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What Can We Learn from a Co-Creation Journey for a Quick Scan Digital Transformation Maturity Assessment Tool for Development NGOs?

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ABSTRACT

This paper describes the approach and lessons learned from a co-creation process with Dutch development NGOs to create a practical and easy-to-use assessment tool for practitioners to assess the organisation's maturity level of digital transformation. For this study, we applied a design science research methodology, specifically a six-step co-creation approach suitable for developing maturity models. The digital maturity assessment tool (quick scan) created is a domain-specific digital transformation maturity tool for development NGOs rather than a generally applicable tool. This artefact was evaluated using an eight-point Requirements framework for the development of digital maturity assessment tools. By developing a quick scan tool based on an existing practitioners' digital maturity assessment tool (Digital Principles), we have taken a reverse direction, going from a comparative to a prescriptive model. With this study, we contribute to the knowledge of digital transformation in the organisational context of development NGOs and the practical requirements for developing a domain-specific quick scan for digital transformation maturity (DTM) assessment that is also relevant for the ICT4D field. In contrast to some DTM practitioners' tools and the literature, an absolute measure of organisational digital transformation maturity is not necessarily achievable or desirable for practical purposes. Furthermore, we argue that developmental paradigms may steer pathways in the organisational digital transformation maturity of development NGOs and should be included in an assessment. We conclude our paper with lessons learned that can be useful for developing a digital transformation maturity assessment tool.

Keywords: Digital Transformation, Maturity model development, Development NGO, DX4D

INTRODUCTION

Development NGOs operate in a fast-changing environment. Nongovernmental organisations (NGOs) are active players in international development as policy advocates and providers of aid and services to underprivileged communities. (Development) NGOs are generally characterised as institutionalised organisations, acting separate from the government (non-state), operating as nonprofit, self-governing, and often have some voluntary participation in their activities (Davies, 2019).

The work of development NGOs in international development is changing due to the rapid advent of various digital technologies, leading to a digital transformation of the sector. The sector has, for example, seen the possibilities of mobile phones, social media, drones, 3D printing, and machine learning but also encounters the negative implications of some of these technologies. In that context, development is changing or transforming, enabled by digital technologies. Digital technology *"is here to stay, [development] NGOs need to adapt to it, it's not going away"*, Haikin and Flatters (2017) argue. Development NGOs struggle to keep up and understand the possibilities and issues digital technologies bring when adopted for international development projects and their organisational operations (Hall et al., 2020).

Therefore, there is a need for better *situational awareness* of where an organisation stands and what can be done next if the development NGO pursues increasing its capabilities in using digital technologies for its organisational goals (i.e. *digital maturity*) and laying out a digital strategy (Vogelsang et al., 2021). Maturity assessment tools are common in the development sector for evaluation of, for example, the monitoring and evaluation of development project performance (Coninck, 2008; Missoni & Alesani, 2023; Yim, 2021). However, development NGOs find the existing digital maturity tools too extensive and time-intensive and prefer a quick scan for an initial survey of the digital maturity level. This practioners' problem is the starting point for this research.

This paper describes the approach and lessons learned from a co-creation process with Dutch development NGOs to create a practical and easy-to-use assessment tool for practitioners to assess the organisation's maturity level of digital transformation. The research was conducted with stakeholders from Dutch development NGOs to ensure the creation of a relevant and acceptable tool. Our paper focuses on the lessons learned from this co-creation process. It addresses the following research question:

What lessons learned can we derive from the co-creation process with development NGOs for a quick scan digital transformation maturity assessment tool?

With this study, we contribute to the knowledge of digital transformation in the organisational context of development NGOs and the practical requirements for developing a quick scan for digital transformation maturity assessment based on the lessons learned. The paper describes the theoretical concepts related to developing digital transformation maturity assessment tools. Then, it describes the research design process we used to co-create an assessment tool on digital transformation maturity for Dutch development NGOs. We present the evaluation results of five commonly used tools by development NGOs from Germany, the United Kingdom, and the USA that are compared for their fit-for-purpose for Dutch development NGOs and which one was chosen as a basis for developing a quick scan digital maturity tool. We reflect on the creation process of the quick scan digital maturity assessment tool, followed by a discussion in which we compare our insights with the literature. We conclude by returning to our research question and reflecting on limitations and suggestions for future research.

RELATED LITERATURE

This section describes the theoretical concepts applied to this paper. We start by briefly discussing development NGOs, followed by digital transformation for development, and then turn to the concept of digital maturity assessment models and the creation of such models.

Development NGOs and ICT

Development NGOs are recognised as key third-sector actors in the landscapes of international development, humanitarian action, human rights, environment and many other areas of public action (Brass et al., 2018; Lewis et al., 2020). Development NGOs are trying to understand the benefits or pitfalls of rapidly evolving digital technologies in the development sector (Partos & The Spindle, 2018). Information and Communication Technology (ICT) has the potential to be a powerful enabler of development goals because its unique characteristics improve communication and the exchange of information to strengthen and create new economic and social networks (Rothe, 2020). The reasons for the stated potential are faster and more accessible information delivery, dissemination of information and knowledge, connectivity and network creation, efficiency and transparency gains, transforming people's lives, and decentralisation and empowerment (Heeks, 2020).

While development NGOs try to make sense of these digital technologies on if and how to implement them in their development projects based on the organisational capabilities, the need for understanding their transformational potential is growing.

Digital Transformation for Development

The 'digital transformation' concept has many definitions. Based on an elaborate literature review in the field of information systems research, Vial (2021) suggests the following definition: digital transformation is *"a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies"*. This definition is not organisation-centric and incorporates improvement as an 'expected outcome of digital transformation without guaranteeing its realisation' and is not associated with any specific digital technology.

Turning from academic research to practice perspective, we see that the term digital transformation has also been popularised and adopted in the nonprofit sector. A common definition used by practitioners in the nonprofit sector is: *"Digital transformation is the process of determining and implementing policies, increasing staff capacity, and specific technology systems which allow organisations to deliver their services with greater impact for the individuals they serve, their own decision-making processes, and policy decision in their communities"* (Techsoup, 2022).

While there are many definitions for digital transformation in the Information Systems field (Kraus et al., 2021; Vial, 2021), there are very few definitions *specifically* looking into international development or digital transformation for development (DX4D) (Heeks et al., 2023).

This paper mainly looks at digital transformation for (international) development. Digital transformation for development (DX4D) is described as *"a radical change in development processes and structures enabled by digital systems"* (Heeks et al., 2022). DX4D emphasises the end-goal focus rather than the digital means, stipulated in the following principles: *"the impact of digital-transformation-for-development emerges not deterministically from technology alone but from a mix of social and technological factors"*, and *"transformation of digital ecosystems is not the goal of digital-transformation-for-development; development – understood as the transformation of societies – is"* (Heeks et al., 2023).

As mentioned in the Introduction, development NGOs want to know where they stand regarding their digital transformation level and what next step they should

take to further increase their digital capabilities. This implies knowledge of their digital transformation maturity level.

Digital (Transformation) Maturity Models

A digital maturity model (DTM) provides the ability to (self-)assess an organisation's digital capabilities and identify the growth trajectory for further developing the capabilities (OECD, 2021). Many models are so-called fixed-level maturity models, *"maturity models that distinguish a limited set of generic maturity levels, such as the well-known CMM*" (van Steenbergen et al., 2013). Digital maturity assessment models (DTMM) can be descriptive, prescriptive or comparative in nature (de Bruin et al., 2005). Descriptive models are useful for assessing the state of affairs at a certain moment in time, such as the as-is situation. A prescriptive model can be used to describe 'how to approach maturity improvement and enable a roadmap for improvement', the authors as mentioned above argue. Lastly, comparative models can be used for benchmarking purposes across different business or civil society domains or geographical areas. These maturity models can be used to assess strengths and weaknesses in organisational capabilities whilst enabling comparison with similar organisations (Fabbro & Tonchia, 2021).

De Bruin et al. (2005) argue that maturity models can evolve from a descriptive model (understanding the as-is situation), via a prescriptive model (through the understanding of current situation pathways to improvement), to a comparative model (potential to compare with other organisations when the model is in use widely). The following components can be identified in a digital maturity model: 1) a set of maturity levels (for example, a descriptor for the level, such as initial, repeatable, defined, managed, and optimised -see Table 1-, 2) a number of focus areas of dimensions, or both that can be developed to achieve the defined maturity levels, and 3) somewhat detailed descriptions and suggestions for improved actions of the suggested evolutionary path to reach the intended maturity level, where *"a maturity level is a well-defined evolutionary plateau within a functional domain"* (Domingues & Ribeiro, 2023; van Steenbergen et al., 2013).

An example of a five-level maturity model is the Capability Maturity Model Integration (CMMI) (Team, 2002). Some authors distinguish between maturity models and maturity grids, where the latter *"provides descriptive text for the characteristic traits of performance at each level, also known as a 'behaviorally anchored scale'*" (Maier et al., 2009). This nuance is not required for our research, as we are comparing relevant models and grids to develop a quick scan.

Table 1. A five-tiered maturity level scheme

Level 1	Level 2	Level 3	Level 4	Level 5
Initial	**Managed**	**Defined**	**Quantitively managed**	**Optimised/ Transformed**
Processes poorly controlled and reactive	*Processes characterised for projects are often reactive*	*Processes characterised by the organisation and are proactive*	*Processes measured and controlled*	*Focus on process improvement*

Developing Digital (Transformation) Maturity Models

Based on an extensive literature review on Maturity Models Development, Lasrado et al. (2015) observed that all approaches *"advocate a step-by-step iterative sequential approach for developing a maturity model"*. Common approaches vary in five, six or eight steps, where all these approaches point out to validate to safeguard practical relevance. Irrespective of the chosen approach, Becker et al. (2009) inspired by design science guidelines from Hevner et al. (2004) have formulated requirements for the development of maturity models (Table 2). These requirements provide design and evaluation guidance for developing a digital maturity model.

Table 2. Requirements for the development of maturity models (Becker et al., 2009)

Requirement	Summary
R1 (Comparison with existing maturity models)	The need for the development of a new maturity model must be substantiated by a comparison with existing models. The new model may also just be an improvement of an already existing one
R2 (Iterative Procedure)	Maturity models must be developed iteratively, i.e., step by step.
R3 (Evaluation)	All principles and premises for the development of a maturity model, as well as the usefulness, quality and effectiveness of the artefact, must be evaluated iteratively
R4 (Multi-methodological Procedure)	The development of maturity models employs various research methods, each of which needs to be well-founded and finely attuned.
R5 (Identification of Problem Relevance)	The relevance of the problem solution proposed by the projected maturity model for researchers and/or practitioners must be demonstrated.

R6 (Problem Definition)	The prospective application domain of the maturity model, as well as the conditions for its application and the intended benefits, must be determined prior to design.
R7 (Targeted Presentation of Results)	The maturity model's presentation must be targeted to its application conditions and users' needs.
R8 (Scientific Documentation)	The design process of the maturity model needs to be documented in detail, considering each step of the process, the parties involved, the applied methods, and the results

There is some critique on using digital maturity models in information systems. Poeppelbuss et al. (2011) found in their literature review of digital maturity models that *"the applicability and reliability of maturity models is subject to criticism"*. For example, McCormack et al. (2009) argue that such models may oversimplify reality and often lack solid empirical underpinning. Van Steenbergen et al. (2013) argue that opposite the majority of models that are fixed-level maturity models, *"another form of maturity model, the focus area maturity model, is better suited to supporting incremental improvement."* Furthermore, Poeppelbuss et al. (2011) suggests that because of the dominance of maturity models created by Western information systems researchers, one should reflect on the applicability of the maturity models in different geographical regions (e.g. countries in the Global South).

A suggestion based on their literature review is that potential maturity model users find it difficult to find a suitable, easy-to-use model for their organisations because of the large number of models that are available (ibid). To mitigate this Domingues and Ribeiro (2023) provide suggestions for comparing maturity models by comparing aspects such as their complexity, customisability, data collection mechanism, ability of benchmarking, and having been validated. Another recommendation was to focus on under-researched domains where digital maturity models could be useful (Poeppelbuss et al., 2011). This could apply to digital development and, thus, digital transformation for development (DX4D) maturity models, which are the subject matter of this paper.

The next section describes the co-creation method used for the digital transformation maturity model.

RESEARCH METHOD

This section describes the method applied to develop the digital maturity assessment tool. As discussed in the Related Literature section, the focus of the digital maturity model can be general or domain-specific. The tool was co-created with the Dutch development NGOs and their (overarching) representative association Partos. There are approximately one hundred Dutch development NGOs (Partos, 2012). The development NGOs wished for a *domain-specific model* that could be used as a quick scan tool, which means it was easy to use and not time-intensive. As the model's purpose is to be used by practitioners, involving development NGOs' practitioners is logical here to increase acceptability.

One of a range of Design Science Research methodologies that can be applied to creating an Information Systems artefact (Kirmizi, 2022), like a digital maturity assessment tool, is the six-step method from de Bruin et al. (2005). For this study, we adopted this six-step co-creation method for developing maturity models in various domains as proposed by de Bruin et al. (2005), and suitable for model development with practitioners. The method proved to be relatively easy to explain to the participating development NGOs and suitable for a co-creation process with them and for creating a digital maturity assessment tool (Table 3). With co-creation, we understand both creation and co-design combined, meaning co-creation is understood as a *"collective creativity process among researchers, developers and end-users"* and co-design is the *"co-creation through the entire design, development and evaluation processes"* (Suero Montero & Kapinga, 2019). Suero Montero and Kapinga (2019) argue that especially in the context of ICT for development (ICT4D) in which development NGOs operate, strengthening the Design Science methodologies by *"including elements of co-creation and co-design" helps to "produce meaningfully contextualised solutions and to foster a stronger sense of ownership and social acceptance of a developed technological artefact".* The co-creation aspect means in the approach, the user is actively participating and provides ideas for the design and creation of the artefact, instead of being a passive participant from whom data is collected, for example, via a questionnaire.

This supports the choice of the Design Science methodology from de Bruin et al. (2005). Their six-step method for developing a maturity model includes the following steps going from Scope > Design > Populate > Test > Deploy to Maintain (ibid), which we briefly describe hereafter.

Step 1 - Scope: the initial step is the Scope step, in which decisions are made on the focus of the maturity model, such as a domain-specific versus generally applicable model. Furthermore, the stakeholders involved in the creation of the model are determined. For example, for a domain-specific model, these could be practitioners or academia.

Step 2 -Design: The Design step for the creation of the maturity model covers a needs analysis of the target audience in the organisation and how these needs will be met. Furthermore, decisions are made on whom and how to collect data input for the digital maturity model. When a sector is relatively inexperienced in measuring digital maturity or the notion of what constitutes maturity, a top-down approach is suitable according to de Bruin et al. (2005). The emphasis is then *"what needs to be measured in the maturity assessment and how this can be measured"* (ibid).

Step 3 – Populate: the Populate step, comes after the scope and design of the model are determined and focuses on the content of the model. At this step decisions are made on developing a whole new model or based on existing models both from academic literature and practice, creating an adapted version suitable for the context of the development NGOs.

Step 4 – Test: the fourth step, Test, involves the testing of the digital maturity model on its applicability, rigour and relevance, and analysing its validity, reliability and generalisability. This involves identifying a relevant group of users for testing and evaluating the outcomes of the test.

Step 5 – Deploy: after testing, the fifth step, called Deploy, the maturity model is made available to more organisations in the same context or sector.

Step 6 – Maintain: the final step is Maintain and is about ensuring the maturity model remains available and maintained for use, for example, by updating its web interface.

The co-creation process described by these steps bears resemblance to a design science approach, particularly the 'design cycle' (Hevner et al., 2008) in the way, it approaches a 'wicked problem' of getting grips with digital transformation maturity (DTM) while designing and co-creating together with the intended users a prototype for a quick scan DTM tool for development NGOs (steps 1-3). The trial and later field test with 20 development NGOs and maintenance (steps 4-6) are related to design science's 'relevance cycle'. This is summarised in the following table.

Table 3. Digital Maturity Model development steps

Step DMM Development	Criterion	Specifics for this study
Step 1 - Scope	Focus of model	Domain-specific for International Development (quick scan tool)
	Stakeholders involved in co-creation	Five practitioners working at development NGO (field workers, head office and information management) plus two from the association of development NGOs.
	Data collection & analysis	Co-creation is ensured by having an activity form where all voices are heard and ideas are collected: focus groups are facilitated with an online brainstorming tool. Feedback was grouped into categories.
Step 2 – Design in Co-creation	Audience	Internal at NGO (same as above)
	Method of Application	Self-assessment by users
	Driver of Application	Internal and external promotion: promoting participation in co-design at selected development NGOs and via umbrella association of the development NGO sector.
	Respondents	Seven NGO staff (field workers, head office and information management)
	Application	Per development NGO, there is at least one, preferably multiple, country or region in the Global South where they have projects.
	Data collection & analysis	Co-creation sessions were facilitated with an online brainstorming tool. Feedback was grouped into categories.
Step 3 - Populate	What and how measured	Evaluation of existing models from practice, fit-for-purpose for development NGOs.

	Data collection & analysis	Co-creation by having focus group meetings jointly prioritising questions and collecting argumentation.
Step 4 - Test	Identification of test users	Trial user group at five development NGOs.
	Data collection & analysis	Usability survey; and afterwards, focus group discussion where all voices are heard and feedback and ideas are collected.
Step 5 - Deploy	Rolling out to more organisations for use and evaluation.	Deployment to 20 development NGOs; sampled to ensure a broad level of digital development maturity.
	Data collection & analysis	Usability survey; and afterwards, focus group discussion.
Step 6 - Maintain	Management and updating of the tool.	Evaluation with umbrella association of development NGOs for follow-up.
	Data collection & analysis	Analysis of Findings and surveys steps 4&5; group discussion with the stakeholders.

Overall, during the process, qualitative data was collected via group meetings, online brainstorming (Miro) boards, and secondary data (reports and maturity assessment tools), all of which were analysed qualitatively.

In our Results section these steps are visible, up to the Test phase, as the project has been halted after that stage.

RESULTS

In this section, we report the findings of the 6-step development process and the resulting outcome of the created digital transformation maturity quick scan tool, both of which were analysed for lessons learned.

Step 1 – Scope – stakeholders in co-creation & model focus

Regarding the stakeholders involved, representatives from the Association of Dutch Development NGOs (Partos) helped us identify eight participants at development NGOs to co-create and run a pilot of the digital transformation

maturity tool. Maturity assessment tools are common for monitoring and evaluating development project performance in the development sector. The participants from this pilot group of development NGOs are all active in working groups on data for development and, therefore, were sufficiently knowledgeable and interested in measuring digital transformation maturity.

With respect to the **focus of the digital maturity model,** the development NGOs and the overarching association of Dutch Development NGOs (Partos) expressed a common goal: creating a short, easy-to-understand, quick scan tool in a format with which the development NGO practitioners are familiar. So, the goal was to develop a measurement instrument that was not too complex and too extensive and could be used by development practitioners for a quick assessment. If needed, the development NGO could conduct a more thorough assessment using other instruments. To summarise, the decision parameters for scope definition are shown in Table 4The quick scan is a domain-specific instrument for aiding development NGOs in their organisational digital strategy decisions. It was co-created with development NGO staff (practitioners) and academic researchers and is intended for policy and decision-makers in these NGOs. The wish to compare across organisations (benchmarking) was stated, but more as a 'nice to have'.

Table 4. The resulting decision parameters for scope definition, based on de Bruin et al. (2005)

Decision Parameter	**Characteristics for Quick Scan Digital Maturity tool (in bold)**			
Focus	***Domain-Specific***		General	
Level of Analysis	Group Decision making	***Organisational considerations***	***Inter-organisational considerations***	Global and Societal Considerations
Development Stakeholders	**Academia**	***Practitioners***	Government	Combination
Audience	***Management-oriented***	Technology-oriented		Both

Step 2 – Design Criteria

Five co-creation sessions were organised to establish a common understanding of what is available and what the development NGOs want to achieve with a quick scan instrument.

The initial sessions led to the formulation of the following **design criteria** for the quick scan tool for digital transformation maturity self-assessment:

1. The quick scan (in English) should take no more than 20-30 minutes. To fulfil this time constraint, the quick scan tool should consist of **no more than 25-30 questions or statements**. This was the outcome of finding a balance between rigour (the alleged accuracy of a long survey) and relevance (practical, easy to understand, and fast to fill out): the quick scan design leans more toward relevance.
2. All digital transformation aspects are covered: **process, people, technology, ánd digital leadership and organisational culture.**
3. Questions should address a mix of **operational, tactical, and strategic levels;** even a quick scan should address the digital transformational aspects at all these levels of the development NGO.
4. The primary process of international development NGOs, thus the **development projects in Global South** countries, should be emphasised rather than the back-office and secondary processes of development NGOs.
5. The **language** or phrasing of questions should be such that development practitioners can quickly grasp the meaning. Most NGOs internally use English as their **communication language**. The meaning of terms and expressions within the tool should be self-explanatory.

These criteria can be summarised as a quick scan tool in English appropriate for the development sector in cross-boundary and geographically remote activities and use understandable language for development practitioners. This led to the idea of exploring existing tools used by NGOs and exploring modification.

Step 3 – Evaluation of existing practitioners' tools & resulting quick scan tool

Considering the criteria mentioned above and based on the characteristics of the Dutch development NGOs, we observed that tools used by Western/Northern-based nonprofit organisations could be included in the evaluation. We identified five tools for evaluation through desk research (Figure 1). We briefly summarise our findings of this evaluation.

The first tool is called Digital Principles for Development. This self-assessment tool states on its website (https://digitalprinciples.org/about/) that it is "a set of living guidance intended to help practitioners succeed in applying digital technologies to development programs". The tool covers nine principles: Principle 1: Design with the User; Principle 2: Understand the Ecosystem; Principle 3: Design for Scale; Principle 4: Build for Sustainability; Principle 5: Be Data Driven; Principle 6: Use Open Standards, Open Source, Open Data, and Open Innovation; Principle 7: Reuse and Improve; Principle 8: Address Privacy and Security; Principle 9: Be Collaborative. The principles are not considered compulsory but can be seen as recommendations supported by the experiences of practitioners in

the development sector (Waugaman, 2016). The tool is published under Creative Commons, which makes modifications possible. We evaluated the version before the revision of the Digital Principles at the beginning of 2024.

Tool	**Digital Principles Self-Assessment**	**Techsoup Digital Assessment Tool (DAT)**	**NetHope Digital Nonprofit Ability (DNA) Assessment**	**IFRC Digital Maturity Framework**	**Toolkit 2.0 – Digitalisation in Development Cooperation**
Goal	Assessing awareness & use of the Digital Principles	the DAT is designed to guide your organization along the path to digital resiliency.	The Digital Nonprofit Ability (DNA) Assessment for readiness for digital transformation	The digital maturity framework aims to measure for continuous improvement of operations through the application of data analytics and digital technology	Evaluating Digitalisation in development projects.
Survey size	83 questions over 9 Principles domains	Introductory assessment is 20 questions, but many (100!) questions for specific categories. These can be delegated to colleagues.	Many (89) questions covering Readiness, People, Process, Technology, Data & Investment	50-60 questions/statements with 5-level range (beginner/basic to expert-future proof) for each.	Over 80 questions and checklist statements.
Pros	Easy to understand principles, benchmarking with a large group of NGOs worldwide. Useful when organizations want to go ahead with Digital Principles. Aligns with prior communications by Partos on these Principles.	Provides Digital Capability Score and a recommendations that can help improve organisational capabilities. Assesses along common maturity roadmap.	Fits well with topics of digital transformation maturity frameworks. DNA has four quadrants that describe possible states to digital transformation.	Covering all processes. Leadership & culture assessment	Digitalisation in development context.
Cons	The survey seems to focus on the level of engagement in implementing the Digital Principals. However, this can be modified toward digital transformation. Lacking a bit on organisational or strategic digital leadership capabilities needed.	It has a mechanist approach to DT, by stipulating tactical goals as a starting point, for change in technology, people's procedures of working etc. Results present steps to digitalisation (not transformation) and TechSoup services offered.	Too many repetitive questions (each question is 4x repeated) focused on different organisational levels; these may put off the respondents.	Not specific development-goals oriented, but useful for non-profits.	Focuses on digitalisation on the project level, not on maturity at an organisational level.
Remarks	Published under Creative Commons, so adaptions are allowed. Additional tools like Business Model Sustainability Toolkit	Next to the Principles, this model could be suitable for Partos members.	Has also (Data) Digital Skills Framework for the Nonprofit	Helps with formulation goals for a digital strategy	Toolkit developed by German Federal Ministry for Economic Cooperation and Development (BMZ)
Website	https://digitalprinciples.org	https://assessment.techsoup.org	https://nethope.org/toolkits/digital-skills/	https://www.510.global/the-digital-maturity-framework-establishing-a-collective-vocabulary-for-digital-transformation/	https://www.giz.de/expertise/downloads/Toolkit-2.0-Digitalisation-in-Development%20Cooperation.pdf

Figure 1. Evaluation of Digital Maturity assessment tools used by nonprofit organisations

The second tool we evaluated is the TechSoup Digital Assessment Tool (DAT). The tool focuses more on a step-by-step digitalisation approach rather than a holistic digital transformation assessment.

The third tool, NetHope Digital Nonprofit Ability (DNA) Assessment, states that it assesses readiness for digital transformation. The survey covers Readiness, People, Process, Technology, and Data & Investment. It has four quadrants that describe possible states of digital transformation. The actual questions of the survey may put off respondents as there are too many repetitive questions -each question is repeated four times- focused on different organisational levels), and could be misinterpreted by development practitioners whose first language is not necessarily English.

The fourth tool is called the IFRC Digital Maturity Framework. This is developed by the International Federation of the Red Cross Red Crescent (IFRC), specifically designed for use on a national level by the 192 Red Cross and Red Crescent National Societies (NSs). The language of the five maturity levels has been adapted to the language and jargon used by national organisations. The survey questions cover all significant processes, leadership and an organisational culture assessment. The tool itself is not specifically development-goals oriented but valuable for nonprofit organisations.

The fifth tool in this evaluation, developed by the German Federal Ministry for Economic Cooperation and Development (BMZ), is called Toolkit 2.0—Digitalisation in Development Cooperation. The toolkit focuses on evaluating digitalisation in development projects and, as such, does not primarily look at the development NGO's digital transformation maturity on an organisational level.

This comparison led to the following observations:

- Existing digital maturity tools have long surveys.
- Not all are user-friendly or easy to understand; some questions are more understandable for (tech) experts.
- Tools sometimes focus on digitalisation rather than digital transformation.
- Some assessment tools are missing questions on eLeadership.
- There is no actual link to development paradigms that steer NGO's strategy, such as decolonisation.

Based on this evaluation of the five digital transformation maturity assessment tools, together with the development NGOs, we concluded that the Principles for Development fit well, both in language and depth and width, with the digital maturity assessment needs of the development NGOs. The Digital Principles seem to be suitable as a starting point for creating a quick scan because of the following observations by the participants:

- The Digital Principles For Development tool, developed within the development sector two decades ago, is a useful starting point for a quick scan assessment of digital maturity.
- The 80+ three-option multiple-choice questions for the Principles can be associated with digital maturity levels 1 (Initial), 3 (Defined), and 5 (Optimised/Transformed) of common digital maturity frameworks, which have five maturity levels.
- The Digital Principles assessment encompasses the digitalisation changes of the NGO and the digital development projects.
- The desk research revealed that some of the leadership-related questions from the IFRC tool could be a helpful addition.

Therefore, these Digital Principles have been adopted as the starting point for developing a quick scan tool with a drastically reduced number of questions. The participants found the three-tiered maturity level of the Digital Principles or even only yes/no statements preferable for a quick scan.

The outcome of co-creation: a quick scan tool

Forty questions were selected from the original Digital Principles tool's 80+. This was further reduced by merging some questions and reformulating both the questions and the answer options. Some questions were rephrased to make them more understandable to development practitioners instead of information and data specialists. The meaning of the nine principles of the Digital Principles for Development tool was added to the quick scan questions or their explanations to improve explainability.

Below (Figure 2) is a screenshot from the spreadsheet used to determine the questions for the quick scan based on the Digital Principles, supplemented with additional questions or statements related to digital leadership and data justice. This was created in a series of co-creation sessions in which questions were assessed on relevance for Dutch development NGOs and their partners, the need for that information for a quick assessment, and the level of detailed knowledge the respondent needs to have to fill out the questionnaire.

Maturity Matrix			Alignment by Digital Principle				Low = Level 1 / Initial	Medium -= Level 3 / Defined	High = Level 5 / Transformed
Maturity Goal (To Be)	Self Assessment Score (As Is)	Digital Principle	Phase	Activity	Include Question in Quick Scan (Y/N)	Operational, Tactical or Strategic Organisation Level	1	2	3
1	3	Be Collaborative	Analyze & Plan	Licensing & Distribution	N		Mentions potential adoption of a creative commons license for the project in areas where such a license could clearly be used.	Clearly details how open and creative commons licenses could be used in specific parts of the project and proposes which license(s) to use.	Calls for a full creative commons license to be used in a majority of areas for the entirety of the project's lifecycle and details which license is appropriate and why.
0	2	Be Collaborative	Design & Develop	Community Connections	N		Notes a community-collaboration approach in the design of the project.	Calls for a thorough regional and international community engagement strategy that is connected to clear areas of the project, as needed.	Offers a thorough cross-sector engagement strategy alongside possible tools and ongoing practices that directly relate to various areas of the proposed project.
3	0	Be Collaborative	Design & Develop	End User Involvement	Y	Tactical	Mentions a collaborative process for involving end users.	Calls for a thorough end-user feedback process. Communities in the field are identified and involved through specific workflows.	Presents a rigorous end-user involvement process and ensures that civil, municipal, and government organizations are involved in collaboration and feedback processes.
1	1	Be Collaborative	Design & Develop	Modularity	N		Notes a degree of modular capability for the project.	Calls for a well-developed modular approach to project design and collaborative processes.	Presents a thorough understanding of how the project will be modular and how collaboration and community engagement will act on such modularity to improve the overall project feedback processes.
2	0	Be Collaborative	Deploy & Implement	Open Source Participation	Y/N		The proposal or project details an average approach to engaging with open source and other active communities operating in the field. Little is discussed regarding how the project will encourage transparency and appropriate feedback.	The proposal or project calls for a thorough approach to deploy the project in an open and transparent fashion.	The proposal or project details clear avenues for open source community engagement. In areas where the project may be lacking, it identifies where it can improve collaboration efforts between local and international communities.

Figure 2. Screenshot of the spreadsheet used for determining questions for the quick scan

After a couple of iterations, the list of questions of the quick scan prototype was reduced to approximately 26 yes/no and three-option questions, taking not more than 30 minutes to answer. The quick scan is therefore leaning more toward practical, easy to understand with a choice of language aimed to be understandable

for development practitioners, and a tool that can be filled in quickly. Following the initial criteria, the focus is on the development projects (the primary process of development NGOs) with questions on operational, tactical and strategic levels. The questions cover digital transformation aspects from process, people, technology, and eLeadership to organisational culture. The quick scan also covered inclusiveness, data bias and decolonisation of data and technologies that were not yet present in the evaluated tools. The resulting list of questions can be found in the appendix 'Quick Scan Digital Maturity'.

Step 4 – Test – Trial run of quick scan tool

Five development NGOs were willing to test the prototype quick scan. The participants from these development NGOs have roles covering management positions, head office staff, information management, and development practitioners in two countries and were not involved in the group that helped design the quick scan. All participants were invited to share their experiences and feedback during two online sessions. We used the online mind map tool (Miro) to collect input on questions that covered the whole development trajectory of the quick scan (Figure 3), and after clustering the input, we had a conversation with the participants to elaborate.

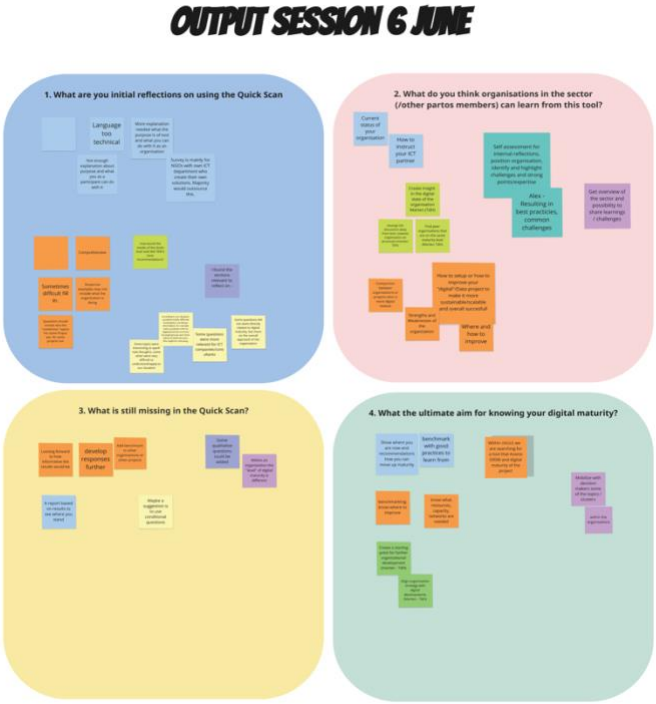

Figure 3. Example of online brainstorming board with feedback from test-users of a quick scan.

The results of these sessions are summarised as follows:

- The digital maturity quick scan survey questions are **difficult to answer by one single staff member from a development NGO.** It was suggested that the questions be grouped according to relevancy and ability to respond based on the (job) role so multiple role-appropriate quick scan digital maturity surveys can be effectively created.
- The language used in the quick scan still relies on **IT jargon** and the IT perspective; examples are *"the underlying social-political infrastructure in relation to the digital project"* or *"landscape assessment"*. It was suggested that more **organisational contex**t be added, thus using more **development jargon**; some even suggested business-like language (primary processes) instead of a digital transformation focus. The results can then be translated into strategic digitalisation or digital transformation goals.
- A lot of the questions seem to assume in their phrasing that ICT activities are within the development NGO and seem to **overlook outsourced IT** operations.
- The '**what's in for me'** can be emphasised by creating a direct and practical output as to how the survey results related to Digital Transformation Maturity for the development NGO using the tool. This increases (sense of) **purpose** for participants to fill in the quick scan.
- The quick scan measures digital maturity on an organisational level. For some projects, the development NGOs intensively use digital tools or solutions, while for others, they do not, depending on **country-specific or other contextual issues affecting IT adoption and use in projects**. This influences the quick scan response. Some suggested providing the option for a qualitative response. Furthermore, this can lead to **differences in scoring** depending on project location or the organisation's department.
- Participants missed the aspect of raising awareness about one's individual digital skills level; this is not part of the quick scan as this is focused on an **organisational level** for the development NGOs.
- "Digital transformation should be about the question: is the change process suitable for the mission/strategy? You have to talk about that first and about appropriate technology afterwards and not upfront", as the digital maturity **quick scan does not cover the mission/strategy of the NGO.**
- In the process of communication, more could be done to **raise awareness** about why a quick scan is necessary, and after a quick scan, one can still opt-in for a more detailed evaluation of specific topics that arose from such a quick scan.
- The participants were positive about sharing findings on **'best practices'** between NGOs and the potential for comparing with other NGOs (**benchmarking**).

This feedback was then translated into a list of functional requirements for further development of a quick scan (Table 5).

Table 5. Digital maturity quick scan improvement suggestions from Test users

Main Topics for Revision	Functional requirements for Quick Scan improvement
Language	Clarity, no technical jargon, relatable to development professionals.
Answer options	Provide the possibility to add textual answers. Also useful when respondents choose a 'middle-option' answer.
Survey respondents	Personalise questions to the respondent's role. Questions should distinguish between organisational or project level, where needed.
Purpose	Explain the purpose of the quick scan.
Instant gratification (what's in it for me)	Direct after a quick scan shows a summary of results. Provide inspirational content based on outcome.
Benchmarking	Position NGO in the landscape of Digital Transformation Maturity and suggestions for next steps.
Target audience	There are different digital maturity surveys for other teams within the organisation (for example, the IT department, for development projects, and organisation-wide); look at other frameworks for inspiration.

Due to strategic agenda shifts at the overarching umbrella association, the project for creating the digital maturity quick scan has (temporarily) halted at this step. A co-creation process with development NGOs has the risk of sudden changes due to strategic shifts or political funding decisions. Together with the association partnering in the process, the project was halted with the delivery of this first version of the quick scan tool.
The next section discusses the results up to this Test phase.

DISCUSSION & REFLECTION

We reflect on the results from the previous section both in the creation process and in the contents of the quick scan digital maturity assessment tool.

Reflecting on requirements for developing a maturity model

Becker et al. (2009) inspired by design science guidelines from Hevner et al. (2004) have listed eight requirements for developing maturity models. We have compared these with the development of the quick scan tool (Table 6). We found that these requirements provided useful guidance for developing the digital maturity tool, confirming their effectiveness.

Table 6. Comparing the co-creation process with requirements for maturity model development (Becker et al., 2009)

Requirement	Summary
R1 (Comparison with existing maturity models)	Five maturity models used by NGOs were compared, and based on the Digital Principles model, a shorter maturity quick scan was developed. The Digital Principles tool was designed by financial donor organisations and mainly large healthcare (development) NGOs from the USA, Canada and the UK.
R2 (Iterative Procedure)	The mode development followed a couple of iterations before being tested.
R3 (Evaluation)	In retrospect, effectiveness was evaluated after the test and not earlier on. Other criteria for usefulness were formulated together with participants from the development NGOs. After the initial Test, no further deployment or evaluation was carried out.
R4 (Multi-methodological Procedure)	The development started with a focus group meeting to formulate criteria, after which desk research resulted in candidate tools. After selecting a promising tool as a starting point, the quick scan was developed in co-creation by reducing the number of questions. For the test, users were selected from various departments of the participating NGOs and their development field workers in two countries in the Global South. The evaluation was carried out via two online sessions supported by online tools.
R5 (Identification of Problem Relevance)	The test users from the development NGOs validated the relevance of a quick scan maturity model.
R6 (Problem Definition)	The application domain was determined in sessions with the association of development NGOs and

	confirmed by participants from individual NGOs. The tool needed to be focused on the development sector. NGOs need an initial maturity measurement instrument that is easy and fast to use, hence a quick scan.
R7 (Targeted Presentation of Results)	This requirement was not further developed as the process halted after the test. The original tool on which the quick scan is based presented the results in a spiderweb diagram visualisation.
R8 (Scientific Documentation)	During the design process of the maturity model, meeting notes were made, and decision steps were recorded, including the participants involved in the steps. The quick scan is based on a well-established practitioner's tool that has existed for 20 years now. However, the reliability and validity of documents for this starting point, the Digital Principles tool, were not found. However, the tool's questions were comparable with other tools, and the test users evaluated their relevance.

Lasrado et al. (2015) found that practically all maturity tools follow a step-by-step iterative sequential approach for their creation. This study confirms this iterative approach for developing a maturity assessment tool. However, the co-creation process brought some challenges, such as strategic goal shifts or political funding decisions that impacted the partners' willingness to participate in the co-creation process.

Comparing and contrasting with related literature

We identify the following when comparing and contrasting our findings with the literature in the Theoretical Concepts section.

When we reflect on the creation of the quick scan that is based on an existing internationally used Digital Principles maturity assessment model (predominantly in the USA, Canada & and UK), we have taken a somewhat **reverse direction,** going from a *comparative model to a prescriptive model*, where the common approach is the other way around, in contrast to what de Bruin et al. (2005) prescribes. The Digital Principles maturity model has existed for over 24 years and evolved into nine dimensions and more than 80 questions (DIAL, 2016). Downgrading an established and well-maintained maturity model to a quick scan tool may lead to more ambiguity when assessing the maturity level of a development NGO. The accuracy is lower with a quick scan than a full-fledged

tool, but the quick scan is intended for an initial assessment. The advantage is the speed and ease of use, while the level of accuracy is somewhat sacrificed to fit the practitioners' needs of the NGO's decision-makers. NGOs may choose to use the full version of the Digital Principles maturity tool for further measurement afterwards.

In contrast to the literature, where Poeppelbuss et al. (2011) emphasise possible discourse around the applicability and reliability of the maturity model, and McCormack et al. (2009) cautions for oversimplification by these models of reality and lack of empirical underpinning, we found that practitioners are pursuing a different goal. From a practitioner's point of view (here, development NGOs), sacrificing the accuracy of a maturity assessment tool for s**implicity and speed is relevant** and aligned with the development NGOs' needs. Striving for an absolute measure of maturity is not the aim; a **relative comparison may be useful**.

In contrast to some development practitioners' DTM tools and the literature, an absolute measure of organisational digital transformation maturity is not necessarily achievable or desirable. The circumstances differ per geographic context or developmental thematic areas of projects (healthcare, education, et cetera). **A relative measure of digital maturity** works well and can be used to set organisational strategies for further increasing digital maturity per geographic context or thematic area of projects.

Our study aligns with van Steenbergen et al. (2013) argumentation that focus area maturity models (here focusing on international development and NGOs) may be better suited for incremental changes. Except that our study confirms this, it also extends the notion of focus areas by highlighting the importance of creating context-specific models, as here for development NGOs, and adding (context)-specific assessment focus areas, such as digital leadership, inclusiveness, data bias, and decolonisation of data and technologies, which are missing in many of the evaluated tools.

Poeppelbuss et al. (2011) suggest that because of the dominance of maturity models created by Western information systems researchers, one should reflect on the applicability of the maturity models in different geographical regions (e.g. countries in the Global South). Indeed, we found a challenging aspect. The development NGO practitioners argued there are differences in the use of digital technologies in development projects across countries in which the development NGO operates, resulting in **different scoring** for the same development NGO in the quick scan digital maturity assessment, which can all be trustworthy for their context. This is due to differences between Western and non-western [Global

South] countries that influence (ICT for) development projects (Heeks, 2017), such as uncertainty because of (political) instability and volatility in systems like supply chains and markets or resource constraints (shorter supply of money, skills, technology).

This may sound like a paradox and differs from the criticism of the reliability of the model, as stated by Poeppelbuss et al. (2011), because the simultaneous existence of **multiple maturity levels** within the development NGO may reflect the persistent reality of the NGO in different projects in different countries across the Global South. By multiple maturity levels, we mean the actual level of digital maturity on which the development NGO operates in that country-specific context, often relying on partnerships, and therefore, it is not always possible to apply all digital capabilities.

The study identifies issues when applying a digital maturity assessment tool to a development NGO operating in multiple geographical areas or with multiple development activities. The context per geographical area is different and influences the actualisation and development of the organisation's digital capabilities. A comparison between the two different regions with likely different contexts and challenges may be informative but not necessarily effectively useful for the organisation to assess gradual digital growth in a specific geography. Of course, some insights can be derived from an assessment across regions.
Furthermore, as we will discuss next, this study theorises that the development NGO's digital transformation maturity goals should be linked to the **organisation's development paradigm** enacted in their projects.

Development paradigms, a missing link in digital maturity model for development NGOs?
As presented in the Results, the participants argued that digital maturity quick scan does not cover the NGO's development goals or organisation strategy. We argue that digital maturity growth (i.e. increasing maturity level) of nonprofit organisations such as development NGOs is influenced by the **NGO's development paradigm** (what philosophy/-ies has the NGO embraced for international development?) and strategy, steering the evolutionary pathway, cf. van Steenbergen et al. (2013). These paradigms may guide the growth strategy of development NGOs toward certain aspects of their digital maturity, meaning some digital principles are prioritised based on the paradigm under which the development NGO operates.

To illustrate this, we have taken the five most prevalent paradigms in the development sector and plotted how these would translate to priorities for the

Digital Principles for development. In summary (Table 7), these five paradigms entail the following (Heeks et al., 2022):

- Neoliberal: markets and market relations are the central foundation for economic development.
- Structuralist: particular socio-economic structures inhibit development.
- Sustainable: ensuring resource usage does not compromise the ability of future generations.
- Human Development: development as freedom; in particular economic, political, social, security and informational freedom for all.
- Decolonisation: reversal of the current and legacy negative impacts of colonisation.

Table 7. Digital implications from various development paradigms. Source: Heeks et al. (2022)

Development Paradigm	Digital Implications?
Neoliberal: Markets and market relations are the central foundation for economic development	Digital markets & Digital will also enable the development of private sector responsibility for public service delivery and improvements in efficiency of remaining public sector.
Structuralist: Particular socio-economic structures inhibit development.	Digital must support radical structural change based on localised production and/or cooperative or similar ownership structures.
Sustainable: Ensuring resource usage does not compromise the ability of future generations.	Digital must support a step-change in resource usage and polluting outputs of all economic and social processes, including those involving digital itself.
Human Development: Development as freedom; in particular economic, political, social, security and informational freedom for all.	Digital must be not just accessible but usable and appropriable by all. It must then support the ability of all to choose the kind of lives and livelihoods that they value, thus requiring some customisation to individual contexts.
Decolonisation: Reversal of the current and legacy negative impacts of colonisation.	Digital must be accessible, usable and appropriable by indigenous peoples, enabling them to exercise self-determination. Digital sovereignty will enable local control over digital assets.

The digital implications from these paradigms vary from private sector focus (Neoliberal), local ownership (Structuralist), sustainable resource use (Sustainable), equitable and appropriate digital technologies focus (Human Development), to digital sovereignty promoting (Decolonisation), as shown in Figure 4.

Principles▶ Paradigms ▼	Design With the User	Understand the Existing Ecosystem	Design for Scale	Build for Sustain-ability	Be Data Driven	Open Standards, Data, Source, Innovation	Reuse and Improve	Address Privacy & Security	Be Collabo-rative
Neoliberal			√√√						
Structuralist	√√√	√√√						√√√	√√√
Sustainable	√√√			√√√		(√√√)			√√√
Human Developme nt	√√√	√√√					√√√		√√√
Decolo-nisation	√√√					√√√		√√√	√√√

Figure 4. Prioritisation of Digital Principles per development paradigm.

To conclude our discussion, we reflect on our approach with the Checklist for Digital-Transformation-for-Development (DX4D) Research as proposed by Heeks (2024). This checklist is intended to improve research fit with digital transformation for development. We notice that the checklist is useful for this evaluation.

Table 8. Evaluating our research using the checklist for Digital Transformation for Development (DX4D) Research, as proposed by Heeks (2024).

Checklist for (DX4D) Research	**Reflecting on our Research Approach**
1. Does your research incorporate a definition of digital transformation for development: both the digital transformation element and the developmental transformation that is the goal of DX4D?	Yes, DX4D is defined by Heeks et al. (2023) with an organisational digital maturity focus.

2. Is digital transformation for development understood in your research to be different from incremental digitally-enabled change: creating significant systemic disruption that involves technological changes to digital data and systems but also involves and requires broader, parallel transformative changes in development processes, resource distributions, formal and informal institutions, and structural relations?	Yes, although the practitioners' tools take a somewhat nuanced approach in distinguishing between incremental digitally enabled change and systemic disruption toward an 'end goal' of a certain maturity level of the development NGO enacting in their development projects.
3. Does your research, therefore, recognise that the impact of digital transformation for development emerges not deterministically from technology alone but from a mix of social and technological factors?	The questions in the created quick scan do reflect this.
4. Is there recognition in your research that there are both positive and negative impacts associated with DX4D?	The questions in the created quick scan do address these.
5. Is the focus of your research the micro-level, proactive actions of individuals within organisations (digital transformation for development) and/or the macro-level societal changes (digital transformation of development) that both derive from and shape micro-level actions?	The focus is the organisational (micro)level of development NGOs. However, we noticed that the geographical-dependent or development-activity-specific maturity might vary from region to region or activity to activity for the same development NGO.
6. If your research discusses implementation drivers, barriers, processes, etc., does it move beyond traditional ICT4D research to take into account the specific scope, duration, disruption, and other features of digital transformation for development?	The questions in the quick scan superficially address these. The original sources from which the quick scan was developed are more detailed.

7. If your research provides practical DX4D recommendations, do these cover not just the content of organisational (private, public, NGO, and international agency) strategy or government policy but also details of the processes and structures through which that strategy or policy will be implemented?	Yes, the study reveals the importance of understanding the paradigms for development NGOs enact in their strategy and how these translate to pathways for digital transformation maturity development of the NGO and within their projects.

CONCLUSION

As outlined in this paper, the step-by-step development of the Digital Maturity Model includes co-creation activities with the target users (participants working at development NGOs) to design and develop a quick scan of digital transformation maturity suitable for development NGOs. This paper has provided some lessons learned from a co-creation design approach by asking: *what lessons learned can we derive from the co-creation process with development NGOs for a quick scan digital transformation maturity assessment tool?*

A quick scan digital maturity tool with a development sector-specific focus was co-created mainly based on a narrower selection of (slightly reformulated) questions from the Digital Principles self-assessment tool, which covers all principles and digital leadership. Although the quick scan tool we developed has not fulfilled our expectations and has not been fully deployed, we have learned valuable lessons from the project.

Digital Transformation Maturity tools do not yet incorporate steering toward development paradigms. An analysis of plotting five main development paradigms (neoliberal, structuralist, sustainable, human development, decolonisation, see Heeks et al. (2022)) onto the nine elements of the Digital Principles digital maturity tool shows us that it is possible to identify key principles to be prioritised by a development NGO that has embraced certain development paradigm(s). We argue that international development paradigms, organisational strategy, and values influence how digital technologies are adopted, and their use is 'maturing' by development NGOs, affecting their digital maturity and evolutionary pathways.

Development NGOs do not operate alone but collaborate in networks. Their collaboration partners include local NGOs, nation-states, the private sector and multilateral donors (Schaaf, 2013). When assessing digital maturity, one could evaluate the level of maturity across the 'chain' of collaboration partners in a specific development project rather than organisational maturity.

So, to summarise, here are our lessons learned:

- Be specific about the target audience of the digital maturity assessment tool.
- Specific areas may need to be addressed when evaluating smaller versus larger organisations.
- An organisation's strategy, mission, and vision may be relevant to understanding its digital transformation aims. For development NGOs, this means understanding under what development paradigm(s) they operate.
- Most digital maturity assessment tools seem to be focused on the input from a single respondent of an NGO and combine or 'average' the results of multiple respondents from the same NGO. It may be useful to have relevant respondents only provide input for their relevant areas in the assessment tool.
- Connecting information on 'how-to-achieve' next maturity level in the maturity assessment tool is advisable.
- Digital maturity assessment tools may cover different topics that are general or context-specific. It is relevant to choose an existing one or a design one that covers the topics relevant to the development NGO's strategic goals.
- Tools can be developed based on evaluating existing (preferably open sources that are allowed to be adapted) tools from practices and/or academic body of knowledge. Still, user testing is required to analyse usability and effectiveness for data-driven decision-making.
- The multi-context of development projects across multiple countries in the Global South provides a complex scenario for organisations like development NGOs to consider what they want to measure with a digital maturity assessment tool. For example, is the goal to compare the maturity level at different regions, for different activities or with similar NGOs?

Limitations and Suggestions for Future Research

Developing a quick scan tool based on an extensive maturity model and moving from an established comparative model toward a more prescriptive tool may have introduced difficulties in creating the tool and understanding its outcome in a development NGO's maturity level.

Reducing a complex assessment tool to create a quick scan instrument downgrades its accuracy; thus, determining a maturity level becomes fuzzier and leads to a larger margin of uncertainty. This is an uncommon step, going from a complex assessment tool to a more reduced assessment in creating quick scan tools, and it may have led to some limitations.

A limitation in a co-creation approach may be the subjectivity or choices made when selecting questions for a quick scan. A mitigation measure to reduce bias was remaining close to the nine principles and seeking to formulate questions similar to the original survey, improving their comprehensibility for development practitioners. As we noted from the feedback from the prototype testing, this can still be improved. The co-creation approach may introduce a bias in the quick scan tool, as the participants' perspectives and opinions may have influenced the final result.

A limitation, though probably embedded in the design of many digital maturity tools, is that they rely on self-assessment. For a Dutch development NGO operating in multiple countries, the resulting scoring by the management in the North may differ from the assessments of development professionals who work on different projects in the Global South under different circumstances, affecting the ability to use digital technologies. Depending on geography and context, the same Development NGO may have different digital maturity level scores for the development projects and internal processes.

A practitioners' digital transformation maturity assessment tool specifically designed for a specific target group, like the development sector, has merits in practical applicability and was used as the foundation for creating the quick scan tool. There may be issues regarding scientific reliability and validity. However, if a sector agrees on what is understood regarding maturity levels and takes action to move to another level, it becomes fit for purpose. Although scientific scrutiny may be lacking in some of the practitioner's tools.

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APPENDIX QUICK SCAN DIGITAL MATURITY

This appendix presents the result of the co-creation process for the digital maturity assessment quick scan, mainly based on Digital Principles, and combined with insights from other tools relevant to Development NGOs.

Quick Scan Digital Maturity

The Digital Maturity Quick-scan consists of 27 questions that will be used to scan the current status/level of digital maturity of organisations working in International Development Cooperation.

About

The digital maturity scan is adapted from the Principles for Digital Development and provides insight into where the development NGO currently stands with respect to inclusive, responsible, and 'smart' data and digitalisation use. It does not accurately assess the level of maturity within your organisation but gives a broad picture of how conducive or not your organisation is to digital maturity.
This survey assesses if your organisation is committed to the following areas:

- Level of engagement with the user in designing
- Level of assessment of and engagement with the local context
- Level of integration of scaling strategies
- Level of data-driven practices and strategies
- Level of incorporating an open standard approach to digital projects
- Level of adapting practices to reuse and improve.
- Level of collaboration in digital projects
- Level of Digital Leadership

How to?

- The survey questions should be answered from the perspective of the organisation and its management approach to digitalization. It is not an exercise to test your individual competence.
- We expect you to fill out this survey only once within your organisation (one submitted survey per organisation).
- (If you do not know) you are encouraged to involve your team and/or colleagues responsible for the digitalisation work when answering the questions.

- There are no right or wrong answers, the scan merely provides a comparative framework to situate your organisation in the different stages of maturity.

Results

Use these results to help identify the areas you have developed and the ones which you can strengthen. The Principles for Digital Development provide plenty of tools to help you further.

Designing with the User

This principle is focused on engaging end-users and engaged communities in the design, implementation, evaluation, and decision-making of your program.

- Does your organisation empathise with the *needs & motivation* of end-users through user persona development, user testing or other approaches for designing with the user as part of the planning and later stages of the project?
- Does your organisation evaluate together with users throughout every stage of the project?
  - Yes, we apply rapid-response user feedback throughout every stage of the project, as well as sufficient time to partner with users
  - To some extent, we recognise the value and need to get real-time or rapid feedback from the target user audience, but do not allow enough time to partner with users.
  - No, we don't do it or have a feedback mechanism for engaging with users.
- Does your organisation organise training, material and instruction for end-users and collaborators when introducing a new digital solution or tool?

Understanding the Existing Ecosystem

This principle focuses on the underlying social-political infrastructure in relation to the digital project. It details preliminary and exploratory research to understand how your digital program will interact with the social realities of your context & implementation.

- Does your organisation conduct a landscape assessment that includes political situations and input from local civic organisations, implementers, donors, and stakeholders?
- Does your organisation use a feasibility assessment with a focus on the existing communities and contexts of the projects?
  - Yes, we apply an assessment and connect it to project goals which are linked to communities.
  - Partially, we apply a feasibility assessment within the projects' context *but do not link it to the project goals of the involved community.*
  - No, we don't / we only mention a feasibility assessment, but do not apply it.
- Does your organisation work on integration and access of existing systems, tools & projects to shift ownership to local communities and programs (by including partners in decision-making and project development)?
- Does your organisation organise training, material and instruction for teams to identify data bias and act upon systemic injustices in the digital context of your projects (for example, through power analysis, feminist technology approaches, and data feminism)?

Design for Scale

Designing for scale means thinking beyond the pilot and making choices that will enable widespread adoption later. It also means determining what will be affordable and usable by a whole country or region rather than by a few pilot communities.

- Does your organisation/project include a scaling-up strategy with a clear outline of steps and approaches for scaling up?
- Is the digital infrastructure of your solution built with the flexibility of scaling the project in size and reach?
- Does your organisation have a financial scaling strategy that outlines the per-user cost of the project for forecasting the costs and risks if the project may be scaled up?
    - Yes, we have.
    - Partially, we have a financial scaling strategy that outlines per-user cost and forecasts the costs and risks
    - No, we don't have or do this.

Build for Sustainability

Building sustainable programs, platforms and digital tools is essential to maintain user and stakeholder support, as well as to maximize long-term impact. Adaptive decision-making, using evidence-based learning to inform adjustments throughout project implementation, is key to building sustainability. These steps towards building affordability, accessibility and availability of your digital services are described in your sustainable business model.

- Does your organization ensure local ownership and adaptive decision-making in the project to remain adaptive to shifting needs & contexts?
- Does your organization identify and implement a sustainable business model when developing digital solutions?

Be Data Driven

This principle focuses on best practices around your data journey & informing project decisions on data. It includes setting a baseline/data indicator, monitoring frameworks, decision-making but also Data Privacy.

When an initiative is data-driven, quality information is available to the right people when they need it, and they use that information to take action.

- Has your organisation defined a data management strategy with standards that are connected to your Theory of Change or project for the entire lifecycle?
- Does your organisation use a method for using data in decision-making to drive the project outcomes and results?
- Does your organisation disaggregate data with the goal of monitoring intersectionality & inclusion indicators in your projects (disabilities, gender inclusion, age, language, etc.)
- Does your organisation identify data literacy needs for the project's audiences?
- Does your organisation have a clear procedure for data privacy in the project to protect your own organisations, partners, communities & users involved (for example. risk assessments and data storage)?

Use Open Standards, Open Data, Open Source, and Open Innovation

An open approach to digital development can help increase collaboration in the community and avoid duplicating work that has already been done.

- Does your organisation explore or use open-source, free, open-source software when developing digital products?
- Do you share digital development projects publicly share open-source software solutions, findings et cetera (choose one or more):
    - inside your organisation
    - Within the network of involved project partners

○ With the outside digital development community.
Reuse and Improve Instead of starting from nothing, programs that "reuse and improve" look for ways to adapt and enhance existing products, resources, and approaches. • Does your organisation conduct a local needs assessment to evaluate how existing technology or products (local and global) could be reused, modified or extended?
Address Privacy & Security Addressing privacy and security in digital development involves careful consideration of which data are collected and how they are acquired, used, stored, and shared. Organisations must take measures to minimise collection and protect confidential information and the identities of individuals represented in data sets from unauthorised access and manipulation by third parties. • Does your organisation conduct an in-country context assessment that presents risks and opportunities for data management for projects? • Do you have a security strategy for project data within your organisation and involved project partners? • Does your organisation have a plan on how to manage sensitive (to persons identifiable) information to prevent data leakages or misuse?
Be Collaborative Being collaborative means sharing information, insights, strategies and resources across projects, organisations and sectors, leading to increased efficiency and impact • Do you stimulate collaboration by, for example, sharing information, insights, strategies and resources across projects, organisations and sectors? • Does your organisation engage with (local) experts, research institutes and authorities across sectors and contexts to inform your decision-making?
Digital Leadership Digital leadership describes the strategic use of an organisation's digital resources and capabilities to achieve its goals. Digital leaders are persons who set the use of those resources and capabilities in motion and track the success of their application. • Does your organisation's leadership have one person in charge of digital adoption and changes in ways of working who is knowledgeable in interpreting data? • Does your organisation have a digital strategy that is part of the organisation's total strategy?