, users need to be included, at various stages, in the design process of the digital intervention, i.e. following the digital principle ‘Design with the user’.

In general, the analyses demonstrate that conscientious implementation of the individual digital principles or adhering to them overall leads to the desired results, even in settings where other contextual conditions may be disadvantageous.

Moreover, it turns out that ownership of and commitment to digitalisation processes by partners are other important factors that affect the contribution of digital interventions to various development results. This reflects statements from the focus group discussions, which stressed the relevance of partners' support for the digital intervention and the importance of embedding digital interventions in a broader digitalisation framework.

To what extent did the digital interventions trigger any unexpected negative consequences?

For most digital interventions, no unintended negative consequences, or only very minor ones, were reported. Just a few problems were mentioned during the focus group discussions. Whether this means that everything always went to plan or it signals a lack of engagement with the potential negative consequences remains open at this point.

Certainly, a lack of awareness cannot be dismissed out of hand, in light of the fact that digital principles concerning the conduct of strategic foresight analysis and technology assessment to identify benefits and risks before the implementation of a digital intervention were among the less frequently followed ones.

The analysis of contexts that might be conducive to triggering unintended negative consequences shows that while they do not have to occur in non-positive contexts, they are much more likely to than in positive contexts, indicating a vicious circle whereby negative starting conditions may lead to a worsening of the situation as a result of digital interventions.

To what extent did the digital interventions contribute to wider digital transformation?

Respondents felt the largest contribution was in encouraging relevant stakeholders to be more open to applying digital solutions in the future. However, it became apparent that the ratio of positive evaluations in the survey decreased the more transformative the change that was targeted.

During the focus group discussions, it was frequently mentioned that it is not enough simply to convert analogue processes into digital ones but that a broader digitalisation strategy is needed in which the digital interventions are firmly embedded.

The analysis of contextual factors that are conducive to positive contributions to wider digital transformation shows a weak positive correlation between the individual, organisational and socio-political contexts and strengthened digital capacities to cope with growing technical requirements, as well as triggering a further process of digitalisation among stakeholders. Hence, the data suggest that the better (or worse) the context is rated, the larger (or smaller) the contribution to strengthening the digital capacities of partners and facilitating further digital processes.

How can the Digital by Default approach and the effective rollout of digital interventions be further improved in the future?

In general, the Digital by Default (DbD) approach was perceived as a necessity for development work in the digital age that cannot and should not be avoided. Yet, it was also stressed that digitalisation is and should not be an end in itself but a means to achieve defined objectives. DbD should therefore always be human-centred. Projects implementing digital interventions must always ask *'how services provided by people can be enhanced, instead of solely focusing on replacing people'* (anonymised participant).

To achieve this, more awareness of DbD within GIZ is needed, as are structural changes that would help facilitate and implement the DbD approach in a more effective manner. A major criticism here was that project cycles are far too short and too linear, and therefore not suitable for digital projects, which need more time and room for learning, going back and forth between different options, and making necessary adaptations. Further, the requirement to have more expertise and personnel who can handle specific topics related to digitalisation has been highlighted. It was noted, for instance, that certain topics require more diverse but also more specialised skills from the personnel involved.

In addition, participants in the focus group discussions explicitly called for more knowledge-sharing and knowledge management within GIZ regarding how best to implement the DbD approach. This included, *inter alia*, sharing best-practice examples and lessons learned or providing more

guidance when dealing with questions related to data protection or open data and open software.

Finally, there was a general call for investing more time, resources and capacities in assessing digital interventions for their usefulness, adequate areas of use, effects, consequences, etc.

Conclusions

Digital capacities are one of the key issues when implementing digital interventions. First and foremost, this pertains to ensuring high levels of digital literacy and skills, the availability of digital infrastructure and/or adequate access to digital technologies among stakeholder groups.

In addition, users need to be included, at various stages, in the design process of the digital intervention, i.e. following the digital principle 'Design with the user'.

The analyses have also shown that creating ownership and ensuring high levels of commitment to digitalisation processes by partners are other important factors that affect the contribution of digital interventions to various development results. Ownership and a sense of shared responsibility, as well as transferring knowledge to and including multipliers from partner countries' societies, are also connected to the aforementioned aspect that stakeholders should be included at various stages of the digital intervention. However, this also requires thinking about how the durability of digital interventions can be guaranteed right from the start.

The reported findings furthermore suggest that there is a systematic blind spot when it comes to unintended negative consequences. Only a few digital interventions reported negative effects and, often, connections between challenges and unwarranted negative effects were not drawn. Formulating a digital principle that explicitly addresses this problem and raises awareness among GIZ staff of negative consequences associated with digital intervention would be a fruitful option for addressing this blind spot.

While many digital interventions did not trigger any negative consequences, several caused one, two or even multiple negative consequences. Here, further analyses seem to indicate a vicious circle whereby negative starting conditions may lead to a worsening of the situation as a result of digital interventions – another fact that underscores the critical issue of digital capacity-building at the individual, organisational and socio-political levels.

Beyond the necessity for digital capacity-building, the analyses have shown that conscientious implementation of individual digital principles or adhering to them overall leads to the desired results, even in settings where other contextual conditions may be disadvantageous. Creating a stronger awareness of the Principles for Digital Development might be an effective strategy, therefore.

While GIZ is already operating from a solid basis, future efforts should concentrate on providing more guidance on how to translate abstract principles into everyday practice and on offering more opportunities for sharing knowledge and best-practice experiences regarding how to embed digital principles when planning, designing and implementing digital interventions.

This will require investing more time, resources and capacities in assessing the impact of digital interventions. Also, structural changes might be required to facilitate and implement the DbD approach in a more effective manner. This includes, *inter alia*, sharing best-practice examples and lessons learned or providing more guidance and support with regard to dealing with questions related to data protection or open data and open software. Moreover, more flexibility regarding contracting was mentioned, as was the requirement to have more expertise and personnel with regard to specific digital topics.

It is crucial to follow a human-centred approach. When planning and implementing digital interventions, questions that should to be addressed include, *inter alia*, whether and how the respective digital services lead to actual advances or how features of a digital intervention need to be designed to ensure trustworthiness, reliability and usability among stakeholders. This is crucial, since positive experiences among users and a willingness or openness to adopt digital tools are relevant factors that support the practical benefit of digital interventions across selected aspects of development work.

A human-centred approach, however, also means asking how analogue and digital approaches can be combined in smart ways to create synergies; when

analogue processes and human interactions might be better suited to achieving certain goals; or in which settings human components are required and cannot or should not be digitalised.

1 Introduction: Review object and objectives

1.1 GIZ's development work in the digital era

Successful development cooperation has a decisive impact on the future lives of millions of people. The digital transformation is shaping this future as it leads to profound changes in economic, social and governmental aspects worldwide. The ongoing and rapidly accelerating digitalisation not only has profound effects on how individuals communicate, learn, age, work or spend their leisure time, it also impacts the environment and has consequences on the societal level, as is becoming increasingly apparent from the disruption caused by manipulation and misinformation across social media or the growing monopolisation of digital resources. As a result, digital technologies penetrate almost all areas of life – including GIZ's development work – and this trend is steadily increasing.

In its *Digital Change Vision* (GIZ, 2016), GIZ recognised this trend and the importance of technology use back in 2015 and set a course for the future. According to its guiding framework for digital change, 'GIZ aims to make "active use of the opportunities presented by new technologies and digital innovations throughout all business units, adopting a user-centred approach"' (GIZ, 2016). To this end, GIZ has invested considerable resources in furthering digital transformation. This includes both the implementation of digital technologies in service delivery and promoting further digital transformation by, *inter alia*, enhancing digital ecosystems, supporting regulatory frameworks and digital policies, promoting the development of digital skills and digital capacities at individual and organisational levels or supporting the advancement of digital public goods across domains and sectors, in close cooperation with partners across the globe. GIZ's commitment to digital transformation is also reflected in the premise of the Digital by Default (DbD) approach, according to which digital components should be supported whenever appropriate (see also the box entitled 'Going digital: some definitions' at the end of this section).

The potentials for digital transformation are also potentials for development work, therefore. GIZ's global portfolio currently encompasses more than 500 active projects with digital service elements, and the number is rapidly increasing. However, development results of digital services are not usually specifically attributed to the selected digital interventions; rather, they are defined by the thematic focus of the project in which the digital intervention is applied. Consequently, results of digital services are most commonly reflected in the value that digital interventions add to development results and are not captured as results in their own right as part of regular project monitoring. A similar situation applies to the monitoring of the 'Principles for Digital Development' and adherence to them in the planning, design and implementation of digital interventions. Although GIZ's portfolio queries on the topic of digitization in German Development Cooperation include a self-assessment component to evaluate whether digital projects adhere to the Principles for Digital Development (https://digitalprinciples.org; Waugaman, 2016), the nine principles are not further operationalised[1], so the self-reported data are not very reliable. In a context where the use of digital technologies is becoming ever more widespread and common in development work, there are many questions to be answered if development work and project implementation are to be successful – for instance:

- there is no reliable information about how the Principles for Digital Development are applied,
- there is not much systematic information either, regarding how digital interventions contribute to outputs and outcomes of projects,

[1] A lack of operationalization means that abstract principles are usually not translated into measurable indicators which can be used for further evaluation.

- if results of digital interventions are examined, unintended consequences – whether positive or negative – are usually not evaluated systematically, and
- there is a lack of systematic evidence regarding what factors are important for facilitating the successful use of digital tools and what the critical barriers are that need to be overcome from the perspective of practitioners in the field.

Against this backdrop, it is the explicit goal of the Harvesting Digital Service Results (HDSR) project to record the lessons learned concerning GIZ's digital services by assessing the benefits of digital interventions for sustainable development.

In this report, we present the findings derived from the systematic cross-case analysis component of the HDSR project, which aimed to generate systematic data and empirical analysis of the use of digital interventions across a wide spectrum of services provided by and contexts operated in by GIZ. The report provides an aggregate perspective of not only a set of predefined results at different analytical levels (output, outcome and impact) but also selected factors that are deemed to affect the successful implementation of digital interventions and their effects on digital service delivery. In addition, information across different sectors, country contexts and types of digital interventions, among others, is presented.

This report's focus, therefore, is not on examining a single or just a few digital projects within a closely defined context, but rather on finding systematic patterns across a heterogenous sample of digital interventions that reflect the broad portfolio of GIZ's development work. By highlighting and discussing the (potential) effects of digital interventions, as well as relevant factors that influence the successful implementation of digital projects, this report directly contributes to

- GIZ's ability to document, monitor and communicate its achievements in digital service delivery, and
- continuous improvement of the DbD approach and effective rollout of digital interventions in the future.

1.2 Analytical goals of this evaluation

Previous work conducted within the HDSR project demonstrated that when it comes to the evaluation of digital interventions, efforts so far have focused almost exclusively on **generating evidence for the feasibility and the use of digital interventions for service delivery and less on the direct effects and specific added value digital interventions (might) have**. At the same time, an **increasing demand for evidence of positive and negative effects of digital interventions was identified**. In cases where such evaluations were conducted, the focus was clearly on sector-specific projects and/or selected types of interventions. Consequently, it was deemed vital to support and steer the process of implementing digital interventions and enhancing wider digital transformation through more systematic collection of data and analysis covering a larger sample of digital interventions and development projects.

To this end, the HDSR project was launched in 2019 as part of GIZ's roadmap process for digital change.

The HDSR project encompassed the following four stages:

- Stage 1 involved an initial evaluability assessment to identify relevant needs and goals for the overall project. In addition, a preliminary theory of change (ToC) was formulated.
- Stage 2 focused on a series of six rapid trials to obtain empirical insight into and impressions of how digital interventions contribute to development results, as well as to assess the added value of using digital interventions in service delivery.
- Stage 3 consisted of an evaluation synthesis of ten central project evaluations to broadly review whether the use of digital interventions improved GIZ's service provision and to gain insight into how digital interventions can best contribute to development results based on the experiences of the sample projects.

- Stage 4 consisted of two components: the first included three outcome-harvesting case studies conducted by the Corporate Unit Evaluation in order to gain further insight into potential results as well as unintended positive and negative consequences triggered by digital interventions. These insights then informed the second component, which consisted of a cross-case analysis of a broad sample of digital interventions covering the breadth of digital-service provision within GIZ's portfolio.

This report presents the findings from the second component of stage 4. The evaluation was conducted by GIZ's Corporate Unit Evaluation together with a team of external consultants from the Munich School of Politics and Public Policy at the Technical University of Munich (TUM). GIZ's sectoral department (FMB), together with GIZ projects, are the primary users of the evaluation results.

Table 1: Research questions addressed in this systematic cross-case analysis (stage 4) of the HDSR project

Research question 1	To what extent did the digital interventions adhere to digital principles?
Research question 2	To what extent did the digital interventions contribute to the development outputs and outcomes targeted by different projects? What important helping and/or hindering factors can be identified regarding the effective implementation of digital interventions?
Research question 3	To what extent did the digital interventions contribute to wider digital transformation?
Research question 4	To what extent did the digital interventions trigger any unexpected negative consequences?
Research question 5	How can the Digital by Default (DbD) approach and the effective rollout of digital interventions be further improved in the future?

The main goal of the HDSR project was to assess the added value of digital interventions for sustainable development. This broad objective was translated into a set of research questions that were directly derived from the information and evidence gaps identified in section 1.1. Table 1 presents the research questions that were addressed. The report sheds light, first, on the extent to which principles for digital development were considered during planning and implementation of digital interventions across different development projects (RQ1). Second, it offers an initial systematic picture of the (perceived) effects of digital interventions and how they contribute to the outputs and outcomes of GIZ's development work. In addition, factors that might help and/or hinder the effective contribution of digital interventions are identified and discussed (RQ2). Third, it also touches on the question of how far the digital interventions implemented contributed to wider digital transformation in partner organisations, a particular sector and/or society at large in the partner country in question (RQ3). Fourth, the report presents some initial insight into unintended consequences linked to the implementation of the digital intervention (RQ4). The fifth question addresses the perception of the DbD approach among GIZ employees, its added benefits and the basic requirements for its effective implementation (RQ5).

Going digital: some definitions

- **Digital transformation** in the context of international cooperation is understood by GIZ as the 'the targeted management' of the profound and potentially disruptive economic and societal transformation stemming from the accelerating digitalisation of almost all aspects of life and the 'harnessing of digital technology with the aim of making societies more sustainable and, hence, fit for the future. […] It is an ongoing change process resulting from the interaction between economic, political and civil society decisions and digital progress.' (GIZ, n.d.: 5).
- **Digitalisation**, on the other hand, is defined by GIZ as the conversion of analogue value creation and interactions into digital formats through the 'development and application of digital and digitalised technologies [...] that dovetail with and augment all other civilisational technologies and methods'. (German Advisory Council on Global Change, 2019, cited in GIZ, n.d.: 5).
- **Digital interventions** (or **digital solutions**, as a synonymous term) include i) technical applications or apps, ii) a broader set of digital techniques such as social media or e-learning tools, and iii) delivering digital policy advice and building the digital capacity of partners. Digital interventions therefore include measures that represent individual digital solutions or aim to facilitate further digital transformation (GIZ, n.d.).
- **Digital projects**, on the other hand, refer to the larger project context within which digital transformation can be the primary or secondary objective. They include i) independent projects focused on furthering digital transformation within a country and/or sector through governance reforms, capacity-building, etc. and ii) digital components of development projects that use digital technologies to achieve project goals within a country and/or sector (GIZ, n.d.: 12).
- The **Principles for Digital Development** – the term **digital principles** is used synonymously in this report – offer a heuristic framework for designing, implementing and evaluating digital projects in development cooperation. They consist of nine guidelines for developing impact-oriented, user-centred, efficient and responsible digital solutions: i) design with the user, ii) understand the ecosystem, iii) design for scale, iv) build for sustainability, v) be data-driven, vi) use open standards, open source, open data and open innovation, vii) reuse and improve, viii) address privacy and security, and ix) be collaborative. Instead of a set of fixed indicators, they can be understood as 'living guidelines that are designed to help integrate best practices into technology-enabled programs and are intended to be updated and refined over time' (https://digitalprinciples.org). They are the result of a community effort to develop recommendations for the responsible handling of technology. GIZ ratified the digital principles in 2018.
- The **Digital by Default** (DbD) approach refers to a general push towards using the abundant potential of digital technologies and furthering digital transformation in current and future GIZ projects. The approach shifts the burden of proof, in the sense that the use of digital tools becomes the standard and not the exception. Projects that do not include any digital intervention have to justify why not at the planning stage. This shift in the burden of proof aims to be a significant driver for promoting digital services. The focus, however, should always be on practical benefits by concentrating on how digital interventions can contribute to making a project, *inter alia*, more effective, more efficient or more innovative.

2 Conditions for and effects of digital interventions

2.1 Status quo

Previous HDSR reports have identified an apparent **conceptual ambiguity** regarding the impact assessment of digital interventions within the international development sector. Examining frameworks, guidelines and websites of 25 bi- and multilateral development agencies, the HDSR literature review *Measuring Results of Digital Interventions for Development Cooperation*, for instance, stated that there is an emerging consensus on what conditions and effects are most important to be evaluated when assessing the contributions of digital interventions for developmental work. However, it became apparent that the concepts used to capture essential outputs, outcomes or impacts related to digital interventions are often ambiguously defined, not well differentiated from each other, and their interrelationships are not systematically spelled out. This problem pertains not only to different reports from different agencies but even to publications from within the same agency, which can often be inconsistent and incoherent when it comes to the conceptualisation of the core aspects and effects of digital interventions.

Conceptual clarity is an essential precondition for measurement, since one has to know what to measure in order to derive valid indicators and start to quantify. It is not surprising, therefore, that the HDSR literature review, as well as further analysis, found that a clear basis of measures and indicators, which would allow a systematic, reliable and measurable quantification of the added benefits of digital interventions, is largely lacking.[2] In short, there is an enormous **measurement gap**, since comparable data are rarely available to assess the effects of digital interventions on sustainable development. Moreover, it was stated that evaluation frameworks tend to focus only on the positive benefits of digital services but miss potential negative consequences of digitalisation and digital transformation. If there is evidence of the contribution of digital interventions in development work, it is usually based on ex-post feedback collected via interviews from a single project or small sample of projects. At the start of this cross-case component of the HDSR project, no evaluation using a systematic framework on a larger scale had been identified.

2.2 Theory of change

The empirical analysis in this study builds on the **theory of change** (ToC) initially developed by the GIZ Corporate Unit Evaluation at stage 1 of the HDSR project (see Harvesting Digital Service Results, 2020, Harvesting Digital Service Results, n.d., for more details). The ToC was purposely designed as a work in progress, which explicitly called for making further adjustments, modifications and improvements over the course of the evaluation. The HDSR literature review corroborated, however, that the initial ToC already covered a significant number of contextual factors, results and consequences that were also considered most relevant across a set of development agencies. The ToC covers four analytical levels: input, output, outcome and impact. In addition, contextual factors are highlighted that might have an influence on the successful implementation of digital interventions and their contributions to development work. Finally, it also outlines areas where the implementation of digital interventions might lead to unintended negative consequences for stakeholders, beneficiaries, users and/or the wider public and ecosystem.

2 Whether such a quantification is possible or even desirable, given the complexity of potential determinants on and effects of further digitalisation, is a different question, which should be further explored in the future when developing appropriate evaluation frameworks.

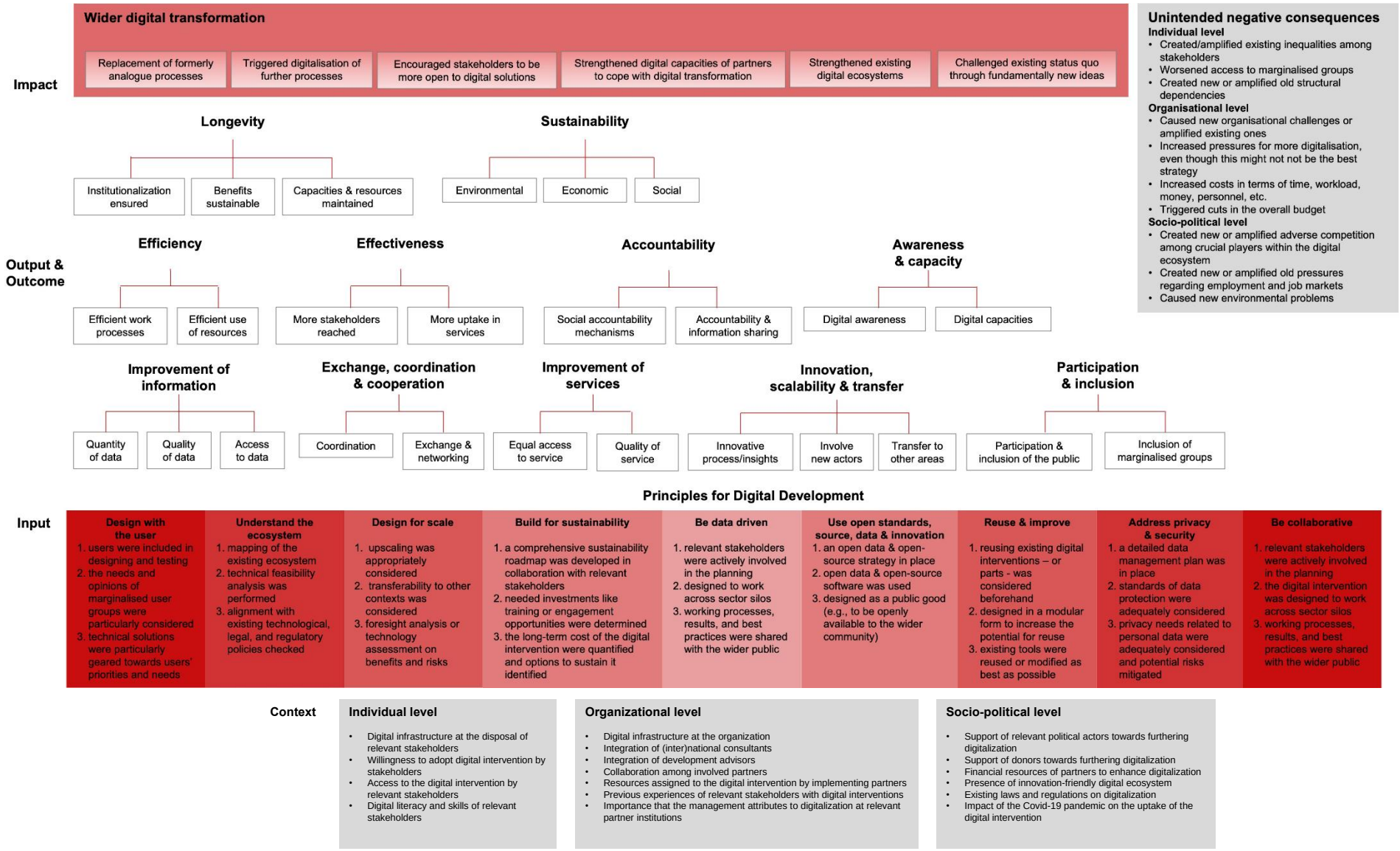

Figure 1: Conceptualisation and operationalisation of the theory of change for this analysis

Using the ToC as a starting point, the first step of this HDSR systematic cross-case analysis involved the **identification and operationalisation of the key concepts** and **their translation into measurable attributes and indicators**. This involved all layers of the ToC. See Annex A1 for the full questionnaire used for data collection.

Input level: Principles for Digital Development. The Principles for Digital Development (https://digitalprinciples.org; Waugaman, 2016) are a framework to support the planning, design and implementation of digital interventions in development cooperation. In total, the framework includes nine sets of broad guidelines and recommendations. While the digital principles offer a good frame of orientation and practical guidelines, they lack practicality, distinctiveness and conceptual clarity, as several categories overlap and are not clearly differentiated from each other. A proper operationalisation, i.e. translation into measurable indicators, of the digital principles was therefore needed.

To this end, for each Principle for Digital Development three sub-principles were formulated. Drawing on the original framework of nine principles, the selection of sub-principles was guided by three main rationales: first, sub-principles should capture the essence of the relevant digital principle at the upper conceptual level; second, they should be distinct in order to ensure clear differentiation from neighbouring digital principles; and third, they should capture different analytical dimensions of the relevant digital principle. Figure 1 lists the nine Principles for Digital Development together with the three sub-principles we used to define each principle. For each sub-principle, a respective question was formulated, and participants had to indicate whether they had taken the respective sub-principle into account or not. For each Principle for Digital Development an aggregate value was calculated, where a score of 3 indicates that all sub-principles were considered, while a score of 0 means none of the sub-principles was applied. In addition, an overall aggregate score across all sub-principles was calculated based on empirical distribution, i.e. the mean and the first and third quartile.[3]

Output and outcome levels: assessing the contribution of digital interventions. The initial ToC included between 11 and 15 different outputs and outcomes to which digital interventions were expected to contribute. Since the classification of results according to different levels, i.e. output and outcome, remains analytically ambivalent (see Harvesting Digital Service Results, n.d.), it was decided to not differentiate between the two levels. Similarly, specific hypothesised pathways on how to reach such outputs and outcomes are less pronounced and largely unelaborated.

In total, 11 contributions to outputs and outcomes by digital interventions were examined. Each result was operationalised via two or three sub-components. This is displayed in Figure 1 through the links between the upper and the lower conceptual levels. Following best practices from literature on concept formation (Goertz, 2020; Özvatan & Siewert, 2020), each sub-component captures a distinct analytical aspect and overlap between neighbouring concepts, whereby different analytical concepts at the upper level share the same sub-component at the lower level, was avoided. In the survey, each sub-component was captured by a single question; respondents had to rate the contribution of the digital intervention to the respective output or outcome on a six-point scale, which was later converted to a four-point scale by combining the first three lowest answer categories.[4] For the further analysis, the sub-components were aggregated using the so-called 'weakest-link rule' (Goertz, 2020; Özvatan & Siewert 2020). This means that the aggregate score always reflects the sub-component that received the lowest rating. In this way, the highest rating, according to which the digital intervention contributed to a very large extent to the respective output or outcome, can only be achieved if this high score is given across all sub-components.[5]

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[3] The mean number of sub-principles used in the sample was 18. If the use of digital principles fell into the first quartile (below 15), it was coded 0, whereas a score of 1 was assigned to cases in the third quartile (above 21). Cases between 15 and 17 were coded 0.33 and cases between 18 and 21, 0.66.

[4] As an example: to capture whether a digital intervention contributed to better data quality, we asked whether it 'improved the quality of data or information available to relevant stakeholders'. The answer options were 'to no extent at all', 'to a very small extent', 'to a small extent', 'to a moderate extent', 'to a large extent' or 'to a very large extent'. See Annex A1 for the full questionnaire.

[5] This is based on the rationale that a high score on one sub-component cannot make up for a low score on a different sub-component. For example, to contribute to the improvement of information, it is not enough to have a high score on data quantity and access to data if the contribution to data quality is rated poor.

Impact level: contribution of digital interventions to wider digital transformation. If structural change is supported in a systemic and holistic manner, digital projects ideally also contribute to the broader digital transformation of the societies in which they are embedded. In order to assess these potential contributions, the transformative effects of digital interventions were assessed according to six dimensions as indicated at the top of Figure 1. Each dimension aims to capture a different aspect of digital transformation, i.e. 'replacing formerly analogue processes', 'triggering the digitalisation of further processes', etc. In the survey, each dimension was captured by a respective question, with respondents being asked to rate the contributions of their digital interventions on the same six-point scale as for the outputs and outcomes. For the analysis, the six-point scale was later converted to a four-point scale by combining the first three lowest answer categories.[6]

Unintended negative consequences of digital interventions. Previous HDSR reports stressed that existing evaluations of the use of digital technologies in development work are somewhat biased towards the positive effects. While a focus on the benefits and added value of digital interventions is understandable, it is also important to look out for (unintended) negative consequences that might be directly or indirectly triggered by the rapidly increasing use of digital interventions. Against this backdrop, the initial ToC already highlighted a series of potentially damaging and harmful consequences at the individual and societal levels. For this HDSR component, 11 aspects were formulated based on the existing literature, with the aim of capturing a broad range of negative consequences for stakeholders, organisations and the wider societal, economic and political ecosystem. These consequences are displayed on the right-hand side of Figure 1. Each aspect was again captured via a single question asking respondents to indicate the extent to which the respective digital intervention had a negative effect. As in the case of the outputs, outcomes and impacts, the initial six-point scale used in the survey was converted for the analysis to a four-point scale by combining the first three answer categories, which indicated no or only minor adverse effects.

Context: digital readiness at the individual, organisational and socio-political levels. Whether digital interventions show positive or negative effects may also depend on the respective contexts in which they are embedded. To structure the selection of potential contextual conditions that might affect the extent to which digital interventions contribute to development results, this analysis again differentiated between the individual, organisational and socio-political levels in partner countries. Based on insight gained from the previous stages of the HDSR project, a set of contextual conditions considered to be the most relevant was selected for each analytical level. These are displayed at the bottom of Figure 1. In the survey, respondents had to indicate how they assessed the respective contextual conditions on a six-point scale ranging from 'negative' to 'positive'; again, this was converted to a four-point scale by combining the three negative-answer categories. For the further analysis, single factors were also aggregated into higher-order concepts reflecting the overall assessment of contextual conditions at the individual, organisational and socio-political levels. The aggregation was, again, based on the weakest-link logic outlined above.

3 Design and methods

3.1 Evaluation design

The overall **design of this evaluation** is summative. Its focus, therefore, is less on tracing the planning and implementation of the digital intervention over time and more on offering a snapshot of the project in question

[6] For instance, respondents were asked whether their digital intervention 'contributed to the replacement of formerly existing (analogue) processes and/or systems', to which they could choose from 'to no extent at all', 'to a very small extent', 'to a small extent', 'to a moderate extent', 'to a large extent' or 'to a very large extent'. Later, the three lowest categories were combined into 'to a small or no extent'. See Annex A1 for the complete questionnaire.

at a specific point in time. GIZ staff responsible for the implementation of digital interventions were asked to share their experiences depending on the actual stage of their respective digital projects, e.g. during the planning of the digital intervention, its piloting, implementation or after completion. The analytical perspective, however, is always post-hoc, since, regardless of the project stage at which the evaluation took place, the assessment was always carried out in retrospect.

This cross-case analysis component of the HDSR project used a **comparative research design**. At the beginning of this stage of HDSR (in Q2 2021), the GIZ project portfolio contained 482 projects that involved at least one digital intervention; at the end of 2021, the GIZ ICT database included more than 500 active projects. Based on a purposive sampling, 21 country offices with the largest digital portfolios across regions were successively approached with the offer to participate. The case selection was also driven by the idea of maximising the diversity of country contexts, policy sectors and types of digital interventions. The decision to have a heterogeneous sample was therefore made deliberately at the outset of the project, with the goal of capturing the variety of digital interventions that make up GIZ's development work. Digital projects operating in 11 countries plus the SICA states[7] were selected for this stage. To approximate the total population of projects with digital interventions, data from the most recent BMZ digitalisation in development cooperation toolkit query (https://digitalportfolio.toolkit-digitalisierung.de) were used and further validated by digital focal points at the country level.

This evaluation applied a **multi-method design**, combining various techniques of data collection – standardised online survey, structured focus group discussions – and different modes of data analysis – quantitative descriptive analysis, content analysis, qualitative comparative analysis. Different data sources and types of analysis were triangulated to produce the comprehensive analytical picture necessary to address the research questions outlined in section 1.2. Relevant details on the methodology are provided in the next section.

3.2 Data collection and data analysis

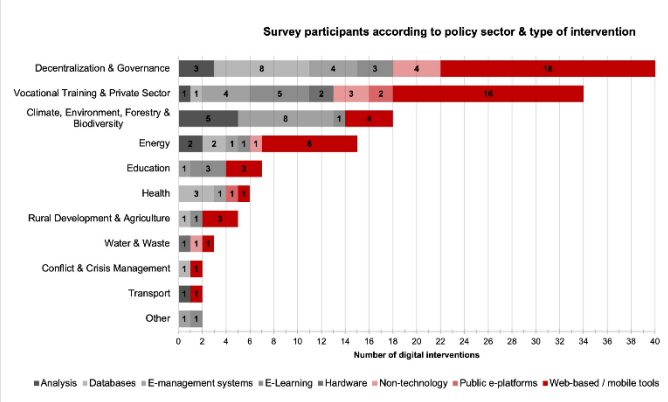
Data collection. Two main methods of data collection were used to gather the relevant information. An **online survey** was conducted using the Askallo software. The choice of survey design was motivated by the fact that a questionnaire allows the collection of systematic data on a wide range of analytical aspects across different contexts, i.e. type of digital intervention, country, policy sector, etc. (Schnell, 2012; Schlipphak & Isani, 2020; Wagner-Schelewsky & Hering, 2019). In line with existing best practices (Weichbold, 2019), the questionnaire was pre-tested. In addition, GIZ staff were consulted for feedback, e.g. on the comprehensiveness of the survey, the wording of questions, etc. The final questionnaire focused on five thematic blocks addressing mainly RQ1 to RQ5 outlined in Table 1 in section 1.2:

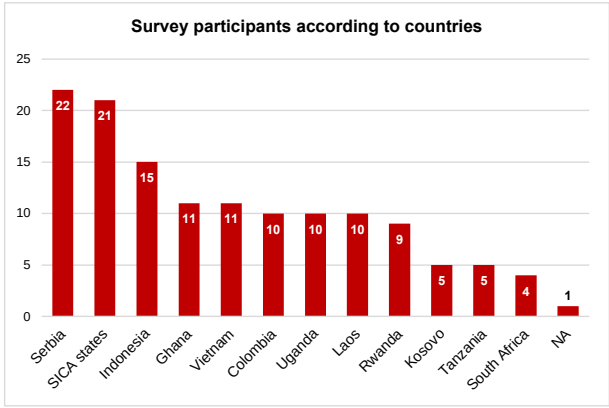
- The results and consequences of the digital intervention, e.g. the extent to which it has triggered the (targeted) changes and contributed to certain outputs and outcomes.
- The wider implications of this digital intervention concerning the digital transformation in partner institutions, a given sector and/or society at large.
- Negative consequences for stakeholders, structures or the ecosystem triggered by the digital intervention.
- The digital readiness at the individual, organisational and societal levels in which the digital intervention was embedded.
- The adherence to the set of digital principles when designing/implementing the digital intervention.

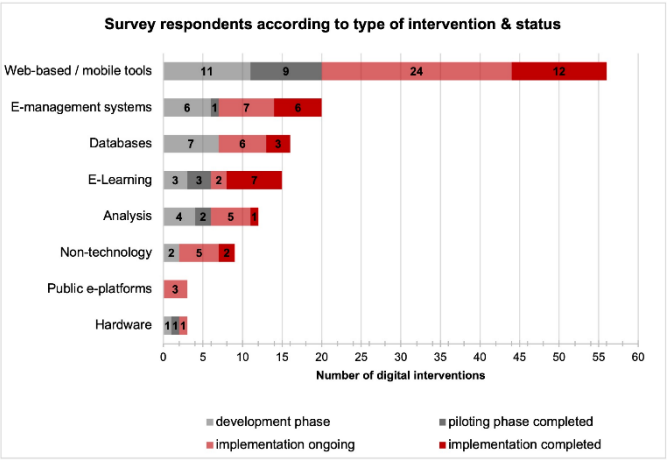
Participants were made aware that the benchmark on which they should base their assessment was the situation in their projects prior to or without a digital intervention. Annex A1 contains the questionnaire, while

7 The eight states of the Central American Integration System (SICA) are: Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

detailed descriptions of the measurement scales of the relevant constructs can be found in section 2.2 on the ToC. In total, 218 projects (with one representative per project) across 11 country portfolios and one regional portfolio (SICA states) were contacted for the purpose of the survey. Since individual projects can implement one or more digital interventions, it was requested that a separate survey for each digital intervention is completed by the project team member with the most knowledge of each intervention. The questionnaire was open between 16 August and 15 September 2021, and a total of 134 was completed.[8]







Note: The figures show the absolute numbers of digital interventions. For ease of interpretation, intervention types were aggregated into eight categories: i) web-based/mobile tools, including web platforms and smartphone apps; ii) e-management systems, including CRM and e-management systems; iii) databases, i.e. digital registries and other databases; iv) e-learning tools, covering a range of e-learning platforms, apps, etc.; v) analysis, including tools for monitoring or big-data analysis; vi) non-technology-based interventions, e.g. policy consultations, frameworks, hubs, etc.; vii) public e-platforms, including e-payment/e-marketplace systems; viii) hardware, i.e. 3D printers, virtual reality components and other infrastructure.

Figure 2: Overview of survey participants according to policy sector, intervention type, status of intervention and country

In addition, a series of structured **focus group discussions** was conducted. The main objective was to validate and contextualise the quantitative findings from the survey, and to complement and identify potential further aspects that had been missed by the comprehensive but ultimately rigid format of the questionnaire (Mäder, 2013; Prinzen, 2020; Vogl, 2019). Beyond these substantive goals, the focus group discussions also provided an opportunity for GIZ staff to exchange viewpoints on digital projects and interventions, share their experiences and discuss best practices regarding the implementation of digital interventions. The focus group discussions followed structured interview guidelines (see Annex A2). Each focus group lasted 90 minutes (with one exception, which lasted 60 minutes). The focus groups were conducted by a team comprising two external consultants. The discussion was structured into three thematic blocks, which mainly addressed RQ2, RQ4 and RQ5 outlined in Table 1 in section 1.2:

- Participants were first asked to briefly introduce the status of digitalisation in their policy sector within their respective country.

8 Digital interventions that were still under development at the time of the survey (in total, 34) only received questions regarding adherence to the Principles for Digital Development, which is why the sample size differs throughout the analysis. Of the 134 individual questionnaires completed, six were excluded from further empirical analysis because less than 50% of the questions had been answered. One participant did not indicate the country of origin; this was coded NA.

- Next, participants were asked about their experiences regarding the (positive/negative) effects of the digital interventions they supported in their work, the essential helping and hindering conditions for successful implementation, and whether they could name unintended (positive/negative) consequences.
- The focus groups ended with a discussion of the GIZ Digital by Default approach and potential supporting measures required to facilitate an effective rollout of this approach.

A total of 47 participants took part in nine focus group discussions between 11 and 22 October 2021.[9] The group sizes ranged from a minimum of three to a maximum of seven participants, which is well within the numbers suggested in the literature. Participants were assigned to the focus groups according to their respective policy sectors and countries. Where policy sector portfolios consisted of numerous digital projects, participants were further selected based on a stratified sampling approach (split into time zones and countries). This ensured that the focus groups shared a common set of contextual conditions, based on the status of digitalisation within the respective policy sector, while, at the same time, allowing for analytically relevant variation, such as differing country contexts or types of digital project. Figure 3 provides an overview of the composition of the focus groups according to policy sectors, countries and gender.

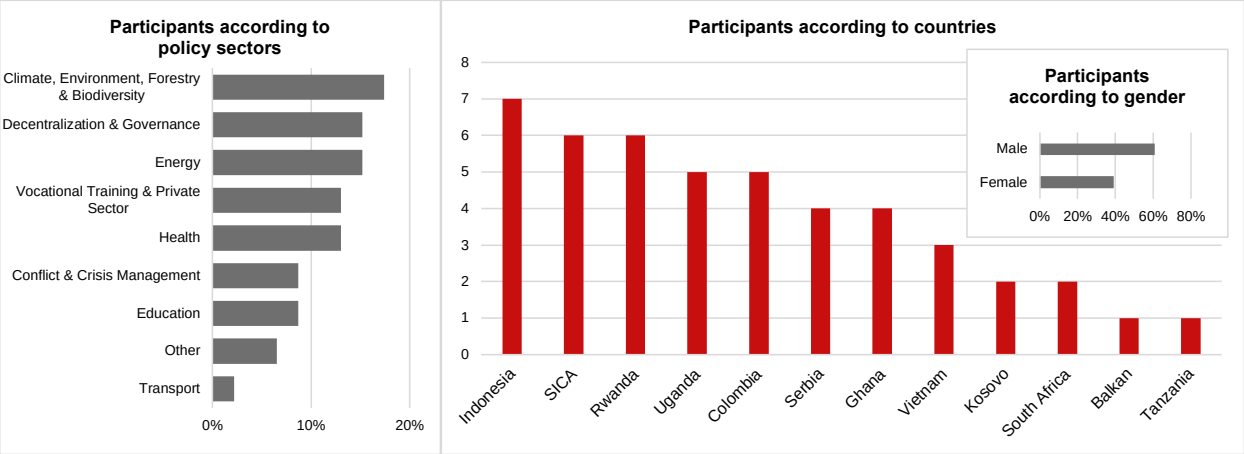


Figure 3: Composition of the focus groups according to policy sectors, countries and gender

Data analysis. To analyse the collected data, three techniques were applied. First, the qualitative information from the focus group discussions was further examined via qualitative content analysis. To build analytical categories, both deductive and inductive strategies were applied using an iterative approach, which is typical in qualitative methods (Ragin, 1994). This allowed a comparison of categories between the survey and the focus groups, and offered the flexibility to create new analytical categories, if necessary. Second, descriptive analyses and basic co-variate analysis of the data from the survey and the focus groups were conducted (Gerring, 2012). Third, Qualitative Comparative Analysis (QCA, Ragin, 2008; Wagemann & Siewert, 2020) was used to identify helping and/or hindering factors affecting the contribution of digital interventions to various outputs and outcomes. (See box in section 4.3 entitled 'Qualitative Comparative Analysis', for a very brief introduction to QCA.)

Data protection measures. The evaluation included a range of measures to ensure compliance with the provisions of the General Data Protection Regulation (GDPR). The data protection offices of both the TUM and GIZ were involved at crucial stages of the evaluation design. The measures implemented ensured the integrity, confidentiality, availability and resilience of the information collected over the course of the evaluation. Only the team of external consultants from TUM had access to the raw data collected, and at no point were these data shared with GIZ.[10] For reporting, all data and empirical analyses have been either fully anonymised or

[9] There is no clear benchmark for how many focus group discussions should be conducted, with methodological best practices referring to a minimum of three to five groups (Prinzen, 2020: 310; see also Mäder, 2013: 41). One can stop to collect data if discussions become saturated, i.e. that additional focus group discussions do not add substantially new insights on the research objectives – a situation which we clearly observed over the course of the evaluation.

[10] There was one exception for one of the focus group discussions where a representative from the GIZ Evaluation Unit participated. Participants were asked for their express consent, which was provided.

pseudonymised on an aggregate level to ensure that the information collected cannot be traced back to individual projects and/or participants involved in the survey and/or focus groups. All data were deleted at the end of the evaluation project.

4 Empirical analysis and findings

4.1 Use of the Principles for Digital Development

Descriptive insights from the focus group discussions. During the focus groups, only three out of nine discussions explicitly mentioned the Principles for Digital Development as a useful framework for mapping and mitigating potential challenges and/or negative (unintended) consequences. Whether this indicates a **general lack of awareness remains unclear**. On the one hand, when directly asked whether they could name frameworks or guidelines that might be helpful to identify challenges encountered in digital interventions, not many participants in the focus groups mentioned the Principles for Digital Development. This seems to suggest a lack of awareness. On the other hand, aspects linked to the individual sub-principles, such as including *'users early on'*, *'mapping the existing ecosystem'*, or *'considering what tools are already used'* (statements by different anonymised participants), did often feature in the debate, although these aspects were not explicitly linked to the digital principles. One way or the other, pushing for **greater awareness of the Principles for Digital Development framework seems warranted.**

Description on the aggregated level. Figure 4 displays the average findings for the aggregated Principles for Digital Development based on the survey questionnaire. It covers 128 digital interventions that provided enough data on the use of digital principles. As explained in section 2.2, each principle was measured by way of three sub-principles on the lower conceptual level. We asked the survey participants to indicate whether they had taken the respective sub-principles into account or not. A value of 3 means a principle was fully taken into account, whereas a score of 0 means it was not applied at all.

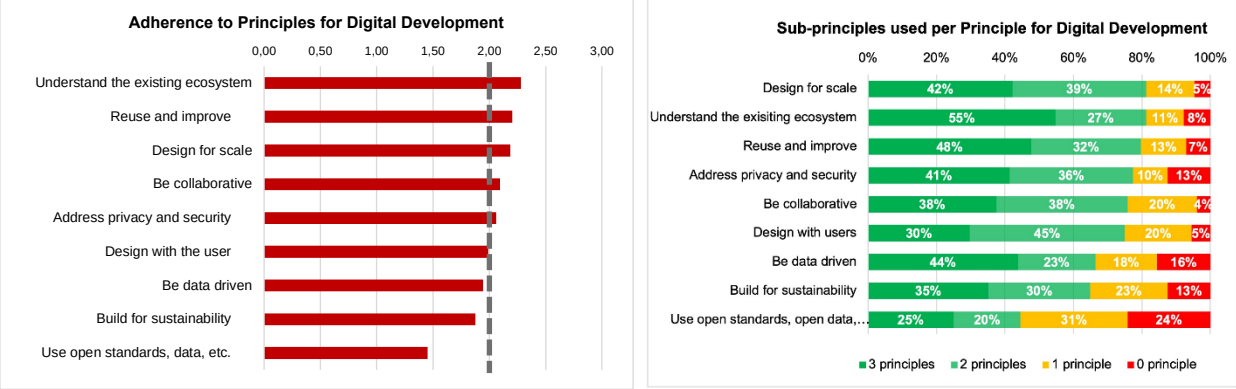


Figure 4: Adherence to the Principles for Digital Development – aggregated and differentiated between sets of sub-principles

On average, two out of the three sub-principles per main Principle for Digital Development were considered when designing, planning and implementing digital interventions. Figure 4 shows that there was some variation between digital principles. **At the top**, 'Understand the ecosystem' was most frequently applied (2.28), followed by 'Reuse and improve' (2.20) and 'Design for scale' (2.19). While the other digital principles lie around the mean, the **clear laggard among the nine principles** is 'Use open standards, open data, open software' (1.45). The right-hand side of Figure 4 indicates how frequently digital interventions applied three (two, one or none) of the sub-principles. It shows that a majority of digital interventions (55%) considered all three sub-

principles when it comes to ‘Understand the existing ecosystem’, whereas only 25% did so for ‘Use open standards, open data, etc.’. Looking at these data from a positive perspective, across all Principles for Digital Development, between 45% and 82% adhered to at least two sub-principles. On the other hand, this also means that for the digital principles at the bottom – following an open approach, building sustainable solutions and being data-driven – there is considerable room for improvement. The share of digital interventions in which only one or none of these three was considered comprise between 34% and 55%.

Description on the disaggregated level. Figure 5 shows the findings for the individual sub-principles that were used to operationalise the nine Principles for Digital Development. On average, 66% of the sub-principles were used. The average not considered was 13%, while a considerable number of respondents (on average, 20%) also answered ‘not applicable’. **At the top end**, ‘involving relevant stakeholders in the planning of the digital intervention’ (90%), ‘thinking about upscaling’ (88%), ‘checking the alignment with existing technological, legal and regulatory frameworks’ (86%) occupy the top three ranks. These are closely followed by ‘gearing the technical solutions towards the needs and priorities of users’ (84%), ‘determining the needed investments’ (81%), and ‘considering standards of data protection’ (80%).

Figure 5: Adherence to the Principles for Digital Development disaggregated for the individual sub-principles

At the bottom end, there are several sub-principles that show considerable room for improvement. A closer look reveals that these sub-principles can be grouped into two main categories:

- First, sub-principles that target the strategic mapping of long-term risks, consequences and resources were significantly less applied. For instance, only 53% of digital interventions in the sample 'developed a comprehensive sustainability map with stakeholders' and 'quantified the long-term costs and identified options for sustaining the digital intervention'. Almost a third of the digital interventions said that they did not follow these two sub-principles. Similarly, only 55% conducted 'foresight analysis and technology assessment on benefits and risks', while 23% did not consider this.
- Second, sub-principles linked to an open approach and focusing on the public were also less frequently followed. Only four out of ten digital interventions 'made use of open data or open-source software' or had 'an open data and open-source strategy' in place, whereas around a quarter did not consider either of these. Furthermore, 62% of digital interventions were 'designed as public good' but a quarter were not, while a fifth of the digital inventions did not 'share work processes, results and best practices with the wider public'.

Basic principles such as 'do no harm' and 'leave no one behind' also apply to digital interventions when it comes to eliminating the risk of any unintended negative consequences, particularly for disadvantaged groups. Yet, only 40% of digital interventions considered 'the needs and opinions of marginalised user groups particularly'.

Short summary. All in all, **the use of the Principles for Digital Development is, on average, well established in the everyday practice of GIZ. However, there is still considerable room for improvement**, both regarding aggregated digital principles, such as using open standards, open data, open frameworks, etc., and individual sub-principles to the main principles. This pertains especially to those sub-principles that address the strategic mapping of long-term risks, consequences and resources, as well as those that focus on an open approach and aim for better inclusion of the public. In general, a greater awareness of the Principles for Digital Development framework seems warranted. While significant progress has already been made in this regard, future efforts should concentrate on providing more guidance on how to translate abstract principles into everyday practice, and on offering more opportunities for sharing knowledge and best-practice experiences regarding how to embed digital principles when planning, designing and implementing digital interventions.

4.2 The contribution of digital interventions to outputs and outcomes

Descriptive insights from the focus groups. This section presents the findings to the question 'what are the most important development results, in your opinion, to which the digital intervention(s) contributed?' which was asked during the focus group discussions. To derive a meaningful and substantive interpretation from the information collected, the individual statements made during all focus groups were aggregated according to the outputs and outcomes determined in the ToC. This was possible for almost all statements, thus confirming the validity and comprehensiveness of the ToC.[11] However, one additional contribution emerged from the discussions that was framed by the participants as a distinct issue that did not match the predefined outputs and outcomes: in six out of nine focus groups, it was highlighted how digital interventions facilitate better analysis and (real-time) monitoring which, down the road, also lead to better advice for policy-makers and more effective decision-making.

Figure 6 presents the aggregated data (the percentages indicate how often a topic was mentioned across all focus groups). It shows that two **key topics**, mentioned in seven out of nine focus group interviews (or 78%, as displayed in the figure), were increasing digital awareness and digital capacity (e.g. *'facilitating curiosity and openness to digital tools more generally', 'furthering digital skills and sovereignty among stakeholders'*

[11] Qualitative information from interviews is, of course, fuzzy. If someone says, for instance, that more people have been reached thanks to digital interventions, it is not clear whether this refers only to access and outreach (which it does) or also covers better inclusion and equality (which it might). Similar problems of framing apply to aspects of sustainability. In these cases, it was decided to code references to inclusion and similar concepts only if they had been explicitly stated, e.g. the digital interventions led to better access of marginalised groups or helped overcome the rural digital divide.

(anonymised quotes from participants)) and improvement of information (*'better and more data'*, *'better access to data'* (anonymised participants)). Also frequently mentioned as major contributions were gains in effectiveness (six out of nine) and efficiency (five out of nine). Regarding the former, participants pointed out that the use of digital tools allowed them *'to expand on the group of users and stakeholders' (*anonymised participant) and made it *'easier to get access to and connect with them'* (anonymised participant). Benefits regarding efficiency were especially observed in terms of saving time and resources, e.g. *'through less travel'* and *'working from home for GIZ staff and the stakeholders'*, or making working processes more efficient, e.g. *'by allowing to work across large geographic distances'* or *'by digitalising former paper-based processes'* (all quotes from anonymised participants).

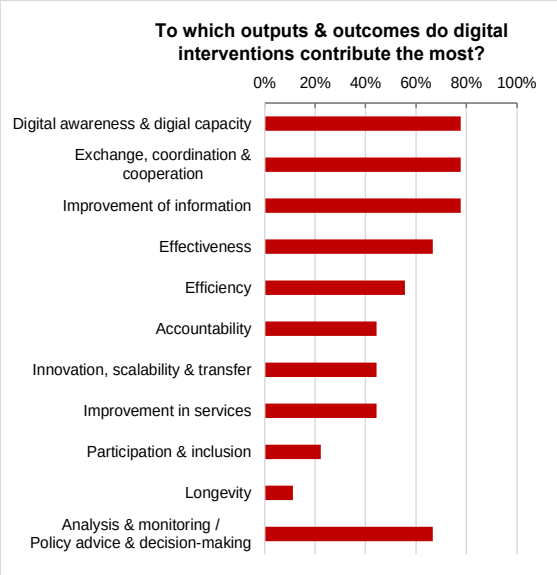


Figure 6: Findings from the nine focus group discussions

Participants also pointed out that digital tools led to major improvements regarding exchange, coordination and cooperation via *'better information sharing or networking'* (anonymised participant). Statements in this vein often came with the proviso, however, that new projects with (especially) unknown stakeholder and user groups still strongly depend on (pre-existing) personal contacts, which cannot (yet) be easily substituted by digital means. **Topics that were mentioned only rarely** throughout the focus group discussions were the contribution of digital interventions to the longevity (one out of nine), the possibilities for stronger participation of stakeholders by *'giving voice to the people'* and the explicit facilitation of more equal access and inclusion (two out of nine). The direct contribution of digital interventions to expediting ecological, social and economic sustainability was never explicitly mentioned in the discussions; however, references to building *'social trust'* (anonymised participant) or increasing *'transparency through openly accessible data'* (anonymised participant), which fall under accountability according to the ToC, also relate to sustainability, which is a less tangible concept. Against this backdrop, it is hard to interpret the absence of explicit sustainability references as a general lack of awareness of this issue. What can be said, however, is that participants did not think of it *explicitly* as something to which digital interventions contribute.

Descriptive insights from the survey. Figure 7 gives an overview of how the outputs and outcomes of service delivery were assessed in the survey. It is based on 96 surveys, which provided sufficient information to allow for reliable analysis. As described in section 2.2, each output and outcome on the upper level consists of multiple sub-components on the lower conceptual level.

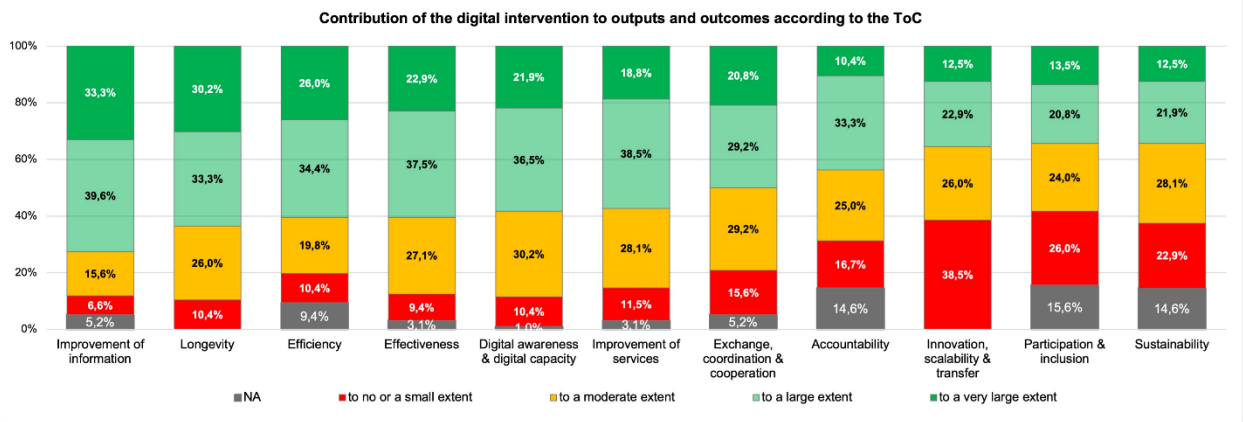


Figure 7: Assessment of the contribution of digital interventions to outputs and outcomes of service delivery

For most of the outputs and outcomes, the survey yielded a **positive assessment**. Among the top five ratings, the improvement of information clearly stands out, with 72.9% of respondents (the green and white answer categories combined) reporting that the digital intervention contributed to a (very) large extent to 'better data quality', 'data quantity' and 'data access'. Next, 63.5% noted (very) large improvements regarding longevity, i.e. the 'institutionalisation of the digital intervention', the 'sustainability of its achieved benefits' and its 'future sustainability of resources'. In third and fourth places were efficiency and effectiveness gains: 60.4% stated that the digital intervention contributed to a (very) large extent to 'more efficient work processes' and 'use of resources' (efficiency); the same percentage of respondents agreed that the digital intervention 'increased the number of stakeholders to be reached' and 'boosted the use of services/knowledge' (effectiveness). Besides these top four outputs and outcomes, the contribution of digital interventions to increasing awareness and capacity was emphasised: 58.3% agreed that going digital 'raised the awareness for further digital processes' and 'led to the build-up of digital capacities among relevant stakeholders'. Not far behind, in sixth place, 57.3% of respondents noted a large or very large improvement in the services provided, i.e., 'quality of and access to them'.

With regard to improvements in accountability and in exchange, coordination and cooperation, the survey revealed a **mixed picture**. Here, the contribution of digital interventions was rated almost equally as either (very) positive, moderate or small and no effects.

At the bottom end, three outputs and outcomes stand out. First, while 34.3% respondents stated that the digital intervention contributed to a (very) large extent to greater participation and inclusion via a 'general inclusion of the public' and 'marginalised groups, in particular', 26.6% noted only a small or even no effect at all. The contribution to 'social, economic and environmental' sustainability shows a similar pattern: 34.4% said their digital intervention made a significant contribution, whereas 22.9% felt theirs had only a small or no effect. Regarding innovation, scalability and transferability, 35.5% noted a (very) large effect, while 38.5% reported only small or no effects. Interestingly, there is no systematic difference between digital interventions implemented in one country versus digital interventions implemented in several countries, i.e. the contribution to innovation, transferability and scalability was assessed very similarly irrespective of the implementation of the digital intervention in different contexts. The same holds true for the comparison between the SICA states and other countries in the sample.

Short summary. The findings from the survey are largely corroborated by the insight from the focus group discussions, and vice versa. The data indicate strong agreement concerning the contribution of digital interventions to improving information, raising digital awareness and digital capacity, as well as efficiency and effectiveness. These four outputs and outcomes were consistently among the top five both in the focus groups

and the survey. The data show that the contribution of digital interventions was rated mainly positively when it comes to the informational and procedural components of service delivery. Evidence from the survey and the focus groups also matches with regard to facilitating accountability and improvements in services – which were ranked in the middle – and with regard to the contribution of digital interventions to furthering participation, inclusion and sustainability, which were ranked at the bottom.

Somewhat surprisingly, the contribution of digital interventions to innovation, transferability and scalability also ranked towards the end, both in the survey and the focus groups. A closer look at the focus group discussions reveals that the use of digital interventions – and digitalisation in general – was frequently criticised for providing very *'specific, localised and isolated solutions'* (anonymised participant) to problems. There was also criticism of the facts that some digital interventions provided *'shiny gadgets'* (anonymised participant) that did not address real problems, and that digitalisation sometimes starts from the desire to develop a specific digital tool instead of thinking about which general problem needs to be solved by digital means – as one anonymised participant put it: *'solutions are put before problems'.* Taken together, these arguments provide some explanation and context for the poor assessment.

The evaluation remains ambiguous regarding the improvement in exchange, coordination and cooperation, and whether or not digital interventions and their benefits can be sustained over time. The former appeared to be much more important in the focus groups than in the survey; the latter was evaluated much more positively in the survey but played only a minor role or was even seen critically in the focus group discussions. Regarding longevity, it was mentioned that it can be difficult to hand over the digital intervention at the end of a project because local partners lack the capacity and resources to sustain and use it afterwards. GIZ's project cycle and a focus on developing single interventions without a broader digitalisation strategy to ensure institutionalisation and continuity of the digital intervention, as well as capacity-building, were frequently mentioned as major obstacles (see also section 4.6).

Finally, the comparatively high proportion of answers that were 'not applicable' (NA) should be taken into account. For instance, looking at sustainability, at least two interpretations are plausible: first, it was too early for an assessment, since sustainable transformations usually happen over longer time periods; second, digital interventions are less likely to explicitly aim to contribute to enhancing the targeted sustainability aspects. The same applies to participation and inclusion or improving accountability, which were also frequently rated as not applicable.

4.3 Helping and hindering conditions for the contribution of digital interventions to development results

Descriptive insights from the focus groups. During the focus group discussions, participants were asked to point out the most critical factors that affect the implementation of digital interventions and are considered necessary in order for digital interventions to make a significant contribution to development results. Around 50 individual statements were issued during the discussions; to ease interpretation, they were again grouped into coherent categories at the three analytical levels, as illustrated in Figure 8.

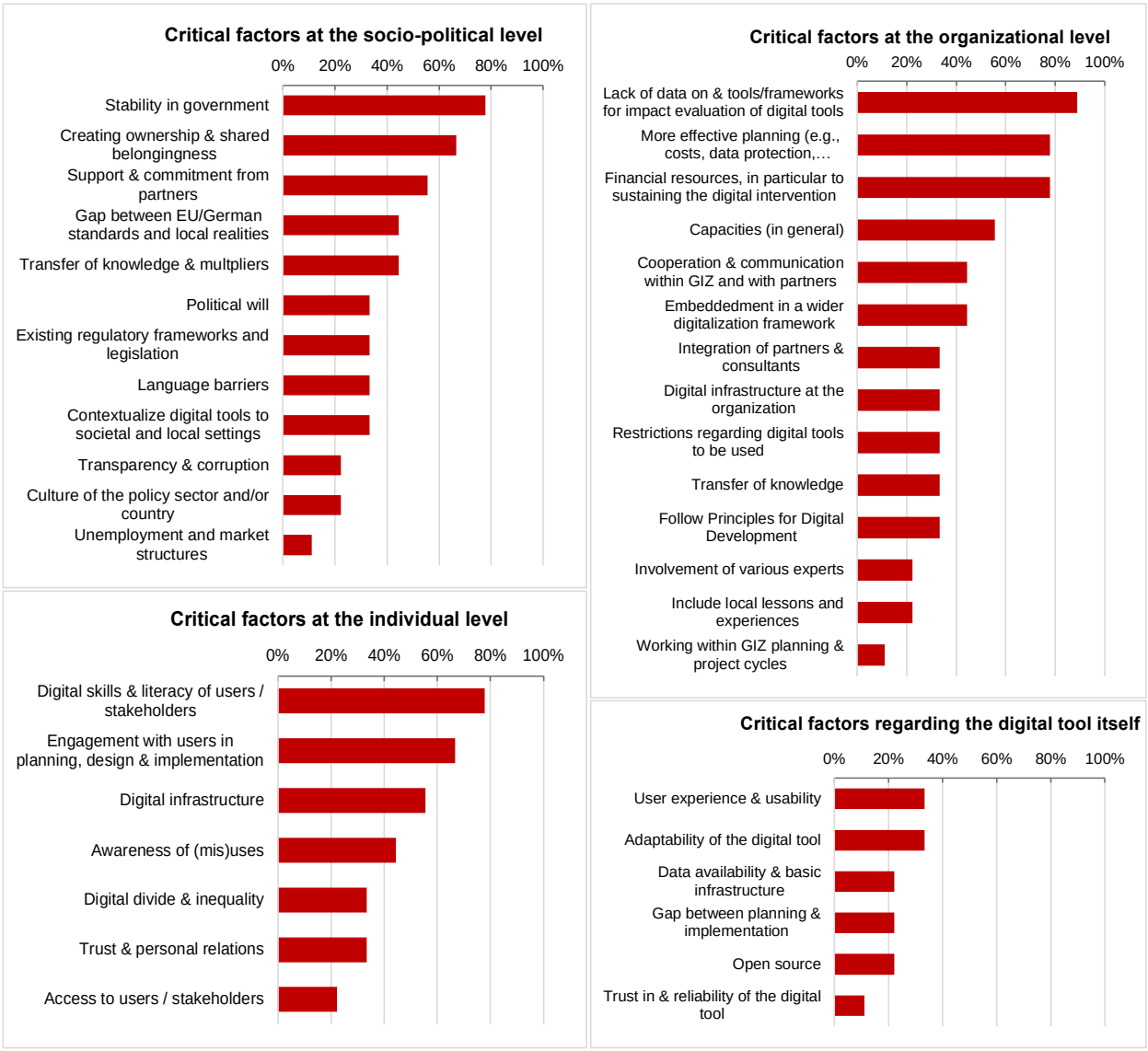


Figure 8: Factors that were seen as critical to the successful contribution of digital interventions to outcomes and outputs in development work, based on the focus group discussions

At the **individual level**, the most critical factors that were mentioned in the majority of focus group discussions were ensuring high levels of digital literacy and skills by the users, e.g. through appropriate training measures, including users at various stages in the design process of the digital intervention (stressing the importance of adhering to the digital principle ‘design with the users’) and the availability of sufficient digital infrastructure, such as internet connection, computers and other ICTs.

Looking at the most prominent factors at the **organisational level**, one set of factors stressed was general capacities, i.e. personnel, resources, etc. – specifically, the financial resources to sustain the digital intervention

in the long run. In other words, if the longevity of the digital intervention is uncertain, this was seen as already having a negative influence at earlier stages of the project. The second set of factors relates to the planning and assessment of the digital intervention. Several focus groups highlighted the importance of (more) effective planning, e.g. regarding the general costs or *'whether open-source or off-the-shelf-solutions might be better'*[12] (anonymised participant) and how to handle issues related to data security and privacy (this is also directly related to the further needs elaborated in section 4.6 below). The lack of tools, frameworks and thus also data concerning an effective impact evaluation of the digital interventions' contribution in everyday practice was also stressed – although this was seen more as a lack of guidance than a challenge for implementation. For instance, it was emphasised that, sometimes, the mapping of which objectives should be achieved through which means could be improved through the provision of guidelines or more information on what works and what does not (see also section 4.6).

While all the factors so far can be directly influenced by GIZ, the factors cited **at the socio-political level** are somewhat more detached. General stability in government, as well as *'continuity in personnel'*, *'existing digital frameworks and planning security'*, '*less frictions, competition and silo thinking between departments'* were highlighted as key factors, but these cannot be directly influenced by GIZ. On the other hand, creating ownership and a sense of shared responsibility, as well as transferring knowledge and including multipliers within partner countries' societies, nicely interrelate with other critical factors mentioned, such as including users and stakeholders at various stages of the digital intervention and mobilising adequate financial resources to continue supporting the digital intervention in the longer term.

Finally, sufficient support by and commitment of partners were mentioned as further essential factors for the success of a digital intervention. A fourth set of statements was identified that directly relates to the digital intervention itself. These statements concern usability, reliability, trustworthiness and adaptability and thus are partly related to the survey question whether stakeholders showed 'willingness to adopt the digital intervention'.

Systematic analysis of helping and hindering factors based on the survey data. This section presents the findings of how a (non-)positive evaluation of the 11 outputs and outcomes can be explained using different contextual factors showcasing the digital readiness at the individual, organisational and socio-political levels, and using the Principles for Digital Development. To distinguish those conditions that might be causally linked to the respective outcomes from those that are not, multiple analyses using QCA (see box below entitled 'Qualitative Comparative Analysis') were conducted for each of the 11 outputs and outcomes (refer back to Figure 1 in section 2.2 illustrating the theory of change).

Since there is no theoretical framework available to guide the selection of conditions for the various analyses, the conditions included in the different explanatory models were chosen based on three types of information: i) theoretical reasoning as to what factors might or might not be relevant, ii) information from the outcome-harvesting case studies and focus group discussions pointing out critical factors and iii) empirical testing of different explanatory models in order to probe alternative solutions and compare their respective empirical explanatory power. In the following sections we present the exploratory models' results.

[12] Off-the-shelf solutions are usually cheaper to purchase, but then come with further costs with regard to maintenance, support, updates, etc. These need to be taken into account when assessing different options. Open-source solutions, on the other hand, are often more expensive at the start (developing, testing, etc.), but can save money in the long run. Moreover, interoperability is easier to achieve and causes fewer dependencies and/or dual structures.

Qualitative Comparative Analysis

Set relations via QCA. Qualitative Comparative Analysis (Ragin, 2008; Wagemann & Siewert, 2020) is a comparatively new method in the social sciences used to uncover set relations that, in turn, can be interpreted in terms of necessity (superset relation) and sufficiency (subset relation). A condition is necessary if, whenever outcome Y is present (absent), so is condition X. A sufficient condition signals that whenever condition X is present (absent), so is outcome Y. QCA aims to isolate those conditions that make a difference across cases and therefore might be causally relevant from those that are redundant. This is done based on Boolean algebra and respective software algorithms.

How to read the results. The results presented in this study are based on the parsimonious strategy, which is driven by the objective to produce minimally sufficient conditions and identify the causal nuclei that must be present so that an outcome can occur (Baumgartner, 2015). Like correlations, however, set relations are not causal *per se*. What QCA does is signal associations of the conjoint presence (or absence) of an outcome and its potential (*sic*) causes – in other words, configurations of conditions whose conjoint presence and/or absence make an outcome possible. To evaluate the quality of set relations, two main parameters are used: the consistency parameter (shortened to 'con' in the following) denotes the strength of an association ranging from 0 (no relationship) to 1 (perfect relationship). The coverage parameter ('cov'), on the other hand, gauges the explanatory scope, with a value close to 0 indicating poor breadth of the results and values close to 1 signalling broad empirical coverage.

How to read the configuration charts. To display the findings from the QCA, configuration charts are used. Filled circles signal the presence of a condition, whereas empty circles indicate the absence of conditions. Empty cells indicate that the respective condition does not play a role (neither by its absence nor presence). The charts also provide information on the consistency and coverage for the overall solution, as well as for single terms (also called pathways) that make up the overall solution. Finally, QCA frequently reports multiple, equally fitting models (also called model ambiguity – Baumgartner & Thiem, 2017). In the configuration chart, this is indicated via a thick black line, which separates the essential pathways, i.e. those that are part of all solution models, from those that are substitutable, i.e. signalling various alternative pathways. The note beneath each chart describes which pathways belong to which model.

Improvement of information. Under which conditions do we observe the presence/absence of a strong contribution by digital interventions to improving information availability? As highlighted in Figure 1, improvements in information can be grouped into three sub-components, namely higher data quality, better data quantity and better data access. A strong contribution means that the digital intervention contributed to a (very) large extent across all three sub-components, whereas the absence of a strong contribution means that one or more sub-components were rated poorly. The explanatory model includes:[13]

- the existing digital infrastructure at the organisational level,
- the general resources assigned to the digital intervention by partners at the organisational level,
- the importance attributed to digitalisation, in general, by the management in relevant partner institutions,
- the degree of adherence to digital principles when setting up/implementing the digital intervention, captured by the combined index across all 27 sub-principles.

Table 2 displays the results of the QCA aiming to uncover which organisational contexts are **favourable for strong improvements in information**. The analysis produced three alternative models with high consistency

[13] Factors at the organisational level are deemed most relevant, as they can be hypothesised to have the most direct effect on improving the state of information. Alternative factors at the individual level were also tested, as were selected digital principles. However, none of the alternative analyses yielded any meaningful results.

(0.87) and high coverage, explaining 70% of the outcome. The first two terms, i.e. results of the QCA analysis, are essential to all models:

Term 1 shows that strong improvements in information appeared at the organisational level of contexts with well-developed digital infrastructure, despite a lack of resources. Underneath this term, two scenarios are plausible: on the one hand, it might be that the respective digital interventions do not need a great deal of resources (e.g. because many tasks are automated); on the other hand, a lack of resources at the partner level might need to be overcome through proper donor investment in essential digital infrastructure at the organisation. This is particularly interesting, since the insight from the focus groups indicated that being well equipped with sufficient capacities is crucial for the success of a digital intervention. Irrespective of which scenario is present, digital infrastructure is a key factor.

Terms 2 and 3 show that the presence of strong commitment at the managerial level of relevant partner institutions, despite the lack of digital principles or a lack of resources, is associated with improving information. Put differently, even if the digital principles are not followed to a large extent or partner resources are lacking, it can still lead to positive improvements in information if the partner is committed to the digital intervention. It would therefore be more recommendable to focus on the conscientious application of the digital principles, especially given that terms 4 and 5 highlight that strong adherence to the Principles for Digital Development can also make up for a lack of resources or a lack of commitment at the partner level.

Term 6, finally, shows that assigning a high volume of resources to the respective digital intervention can also lead to improvements in terms of data quality, quantity and access, even if digital infrastructure is not well developed and strong commitment from relevant partner institutions towards digitalisation is generally lacking. This, in many ways, is the mirror image of term 1, since the initial lack of digital infrastructure is overcome by additional resources assigned to the specific digital interventions, even though commitment to wider digitalisation is otherwise not high on the agenda.

Table 2: Results for the outcome ‘strong improvement of information’

Most parsimonious solution | overall consistency: 0.87; overall coverage: 0.71						
Term	**Digital infrastructure at the organisation**	**Resources for digitalisation**	**Importance of digitalisation assigned by management**	**Adherence to the Digital Principles**	**Con**	**Cov**
1	●	○			0.93	0.34
2			●	○	0.86	0.51
3		○	●		0.90	0.44
4		○		●	0.93	0.37
5			○	●	0.93	0.27
6	○	●	○		0.96	0.19
Note: The analysis yields three alternative models (M). Terms 1 and 2 are essential to all three; M1 additionally includes terms 3 and 6; M2 includes terms 4 and 5, and M3 includes terms 4 and 6. Overall consistency and coverage are the same for all three models.						

Turning to the analysis of the **absence of strong improvements in information**, no consistent association could be identified between the four conditions and the negation of the outcome. In other words, the selected organisational conditions plus adherence to digital principles are suitable to detect patterns linked to major improvements in information but are not able to explain the absence of improvements.

In summary, the analysis reveals that strong improvements in the quality and quantity of, and access to, information can be achieved in various ways. This being said, the adherence to digital principles and the general commitment to digitalisation by the management of the partner institution stand out, since they both figure in two out of six terms. Nevertheless, planning, designing, and implementing a digital intervention should always be based on the digital principles, as strong commitment to digitalisation on the part of the partner lies beyond the sphere of responsibility of a GIZ project. An alternative pathway is either to ensure proper digital infrastructure in general or assign enough resources to the respective digital intervention.

Improvement in exchange, coordination and cooperation. What contexts were (or were not) conducive to facilitating exchange, coordination and cooperation between relevant stakeholders through digital interventions? To address this question, the explanatory model includes the following four factors:

- The overall digital readiness at the individual level measured via the digital infrastructure available, the willingness to adopt digital solutions, the access to digital tools, and the existing digital skills and literacy.
- The general resources assigned by partners to the digital intervention at the organisational level.
- The importance attributed by the management of relevant partner institutions to digitalisation in general.
- The digital principle to design digital tools collaboratively, i.e. by actively including stakeholders in the planning, working across sector silos and sharing the working process and results with the wider public.[14]

Focusing first on explaining the **strong improvement in exchange, coordination and cooperation,** the selected conditions did not reveal any association with the outcome of interest. This means that alternative sets of conditions need to be found that can explain under which conditions digital interventions contribute to better 'exchange & networking' as well as coordination.

Turning to the negation, the analysis revealed two configurations of conditions that are linked to the **absence of strong improvements in exchange, coordination and cooperation**. Table 3 displays the results, which show a consistency of 0.87. Both terms stress the importance of broader digitalisation at the management level. Term 1 indicates that exchange, coordination and cooperation were less pronounced in contexts that lacked both strong partner emphasis on wider digitalisation and adherence to the principle of designing collaboratively. Term 2 again stresses the role of the importance attributed to digitalisation; however, this has to go beyond simply providing additional resources, since that alone is not enough if a deeper commitment is lacking.

Table 3: Results for the outcome 'absence of improved exchange, coordination and cooperation'

Most parsimonious solution | overall consistency: 0.87; overall coverage: 0.35						
Term	**Digital readiness at the individual level**	**Resources for digitalisation**	**Importance of digitalisation assigned by management**	**Designing collaboratively**	**Con**	**Cov**
1			○	○	0.87	0.23
2		●	○		0.88	0.31
Note: Only one model exists, which includes the two terms.						

In summary, the analysis shows that the importance assigned by the management at the partner institution to wider digitalisation seems to be the crucial factor in setting the necessary incentives for improved exchange,

[14] Instead of the general conditions capturing the overall adherence to digital principles, the individual digital principle 'be collaborative' was selected for the analysis because it is more directly linked to the outcome of interest, i.e. the improvement in exchange, coordination and cooperation. To test the effects of using a different indicator, alternative QCA analysis was performed based on the overall measure of the aggregate adherence to the digital principles. This had no effect on the findings, as the single digital principle is substituted by the overall adherence.

coordination and cooperation between relevant stakeholders. However, the relatively low coverage of 35% indicates that other factors not included in the explanatory model also play a role. This means that early buy-in of the management at the partner institutions should be supported to ultimately strengthen the ownership of a digital intervention. This also resonates with statements from the focus group discussions, which stressed the relevance of partners' support for the digital intervention (five out of nine focus groups) and the embedding of digital interventions into a broader digitalisation framework (four out of nine). Moreover, it was frequently stressed that resistance from different stakeholders needs to be addressed early on and on a recurring basis, to try to bring the most important players on board.

Improvement in services. Which combinations of factors are consistently linked to the presence/absence of strong improvements in services owing to digital interventions? Improvements in services provided are captured by two sub-components: i) better quality of services and ii) more equal access to services. The explanatory model includes the adherence to digital principles as well as the following conditions at the individual and organisational levels:

- stakeholders' access to the digital intervention,
- digital literacy and skills of the stakeholders,
- existing digital infrastructure at the organisational level,
- the general resources assigned to the digital intervention by partners at the organisational level,
- the degree of adherence to digital principles when setting up/implementing the digital intervention.

Table 4 presents the results of the **analysis of strong improvements in services**. They consist of two models, each with four configurations of conditions under which strong improvements in services can be observed. Both models perform sufficiently well, with a high consistency of 0.91 and a good coverage of 63%–64%. Comparing the four terms, three basic pathways to improvements in services become apparent.

Term 1 highlights that in contexts that have a well-developed digital infrastructure, to which stakeholders have good access, the digital intervention improves service delivery in terms of more equal access and higher quality of services, even if digital literacy among stakeholders is low and resources for digitalisation are not abundant.

Terms 2 and 3, on the other hand, show that if stakeholders have only poor access to digital services, these services can only improve via strong adherence to the digital principles, investment in sound digital infrastructure and the availability of considerable resources towards digitalisation in general. In addition, term 3 shows that a focus on capacity-building to ensure a high level of digital literacy is required.

Terms 4a and 4b stress the importance of supporting a high level of digital literacy. This, together with strong adherence to all digital principles (e.g. by including stakeholders at various stages of the planning and implementation of the digital intervention), can be effective even in comparatively unfavourable contexts characterised by a lack of resources assigned to the digital intervention by partners and either low digital infrastructure or impeded access to the digital intervention.

Table 4: Results for the outcome ‘strong improvement in services’

Most parsimonious solution | M1 consistency: 0.91; M1 coverage: 0.64 | M2 consistency: 0.91; M2 coverage: 0.63							
Term	**Stakeholder access to the digital intervention**	**Stakeholder digital literacy**	**Digital infrastructure at the organisation**	**Resources for digitalisation**	**Adherence to Digital Principles**	**Con**	**Cov**
1	●	○	●	○		0.89	0.34
2	○		●	●	●	0.90	0.27
3		●	●	●	●	0.89	0.46
4a		●	○	○	●	0.87	0.21
4b	○	●		○	●	0.90	0.22
Note: The analysis yielded two alternative models (M). The first three terms are essential to both models; M1 additionally includes term 4a and M2 includes term 4b, which differ only with regard to one condition and hence strongly overlap.							

Turning to the **analysis of the absence of strong improvements in services**, the QCA revealed two equally fitting models, with a consistency of 0.90/0.91 and a coverage of 42%–43%. Both models show a strong overlap and are displayed in Table 5.

Term 1 highlights how important it is that stakeholders have proper access to the digital intervention, since even in contexts where enough resources were assigned by partner institutions and there were high levels of digital literacy among relevant stakeholders improvements in service quality and equal access were still poor or only moderate. This is particularly interesting in comparison with term 2 in the analysis for the presence of strong improvements, as it signals what else needs to be added: building up a better digital infrastructure and stronger adherence to the digital principles (see Table 4 above).

Term 2a and term 2b are mutually substitutable; they show a strong overlap, as both pathways highlight that improvements in services are not fully achieved if partner resources for wider digitalisation are lacking, even in very favourable contexts where there are high levels of digital literacy, adherence to digital principles and either good access to the digital intervention or proper digital infrastructure.

Table 5: Results for the outcome ‘strong improvement in services’

Most parsimonious solution | M1 consistency: 0.90; M1 coverage: 0.42 | M2 consistency: 0.91; M2 coverage: 0.43							
Term	**Stakeholder access to the digital intervention**	**Stakeholder digital literacy**	**Digital infrastructure at the organisation**	**Resources for digitalisation**	**Adherence to Digital Principles**	**Con**	**Cov**
1	○	●		●		0.88	0.33
2a		●	●	○	●	0.89	0.09
2b	●	●		○	●	0.90	0.09
Note: The analysis yielded two alternative models (M). The first three terms are essential to both models; M1 includes term 1 and term 2a, whereas M2 includes term 1 and term 2b.							

In summary, the analysis highlights several important points when it comes to improving services in terms of more equal access and better service quality. First, it shows that, in most situations, a combination of strategic capacity-building through a proper existing infrastructure or sufficient resources for wider digitalisation, together with individual-level factors and adherence to digital principles, is required. Second, the adherence to relevant

digital principles to enhance services seems to be most promising where there is existing – or the need to build – high digital literacy among the relevant stakeholders. Third, it is promising to see that even in contexts where access to the digital intervention was rated as poor, e.g. because of existing digital divides, this can be overcome, albeit with substantial contributions regarding all other conditions.

Efficiency. Efficiency gains were measured via two sub-components capturing improvements in terms of more efficient work processes by relevant stakeholders and more efficient use of resources (see Figure 1 in section 2.2). To determine which settings are most beneficial for the presence/absence of large efficiency gains, we performed a QCA based, again, on adherence to digital principles and the following conditions:

- existing digital infrastructure at the organisational level,
- the general resources assigned to the digital intervention by partners at the organisational level,
- the importance attributed to digitalisation, in general, by the management of relevant partner institutions,
- the level of positive and negative previous experience of relevant stakeholders with digital interventions,
- the degree of adherence to digital principles when setting up/implementing the digital intervention.

Table 6 illustrates the findings of the **analysis of the factors linked to a strong contribution to efficiency**. The QCA produced three alternative models that nevertheless exhibit considerable overlap in those paths that are substitutable. The model parameters perform sufficiently well with a high consistency of 0.89–0.91 and a moderate coverage of 45%–46%. Adherence to a high number of digital principles is crucial to observing a significant increase in efficiency.

Table 6: Results for the outcome 'strong contribution to efficiency'

Most parsimonious solution | M1 consistency: 0.89; M1 coverage: 0.45 | M2 consistency: 0.91; M1 coverage: 0.45 | M3 consistency: 0.90; M1 coverage: 0.46							
Term	**Digital infrastructure at the organisation**	**Resources for digitalisation**	**Importance of digitalisation assigned by management**	**Digital experience of stakeholders**	**Adherence to Digital Principles**	**Con**	**Cov**
1		○	●		●	0.91	0.33
2	○	●		●	○	0.90	0.24
3a		○	○	●		0.85	0.19
3b		○		●	●	0.92	0.29
3c			○	●	●	0.86	0.20
Note: Terms 1 and 2 are essential for all models. M1 also includes term 3a, M2 includes term 3b and M3 comprises term 3c.							

Term 1 and term 2 are shared by both models displaying two different pathways of efficiency gains. Term 1 highlights the importance assigned to wider digitalisation in combination with strong adherence to digital principles, even in the absence of adequate resources assigned to the digital intervention by partners. Term 2, on the other hand, stresses that appropriate resources and previous positive stakeholder experiences can overcome the lack of infrastructure and use of digital principles. In other words, if stakeholders have already had positive experiences with an earlier digital intervention, that may have a positive effect on the adoption of the next digital intervention.

The substitutable terms 3a, 3b and 3c also highlight the role of previous positive experience of stakeholders with digitalisation in leading to more efficient work processes and use of resources. While term 3a indicates

that this stakeholder experience alone might already be enough, terms 3b and 3c qualify this by indicating that strong adherence to digital principles is also needed.

Table 7 presents the findings from the QCA examining the **absence of a strong contribution to efficiency**. The analysis yielded three models with a similar consistency of 0.89–0.91 and a moderate coverage of 45%–46%.

Table 7: Results for the outcome 'absence of strong contribution to efficiency'

Most parsimonious solution | M1 consistency: 0.89; M1 coverage: 0.45 | M2 consistency: 0.91; M1 coverage: 0.45 | M3 consistency: 0.90; M1 coverage: 0.46							
Term	**Digital infrastructure at the organisation**	**Resources for digitalisation**	**Importance of digitalisation assigned by management**	**Digital experience of stakeholders**	**Adherence to Digital Principles**	**Con**	**Cov**
1	●		○		○	0.95	0.26
2	●	●	○			0.90	0.32
3	●	○		○	○	0.85	0.19
4		●	○		○	0.92	0.29
Note: M1 consists of term 1; M2 includes term 2 and term 3; M3 covers term 2 and term 4.							

The first model consists of just a single path. It highlights that the joint absence of strong commitment and adherence to digital principles is connected to the absence of strong efficiency gains, even in the presence of a positively rated digital infrastructure at the organisational level. The alternative model 2 displays a similar setting; term 2 signals, again, that moderate to small or no efficiency gains are associated with a lack of commitment, despite a positive infrastructure and adequate resources assigned to the digital intervention by partners, as shown. Term 3, on the other hand, indicates that efficiency gains regarding work processes and resources were rated less positive in contexts that displayed a lack of adequate resources assigned to the digital intervention by partners, less positive stakeholder experience with digital tools, and below-average adherence to digital principles. In the third model, term 4 replaces term 3; here, the combination of a lack of commitment and less attention to digital principles is connected to the absence of strong contributions to efficiency.

In summary, the positive assessment of more efficient work processes and use of resources owing to digital interventions seems to be strongly linked to prior positive experience of the stakeholder and adherence to digital principles – either alone or in combination. This is corroborated by the analysis of the absence of efficiency gains, where these two components are also, crucially, missing. In addition, the lack of commitment by management plays a prominent role. Digital infrastructure and resources, on the other hand, do not seem to be too important, since their presence does not seem to substantially affect efficiency and their absence does not hinder the achievement of strong efficiency gains.

Effectiveness. According to the initial theory of change, gains in effectiveness were measured via two sub-components: whether more stakeholders were reached and whether the digital intervention led to higher uptake of the respective services (see Figure 1 in section 2.2). To examine under which combination of conditions the presence/absence of large gains in effectiveness were observed, a QCA was performed based on the following explanatory model:

- The overall digital readiness at the individual level measured via the digital infrastructure available, willingness to adopt digital solutions, access to digital tools, and existing digital skills and literacy.

- The resources assigned by partners to the digital intervention and the positive/negative previous experiences of relevant stakeholders with digital interventions.
- The degree to which the digital intervention increased awareness of digitalisation and digital capacities.
- The digital principle to design digital tools with users, i.e. by gearing technical solutions to the priorities and needs of the users, including users in designing and testing, and paying particular attention to the opinions/needs of users from marginalised groups.
- The principle to use open standards, open data and open-source strategy and software in developing the digital intervention, and to design it as a public good (e.g. so that it is openly available to the wider community).

Looking at the results of the analysis of the **presence of a strong contribution to effectiveness**, the QCA produced two models that strongly overlap. Table 8 presents the findings, which indicate a high model fit, with a consistency of 0.92 and a moderate coverage of 53%. Term 1 indicates that high gains in effectiveness largely depend on the resources assigned by partners to the digital intervention and the positive previous experiences of the stakeholders with digitalisation, even if no open standards are used.

Table 8: Results for the outcome 'strong contribution to effectiveness'

Most parsimonious solution | M1 & M2 consistency: 0.92; M1 & M2 coverage: 0.53							
Term	**Digital readiness at the individual level**	**Resources for digitalisation and experiences by stakeholders**	**Digital awareness & digital capacity**	**Use open standards, data, etc.**	**Design with the users**	**Con**	**Cov**
1		●		○		0.94	0.31
2a	●	○		●		0.92	0.23
2b		○	●	●		0.92	0.23
Note: M1 includes term 2a and M2 includes term 2b.							

Terms 2a and 2b, on the other hand, are mutually substitutable and indicate an alternative pathway to gains in effectiveness. The absence of adequate resources and positive stakeholder experiences can be compensated for by adhering to the principle 'Use open standards, data, etc.'. This does, however, need to be combined with either high levels of digital readiness at the individual level – i.e. the conjoint presence of positive digital infrastructure available, willingness to adopt digital solutions, access to digital tools, and existing digital skills and literacy – or positive increases in the digital awareness and digital capacity of the stakeholders.

Turning to the analysis of the **absence of a strong contribution to effectiveness**, the QCA did not produce stable associations for the selected explanatory model.

In summary, for gains in effectiveness, two alternative paths can be identified. Reaching more stakeholders and increased uptake by them seem to be strongly associated with either spending adequate resources in contexts where stakeholders have had generally good experiences with the use of digital technologies or adhering to the digital principle to use open standards, data, etc. in contexts where stakeholders have high levels of capacity, awareness and positive access to infrastructure and tools.

Participation and inclusion. Whether a digital intervention enabled more participation and inclusion was assessed based on two sub-components: whether it contributed to the participation and inclusion of the public and whether it facilitated the inclusion of marginalised groups, thus reducing inequality (see Figure 1 in section 2.2). To examine which conditions are consistently associated with the presence/absence of strong

improvements in participation and inclusion, a QCA was performed based on an explanatory model combining three individual-level factors and two relevant 'Principles for Digital Development':

- The state of the digital infrastructure at the relevant stakeholders' disposal.
- The stakeholders' access to the digital intervention.
- The digital skills and literacy of the stakeholders addressed by the digital intervention.
- The principle to design digital tools collaboratively, i.e. by actively including stakeholders in the planning, working across sector silos and sharing working process and results with the wider public.
- The digital principle to design digital tools with the user, i.e. by gearing technical solutions to the priorities and needs of the users, including users in designing and testing, and paying particular attention to the opinions/needs of users from marginalised groups.

The QCA of **strong improvements in participation and inclusion** did not yield any stable associations for the selected explanatory model.

Table 9: Results for the outcome 'absence of strong contribution to participation and inclusion'

Most parsimonious solution | overall consistency: 0.85; overall coverage: 0.47							
Term	**Infrastructure at stakeholders' disposal**	**Stakeholder access to the digital intervention**	**Stakeholder digital literacy**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1	○				○	0.88	0.35
2			○		○	0.91	0.38
3		●	○	○		0.90	0.29
4a	○	●		○		0.86	0.27
4b	○		●	○		0.89	0.23
Note: Terms 1, 2 and 3 are essential. M1 includes term 4a; M2 includes term 4b.							

Table 9 presents the results of the **analysis of the absence strong improvements in participation and inclusion**. The model fit is good, with a consistency value of 0.85 and moderate coverage of 47%. The solution consists of two models that strongly overlap, as terms 4a and 4b only differ regarding one condition. Taken together, the different pathways highlight that there will be no major improvements in participation and inclusion if the two Principles for Digital Development 'design with the user' and 'be collaborative' are not properly addressed. If enhancing participation and inclusion is the goal, paying attention to these two principles can therefore help achieve it. At the same time, users must receive appropriate digital capacity-building to facilitate their participation (highlighted by the lack of digital literacy in term 2 and term 3) or the corresponding digital infrastructure must be available and/or supported (as stressed by term 1 and term 4a/b). In the last path, too, it is clear that this would be a prerequisite, since positive levels of digital skills alone do not increase participation without the infrastructure being provided. Furthermore, access to digital interventions alone is not enough to increase participation and inclusion if either digital literacy or infrastructure is lacking.

Awareness of digitalisation and digital capacity. To capture the contribution that digital interventions make to digital awareness and digital capacities, two sub-components in the survey asked, first, whether the digital interventions raised awareness among relevant stakeholders at the individual level to use digital tools and/or processes, and second, whether they built digital capacities of relevant stakeholders (see Figure 1 in section 2.2). To address the question which settings are (or are not) conducive to raising digital awareness and digital

capacity, the following explanatory model, encompassing five conditions combining characteristics of the digital intervention, individual level factors, context and digital principles, was applied:

- The effect of the digital interventions on improving the state of information, i.e. better data quality, quantity and access.
- The overall digital readiness at the individual level measured via digital infrastructure, willingness to adopt digital solutions, access to digital tools and existing digital skills and literacy.
- The extent to which the COVID-19 pandemic was seen as a catalyst for digitalisation.
- The principle to design digital tools collaboratively, i.e. by actively including stakeholders in the planning, working across sector silos, and sharing working process and results with the wider public.
- The digital principle to design digital tools with the user, i.e. by gearing technical solutions to the priorities and needs of the users, including users in designing and testing, and paying particular attention to the opinions/needs of users from marginalised groups.

Table 10 presents the results for the **analysis of strong contribution to awareness and capacity**. The solution consists of four paths and has a good model fit, with a consistency of 0.84 and a coverage of 70%. The first three terms all stress how important designing collaboratively with the users of digital interventions is to making a strong contribution to raising awareness and capacity among stakeholders. However, the two principles alone are not sufficient; they need to be combined with either one of the other conditions, i.e. positive individual contexts (term 1), strong improvements in information (term 2) or COVID-19 pandemic as an accelerator for the uptake of the digital intervention (term 3). Term 4 is rather interesting, as, apart from strong adherence to designing collaboratively, it is characterised by conditions that would be expected to be negatively related to increasing awareness and capacity. The comparatively low empirical coverage signals that this path covers only a few cases, in which there were some additional or even idiosyncratic features that explain why awareness and capacity increased strongly despite the rather unfavourable conditions.

Table 10: Results for the outcome ‘strong contribution to awareness and capacity’

Most parsimonious solution | overall consistency: 0.84; overall coverage: 0.70							
Term	**Improvement in information**	**Digital readiness at the individual level**	**Positive effect due to COVID-19**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1		●		●	●	0.84	0.48
2	●		○	●	●	0.88	0.39
3	○		●	●	●	0.88	0.32
4	○		○	●	○	0.90	0.18
Note: The QCA produced only one model with four terms.							

Next, we turn to the analysis of the **absence of strong contributions to awareness and capacity** as a result of the digital intervention. Here, the explanatory model produced a single path, displayed in Table 11, which is highly consistent (0.89) but only able to explain 25% of the outcome set. It shows that the absence of positive individual contexts, together with a lack of adherence to the two digital principles ‘Be collaborative’ and ‘Design with users’, leads only to moderate or small/no increases in awareness and capacity. This holds true even in contexts where COVID-19 led to an uptake of the digital intervention.

Table 11: Results for the outcome ‘absence of strong contribution to awareness and capacity’

Most parsimonious solution | overall consistency: 0.89; overall coverage: 0.24							
Term	**Improvement in information**	**Digital readiness at the individual level**	**Positive effect due to COVID-19**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1		○	●	○	○	0.89	0.24
Note: The model consists only of one term.							

In summary, the presence/absence of strong improvements in awareness and capacity among relevant stakeholder groups seems to be strongly associated with adherence to the two most relevant digital principles in this context, namely ‘Be collaborative’ and ‘Design with users’. It must, however, be stressed that other conditions must be present in order for these principles to realise their positive effects. While the model explains the increase in awareness and capacity very well, it explains its absence less well. This indicates that the lack of a strong increase in awareness and capacity depends on additional factors not included in this model.

Accountability. Increases in accountability are measured via two sub-components: gauging whether the digital intervention strengthened social accountability mechanisms of the public and whether it strengthened the accountability of and information-sharing by relevant stakeholders (see Figure 1 in section 2.2). To examine which combinations of factors are consistently linked to the presence/absence of strong improvements in accountability due to digital interventions, the explanatory model draws on five factors that capture characteristics at the individual and organisational levels, the respective stakeholder groups of the digital intervention and adherence to selected digital principles:

- Whether the general public or a civil society organisation (CSO) (or both) were among the main stakeholder groups of the digital intervention, or whether it solely addressed actors from the political, administrative, public or private sectors.[15]
- The overall digital readiness at the individual level measured via digital infrastructure, willingness to adopt digital solutions, access to digital tools and existing digital skills and literacy.
- The importance attributed to digitalisation, in general, by the management of relevant partner institutions.
- The principle to design digital tools collaboratively, i.e. by actively including stakeholders in the planning, working across sector silos, and sharing working processes and results with the wider public.
- The digital principle to design digital tools with users, i.e. by gearing technical solutions to the priorities and needs of the users, including users in designing and testing, and paying particular attention to the opinions/needs of users from marginalised groups.

[15] The survey asked participants to indicate which stakeholder groups were targeted by the digital intervention. For this analysis, whenever the wider public or a civil society organisation (e.g. NGO, CSO, union, etc.) were among the main stakeholders, the information was coded 1; if neither of the two was mentioned among the main stakeholders, it was coded 0.

Table 12: Results for the outcome ‘strong contribution to accountability’

Most parsimonious solution | overall consistency: 0.84; overall coverage: 0.42							
Term	**Public/CSO main stakeholder**	**Digital readiness at the individual level**	**Importance of digitalisation assigned by management**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1	●		●		○	0.87	0.41
2	●	○	●	●		0.89	0.39
3	●	●	●	○		0.90	0.11
Note: The QCA produced only one model with three terms.							

Table 12 presents the results of the analysis of digital interventions with a **strong contribution to increasing accountability**. The paths are consistently linked, with a high consistency (0.84) and a moderate empirical coverage of 42%. The terms show a high degree of overlap. All three indicate that the combination of the general public and/or CSOs with a strong emphasis on digitalisation by management of relevant partner institutions leads to (very) large increases in accountability. While term 1 indicates that the combination of these two conditions is already sufficient to overcome even a lack of adherence to the principle ‘Design with users’, term 2 and term 3 indicate that further conditions – either planning and implementing the digital intervention in a collaborative manner or the presence of positive overall digital readiness at the individual level – are required to overcome adverse conditions in each context.

Exploring the **absence of a strong contribution to accountability**, the QCA produced two models with a high consistency (0.94–0.95) and a moderate coverage of between 43% and 50%. In contrast to the analysis of the positive connection, the identified patterns are more diversified, indicating that the lack of an increase in accountability occurs in various settings that have less in common. Table 13 shows that the first three terms are essential to both models.

Table 13: Results for the outcome ‘absence of strong contribution to accountability’

Most parsimonious solution | M1 consistency: 0.94; M1 coverage: 0.43 | M2 consistency: 0.95; M1 coverage: 0.50							
Term	**Public/NGO main stakeholder**	**Digital readiness at the individual level**	**Importance of digitalisation assigned by management**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1	○			○	○	0.95	0.17
2	○		○			0.96	0.22
3			○	○		0.96	0.21
4a			○		○	0.93	0.25
4b	●	○		●	○	0.95	0.16
Note: Terms 1, 2 and 3 are essential. M1 includes term 4a; M2 includes term 4b.							

According to the analysis, moderate to small/no increases in accountability occur in contexts where the digital intervention is not mainly geared towards the public or an CSO and where there is either a lack of adherence to the two digital principles ‘Be collaborative’ and ‘Design with users’ (term 1) or a lack of importance assigned to digitalisation by the partner institution’s management (term 2). As indicated by term 3, small/moderate increases in accountability also occur irrespective of the main stakeholder group, as, here, a lack of managerial

importance and collaborative design is associated with the outcome. This is even more pronounced in the alternative terms 4a and 4b. While term 4a substitutes a lack of designing collaboratively with a lack of designing with users, term 4b highlights that even digital interventions that address the public and/or an CSO as main stakeholder and are designed collaboratively can yield only moderate to small improvements in accountability, if the digital intervention was not designed with users and is founded on a weak level of digital readiness at the individual level, i.e. lack of digital infrastructure and lack of access, willingness and skills on the part of the stakeholders.

In summary, the analysis of the presence/absence of strong improvements in accountability underscores the relevance of the main stakeholder group of the digital intervention, i.e. the general public and/or an CSO, and the commitment to digitalisation at relevant partner institution's management level. Both were positively associated with a strong increase in accountability, while the absence of both together is linked in four out of five paths to the absence of strong accountability gains. Being focused on the public or an CSO is no guarantee for strengthening accountability, however, since even in contexts where this is the case, only moderate or even small/no increases in accountability were observed where digital principles were considered less in planning/implementation, partner commitment was low or individual factors were mostly unfavourable.

Innovation, transferability and scalability. Determining the contribution of digital interventions to innovation, transferability and scalability was based on three sub-components: i) to what extent they stimulated innovative processes or new insights, ii) the extent to which they involved new actors beyond the original set of users and iii) the degree to which the digital intervention has been able to be transferred to other sectors, regions or user groups (see Figure 1 in section 2.2). To examine which conditions facilitate innovation, transferability and scalability through digital interventions, we performed a QCA by drawing on five factors from different analytical levels:

- Whether the digital intervention was implemented in several countries and therefore was inherently transferable.
- The overall digital readiness at the organisational level measured via the digital infrastructure, the resources assigned to digitalisation and the previous experiences with digital interventions of relevant stakeholders.
- The importance attributed by the management of relevant partner institutions to digitalisation in general.
- The presence of an innovation-friendly ecosystem.
- The degree of adherence to the digital principle 'Design for scale', i.e. whether upscaling and transferability to other contexts were considered, and foresight analysis or technology assessment on benefits and risks were conducted.

Focusing first on explaining the **strong contributions to innovation, transferability and scalability**, the QCA was not able to consistently identify a set relationship between the selected conditions and the outcome of interest.

Table 14 shows, however, that the explanatory model yielded three configurations of factors associated with the **absence of a strong contribution to innovation, transferability and scalability**. The model performs well, with a consistency of 0.91 and an empirical coverage of 47%.

Table 14: Results for the outcome ‘absence of strong contribution to innovation, transferability and scalability’

Most parsimonious solution | overall consistency: 0.91; overall coverage: 0.47							
Term	**Implemented in several countries**	**Digital readiness at the organisational level**	**Importance of digitalisation assigned by management**	**Innovation-friendly ecosystem**	**Design for scale**	**Con**	**Cov**
1					○	0.91	0.34
2		●	○			0.94	0.19
3	●		○	○		0.94	0.11
Note: The QCA produced one model with three terms.							

Term 1 highlights the importance of adhering to the digital principle ‘Design for scale’, as its absence alone is sufficient for a poor contribution to innovation, transferability and scalability of the digital intervention.

Terms 2 and 3 signal two alternate paths, irrespective of paying attention to the digital principle while planning and implementing the digital intervention. Term 2 stresses that the management level needs to attribute importance to wider digitalisation if digital interventions are to contribute to scalability, transferability and innovation. Term 3 even points out that there is no guarantee of innovation, transferability and scalability of digital interventions that are implemented in different country settings if the ecosystems there are not highly innovation-friendly and digitalisation is not considered sufficiently important by the partner institutions’ management level.

Sustainability. Sustainability is understood in this report as the contribution of a digital intervention to improving the sustainable management of natural resources (environmental dimension), including marginalised groups and thus reducing inequality (social dimension), and improving working conditions (social dimension). This is different, therefore, from whether a digital intervention and its benefits can be sustained over time. In order to examine under which combinations of conditions the presence/absence of major contributions to sustainability can be observed, a QCA based on the following explanatory model was performed:

- The effect of the digital intervention on improving efficiency, i.e. of work processes and the use of resources.
- Whether the digital intervention was seen as the best approach, compared with other alternatives, to achieve the original objectives.
- The importance and commitment attributed to digitalisation, in general, by the management level of relevant partner institutions.
- The principle to design digital tools collaboratively, i.e. by actively including stakeholders in the planning, working across sector silos, and sharing working processes and results with the wider public.
- The digital principle to design digital tools with users, i.e. by gearing technical solutions to the priorities and needs of the users, including users in designing and testing, and paying particular attention to the opinions/needs of users from marginalised groups.

Analysing, first, the **presence of a strong contribution to sustainability**, the QCA was not able to identify any consistent relations between the selected factors and the outcome.

Table 15: Results for the outcome ‘absence of strong contribution to sustainability’

Most parsimonious solution | overall consistency: 0.93; overall coverage: 0.42							
Term	**Efficiency**	**Digital as best approach**	**Commitment by management to digitalisation**	**Be collaborative**	**Design with users**	**Con**	**Cov**
1		○				0.98	0.34
2	○				○	0.90	0.31
Note: The QCA produced one model with two terms.							

Concerning the **absence of a strong contribution to sustainability**, Table 15 presents the findings of the analysis: two paths with a high consistency (0.93) and a moderate coverage of 42%. Term 1 highlights that if a digital intervention was rated as not being the best approach to achieve the objectives set out in the overall project, its contribution to ecological, social and economic sustainability was also assessed as poor. In other words, in cases where analogue alternatives would have been preferable, the digital intervention seemed to have little effect on the sustainability dimensions. Term 2, on the other hand, indicates that no or only moderate increases in sustainability can be observed if the digital intervention did not lead to large efficiency gains and users were not included in the planning and implementation of the digital intervention.

Longevity. Finally, the aspect of longevity, i.e. whether the digital intervention and its benefits can be sustained over time, was determined via three sub-components: i) the degree to which the digital intervention is institutionalised, ii) the extent to which the benefits of the digital intervention are likely to be sustained after the project has ended and iii) the degree to which the digital intervention can be maintained with sufficient capacity and resources by relevant stakeholders after the project has ended. The combinations of factors that enhance the longevity of the digital intervention were subsequently examined via a QCA based on five factors:

- Whether the initiative for the digital intervention came from outside GIZ or respective donors, i.e. from partners, the private sector or civil society, or whether GIZ projects and/or donors advanced the idea of the digital intervention.
- The degree to which national consultants are involved in the digital intervention, i.e. use of national expertise.
- The support by other donors towards furthering digitalisation in general.
- The financial resources allocated by partners to digitalisation in general.
- The digital principle to design to sustain, i.e. by developing a sustainability roadmap, determining the investment required and identifying long-term future costs and options to cover them.

Table 16 presents the results of the analysis for the **presence of a strong contribution to longevity**. They consist of two overlapping models with a high consistency (0.84) and coverage of 59%–66%. Term 1 and term 2 cover two distinct sets of digital interventions. The former consists of digital interventions where the idea came from GIZ or donors, and no adequate financial resources were provided by partners to digitalisation in general. Here, longevity was ensured by proper use of national consultants, i.e. national expertise, and strong adherence to the digital principle ‘Design for sustainability’.

Digital interventions covered by term 2, on the other hand, originated from outside GIZ and/or donors, i.e. from partners, the private sector or civil society, and were provided with adequate financial resources for further digitalisation – sufficient, even, to overcome the lack of attention paid to embedding long-term costs and investments in the planning of the digital intervention.

Term 3a and term 3b, finally, are mutually substitutable; both stress the joint relevance of designing to sustain and the general support by donors for furthering digitalisation, which can also compensate in contexts where national expertise is negatively assessed.

Table 16: Results for the outcome 'strong contribution to longevity'

Most parsimonious solution | M1 consistency: 0.84; M1 coverage: 0.59 | M2 consistency: 0.84; M1 coverage: 0.66							
Term	**Idea from outside GIZ/donors**	**Use of national consultants**	**Support by donors**	**Financial resources for digitalisation**	**Design to sustain**	**Con**	**Cov**
1	○	●		○	●	0.84	0.50
2	●			●	○	1.00	0.07
3a	○		●		●	0.83	0.48
3b		○	●		●	0.88	0.30
Note: Terms 1 and 2 are essential. M1 includes term 3a; M2 includes term 3b.							

Turning to the **absence of a strong contribution to longevity**, the results of the analysis are displayed in Table 17. Two paths with a high consistency (0.89) and moderate coverage (0.39) are linked to the outcome. In both, adequate support for furthering digitalisation by donors is absent. Lack of donor support alone, however, is not decisive for a moderate to small/no contribution to the longevity of the digital intervention. It is accompanied by a lack of adherence to including sustainability considerations in the planning/implementation processes, or inadequate use of national consultants and ideas to implement digital interventions that might not fully match the needs of the stakeholders (as the idea to implement the digital intervention was mainly brought forward by GIZ and/or donors).

Table 17: Results for the outcome 'absence of a strong contribution to longevity'

Most parsimonious solution | overall consistency: 0.84; overall coverage: 0.39							
Term	**Idea from outside GIZ/donors**	**Use of national consultants**	**Support by donors**	**Financial resources for digitalisation**	**Design to sustain**	**Con**	**Cov**
1			○		○	0.87	0.34
2	○	○	○			0.86	0.22
Note: The QCA produced one model with two terms.							

Short summary. First, there are multiple pathways linked to the different outcomes, which frequently comprise several crucial conditions. Second, the fact that for some parts of the analysis, set relations were identifiable, whereas for the opposite outcome they were not indicates that relationships are, indeed, asymmetric: while a certain set of factors might be linked to the presence of certain effects, this does not mean that the same set of factors is able to explain their absence – and vice versa. Third, the moderate coverage value of several models highlights that there are other, alternative, factors that also have an effect and might explain the outcome in a different manner. Taken together, therefore, the results of the QCA underscore the complex dynamics underlying the issue.

Which findings stand out? Regarding the introduction of digital technologies, digital capacity development should always be taken into account. This is primarily about developing and facilitating digital skills among stakeholders and providing not just sufficient digital infrastructure but also access to digital technologies. Depending on the results to be achieved, however, proper digital capacities might not be enough, but they should provide the necessary prerequisites to adopt digital interventions. In addition, they need to be facilitated by including users at various stages in the process to design the digital intervention, i.e. by following the digital principle 'Design with the user'. Furthermore, the analyses have shown that conscientious implementation of the individual digital principles or adherence to them overall leads to the desired results, even in settings where other contextual conditions may be disadvantageous. Moreover, it turns out that ownership of and commitment to digitalisation processes by partners are other important factors that affect the contribution made by digital interventions to various development results. This also resonates with statements from the focus group discussions, which stressed the relevance of partners' support for the digital intervention and the embedment of digital interventions in a broader digitalisation framework.

4.4 The contribution of digital interventions to wider digital transformation

Descriptive insights from the survey. Figure 9 presents the findings from the survey regarding the extent to which the digital intervention under evaluation contributed to wider digital transformation within the respective institutions, the sector concerned and/or society at large. The findings reveal a mixed picture: although a significant percentage of respondents agreed that their digital intervention contributed to wider digital transformation to a large or very large extent, this varies between 42% and 66%.

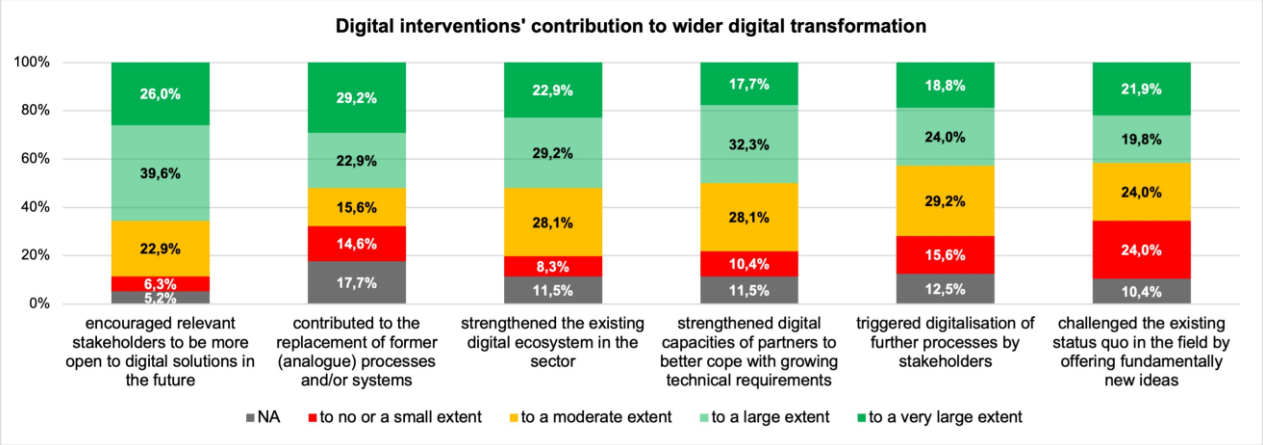


Figure 9: Findings from the survey regarding the contribution of digital interventions to wider digital transformation

Respondents saw the largest contribution in 'encouraging relevant stakeholders to be more open to applying digital solutions in the future'**. It becomes apparent that the ratio of positive evaluations decreases the deeper/stronger the desired transformative change becomes**. For instance, questions related to raising digital awareness and strengthening digital capacities at the individual, organisational and societal levels are seen somewhat more positively than the change processes that have broader implications, such as 'triggering further digitalisation processes' or 'challenging the status quo'.

GIZ differentiates between projects that support their partners in achieving development objectives more effectively and/or efficiently with the aid of individual digital solutions (digitalisation of individual processes, sectors and sub-systems) and projects that support partners in shaping a broader process towards digital transformation through reform efforts and systemic capacity development in partner countries (GIZ, n.d.). The focus group discussions frequently mentioned that it is not enough simply to convert analogue processes into digital ones; they need to be embedded in a broader digitalisation strategy. Similarly, when focus group participants talked about the problem of *'shiny digital gadgets'* that do not solve actual problems in a sector

and/or society, this was borne out by the comparatively poor evaluation of the contribution of digital interventions to facilitating deeper transformative changes. Based on the data from the survey, however, there was no observable systematic correlation between the assessment of whether the digital intervention was in line with the partner's digital strategy and the evaluation of the digital intervention's contribution to wider digital transformation.

Analysis of digital readiness and contribution to wider digital transformation. Table 18 provides the findings from simple bivariate correlations between the digital readiness at the individual, organisational and socio-political levels vis-à-vis the contribution of the digital intervention to wider digital transformation. **They reveal a weak positive correlation between the three levels and strengthened digital capacities of partners to cope with growing technical requirements of the digital transformation, and triggering a further process of digitalisation among stakeholders.** The data suggest, therefore, that the better (poorer) the context is rated, the larger (smaller) was the contribution to strengthening the digital capacities of partners. Similarly, the better (or worse) the context, the larger (or smaller) the contribution of the digital intervention to facilitating further digital processes. Since the contextual factors comprise several features, multiple underlying mechanisms can be hypothesised. During the focus group discussions, for instance, it was frequently pointed out how important it is for users and stakeholders to have positive experiences with a digital intervention. The presence of a positive individual context might be a critical factor here, as it captures the required necessary components, such as digital infrastructure, but also the willingness to adopt and the capacities to use the digital interventions.

Table 18: Bivariate correlation between the context at the individual, organisational and socio-political levels, and the contribution of the digital intervention to wider digital transformation

	Encouraged relevant stakeholders to be more open to digital solutions in the future	**Contributed to the replacement of former (analogue) processes and/or systems**	**Strengthened the existing digital ecosystem in the sector**	**Strengthened digital capacities of partners to cope with growing technical requirements**	**Triggered digitalisation of further processes by stakeholders**	**Challenged the existing status quo in the field by offering fundamentally new ideas**
Digital readiness in the individual context						
Pearson's r *(p-value)*	0.188 (0.067)	0.113 (0.273)	0.063 (0.542)	**0.309** **(0.002)**	**0.344** **(0.001)**	0.041 (0.692)
Digital readiness in the organisational context						
Pearson's r *(p-value)*	0.191 (0.849)	0.163 (0.871)	0.136 (0.892)	***0.259*** (0.796)	***0.286*** (0.775)	-0.014 (0.989)
Digital readiness in the socio-political context						
Pearson's r *(p-value)*	0.171 (0.865)	-0.072 (0.943)	0.224 (0.823)	***0.347*** (0.730)	***0.276*** (0.783)	0.187 (0.852)

Note: The individual context includes the following factors: digital infrastructure, willingness to adopt digital solutions, access to digital tools, and digital skills and literacy. The organisational context is based on: the digital infrastructure, resources assigned to digitalisation and previous experiences of digital interventions of relevant stakeholders. The socio-political context includes: the support of relevant political actors towards furthering digitalisation; the support of other donors towards furthering digitalisation; the financial resources of partners for enhancing digitalisation; the presence of an innovation-friendly digital ecosystem; existing laws and regulations on digitalisation.

4.5 Digital interventions and their unintended negative consequences

Descriptive insights from the survey and the focus groups. As pointed out in section 2, most existing evaluations of digital technologies in development work concentrate only on the positive effects, while overlooking (unintended) negative consequences that might be directly or indirectly linked to the use of digital interventions.

Figure 10 displays the findings regarding whether the digital intervention triggered any negative consequences at the individual level, the organisational level and/or the socio-political level. The findings are from 96 surveys, which provided sufficient information. Several points stand out.

Between two-thirds and three-quarters of survey participants indicated that their digital intervention caused no negative consequences (with just a few mentioning very minor negative consequences). Very negative ratings, i.e. that the digital intervention triggered negative consequences to a large or very large extent, were rare. Taking both categories together, between 0% and 7.3% of respondents rated their digital interventions thus. Stating that a digital intervention had moderate negative consequences could therefore be considered a rather non-positive finding. Few respondents did so, however, so, **overall, the picture appears very positive.**

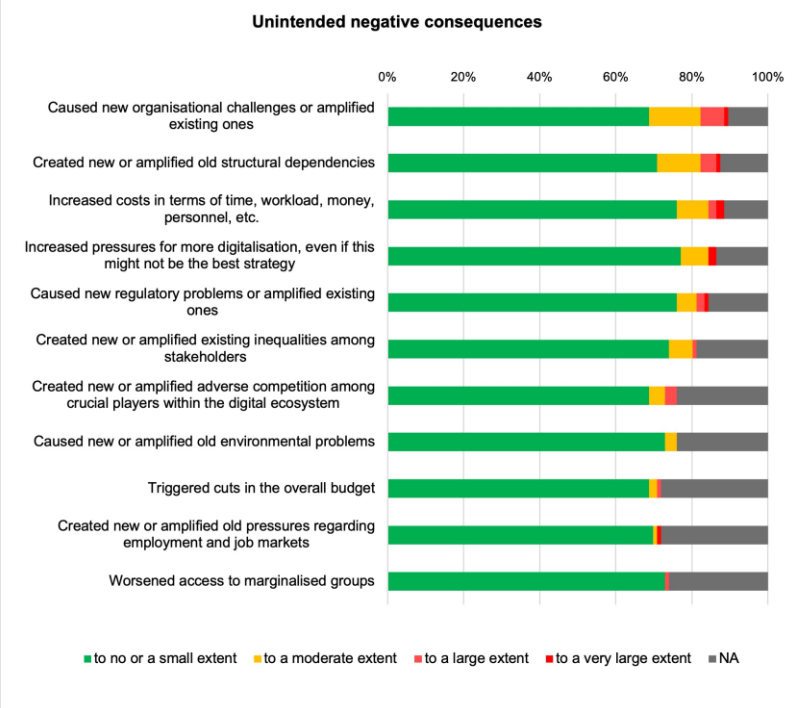


Figure 10: Findings from the survey regarding unintended negative consequences

These data patterns can also be read very differently, however. First, the analysis of adherence to digital principles (see section 4.1) showed that conducting proper foresight analysis to identify risks and negative consequences was one of the least applied sub-principles. If this is the case, projects might have a blind spot concerning negative consequences of which they might not even be aware.[16] The same applies to the sub-principle 'inclusion of marginalised groups', which was also among the least followed principles. In other words, the lack of negative consequences might be due, instead, to the fact that such consequences were not properly mapped and monitored. Second, a (potential) lack of awareness of negative consequences also became apparent during the focus group discussions. From all segments of the focus groups, the discussion about negative consequences produced the lowest number of statements from participants. Many participants were struggling to name *any* negative consequences and several statements revealed that participants struggled, in general, with the examination of negative consequences or were unable to link the discussion about challenges in implementing digital interventions to potential negative consequences resulting from them.

Overall, therefore, the appearance of negative consequences more frequent than the assessment suggests. It fits a pattern that was highlighted by another participant in the focus group discussions, who felt

[16] Besides the unintended negative consequences listed, the survey included a free-text option for respondents to add further negative consequences in case they were unable to make a selection from the categories offered. This option was barely used, however, indicating that the survey was targeted at the correct set of negative consequences.

there is a tendency for reports collected on projects to *'mention less and less negative or unintended consequences'.*

If negative consequences were noted, they referred mainly to **problems at the organisational level**: 20.8% stated that the digital interventions caused new organisational challenges or amplified existing ones. In addition, 12.5% observed an unexpected increase in costs in terms of time, workload, money or personnel, while 10% noted that the use of digital interventions increased pressures for more digitalisation, even where this was unwarranted. Besides these negative consequences pertaining to the organisational level, the amplification of structural dependencies (16.7%) ranks among the top three unintended consequences covering a range of negative side-effects that cut across the three analytical levels.

Some of the few statements made in the focus groups about unintended negative consequences related directly to those covered in the survey, such as the *'the duplication of work'*, *'negative effects on jobs'* and *'increase in entry barriers and digital divide'*. Several other negative consequences were mentioned that should be added to the list: participants in three out of nine focus groups highlighted that, compared with analogue projects, they had to invest more effort in establishing personal relations, trust and awareness among their stakeholders. Participants in three focus groups also observed that interactions with and participation by the stakeholders was greatly reduced in digital settings compared with analogue ones. In addition, participants stated that they observed a loss of human empathy, referring to *'uncivility, bad behaviour and missing digital etiquette in debates'* (anonymised participant) or a lack of human interaction more generally. Further unintended negative consequences discussed by two out of nine focus groups referred to the (unexpected) resistance by or vested interests on the part of different actor groups, as well as issues relating to privacy, security and data protection, particularly in contexts where '*sensitive data might do harm to vulnerable groups*' (anonymised participant) should it fall into the wrong hands.

Analysis of potential causes linked to unintended negative consequences. No relationship can be observed between the number of Principles for Digital Development adhered to and the number of unintended negative consequences reported. **In other words, unintended negative consequences are present/absent irrespective of whether projects adhered to many or few digital principles.** As pointed out in section 4.1, the sub-principle regarding the conduct of foresight analysis or technology assessment on benefits and risks – which is clearly related to thinking upfront about potential negative consequences – was one of the least applied sub-principles. One could therefore expect that failure to consider risks in advance is linked to the number and/or occurrence of unintended negative consequences. However, a simple bivariate test suggests there is no systematic difference between digital interventions with or without unintended negative consequences and adherence to this sub-principle. Taken together, these findings suggest that the digital principles – at least as understood in this report – cannot explain the occurrence or absence of unintended negative consequences.

A closer look at the unintended negative consequences observed shows that they **are largely grouped within a sub-sample of digital interventions.** While 70% of the survey respondents indicated no or (very) small unintended negative consequences (67 out of 96 digital interventions), for 16% (15) of the digital interventions it was reported that one or two negative consequences were apparent to a moderate or even (very) large extent. Indeed, 15% (14) of survey respondents noted that the respective digital intervention triggered three or more negative consequences to a moderate or (very) large extent. What differentiates these two groups? Among the types of digital interventions, public e-platforms, includinge e-payment/e-marketplace systems stand out as being more likely to trigger negative consequences. Here, organisational problems were frequently mentioned, like inefficient work processes, e.g. because of double structures featuring either different systems or a combination of paper-based and digitalised processes, and the higher workload these created. One participant in the focus groups, for instance, mentioned the *'duplication of work, since multiple systems needed to be built'*, because they were not interoperable. Regarding policy sectors, climate, environment, biodiversity and forestry, as well as agriculture and rural development, show a slightly higher propensity to be associated with unintended negative consequences compared with other sectors. There is no

apparent trend with regard to countries or regions, although participants from Colombia reported comparatively more negative consequences of digital interventions than those from other countries.

An alternative set of explanatory factors are the individual, organisational and socio-political contexts in which the respective digital interventions are embedded. For instance, it is reasonable to assume that the positive/negative evaluation of the context at the individual level, i.e. the digital infrastructure, willingness to adopt digital solutions, access to digital tools, and digital skills and literacy, is linked to the occurrence (or not) of unintended negative consequences at the individual level, i.e. digital interventions that 'created/amplified inequalities among stakeholders', 'worsened access to marginalised groups' or 'created/amplified structural dependencies'. The same can be assumed with regard to the organisational and socio-political contexts vis-à-vis their respective unintended negative consequences. Examining patterns between the digital readiness at each contextual level and the occurrence of unintended negative consequences yields no significant correlations if we look at the fine-grained scales.

Table 19 indicates an asymmetric relationship that is not explained by correlations, however. At the individual and organisational levels, unintended negative consequences do not occur (0) in all kinds of contexts (positive and non-positive, i.e. moderate or negative); they occur almost exclusively (1) in the absence of positive contexts. In other words, while non-positive contexts, such as a lack of digital infrastructure, willingness to adopt digital solutions, access to digital tools and digital skills among stakeholders, do not automatically lead to unintended negative outcomes, almost no negative consequences appear in positive contexts. Calculating the odds ratio, it becomes apparent that the **chance of observing negative unintended consequences in non-positive contexts at the individual level is 3.5 times higher than for positive contexts, and 7.6 times higher at the organisational level**. No relationship can be found for the socio-political level.

Table 19: Relationship between unintended negative consequences at the individual, organisational and socio-political levels and the respective digital readiness at the contextual level

	Digital readiness at the individual level related to individual unintended negative consequences		**Digital readiness at the organisational level related to organisational unintended negative consequences**		**Digital readiness at the socio-political level related to socio-political unintended negative consequences**	
	0	*1*	*0*	*1*	*0*	*1*
Non-positive context	76%	24%	76%	24%	84%	16%
Positive context	91%	9%	96%	4%	84%	16%
	Odds ratio 3.5		Odds ratio 7.6		Odds ratio 1.0	

Note: 0 includes cases that show no or only very minor negative consequences; 1 includes all digital interventions with one or several unintended negative consequences at the respective level. Digital interventions displaying unintended negative consequences at the individual level are those which 'created/amplified inequalities among stakeholders', 'worsened access to marginalised groups' or 'created/amplified structural dependencies' – a total of 19 digital interventions. Negative consequences at the organisational level include 'caused/amplified organisational challenges', 'increased pressures for more digitalisation', 'increased costs in terms of time, workload, etc.' or 'triggered cuts in the overall budget' (in total, 22 digital interventions). Socio-political unintended negative consequences comprise 'created new or amplified existing pressures regarding employment and the jobs market', 'created new or amplified existing environmental problems', 'caused new regulatory problems or amplified existing ones' and 'created new or amplified adverse competition among crucial players within the digital ecosystem' (in total, 14 digital interventions). The individual context includes the following factors: digital infrastructure, willingness to adopt digital solutions, access to digital tools, and digital skills and literacy. The organisational context is based on: the digital infrastructure, the resources assigned to digitalisation and the previous experiences with digital interventions of relevant stakeholders. The socio-political context includes: the support of relevant political actors towards furthering digitalisation; the support of other donors towards furthering digitalisation; the financial resources of partners for enhancing digitalisation; the presence of an innovation-friendly digital ecosystem; existing laws and regulations on digitalisation. Patterns at the organisational level reach statistical significance $p < 0.05$.

Short summary. For most digital interventions, no unintended negative consequences or only very minor ones were reported. Moreover, only a few issues were mentioned during the focus group discussions. The question whether this means that '*everything went as planned*' in all cases, as one participant said during the focus group discussions, or it signals a lack of engagement with the potential negative consequences must remain

open at this point. The survey and focus groups confirmed that fewer and fewer negative consequences seem to get reported. This, together with the fact that digital principles concerning the conduct of strategic foresight analysis and technology assessment to identify benefits and risks before the implementation of a digital intervention were among the less frequently followed principles, means a lack of awareness cannot be dismissed out of hand.

Against this backdrop, formulating a **new digital principle that explicitly addresses this problem and raises awareness among GIZ staff of the negative consequences associated with digital interventions** might be an effective way of mapping potential negative problems upfront. It is also noteworthy that unintended negative consequences are strongly grouped within certain digital interventions. Put differently, while many digital interventions triggered no negative consequences, several caused one, two or even multiple negative consequences.

Finally, it seems that the appearance of unintended negative consequences is – at least partially – associated with the presence of non-positive contextual conditions capturing the digital readiness at the individual and organisational level. **While unintended negative consequences do not have to occur in non-positive contexts, they are much more likely to do so than in positive contexts, indicating a vicious circle whereby negative starting conditions may lead to a worsening of the situation as a result of digital interventions**.

4.6 Further need for effective rollout of digital interventions

Digital by Default approach. When asked whether using a digital tool was the best approach to achieve the planned objectives compared with existing alternatives, respondents overwhelmingly agreed, with 91% indicating (strong) agreement. This positive assessment of 'going digital' was corroborated in the focus group discussions. In general, the Digital by Default (DbD) approach was perceived as a necessity for development work in the digital age that cannot and should not be avoided (mentioned in four out of nine focus groups). In addition to making very **positive statements** about GIZ's DbD approach, describing it as a *'clear success story'* (anonymised participant) and a successful way to *'further an open digital culture within GIZ'* (anonymised participant), the majority of focus groups reviewed the **merit of DbD critically and in a constructive manner**. The discussions revolved around three interrelated topics:

- First, all focus groups stressed, one way or another, that **digitalisation is or should not be an end in itself but a means to achieve defined objectives**. DbD should therefore always be human-centred. Projects implementing digital interventions should always ask *'how services provided by people can be enhanced, instead of solely focusing on replacing people'* (anonymised participant). Two-thirds of the focus groups furthermore highlighted that DbD needs to be combined with an assessment of context and problems that require a strong human component or where it is essential, even, to have humans in the loop at every stage of the project. Instead of thinking *'digital only'*, the smart combination of online and offline services was seen as the most promising way forward in seven out of nine focus groups.
- Second, a related but slightly different aspect was the fear expressed by participants that DbD facilitates a **focus on 'shiny' digital gadgets instead of effective problem-solving tools**. As one participant observed, there is a *'tendency in project meetings to ask as a last question: "and now, what can we digitise?"'* (anonymised participant). Others observed a tendency towards *'over-engineering'* in order to come up with new digital solutions (anonymised participant).
- Third, **creating more awareness of DbD within GIZ** was stressed in one third of the focus groups. For instance, two focus groups highlighted that there is still some resistance to digital approaches at HQ and among other GIZ personnel. There was an explicit desire for making it clearer what DbD means for GIZ and what it can contribute to making development work more effective.

Further support from GIZ. We also asked participants in the focus group discussions what their digital projects would need in the future from GIZ and/or colleagues to enable them to promote the Digital by Default approach effectively and create more impact with the rollout of their digital interventions. The issues mentioned can be grouped into three thematic clusters:

- Six out of nine focus groups stressed that **GIZ should rethink how projects are set up in the digital age**. A major point of critique here was that project cycles are way too short and too linear, and therefore not suitable for digital projects, which need more time and room for learning, going back and forth between different options, and making necessary adaptations. As one (anonymised) participant put it, having *'longer appraisal missions in order to get an adequate picture about what is actually needed'* would also allow the inclusion of innovative approaches from partners. In addition, an extension of the reporting and reviewing phase, together with the provision of greater financial resources, was called for in several focus groups, to ensure that enough resources are provided in order to derive lessons to be learned. Besides time and money, more flexibility regarding contracting was mentioned (in one focus group), as was (in another) GIZ's general role as a facilitator versus producer of ICTs.
- There were also practical examples provided of **how GIZ could improve support to its staff**. One topic discussed in three out of nine focus groups was the requirement to have more expertise and personnel regarding specific topics important to digitalisation. For instance, it was highlighted that specific topics require more diverse but also more specialised skills on the part of personnel. Initiatives like GIZ's digital ambassadors were therefore seen as critical as they mostly offer a generalist's expertise where more specialisation is often required. In this sense, **digitalisation in general is not a competence**. In addition, it was highlighted that technical experts without a background in digitalisation should always be heavily involved, to ensure feasibility and relevance of the intervention. A second theme discussed in connection with increasing awareness of DbD was the need for more knowledge-sharing and management within GIZ. Participants referred to various stages – from ideation, planning and designing to implementation and assessment of digital interventions. A third of the focus groups mentioned sharing best-practice examples and lessons learned as a way of avoiding people feeling like they are *'the first person [to have] this specific problem'* (anonymised participant). There were also calls for more support in dealing with legal questions related to, *inter alia*, data protection or open data and open software, and more support for project managers to think about how best to implement the DbD approach. Finally, one focus group also intensively debated the issue of how GIZ needs to enlarge its digital toolkit and open it up or make it possible to use alternative (software) tools, if partners' contexts require this, e.g. because of often higher acquisition and maintenance costs, etc.

- Finally, there was a general call (in six out of nine focus group discussions) for investing more time, resources and capacities in the **assessment of digital interventions** in terms of their usefulness, adequate areas of use, their effects and consequences, etc. Existing frameworks for assessment, e.g. the criteria in the BMZ toolkit, were criticised for not adequately capturing core criteria or providing only very rough definitions. Along the same lines, participants in four out of nine focus groups stressed that assessment tools and frameworks should include quantitative as well as qualitative indicators to capture soft aspects that are difficult to measure quantitatively. It was also acknowledged that a balance needs to be struck *'between standardisation and datafication'* (anonymised participant), because there is a tendency towards the latter. Some focus groups also discussed possible solutions. In cases where there are a lot of quantitative data available, the use of big data and algorithms was suggested as a way to overcome the problems inherent in self-assessment. The idea of pre-registration might be practical in contexts characterised by a lack of data. Pre-registration is a concept from social science methodology, where critical aspects and benchmarks of a research design and expected findings are registered in advance of the actual study, so that it can be determined where a project deviated from the original plan and which decisions and/or results ran counter to the initial ideas. Translated to development work, projects could define (qualitatively or quantitatively) the expected results of digital interventions *a priori*, and then use these initial scores as benchmarks for their subsequent evaluation. Where a digital intervention is used multiple times, results and effects might be compared over time and space. Finally, it was also suggested that a digitalisation marker be introduced, which could function like existing gender markers (see, for instance: GIZ, 2014).

5 Conclusions

This evaluation is of a systematic cross-case analysis aimed at generating systematic data and providing empirical analysis of the use of digital interventions across a wide spectrum of services implemented by GIZ. Section 4.1 shed light on research question (RQ) 1 by examining the extent to which the Principles for Digital Development framework is considered during the implementation of digital interventions. Section 4.2 then addressed RQ2 by offering a systematic picture of the (perceived) major added benefits of digital interventions at the output and outcome level of GIZ's development work. To provide some initial answers concerning potential factors that consistently help and/or hinder the effectiveness and success of digital interventions, section 4.3 presented the findings of a series of QCA on individual results dimensions based on the ToC outlined in section 2.2. Touching upon RQ3 regarding the extent to which the digital interventions contributed to wider digital transformation, section 4.4 discussed the descriptive patterns and examined whether and to what degree digital readiness at the individual, organisational and socio-political levels is associated with selected aspects of digital transformation. Section 4.5 reported the findings relating to RQ4: to what extent the digital intervention triggered unintended negative consequences and which areas are most prone to experiencing negative effects – a topic that is often widely neglected. Finally, section 4.6 answered RQ5 by addressing perceptions of the DbD approach among GIZ employees, its added benefits and the basic requirements for effective implementation.

What conclusions can be drawn from the data and analyses presented? Following is a summary of some of the main findings discussed in the different sections, together with an indication of recurring features that appear to be crucial if digital interventions are to have a positive effect in development work.

Digital capacity-building at the individual level is key. When introducing (new) digital technologies, digital capacity turns out to be a key issue. This pertains to ensuring high levels of digital literacy and skills among users, e.g. through appropriate training measures, the availability of adequate digital infrastructure, like internet

connection, computers and other ICTs, or sufficient access to the digital technologies used in development work.

Depending on the results to be achieved, however, proper digital capacities might not be enough but they should provide the necessary prerequisites to adopt digital interventions. In addition, they need to be further facilitated by including users at various stages of the process to design the digital intervention, i.e. following the digital principle 'Design with the user'. Against this backdrop, the finding that most projects do include users in the planning of digital interventions gives cause for a positive evaluation. However, it was also apparent that greater consideration of the 'leave no one behind' principle might be warranted, as only a minority of projects stated that they explicitly focused on the inclusion of marginalised user groups.

Commitment to and ownership of digital interventions as another critical factor. The analyses have also shown that creating ownership of and ensuring high levels of commitment to digitalisation processes among partners are also important factors that affect the contribution of digital interventions to various development results. Early buy-in by the management of the partner institutions should be supported to ultimately strengthen ownership of a digital intervention. This also resonates with statements made in the focus group discussions stressing the relevance of partners' support for the digital intervention and the embedment of digital interventions in a broader digitalisation framework.

Creating ownership and a sense of shared responsibility, as well as transferring knowledge to and including multipliers from partner countries' societies, are also linked to the aforementioned aspect that stakeholders should be included at various stages of the digital intervention. In addition, it was pointed out that convincing stakeholders who are sceptical about or even resistant to further digitalisation needs to be dealt with early on.

However, this also requires thinking about sustainability plans and how durability of digital interventions can be guaranteed right from the start. Here, the analysis of the digital principles revealed considerable room for improvement, as only a slim majority of the digital interventions in the sample noted that they had developed a comprehensive sustainability map together with stakeholders or identified the long-term costs and respective options for sustaining the digital intervention beyond the end of the project. Regarding the latter, it was mentioned that it can be difficult to hand over the digital intervention at the end of the project, because local partners lack the capacity and resources to sustain and use it afterwards. With regard to capacity-building, the institutionalisation and continuity of the digital intervention, it was highlighted that developing single digital interventions only makes sense if they are embedded into a larger digitalisation strategy.

Unintended negative consequences of digital interventions as apparent blind spots. The reported findings suggest that there is a systematic blind spot when it comes to unintended negative consequences. Only a few digital interventions reported negative effects and, often, connections between challenges and unwarranted negative effects were not drawn. As the conduct of strategic foresight analysis and technology assessment to identify benefits and risks before the implementation of a digital intervention was among the least frequently followed digital principles, a lack of awareness cannot be dismissed out of hand.

An effective option here would be to formulate a digital principle that explicitly addresses this problem and raises awareness among GIZ staff of the potential negative consequences associated with digital interventions. For instance, criteria drawn from technology assessment and responsible research and innovation could serve as a checklist that projects can use to assess the potential negative consequences of their digital intervention in a systematic and comprehensive way.

Another interesting finding was that while many digital interventions did not trigger any negative consequences, several caused one, two or even multiple negative consequences. Here, further analyses seem to indicate a vicious circle, whereby negative starting conditions may lead to a worsening of the situation as a result of digital interventions – a fact that, again, highlights the importance of digital capacity-building at the individual, organisational and socio-political levels.

Increasing awareness of digital principles. Beyond the necessity for digital capacity-building the analyses have shown that conscientious implementation of the individual digital principles or adherence to them overall

leads to the desired results, even in settings where other contextual conditions may be disadvantageous. Creating stronger awareness of the Principles for Digital Development might be an effective strategy, therefore, especially in light of the facts that i) the framework is not as widely known (or at least explicitly used) by GIZ staff as was thought and ii) there is still considerable room for improvement with regard to applying all digital principles.

While GIZ is already operating from a solid basis, future efforts should concentrate on providing more guidance on how to translate abstract principles into everyday practice and on offering more opportunities for sharing knowledge and best-practice experiences regarding how to embed digital principles when planning, designing and implementing digital interventions.

More orientation, guidelines and impact assessment required. To do so, however, will require investing more time, resources and capacities in assessing the impact of digital interventions, i.e. their usefulness, adequate areas of use, their effects and consequences, etc. Beyond creating more awareness of the DbD approach within GIZ, structural changes were frequently cited as necessary in order to facilitate and implement DbD in a more effective manner. Another recurring topic was the need for more knowledge-sharing and management within GIZ. This includes, *inter alia*, sharing best-practice examples and lessons learned or providing more guidance and support for dealing with questions related to data protection or open data and open software. Besides time and money, more flexibility regarding contracting was mentioned, as was the requirement for more expertise and personnel with regard to specific digital topics.

It is crucial to follow a human-centred approach. At the end of the day, further digital transformation needs to be steered towards making the life of humans better. Digitalisation must not be an end in itself, therefore, but should be human-centred. When planning and implementing digital interventions, questions that should be addressed include whether and how the digital services concerned lead to actual advances or how features of a digital intervention needs to be designed to ensure trustworthiness, reliability and usability among stakeholders. Here, the analyses highlighted that, compared with analogue projects, digital interventions need to make additional efforts to establish personal relationships, trust and awareness among their stakeholders. This is crucial, since positive experiences among users and a willingness or openness to adopt digital tools have turned out to be relevant factors that support the effectiveness of digital interventions across selected aspects of development work.

A human-centred approach, however, also means asking how analogue and digital approaches can be combined in smart ways in order to create synergies; when analogue processes and human interactions might be better suited to achieving certain goals; or in which settings human components are required and cannot or should not be digitalised.

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7 Annex

7.1 Annex A1: Survey questionnaire

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Harvesting Digital Service Results – Share your project's experiences

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Thank you for sharing your experiences linked to one digital intervention within your project!

For this survey, digital intervention is defined as:
Any project activity or output, which was delivered by means of 1) a digital technology or innovation to support the achievement of project or development objectives (e.g. a digital e-management-system, an app, a web platform, a GIS System, etc.) or 2) consulting a partner on digitalization or digital transformation (e.g. a Digital Hub or a strategy on digitalization in the education sector, among others).

About this survey:
This survey is run by **GIZ's Corporate Unit Evaluation** together with a team of **external consultants from the Technical University of Munich (TUM).** Its aim is to collect lessons learned for GIZ's digital service delivery, both **for your country office and GIZ in general.** This survey assesses the **benefits of digital interventions for sustainable development.** Concretely, we are interested in the digital intervention implemented by your project, the application of digital principles as well as supporting and hindering factors to achieve different outcomes and to contribute to digital transformation. We only ask questions on these aspects.

Your digital interventions and experiences count:
Your project has been proposed to participate in this survey by your **country office** and chosen by us because we **believe that your experiences** with implementing digital interventions can **give an important contribution** to the evaluation, as well as the learning of your country office and GIZ in general. Thank you for **giving us about 25 minutes of your time** to contribute to this learning by participating in this survey **until 3.9.2021.**

Before you start, please consider the following aspects:

- On the next pages youshould only report on **one (!) specific digital intervention of your project, as named in the invitation mail**, and make sure that nobody else in your project reports on the same digital intervention.
- If you support(ed) a second, third or even more digital intervention(s), it is crucial that you fill out **a separate questionnaire for each individual digital intervention.**
- You do not have to answer the complete questionnaire in one run. It can be **temporarily saved** once it has been started and can be **resumed** at a **later** point, as long as you use the same device and browser. You and **your colleagues can reply to the survey simoultaneously**, each from your own device.
- Please consider the **Note on Privacy and Data Protection** for this survey here and Askallo in more general.

Just remember to complete the questionnaire before **sending it until 3.9.2021.**

Again, thank you for your time and efforts

Your Corporate Unit Evaluation, together with the team from the Technical University of Munich.

Harvesting Digital Service Results – Share your project's experiences

Please read this brief information before starting the survey!

- This survey aims to evaluate many different GIZ digital interventions to get a comprehensive overview of the wide range of exciting activities you are involved in. The diversity of digital interventions requires that **questions are asked on a rather abstract level. Please, pick the answer on the scale that seems most appropriate to you on an aggregate level.** For example: If situations changed over time, please make the decision on the scale that makes the most sense to you for a **balanced assessment** of the digital intervention.

- For projects **within the SICA region**: If the digital intervention was planned or implemented in more than one country, please base your evaluation on an **overall assessment.** If the digital intervention was part of a bilateral project, please still select SICA region on the next page.

- At the start of each section, we provide you with some information on the **benchmarks against which you should assess the digital intervention** for each battery of questions.

- If you answer to **open text fields**, please make sure that your answers do **not include information** that permit conclusions **on a natural person.** In case of non-compliance, the questionnaire might be deleted and not considered in the evaluation.

- Do not be surprised if questions/sections are partially skipped. **This is because not all questions might be relevant to each stage of implementation.**

- Please only consider the results of the **one digital intervention at hand.** Do not consider further digital services which are part of your project but are unrelated to the specific digital intervention.

- **Important:** All following questions are to be answered for the selected digital intervention in a specific country or the SICA region only. **If there are multiple digital interventions in your project, please fill out a separate survey!**

Harvesting Digital Service Results – Share your project's experiences

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A. General information on the digital intervention

1. We invited you to share your experiences on a digital intervention linked to one specific country or region. Please verify the country or region hereunder and correct if necessary.

- ○ Colombia
- ○ Ghana
- ○ Indonesia
- ○ Kosovo
- ○ Laos
- ○ Rwanda
- ○ Serbia
- ○ SICA region
- ○ South Africa
- ○ Tanzania
- ○ Uganda
- ○ Vietnam

2. We invited you to share your experiences linked to one digital intervention of a specific project. Please verify this project's main sector hereunder and correct if necessary.

- ○ Climate change
- ○ Crisis, conflict, desaster
- ○ Decentralization, urban & regional development
- ○ Education & Youths
- ○ Energy
- ○ Enviromental policy, resources efficiency
- ○ Forestry & biodiversity
- ○ Governance
- ○ Health & Social Protection
- ○ Other
- ○ Private Sector
- ○ Rural development & agriculture
- ○ Transport
- ○ Vocational training & labour market
- ○ Water & Waste

We invited you to share your experiences in this questionnaire linked to one digital intervention.
Please provide us with some additional information on the digital intervention you are reporting up on.

3. Please select the type of digital intervention which is supported within the project and country as stated above. Choose the one item that best describes the digital intervention.

- ○ 3D printers
- ○ (Mobile) applications
- ○ Artificial Intelligence (AI)
- ○ Big Data Analysis Systems
- ○ Control systems
- ○ Customer Relationship Systeme (CRM)
- ○ Cyber Security/IT Security
- ○ Databases / Blockchain
- ○ E-Learning (Digital learning software, MOOC platforms, open educational resources)
- ○ Digital Registries
- ○ Drones
- ○ eMarketplace /eCommerce
- ○ GIS (Geo Information Systems) / Mapping
- ○ Identification and authentication
- ○ E-Management Systems
- ○ Innovation Hubs / Maker Spaces
- ○ Internet of Things / Sensors
- ○ e-Monitoring
- ○ e-Payment Services, FinTech, e-vouchers
- ○ Radio
- ○ Robotics
- ○ Serious Games
- ○ Smart cards, Chip cards
- ○ SMS service, Hotlines, Interactive Voice Response
- ○ Social media, Online Content (FB groups, blogs, etc.)
- ○ Virtual / Augmented Reality
- ○ Web Platforms
- ○ Workflow and Algorithms
- ○ Non-technology based (policy consultation, digital strategy, building digital literacy, hackathons)

4. Please describe the digital intervention very briefly; e.g. what were the main objectives, basic functionalities.

(max. 3 sentences)

5. Please select the status of this digital intervention.

Development phase: The digital intervention is (theoretically) under development but not (yet) tested in the field.
Piloting phase: A first version of the digital intervention is tested but not yet comprehensively put into practice.
Implementation phase: The actual implementation of the digital intervention is ongoing or completed.

- ○ development phase
- ○ piloting phase completed
- ○ implementation ongoing
- ○ implementation completed
- ○ cancellation / postponement decided

6. This digital intervention is in place since … (MM/YYYY)

7. Please select the main stakeholder group using this digital intervention.

(multiple selection possible)

- ☐ administrative governmental institutions (e.g. local, regional or national state institutions, ministry or committees incl. their staff)
- ☐ public service providers (e.g. health center or schools)
- ☐ private sector actors (e.g. companies, MSME or farmers)
- ☐ civil society organisations (e.g. NGO or trade unions)
- ☐ donors
- ☐ general public (e.g. citizens or communities)

8. Is the selected (group of) stakeholders also the final beneficiary of the digital intervention? If not, please who is?

Note: Users of a digital intervention are the persons that are directly working with the digital intervention and "utilize" it. The final beneficiaries of the digital intervention on the other hand, are the target group that is intended to profit from the digital intervention/service. Example: A government agency (user) uses an e-management system (digital intervention) to process public services delivered to citizens (final beneficiary).

9. The idea to implement the digital intervention was brought forward by …

(multiple selection possible)

- ☐ GIZ
- ☐ Partner
- ☐ Public
- ☐ Private sector
- ☐ Donor
- ☐ Other

10. Is this digital intervention implemented in different countries?

- Yes
- No

Information on non-technology-based interventions

The following sets of questions are mainly targeted at technology-based interventions. This means that the framing of the questions might not 100% fit to your intervention in all instances. We kindly ask you to provide answers as best as you see fit and transfer them to the context of your intervention.

Note: If a question is not applicable in the context of this intervention, always select the answer option "Not applicable".

B. Outputs & Outcomes linked to a digital intervention

Please read the information before replying to the following questions.

In this section, we would like to learn more about the results and consequences of the digital intervention, and in how far it has triggered changes across different dimensions. Against this backdrop, how do you rate the following statements?

- When answering the following questions, the **benchmark** should be **the situation prior to or without the digital intervention**. If situations changed over time, please, provide an overall assessment.
- If a specific result **does not apply** to the digital intervention at hand, select "Not applicable".

Efficiency

11. The digital intervention …

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
...made work processes of relevant stakeholders more efficient.	○	○	○	○	○	○	○
… led to more efficient use of resources (e.g., financial, human, environmental).	○	○	○	○	○	○	○

Effectiveness

12. The digital intervention …

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… increased the number of relevant stakeholders to be reached.	○	○	○	○	○	○	○
… increased the use of provided (digitized) services and/or knowledge.	○	○	○	○	○	○	○
… led to more equal access to goods, services, and information by relevant stakeholders.	○	○	○	○	○	○	○
… improved the quality of services provided by relevant stakeholders.	○	○	○	○	○	○	○
… increased profit (e.g. income, revenue) of relevant stakeholders through optimized practices/production.	○	○	○	○	○	○	○

Transparency & Accountability

13. The digital intervention …

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
…increased the amount of data or information available to relevant stakeholders.	○	○	○	○	○	○	○
… improved the quality of data or information available to relevant stakeholders.	○	○	○	○	○	○	○
… improved access to data or information for relevant stakeholders.	○	○	○	○	○	○	○
… strengthened social accountability mechanisms of the public.	○	○	○	○	○	○	○
…strengthened accountability and information sharing of relevant stakeholders towards others.	○	○	○	○	○	○	○
… minimized (the risk of) corruption within relevant stakeholders' environment.	○	○	○	○	○	○	○

Coordination, Communication & Participation

14. The digital intervention...

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… improved exchange and networking of relevant stakeholders.	○	○	○	○	○	○	○
… improved the coordination of activities among relevant stakeholders.	○	○	○	○	○	○	○
… increased participation and facilitated inclusion of the public.	○	○	○	○	○	○	○

Innovation, Scalability & Transfer

15. The digital intervention...

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… stimulated innovative processes and/or new insights within the sector.	○	○	○	○	○	○	○
… made it possible to involve new actors beyond the original set of partners and/or users.	○	○	○	○	○	○	○
… has been transferred to other sectors, geographic regions and/or user groups.	○	○	○	○	○	○	○

Sustainability

16. The digital intervention...

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… is institutionalized in the partner organization.	○	○	○	○	○	○	○
… and its benefits are likely to sustain after project support ends.	○	○	○	○	○	○	○
… can be maintained - with sufficient capacity and resources - by the relevant stakeholders after project	○	○	○	○	○	○	○

support ends.							
… contributed to the improvement of the sustainable management of natural resources.	○	○	○	○	○	○	○
… facilitated the inclusion of marginalized groups reducing inequality.	○	○	○	○	○	○	○
… contributed to the improvement of working conditions.	○	○	○	○	○	○	○
… enhanced the resilience of relevant stakeholders to potential risks.	○	○	○	○	○	○	○

Knowledge, Awareness & Literacy

17. The digital intervention...

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… raised awareness among relevant stakeholders at the individual level to use digital tools and/or processes.	○	○	○	○	○	○	○
… built digital capacities of relevant stakeholders.	○	○	○	○	○	○	○

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Overall Assessment

We close this section with some questions aimed to assess the general contribution of the digital intervention to the project's objectives.

18. The digital intervention...

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree	Not applicable
... is in line with the partner's digital strategy.	○	○	○	○	○	○	○
... was the best approach compared to other alternatives to achieve original objectives.	○	○	○	○	○	○	○
... made a significant contribution to the project's main outcome.	○	○	○	○	○	○	○

19. How do you assess...

	Strongly inferior	Inferior	Slightly inferior	Slightly exceeds	Exceeds	Strongly exceeds	Not applicable
...GIZ's competitive advantage to deliver the digital intervention compared to other players within the field, e.g. other donors?	○	○	○	○	○	○	○

C. Contribution of the digital intervention to wider processes of digital transformation

Please read the information before replying to the following questions.

In this section, we are interested in the wider implications of this digital intervention concerning the digital transformation in the institutions, the given sector, and/or the society at large.

- **Digital transformation** here is understood as a **transformative change through the means of digitalization**, "that converts a current (ecological, social, political, economic, scientific, or technological) system or all systems together into a fundamentally new system that, from there on, forms the new mainstream". We hence see digital transformation as both disruptive and incremental processes of change.
- If a specific aspect **does not apply** to the digital intervention at hand, select "Not applicable".

20. The digital intervention...

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
… contributed to the replacement of formerly existing (analogous) processes and/or systems.	○	○	○	○	○	○	○
… triggered digitalization of further processes by stakeholders.	○	○	○	○	○	○	○
… encouraged relevant stakeholders to be more open to digital solutions in the future.	○	○	○	○	○	○	○
… strengthened digital capacities of partners in a way that they are now better capable to cope with growing technical requirements of the digital transformation.	○	○	○	○	○	○	○
… strengthened the existing digital ecosystem in the sector.	○	○	○	○	○	○	○
… challenged the existing status-quo in the field by offering fundamentally new ideas.	○	○	○	○	○	○	○

D. Potential negative outputs/outcomes of the digital intervention

Please read the information before replying to the following questions.

In this section, we would like to learn more about whether this digital intervention triggered negative consequences for stakeholders, at the organizational level and for the larger ecosystem. We therefore ask you to assess to what degree the digital intervention has caused negative changes across a set of different criteria.

- When answering the following questions, the **benchmark** should be **the situation prior to or without the digital intervention.** If situations changed over time, please, provide an overall assessment.
- If a specific aspect **does not apply** to the digital intervention at hand, select "Not applicable".

21. The digital intervention …

	To no extent at all	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent	Not applicable
... created new or amplified existing inequalities among relevant stakeholder groups.	○	○	○	○	○	○	○
… worsened access to marginalized groups.	○	○	○	○	○	○	○
… created new or amplified existing structural dependencies.	○	○	○	○	○	○	○
… created new or amplified existing pressures regarding employment and the job markets.	○	○	○	○	○	○	○
… created new or amplified existing environmental problems.	○	○	○	○	○	○	○
… caused new organizational challenges or amplified existing ones.	○	○	○	○	○	○	○
… caused new regulatory problems or amplified existing ones.	○	○	○	○	○	○	○
… increased pressures for more digitalization, even if this might not be the best strategy.	○	○	○	○	○	○	○
… boosted costs in terms of time, workload, money, personal, etc.	○	○	○	○	○	○	○
… triggered cuts in the overall budget.	○	○	○	○	○	○	○
… created new or amplified adverse competition among crucial players within the digital ecosystem.	○	○	○	○	○	○	○

22. Did you experience other negative consequences which are not listed above? If yes, please briefly describe the negative consequence in the text field below.

Note: Please indicate for each negative consequence that you list how severe this problem was in your opinion.
Use the scale that was used in the previous questions:
0 = "to no extent at all",
1 = "to a very small extent",

2 = "to a small extent",
3 = "to a moderate extent",
4 = "to a large extent",
5 = "to a very large extent"

E. Digital readiness at the individual, organizational & societal level

Please read the information before replying to the following questions.

In this section, we would like to know more about the digital readiness of actors and contexts in which the digital intervention was embedded. We will therefore ask you a set of questions about various conditions at the individual, organizational and societal level.

- When answering the following questions, we are interested in your general assessment of the status of these conditions **before or during the development/implementation** of the digital intervention. If situations changed over time, please, provide an overall assessment.
- If a specific aspect **does not apply** to the digital intervention at hand, select "Not applicable".

Individual level

23. How do you assess...

	Negative	Mostly negative	Somewhat negative	Somewhat positive	Mostly positive	Positive	Not applicable
… the digital infrastructure at the disposal of relevant stakeholders?	○	○	○	○	○	○	○
.. the willingness of the relevant stakeholders to adopt the digital intervention?	○	○	○	○	○	○	○
… the relevant stakeholders' access to the digital intervention?	○	○	○	○	○	○	○
... digital literacy and skills of relevant stakeholders?	○	○	○	○	○	○	○

Organizational level

24. How do you assess...

	Negative	Mostly negative	Somewhat negative	Somewhat positive	Mostly positive	Positive	Not applicable
... the digital infrastructure at the organization?	○	○	○	○	○	○	○
... the integration of national consultants for the success of the digital intervention?	○	○	○	○	○	○	○
… the integration of international consultants for the success of the digital intervention?	○	○	○	○	○	○	○
... the integration of development advisor(s) ("EH") for the success of the digital intervention?	○	○	○	○	○	○	○
... the collaboration between involved partners?	○	○	○	○	○	○	○
... the resources assigned to the digital intervention by the implementing partner?	○	○	○	○	○	○	○
… previous experiences of relevant stakeholders with digital intervention(s)?	○	○	○	○	○	○	○
... the importance that the management level attributes to digitalization at relevant partner institutions?	○	○	○	○	○	○	○

Societal and political level

25. How do you assess...

	Negative	Mostly negative	Somewhat negative	Somewhat positive	Mostly positive	Positive	Not applicable
... the support of relevant political actors towards furthering digitalization in general?	○	○	○	○	○	○	○
... the support of other donors towards furthering digitalization in general?	○	○	○	○	○	○	○
... the financial resources of partners for enhancing digitalization in general?	○	○	○	○	○	○	○
... the presence of an innovation-friendly digital ecosystem?	○	○	○	○	○	○	○
… existing laws and regulations on digitalization in general?	○	○	○	○	○	○	○
… the impact of the Covid-19 pandemic on the uptake of this digital intervention?	○	○	○	○	○	○	○

F. Adherence of digital principles

Please read the information before replying to the following questions.

This is the final section. Here, we are interested to what extent you applied a set of digital principles which are thought to facilitate the potentials and effects of a digital intervention. Information on the respective digital principles is given below.

- When answering the following questions, we are interested in your general assessment of the status of these conditions **before or during the implementation** of the digital intervention. If situations changed over time, please, provide an overall assessment.
- If a specific aspect **does not apply** to the digital intervention at hand, select "Not applicable".

26. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… the possibility for upscaling (i.e., extending the group of users) was appropriately considered.	○	○	○
… the transferability to different contexts (i.e., sectors, geographic areas, political layers) was considered.	○	○	○
… there has been a foresight analysis or technology assessment on benefits and risks.	○	○	○

27. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… relevant stakeholders were actively involved in the planning stage.	○	○	○
… the digital intervention was designed to work across sector silos.	○	○	○
… working processes, results, and best practices were shared with the wider public.	○	○	○

28. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… there was a mapping of the existing ecosystem, e.g., identifying relevant actors, institutions.	○	○	○
… a technical feasibility analysis was performed.	○	○	○
… it was checked whether the digital intervention is adequately aligned with existing technological, legal, and regulatory policies.	○	○	○

29. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… there was an open data & open-source strategy.	○	○	○
… open data & open-source software was used in developing the digital intervention.	○	○	○
… the digital intervention was designed as a public good (e.g., to be openly available to the wider community).	○	○	○

30. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… users were included in designing and testing the digital intervention.	○	○	○
… the needs and opinions of marginalized user groups were particularly considered.	○	○	○
… technical solutions were particularly geared towards users' priorities and needs.	○	○	○

31. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… a detailed data management plan was in place.	○	○	○
… standards of data protection were adequately considered.	○	○	○
… privacy needs related to personal data and the specific context were adequately considered and potential risks were mitigated accordingly.	○	○	○

32. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… it was explored beforehand whether reusing existing other digital interventions – or parts thereof - was possible.	○	○	○
… the digital intervention was designed in a modular form in order to increase the potential for future reuse.	○	○	○
… existing tools were reused or modified as best as possible.	○	○	○

33. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
… a comprehensive sustainability roadmap was developed in collaboration with relevant stakeholders.	○	○	○
… needed investments like training or engagement opportunities were determined.	○	○	○
... the long-term cost of the digital intervention were quantified and options to sustain it identified.	○	○	○

34. When designing/implementing this digital intervention, …

	Yes	No	Not applicable
... the digital intervention was designed in a way that ensures that impact can be measured at discrete milestones with a focus on outcomes rather than outputs.	○	○	○
... the use of (real-time) information was ensured in order to monitor and inform management decisions.	○	○	○
... all available data was appropriately leveraged.	○	○	○

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You can now leave a comment in the box below or click "Next" to submit the questionnaire!

35. If you have any additional comments, please leave them in the text field below!

Note: Please do not enter data in the text fields of the survey that allows to draw conclusions about a natural person. In case of non-compliance, the questionnaire might be deleted and not considered in the evaluation.

7.2 Annex A2: Guiding questions used for the focus group discussions

State of digitalisation in the policy sector within the respective country (approx. 20min)

- *How would you assess the degree of digitisation in your policy sector?*
- *What chances, potentials, and benefits to promote (further) digital transformation do you envisage in the sector/country? What risks, pitfalls, and negative consequences to promote (further) digital transformation do you envisage in the sector/country?*

Digital interventions: Most important development results, supporting & hindering factors, and unintended (negative) consequences (approx. 45min)

- *What are the most important development results to which the digital intervention contributes?*
- *Which factors were mainly responsible for the success or failure of the digital intervention? Where there any necessary conditions concerning the successful implementation of your digital intervention?*
- *What unexpected (positive or negative) consequences concerning the digital intervention can you envisage, or have you experienced?*

Impactful roll-out and continuous improvement of Digital by Default (approx. 15min)

- *What do you think about the "digital by default"-approach? How fruitful is it for your work?*
- *What does your project need from GIZ and/or other colleagues to further follow this approach?*

7.3 Annex A3: Overview digital principles across policy sectors, intervention types, countries, and stakeholders

Table A3.1: Use of digital principles by policy sector

	Design with the user			Understand the ecosystem			Design for scale			Build for Sustainability			Be data driven			Openness			Reuse and improve			Privacy and Security			Be collaborative		
Climate, environment, forestry & biodiversity	**2**			**2,35**			**2,18**			**2,24**			**2,05**			**1,41**			**2**			**1,82**			**1,94**		
	0,7	0,35	0,94	0,71	0,82	0,82	0,88	0,76	0,53	0,71	0,94	0,59	0,59	0,76	0,7	0,47	0,41	0,53	0,76	0,65	0,59	0,65	0,76	0,41	0,82	0,65	0,47
Decentralization & governance	**2,16**			**2,24**			**2,24**			**1,79**			**2,05**			**1,55**			**2,18**			**2,13**			**2,08**		
	0,84	0,47	0,84	0,84	0,66	0,84	0,76	0,63	0,84	0,53	0,76	0,5	0,71	0,66	0,68	0,42	0,42	0,71	0,71	0,82	0,66	0,66	0,84	0,63	0,42	0,42	0,71
Education	**2,43**			**2,57**			**2,14**			**1,57**			**2**			**2**			**2,29**			**2,57**			**2,71**		
	1	0,57	0,86	0,86	0,71	1	1	0,86	0,29	0,57	0,57	0,43	0,57	0,57	0,86	0,57	0,71	0,71	0,71	0,86	0,71	0,57	1	1	1	1	0,71
Energy	**1,87**			**1,93**			**2,13**			**1,13**			**1,6**			**1,93**			**2**			**1,87**			**1,67**		
	0,73	0,27	0,87	0,73	0,53	0,67	0,93	0,87	0,33	0,13	0,73	0,27	0,27	0,40	0,93	0,67	0,47	0,80	0,73	0,73	0,53	0,67	0,67	0,53	0,80	0,47	0,40
Health	**2,17**			**2,5**			**2,17**			**2,17**			**1,83**			**1,17**			**2,33**			**2,17**			**2**		
	0,83	0,50	0,83	0,83	0,83	0,83	1,00	0,50	0,67	0,67	1,00	0,50	0,67	0,67	0,50	0,33	0,50	0,33	0,83	0,67	0,83	0,83	0,67	0,67	1,00	0,50	0,50
Rural development & agriculture	**1,4**			**2,6**			**2,4**			**2,4**			**1,8**			**0,8**			**2,6**			**2,6**			**2,4**		
	0,4	0,4	0,6	0,8	0,8	1	1	0,8	0,6	0,8	0,8	0,8	0,6	0,4	0,8	0,2	0,2	0,4	0,8	0,8	1	0,6	1	1	1	0,8	0,6
Vocational training & private sector	**1,76**			**2,16**			**2**			**1,95**			**1,89**			**1,08**			**2,31**			**1,88**			**2,13**		
	0,61	0,33	0,82	0,76	0,52	0,88	0,79	0,73	0,48	0,55	0,79	0,61	0,67	0,58	0,64	0,24	0,30	0,52	0,76	0,82	0,73	0,42	0,73	0,73	0,91	0,67	0,55

Note: Numbers show the average usage of digital principles. The first row displays the aggregate ranging from 0 = no sub-principle to 3 = all sub-principles applied. The second row displays the average for each individual sub-principle. The sub-principles are ordered according to the order in the questionnaire in Annex A1; also revisit the description in Figure 2 and Figure 5 for the description of the individual sub-principles. Policy sectors with less than 5 mentions are excluded.

Table A3.2: Use of digital principles by type of intervention

	Design with the user			Understand the ecosystem			Design for scale			Build for Sustainability			Be data driven			Openness			Reuse and improve			Privacy and Security			Be collaborative		
Analysis	**1,64**			**2,19**			**1,82**			**1,72**			**2,1**			**1,45**			**2,01**			**1,73**			**2**		
	0,73	0,09	0,82	0,73	0,64	0,82	0,82	0,64	0,36	0,45	0,91	0,64	0,64	0,64	0,82	0,45	0,27	0,18	0,73	0,73	0,55	0,73	0,82	0,18	0,91	0,73	0,36
Databases	**2,01**			**2,13**			**2,34**			**1,8**			**1,93**			**1,26**			**2,54**			**2,27**			**2**		
	0,87	0,27	0,87	0,67	0,73	0,73	0,87	0,67	0,80	0,53	0,80	0,47	0,53	0,67	0,73	0,33	0,40	0,53	0,87	0,87	0,80	0,80	0,80	0,67	1,00	0,60	0,40
E-Learning	**1,93**			**2,07**			**2,07**			**1,67**			**1,46**			**1,53**			**1,93**			**1,74**			**2,2**		
	0,73	0,67	0,53	0,60	0,60	0,87	0,80	0,87	0,40	0,53	0,67	0,47	0,53	0,40	0,53	0,40	0,33	0,80	0,67	0,73	0,53	0,40	0,67	0,67	0,93	0,67	0,60
Web-based / mobile tools	**2,14**			**2,27**			**2,05**			**1,74**			**1,91**			**1,55**			**2,3**			**2,12**			**2,05**		
	0,76	0,45	0,93	0,82	0,56	0,89	0,85	0,75	0,45	0,47	0,78	0,49	0,60	0,58	0,73	0,40	0,42	0,73	0,73	0,76	0,71	0,55	0,82	0,75	0,89	0,60	0,56
Non-technology	**2,13**			**2,57**			**2,57**			**2,42**			**1,71**			**2,14**			**2,58**			**2**			**2,43**		
	0,71	0,57	0,86	1,00	0,71	0,86	1,00	0,86	0,71	0,71	1,00	0,71	0,57	0,43	0,71	0,57	0,57	1,00	0,86	0,86	0,86	0,71	0,86	0,43	0,86	0,71	0,86
E-management systems	**1,65**			**2,3**			**2,3**			**1,95**			**2,15**			**1,45**			**2,1**			**2,05**			**2,25**		
	0,65	0,2	0,8	0,75	0,75	0,8	0,95	0,75	0,6	0,6	0,85	0,5	0,65	0,75	0,75	0,5	0,6	0,35	0,75	0,8	0,55	0,7	0,7	0,65	0,85	0,8	0,6

Note: Numbers show the average usage of digital principles. The first row displays the aggregate ranging from 0 = no sub-principle to 3 = all sub-principles applied. The second row displays the average for each individual sub-principle. The sub-principles are ordered according to the order in the questionnaire in Annex A1; also revisit the description in Figure 2 and Figure 5 for the description of the individual sub-principles. Types of interventions with less than 5 mentions are excluded.

Table A3.3: Use of digital principles by country

	Design with the user			Understand the ecosystem			Design for scale			Build for Sustainability			Be data driven			Openness			Reuse and improve			Privacy and Security			Be collaborative		
Colombia	**1,78**			**2,34**			**2**			**2,01**			**1,68**			**1**			**1,78**			**1,67**			**1,78**		
	0,78	0,44	0,56	0,67	0,78	0,89	0,89	0,78	0,33	0,67	0,78	0,56	0,56	0,56	0,56	0,22	0,22	0,56	0,67	0,67	0,44	0,33	0,78	0,56	0,78	0,33	0,67
Ghana	**2,1**			**2,6**			**2,5**			**2,1**			**2,4**			**2,3**			**2,6**			**2,1**			**2,2**		
	0,8	0,3	1	1	0,7	0,9	0,9	0,9	0,7	0,7	1	0,4	0,9	0,6	0,9	0,8	0,8	0,7	0,9	1	0,7	0,5	0,8	0,8	1	0,6	0,6
Indonesia	**1,67**			**2,47**			**2,59**			**2,06**			**1,6**			**2,47**			**2,07**			**2,26**			**2,6**		
	0,47	0,53	0,67	0,80	0,87	0,80	0,93	0,93	0,73	0,53	0,93	0,60	0,40	0,53	0,67	0,87	0,67	0,93	0,60	0,87	0,60	0,73	0,53	1,00	1,00	0,87	0,73

Kosovo	**1**			**2**			**2,25**			**2,25**			**2**			**1**			**3**			**2,5**			**2,25**		
	0	0,25	0,75	0,75	0,75	0,5	1	1	0,25	0,5	0,75	1	0,75	0,5	0,75	0,25	0	0,75	1	1	1	1	0,75	0,75	1	1	0,25
Laos	**2**			**2,2**			**2,3**			**2,3**			**1,9**			**1,2**			**2,5**			**2,5**			**1,9**		
	0,7	0,5	0,8	0,7	0,7	0,8	0,9	0,9	0,5	0,6	0,9	0,8	0,6	0,6	0,7	0,3	0,3	0,6	0,9	0,8	0,8	0,7	1	0,8	0,7	0,7	0,5
Rwanda	**1,6**				**1,7**		**1,7**			**1,5**			**1,9**				**1,3**		**1,6**				**1,8**		**1,6**		
	0,7	0,3	0,6	0,6	0,4	0,7	0,6	0,4	0,7	0,4	0,6	0,5	0,6	0,6	0,7	0,4	0,5	0,4	0,6	0,5	0,5	0,5	0,7	0,6	0,7	0,5	0,4
Serbia	**2,18**			**2,23**			**1,91**			**1,63**			**1,81**			**1,28**			**2,4**			**2,23**			**2,04**		
	0,91	0,41	0,86	0,73	0,59	0,91	0,86	0,64	0,41	0,45	0,73	0,45	0,45	0,59	0,77	0,32	0,32	0,64	0,77	0,86	0,77	0,64	0,82	0,77	0,95	0,64	0,45
SICA states	**2**			**2,11**			**1,73**			**1,43**			**1,89**			**1,63**			**1,57**			**1,48**			**2,05**		
	0,79	0,42	0,79	0,74	0,58	0,79	0,79	0,68	0,26	0,32	0,79	0,32	0,63	0,58	0,68	0,42	0,47	0,74	0,47	0,63	0,47	0,53	0,58	0,37	0,84	0,63	0,58
South Africa	**2,25**			**2**			**2,25**			**1,75**			**2,25**			**1**			**1,25**			**3**			**2,25**		
	0,5	1	0,75	0,75	0,5	0,75	0,75	1	0,5	0,75	0,75	0,25	0,75	0,75	0,75	0,25	0,25	0,5	0,25	0,75	0,25	1	1	1	1	0,75	0,5
Tanzania	**1,4**			**1,6**			**2**			**1,8**			**1,6**			**0,6**			**1,8**			**1,4**			**2,4**		
	0,8	0	0,6	0,6	0,4	0,6	1	0,6	0,4	0,8	0,6	0,4	0,6	0,6	0,4	0,2	0,2	0,2	0,6	0,8	0,4	0,8	0,2	0,4	0,8	0,8	0,6
Uganda	**1,8**			**2,1**			**2,6**			**1,7**			**1,9**			**1,1**			**2,4**			**2**			**2,0**		
	0,6	0,3	0,9	0,8	0,5	0,8	0,9	0,8	0,90	0,5	0,6	0,6	0,6	0,6	0,7	0,4	0,4	0,3	0,8	0,8	0,8	0,6	0,8	0,6	1	0,6	0,4
Vietnam	**1,82**			**2,64**			**2,1**			**2,01**			**2,01**			**1,64**			**2,19**			**2,1**			**1,73**		
	0,64	0,27	0,91	0,82	0,82	1,00	0,82	0,64	0,64	0,55	0,91	0,55	0,64	0,64	0,73	0,55	0,36	0,73	0,91	0,64	0,64	0,55	0,91	0,64	0,82	0,55	0,36

Note: Numbers show the average usage of digital principles. The first row displays the aggregate ranging from 0 = no sub-principle to 3 = all sub-principles applied. The second row displays the average for each individual sub-principle. The sub-principles are ordered according to the order in the questionnaire in Annex A1; also revisit the description in Figure 2 and Figure 5 for the description of the individual sub-principles. Countries with less than 5 mentions are excluded.

Table A3.4: Use of digital principles by stakeholder type

	Design with the user			Understand the ecosystem			Design for scale			Build for Sustainability			Be data driven			Openness			Reuse and improve			Privacy and Security			Be collaborative		
Administrative governmental institutions	**1,97**			**2,26**			**2,08**			**1,66**			**2,04**			**1,49**			**2,15**			**1,97**			**2,15**		
	0,76	0,36	0,85	0,79	0,61	0,86	0,85	0,72	0,51	0,47	0,79	0,40	0,63	0,63	0,78	0,43	0,43	0,63	0,72	0,78	0,65	0,65	0,75	0,57	0,88	0,67	0,60
Public service providers	**2,17**			**2,28**			**2,13**			**1,83**			**1,97**			**1,73**			**2,38**			**1,9**			**2,34**		
	0,79	0,55	0,83	0,83	0,55	0,90	0,86	0,79	0,48	0,55	0,83	0,45	0,66	0,59	0,72	0,52	0,52	0,69	0,83	0,86	0,69	0,52	0,76	0,62	0,93	0,69	0,72
Private sector actors	**1,9**			**2,4**			**2,22**			**2,08**			**2,21**			**1,55**			**2,36**			**2,31**			**2,21**		
	0,71	0,40	0,79	0,83	0,69	0,88	0,86	0,76	0,60	0,60	0,88	0,60	0,74	0,64	0,83	0,48	0,45	0,62	0,81	0,79	0,76	0,64	0,86	0,81	0,88	0,71	0,62
Civil society organisation	**2,16**			**2,26**			**2**			**1,31**			**1,9**			**1,47**			**2,1**			**2,21**			**2,36**		
	0,74	0,63	0,79	0,79	0,58	0,89	1,00	0,68	0,32	0,42	0,63	0,26	0,74	0,53	0,63	0,42	0,37	0,68	0,79	0,68	0,63	0,58	0,89	0,74	0,89	0,79	0,68
Donors	**2**			**2,42**				**1,83**		**1,51**			**2,24**			**2,25**			**2,33**			**1,91**			**1,99**		
	0,83	0,25	0,92	0,92	0,67	0,83	0,83	0,75	0,25	0,17	0,92	0,42	0,83	0,58	0,83	0,75	0,67	0,83	0,83	0,83	0,67	0,58	0,75	0,58	0,83	0,58	0,58
General public	**2,12**			**2,17**			**2,15**			**1,49**			**1,85**			**1,78**			**2,07**			**1,93**			**2,19**		
	0,73	0,59	0,80	0,76	0,51	0,90	0,83	0,83	0,49	0,37	0,73	0,39	0,63	0,49	0,73	0,51	0,44	0,83	0,73	0,71	0,63	0,51	0,76	0,66	0,85	0,71	0,63

Note: Numbers show the average usage of digital principles. The first row displays the aggregate ranging from 0 = no sub-principle to 3 = all sub-principles applied. The second row displays the average for each individual sub-principle. The sub-principles are ordered according to the order in the questionnaire in Annex A1; also revisit the description in Figure 2 and Figure 5 for the description of the individual sub-principles. Stakeholder types with less than 5 mentions are excluded.

7.4 Annex A4: Overview outputs and outcomes across policy sectors, intervention types, and countries

Table A4.1: Outputs and outcomes per policy sector

	Improvement of information					Exchange, coordination & cooperation					Improvement in services					Innovation, scalability & transfer					Participation & inclusion				
Climate, environment,forestry & biodiversity (8)	0%	13%	50%	38%	0%	0%	38%	38%	25%	0%	0%	13%	63%	25%	0%	50%	13%	25%	13%	0%	38%	13%	25%	13%	13%
Conflict & crisis management (1)	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%
Decentralization & governance (30)	7%	7%	53%	27%	7%	7%	20%	40%	27%	7%	0%	27%	50%	20%	3%	33%	30%	27%	10%	0%	7%	27%	27%	17%	23%
Education (5)	20%	20%	20%	40%	0%	20%	60%	0%	20%	0%	0%	20%	20%	40%	20%	20%	20%	40%	20%	0%	0%	40%	20%	40%	0%
Energy (14)	7%	21%	36%	36%	0%	36%	7%	36%	21%	0%	7%	50%	29%	14%	0%	43%	36%	14%	7%	0%	29%	29%	14%	7%	21%
Health (3)	33%	0%	67%	0%	0%	0%	100%	0%	0%	0%	67%	0%	33%	0%	0%	67%	0%	33%	0%	0%	33%	0%	0%	33%	33%
Other (2)	0%	0%	100%	0%	0%	50%	0%	50%	0%	0%	0%	100%	0%	0%	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	0%
Rural Development & agriculture (5)	0%	20%	60%	20%	0%	0%	80%	0%	20%	0%	0%	20%	60%	20%	0%	20%	40%	20%	20%	0%	40%	20%	20%	0%	20%
Transport (2)	0%	50%	0%	50%	0%	0%	50%	0%	0%	50%	0%	50%	50%	0%	0%	50%	50%	0%	0%	0%	50%	0%	50%	0%	0%
Vocational training & private sector (24)	4%	17%	17%	50%	13%	21%	29%	25%	17%	8%	21%	25%	29%	21%	4%	33%	21%	25%	21%	0%	42%	21%	17%	13%	8%
Water & waste management (2)	0%	50%	50%	0%	0%	0%	0%	50%	50%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	50%	0%	50%	0%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the policy sector indicate the absolute numbers.

Table A4.1: Outputs and outcomes per policy sector - continued

	Efficiency					Effectiveness					Accountability					Awareness & capacity					Longevity					Sustainability				
Climate, environment,forestry & biodiversity (8)	13%	13%	25%	50%	0%	38%	13%	25%	25%	0%	25%	13%	38%	13%	13%	25%	0%	50%	25%	0%	13%	25%	50%	13%	0%	38%	13%	38%	13%	0%
Conflict & crisis management (1)	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%
Decentralization & governance (30)	3%	7%	47%	37%	7%	3%	20%	47%	23%	7%	10%	13%	53%	13%	10%	7%	30%	40%	20%	3%	7%	27%	40%	27%	0%	7%	40%	27%	10%	17%
Education (5)	20%	0%	20%	40%	20%	0%	20%	0%	60%	20%	0%	60%	20%	20%	0%	0%	60%	0%	40%	0%	20%	20%	0%	60%	0%	0%	20%	20%	40%	20%
Energy (14)	7%	57%	0%	21%	14%	14%	36%	36%	14%	0%	21%	43%	21%	0%	14%	29%	50%	7%	14%	0%	7%	36%	21%	36%	0%	7%	29%	14%	21%	29%
Health (3)	33%	0%	67%	0%	0%	33%	33%	0%	33%	0%	33%	33%	0%	33%	0%	0%	67%	0%	33%	0%	0%	33%	33%	33%	0%	67%	0%	0%	33%	0%
Other (2)	0%	50%	50%	0%	0%	0%	100%	0%	0%	0%	0%	50%	0%	0%	50%	0%	50%	0%	50%	0%	0%	0%	50%	50%	0%	50%	50%	0%	0%	0%
Rural Development & agriculture (5)	0%	0%	40%	20%	40%	0%	0%	100%	0%	0%	40%	40%	20%	0%	0%	20%	0%	80%	0%	0%	20%	0%	60%	20%	0%	40%	20%	40%	0%	0%
Transport (2)	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	50%	0%	50%	0%	0%	0%	50%	0%	50%	0%	0%	0%	100%	0%	0%	0%	50%	50%	0%	0%
Vocational training & private sector (24)	17%	21%	38%	17%	8%	8%	25%	38%	29%	0%	17%	17%	25%	13%	29%	4%	21%	54%	21%	0%	17%	21%	25%	38%	0%	33%	25%	17%	8%	17%
Water & waste management (2)	50%	0%	50%	0%	0%	0%	100%	0%	0%	0%	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the policy sector indicate the absolute numbers.

Table A4.2: Outputs and outcomes per type of intervention

	Improvement of information					Exchange, coordination & cooperation					Improvement in services					Innovation, scalability & transfer					Participation & inclusion				
Analysis (8)	0%	13%	50%	38%	0%	0%	38%	50%	0%	13%	0%	38%	50%	0%	13%	63%	13%	25%	0%	0%	13%	13%	38%	0%	38%
Databases (9)	22%	11%	33%	22%	11%	33%	22%	22%	11%	11%	22%	11%	22%	44%	0%	56%	22%	22%	0%	0%	22%	0%	0%	22%	56%
E-Learning (12)	8%	8%	42%	17%	25%	25%	33%	17%	17%	8%	8%	25%	42%	25%	0%	17%	42%	25%	17%	0%	8%	33%	42%	17%	0%
Hardware (1)	0%	0%	0%	0%	100%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	0%	0%
Web-based / mobile tools (44)5%	5%	18%	39%	39%	0%	11%	23%	36%	25%	5%	7%	34%	36%	18%	5%	32%	30%	25%	14%	0%	27%	30%	23%	11%	9%
Non-technology (5)	20%	40%	20%	20%	0%	20%	0%	20%	60%	0%	20%	20%	40%	20%	0%	20%	20%	40%	20%	0%	20%	20%	40%	20%	0%
E-management systems (14)	0%	14%	50%	36%	0%	21%	43%	14%	21%	0%	21%	21%	43%	14%	0%	64%	14%	7%	14%	0%	36%	29%	0%	14%	21%
Public e-platforms (3)	0%	0%	33%	67%	0%	0%	67%	33%	0%	0%	0%	33%	67%	0%	0%	33%	33%	33%	0%	0%	67%	0%	0%	33%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the type of intervention indicate the absolute numbers.

Table A4.2: Outputs and outcomes per type of intervention - continued

	Efficiency					Effectiveness					Accountability					Awareness & capacity					Longevity					Sustainability				
Analysis (8)	0%	38%	25%	38%	0%	38%	25%	13%	13%	13%	0%	25%	38%	13%	25%	13%	25%	38%	25%	0%	0%	0%	63%	38%	0%	0%	50%	13%	25%	13%
Databases (9)	11%	11%	22%	44%	11%	22%	33%	11%	22%	11%	22%	22%	33%	11%	11%	0%	56%	22%	11%	11%	0%	33%	44%	22%	0%	33%	11%	11%	22%	22%
E-Learning (12)	17%	8%	33%	42%	0%	8%	25%	33%	33%	0%	0%	42%	17%	17%	25%	8%	33%	25%	33%	0%	17%	25%	33%	25%	17%	17%	33%	33%	8%	8%
Hardware (1)	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	0%	100%	0%	0%	0%	100%	100%	0%	0%	0%	0%
Web-based / mobile tools (44)	9%	20%	39%	16%	16%	5%	20%	52%	20%	2%	18%	20%	39%	9%	14%	16%	30%	36%	18%	0%	14%	18%	34%	34%	14%	18%	27%	30%	7%	18%
Non-technology (5)	40%	20%	0%	40%	0%	0%	20%	60%	20%	0%	20%	20%	40%	0%	20%	0%	20%	40%	40%	0%	0%	100%	0%	0%	0%	20%	20%	20%	20%	20%
E-management systems (14)	0%	29%	43%	21%	7%	7%	57%	14%	21%	0%	36%	36%	21%	7%	0%	7%	29%	50%	14%	0%	7%	36%	29%	29%	7%	36%	36%	7%	14%	7%
Public e-platforms (3)	0%	0%	67%	33%	0%	0%	0%	67%	33%	0%	0%	0%	67%	33%	0%	0%	0%	67%	33%	0%	0%	33%	0%	67%	0%	67%	0%	0%	33%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the type of intervention indicate the absolute numbers.

Table A4.3: Outputs and outcomes per country

	Improvement of information					Exchange, coordination & cooperation					Improvement in services					Innovation, scalability & transfer					Participation & inclusion				
Colombia (6)	17%	0%	17%	50%	17%	0%	67%	0%	33%	0%	0%	17%	50%	33%	0%	33%	50%	0%	17%	33%	33%	50%	0%	17%	33%
Ghana (10)	10%	10%	30%	40%	10%	10%	20%	40%	20%	10%	10%	60%	30%	0%	0%	40%	20%	30%	10%	40%	40%	20%	30%	10%	40%
Indonesia (13)	23%	8%	38%	23%	8%	15%	31%	38%	15%	0%	15%	23%	38%	23%	0%	46%	8%	31%	15%	46%	46%	8%	31%	15%	46%
Kosovo (2)	0%	0%	50%	50%	0%	0%	50%	0%	50%	0%	50%	0%	50%	0%	0%	50%	0%	0%	50%	50%	50%	0%	0%	50%	50%
Laos (8)	0%	0%	50%	50%	0%	0%	38%	25%	25%	13%	13%	25%	25%	38%	0%	75%	25%	0%	0%	75%	75%	25%	0%	0%	75%
Rwanda (5)	0%	20%	40%	20%	20%	40%	20%	20%	20%	0%	20%	20%	40%	20%	0%	80%	0%	0%	20%	80%	80%	0%	0%	20%	80%
Serbia (18)	0%	17%	50%	33%	0%	28%	17%	33%	17%	6%	11%	44%	28%	17%	0%	17%	39%	33%	11%	17%	17%	39%	33%	11%	17%
SICA states (17)	0%	24%	35%	35%	6%	6%	18%	47%	18%	12%	0%	12%	47%	24%	18%	24%	29%	35%	12%	24%	24%	29%	35%	12%	24%
South Africa (1)	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%
Tanzania (3)	33%	33%	33%	0%	0%	0%	100%	0%	0%	0%	67%	33%	0%	0%	0%	67%	33%	0%	0%	67%	67%	33%	0%	0%	67%
Uganda (7)	0%	43%	29%	29%	0%	29%	29%	29%	14%	0%	14%	14%	57%	14%	0%	43%	14%	29%	14%	43%	43%	14%	29%	14%	43%
Vietnam (5)	0%	20%	60%	20%	0%	20%	40%	0%	40%	0%	0%	20%	80%	0%	0%	40%	40%	20%	0%	40%	40%	40%	20%	0%	40%
NA (1)	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the country name indicate the absolute numbers.

Table A4.3: Outputs and outcomes per country - continued

	Efficiency					Effectiveness					Accountability					Awareness & capacity					Longevity					Sustainability				
Colombia (6)	17%	0%	50%	33%	0%	0%	50%	50%	0%	0%	0%	33%	50%	0%	17%	17%	33%	17%	33%	0%	0%	17%	67%	17%	0%	0%	50%	33%	17%	0%
Ghana (10)	30%	10%	20%	30%	10%	20%	10%	50%	10%	10%	30%	0%	40%	10%	20%	20%	10%	60%	10%	0%	20%	20%	50%	10%	20%	20%	10%	40%	10%	20%
Indonesia (13)	15%	8%	54%	23%	0%	15%	15%	15%	54%	0%	8%	38%	31%	15%	8%	0%	15%	46%	38%	0%	8%	15%	15%	62%	8%	23%	38%	0%	23%	15%
Kosovo (2)	0%	50%	0%	0%	50%	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	0%	0%	50%	50%	0%	0%	50%	50%	0%	0%
Laos (8)	0%	25%	50%	25%	0%	25%	25%	38%	13%	0%	13%	13%	50%	13%	13%	13%	25%	63%	0%	0%	13%	25%	38%	25%	13%	38%	63%	0%	0%	0%
Rwanda (5)	0%	40%	60%	0%	0%	20%	60%	0%	20%	0%	20%	40%	0%	20%	20%	0%	40%	20%	40%	0%	20%	40%	40%	0%	20%	40%	20%	0%	20%	20%
Serbia (18)	0%	44%	39%	11%	6%	0%	22%	56%	17%	6%	22%	33%	28%	11%	6%	6%	44%	39%	11%	0%	11%	28%	22%	39%	11%	17%	22%	33%	6%	22%
SICA states (17)	0%	12%	12%	53%	24%	0%	24%	35%	35%	6%	12%	6%	41%	6%	35%	12%	35%	29%	18%	6%	12%	24%	29%	35%	12%	0%	24%	29%	24%	24%
South Africa (1)	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%
Tanzania (3)	33%	33%	33%	0%	0%	33%	67%	0%	0%	0%	33%	67%	0%	0%	0%	0%	67%	33%	0%	0%	0%	33%	33%	33%	0%	100%	0%	0%	0%	0%
Uganda (7)	29%	0%	29%	29%	14%	14%	14%	57%	14%	0%	29%	29%	29%	14%	0%	14%	14%	14%	57%	0%	14%	43%	29%	14%	14%	71%	14%	14%	0%	0%
Vietnam (5)	20%	20%	20%	20%	20%	0%	40%	40%	20%	0%	20%	40%	40%	0%	0%	40%	40%	20%	0%	0%	0%	60%	40%	0%	0%	0%	40%	40%	0%	20%
NA (1)	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	0%
	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA	to no or a small extent	to a moderate extent	to a large extent	to a very large extent	NA

Note: Numbers show the percentage of digital interventions in the given category. Numbers in () after the country name indicate the absolute numbers.

7.5 Annex A5 - Evaluation Team

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