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INTERLINK

WP2 Governance Models

D2.3- Governance Performance Indicators

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Glossary

ENTRY	DEFINITION
Acceptance	Acceptance is one's perception of a technology or system after usage (Renaud et al., 2008; Nadal et al., 2019) and thus one's attitude towards a specific digital tool or process supported via digital tools. Within public administration literature, acceptance is often referred to as (service specific) satisfaction.
Co-production	Co-production refers to the generally voluntary (not regulated nor mandated) and active involvement of citizens alongside public employees in the co-engagement, co-design, co-implementation and/or co-sustainability of public services (Loeffler & Bovaird, 2020; Brandsen & Honingh, 2018).
E-services	''A*ctivities provided by provider to a recipient; these services are non-material; they are provided by means of information and communication devices and the result of their consumption can be a benefit, service or acquisition of property*'' (Kvasnicova et al, 2016, p. 193)
Public services	*''A public service is an aggregation of all activities that realize a public authority's commitment to make available to individuals, businesses, or other public authorities some capabilities intended to answer their needs, giving them some possibilities to control whether, how and when such capabilities are manifested''* (Guarino 2017).
Quality	Quality can be considered as what Pollitt and Hupe (2011) have termed a 'magic concept'. The very high degree of abstraction and the notion's solely positive normative connotations overcome any opposition and have meant that aiming for high qualitative services has become an important objective across domain.
Trust	A distinction can be made between interpersonal and institutional trust (OECD guidelines, 2017). Interpersonal trust refers to trust in people who are not known to the respondent (generalized trust). On the other hand, institutional trust refers to trust in all types of institutions (particularized trust), such as governmental institutions (Fledderus, 2016).

ACRONYMS

ABBREVIATED	EXTENDED
KPI(s)	Key Performance Indicator(s)
PA(s)	Public Administration(s)

Table of contents

1 INTRODUCTION 6

2 QUALITY, ACCEPTANCE AND TRUST AS KPIS 6

2.1 A multi-dimensional approach to quality 9

2.2 Acceptance & trust 10

3 NON-TECHNICAL KPIS 11

3.1 Indicators for the survey for co-producers 11

3.2 Indicators for the survey for end-users 15

4 CONCLUSIONS AND NEXT STEPS 18

5 LITERATURE 20

6 APPENDIX 23

6.1 IRSPM paper 23

Executive summary

In Task 5.2,One of the aims of INTERLINK Task 5.2 is the definition of Key Performance Indicators (KPIs) for the evaluation of the INTERLINK platform and the associated technical components. These KPIs should be consistent with the governance model, as a set of principles and procedures. Accordingly, Task 2.3 has translated the design principles of the preliminary governance model into evaluation criteria for the non-technical aspects of the INTERLINK digital platform. This document describes the list of operationalized, non-technical performance indicators, which were used in Task 5.2 to develop KPIs for the evaluation of the platform.

1 Introduction

This deliverable is part of Work Package 2 (WP2), which in the INTERLINK project develops the *governance model*: the structure and guiding principles for decision-making within the digital platform supporting the co-production of public services.

One of the aims of INTERLINK Task 5.2 is the definition of Key Performance Indicators (KPIs) for the evaluation of the INTERLINK platform and the associated technical components. The non-technical KPIs should be consistent with the governance model, as a set of principles and procedures. Accordingly, Task 2.3 has translated the design principles of the preliminary governance model (described in deliverable D2.1) into evaluation criteria for the non-technical aspects of the INTERLINK digital platform.

This document describes a list of operationalized, non-technical performance indicators, which were used in Task 5.2 to develop KPIs for the evaluation of the platform. In setting up the list, we combined indicators from various sources: the service quality literature, particularly the SERVQUAL model; technology acceptance literature; public management literature on trust in government services; and literature on co-production in public services. The conceptual and theoretical issues and considerations that arise when combining such disparate traditions will be developed in a separate academic paper. A first draft of the paper was presented at the IRSPM conference 2022 (see Appendix), will be further developed for an academic workshop on ‘Long-term Sustainability of Co-Creation and Co-production’ in May 2022 and published thereafter.

2 Quality, acceptance and trust as KPIs

In this section we will conceptualise three non-technical KPIs, quality, acceptance, and trust that emerged from the literature as critical concepts for the evaluation of co-production processes and related outputs, starting with the former.

The **quality of services** is becoming an increasingly important focus to measure the performance in the public sector (Bauer, 1996; Luschei & Trube, 2000; Power, 2000; Power, 2003; Reichwein & Broekmate, 2010). Quality can be considered as what Pollitt and Hupe (2011) have termed a ‘magic concept’. The very high degree of abstraction and the notion’s solely positive normative connotations overcome any opposition and have meant that aiming for high qualitative services has become an important objective across domains. However, its

blurriness also means that defining and implementing a framework in the attempt to 'manage' quality is difficult.

To understand the difficulties in defining - and ultimately measuring - quality of (digitalised) public services, it is important to understand its origins. The concept of quality management spilled over from the industrial to the service sector and finally to public services, leading to distinct problems (Cole, 1994; Reichwein & Broekmate, 2010). This means three main difficulties in defining and measuring quality as performance indicators in the public sector (Donabedian, 1988).

- First, many public services are delivered in complex settings. This means that stakeholders with different perspectives are involved, spanning public administration at the national, regional and local level as well as contracted-out public, not-for-profit and private service providers. They all have been touched by the wand but see the colours of the quality prism filtered through their lenses. They do so because quality assessments are normative judgements based on the values of the respective stakeholders (Oechler, 2009; Beckmann et al., 2004) . Defining quality thus usually includes the coordination of different perspectives rooted in their values and interests. This becomes even more difficult in the context of digitalised public services with new players, e.g. IT-service providers, consulting firms, entering the stage.
- Second, responsibilities for quality (failure) are difficult to determine in public services. Not only because of interdependent actor constellations including various of the above-mentioned stakeholders, but also because the consumer of public services is often a co-producer (Beckmann et al., 2007). Thus, her collaboration is necessary for the production of services and, moreover, the acts of producing and consuming coincide. Who then is responsible (for which parts of) quality in public services? This is considered to be a difficult quest (Gosfield, 1997).
- Third, the pursued standardisation of quality, common in the industrial sector, is more complicated in the case of public service provision as hardly predictable human interactions are an integral part of these kinds of services (Oppen 1995, 20–31). Some of the problems to take quality aspects as performance indicators are the same difficulties the application of the industrial sector's quantitative approach to the service sector faced, e.g. the immateriality and intangibility of the 'product' or the non-existence of uniformity in service provision. Others are inherent in the public sector, like the centrality of legal requirements, the client being less independent when compared to services in the private sector and most importantly, the very aim of public services to influence societal processes instead of a focus on an organisation's survival on the market. At the same time, the quality discourse in the public sector is highly embedded in a trend towards rationalization, marketization and mangerialization of public services (Hoggett, 1996; Speck, 1997; Power, 1997) .

Taking these difficulties into account, the quantitative approach of quality management systems, in the attempt to objectivise an understanding of quality, seems unnatural in regard to public services. Yet, it is justifiable if we take into account the above outlined difficulties into the conceptualisation process. Thus, designing indicators of quality as non-technical KPIs needs to take into account the 1) differing emphasis on quality, 2) differing perspectives of co-producers and end-users and 3) the specific requirements of quality in public services. We do this by **1) developing a multi-dimensional perspective on quality, 2) developing distinct**

indicators for co-producers and end-users, 3) incorporating specific indicators for quality in public services.

Given the outlined difficulties, the indicators have two important limitations. First, public services differ in regard to contextual settings. Hence, the proposition of general indicators might not always capture the specific understanding of quality in a public service under investigation. Second, as quality is a result of negotiation processes wherein the definatory power and the role as quality guardian(s) are rooted in existing accountability relationships, it is also a time-sensitive measurement. Changes in assessments of quality can thus not only be stemming from changes in the quality but also from a change in dominant perspectives in judging quality.

In addition to the quality of (digitalised) public services, **acceptance** and **trust** are also widely used to measure performance in the public sector (Van de Walle & Bouckaert, 2003; Kundu & Datta, 2015). The concept of acceptance is well established within the field of Information Systems (IS), in relation to the adoption of Information Technologies (ITs) within organisations (Renaud & Van Biljon, 2008). This concept can be used in different settings and is often used to study the acceptance of e-Government services. Even though the concept of acceptance constitutes different meanings within the scientific literature, acceptance is considered to be positively affected by quality (of services and systems) in both public administration and technological studies (Bouckaert & Van de Walle, 2003; Renaud & Van Biljon, 2008). These studies show that acceptance and quality are related and since we propose a new, comprehensive understanding of quality, it is interesting to study the relationship between quality and acceptance once more.

Regarding the concept of trust, previous studies indicate that the quality of services and systems enhances general levels of trust (Kundu & Datta, 2015). Trust can thus be considered as an effect of quality as well, in relation to public sector performance. Whilst interpersonal trust and institutional trust have already been studied in relation to co-production processes (Fledderus, 2016), these studies did not focus on digital co-production processes. It is, therefore, relevant to research the relationship between quality and trust in a digital setting, based on our proposed comprehensive understanding of quality. Within the field of Information Systems, trust is often considered to be a factor influencing acceptance, in addition to an effect of quality. The assumed relationship between quality, trust, and acceptance is illustrated in Figure 1.

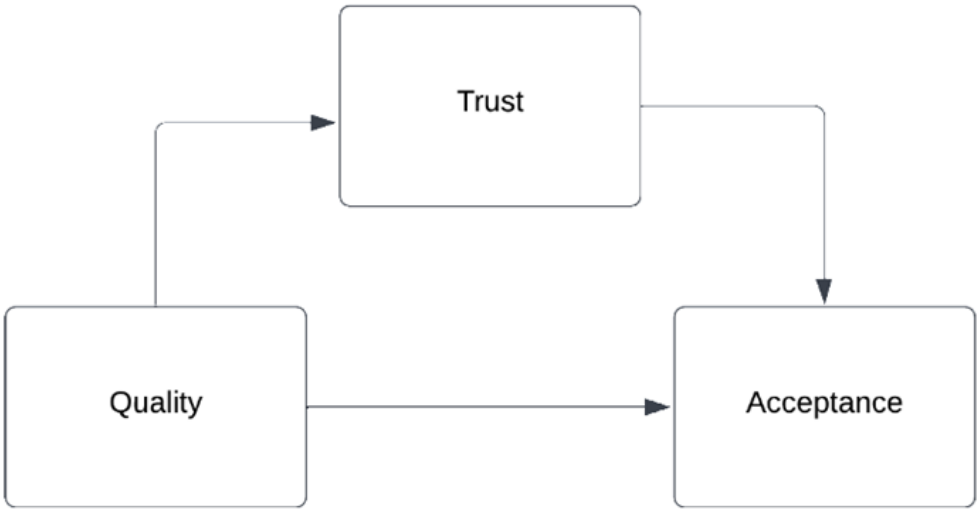

Figure 1. Relation between quality, trust, and acceptance

Source: own illustration.

2.1 A multi-dimensional approach to quality

Definitions on quality differ in the literature regarding their focus. They can be grouped into three main categories (Walsh 1991; Loeffler 2002; Alzaydi et al 2018):

- *A product-based definition* understanding quality as the degree to which a particular service or product conforms to its specification;
- *A user-based definition* understanding quality as being determined by the extent of how attributes of a product meet the customer's requirements;
- *A value-based definition* understanding quality as services being in line with normative expectations towards public services (e.g. legal treatment) and broader societal norms (e.g. democratic values)

By taking up a multi-dimensional understanding of quality, we combine all three different focus points that can be found in the literature, with a particular emphasis on the specific context of public services.

Within the different focus points in the definitions of quality, many ways of specifying the notion of quality into analytical dimensions can be found in the literature. One of the most important differentiation is a focus on technical terms of quality management on the one hand and the human aspects of quality management on the other hand (Lucas 1996; Alzaydi 2018). Another one is applying a process perspective on quality differentiating a physical environment quality from an interaction quality and an outcome quality (Parasuraman et al 1985; Brady/Cronin 2001). In our design of KPIs, we have included both of these perspectives with their respective differentiations to achieve a comprehensive measurement of quality as a non-technical KPI.

In the conceptualisation of the specific indicators, we took into account already existing measurements, indices and indicators on quality, most notably the PSQ and SERVQUAL models (Sabadie 2003; Tan et al. 2008; Guenon et al. 2016). They are important reference points for observing product-based and user-based quality in public services with constituent

dimensions that take into account the specific context of the public sphere (e.g. tangibles, reliability, responsiveness, comprehension). This is why we included them in the model. We further included insights from the literature on service design and satisfaction in the context of digitalised services (Frank 2020) as well as the often referenced ISO frameworks on Product Quality and Quality in Use (currently, ISO/IEC 25020:2019(en) Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality measurement framework). As there is a lack of specifications of a value-based understanding of quality in the literature, we could not refer to existing measurements in this respect but designed items based on the literature of public values and on the specific requirements of service delivery in the public sector (Weber 1922; Li/Shang 2020; Kim et al 2021).

Our conceptual model of quality as non-technical KPIs is thus differentiated into three pillars and corresponding dimensions (see figure 2). The product-based quality is made observable through technical KPIs (see deliverable 5.1). The dimensions for user-based and value-based quality are made observable by two indicators each (see section 3).

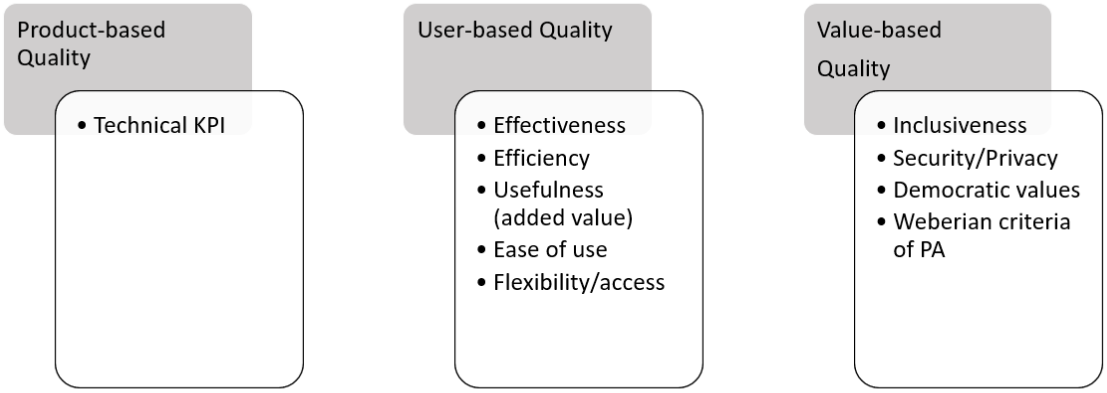

Figure 2. A multi-dimensional conceptualisation of quality

Source: own illustration.

2.2 Acceptance & trust

Whilst being similar to adoption, **acceptance** refers to an attitude or perception after using a specific tool or system. IT researchers pay limited attention to the process towards acceptance or the adoption process as a whole, as they tend to focus on the factors influencing the ultimate/final acceptance. Various 'technology acceptance models' propose a set of factors that are assumed to determine the attitude or perception of users regarding the acceptance of a certain technology (Renaud & Van Biljon, 2008). Even though these acceptance models are acknowledged and validated within the field of IS, they do not fit the purpose of the INTERLINK project given their limited focus in relation to the process towards acceptance.

Within the project, we focus on the acceptance of digital technologies used within co-production processes. In line with the technological perspective, we understand acceptance as the attitude towards a specific digital tool or process supported via digital tools. Additionally, acceptance is also understood in terms of satisfaction within this research. This interpretation of acceptance focuses on the process rather than the outcome and is very service-specific, as it

is based on the literature on good governance originating from the field of public administration (Bouckaert & Van de Walle, 2003). By combining the different definitions of acceptance, we study acceptance (regarding a specific digital tool) by focusing on the estimated frequency of use as a measurement for the attitude after usage.

Similar to acceptance, the concept of **trust** can be understood in different manners and is often studied within the field of Information Systems as well as the field of public administration (Bouckaert & Van de Walle, 2003; Renaud & Van Biljon, 2008). IT researchers mainly focus on trust in technologies, referring to trust as the sense of confidence that a product or system will behave as intended (ISO framework). Additionally, security and privacy guarantees, possibly in relation to personal data governance, are often linked to trust. On the other hand, public administration scholars often follow the OECD (2017) guidelines and focus on trust of individuals in other individuals or institutions. As regards these guidelines, trust constitutes of personal beliefs that a person or institution will behave consistently with peoples' positive expectations. In line with this definition, we refer to trust as the broad, general attitude towards individuals or (public) institutions (respectively: interpersonal/generalized trust and institutional trust).

3 Non-technical KPIs

Based on the above described conceptualisations, RU developed a survey together with DEUSTO that encompasses the following indicators (Table 1 and Table 2). There are different routes through the questionnaires depending on people's role within the co-production process, thus we also differentiated the indicators according to the roles:

- For the **co-producer survey** there is one route for a) Citizens and another one b) for Public servants, non-profit organisations, for-profit-organisations
- For the **end-users survey** there is a route for c) Consumers and another one for d) Co-deliverers.

3.1 Indicators for the survey for co-producers

The indicators for the survey for co-producers are presented in Table 1. A distinction is made between the indicators for *citizen co-producers* (A) and *public servant-, non-profit organizations or for-profit organizations co-producers* (B) (see appendix for the concrete survey).

Table 1. Indicators for co-producers

Concept	Dimension	Indicator
Quality (user-based)	Effectiveness	A): "The extent to which INTERLINK collaborative tools increase the satisfaction of engaging in a co-production process." B: "The extent to which INTERLINK collaborative tool(s) contribute to meeting (everyday work) objectives in a co-production process."
		A): "The extent to which INTERLINK collaborative tools help citizens to complete their objectives in a co-production process." B): "The extent to which co-producers believe that INTERLINK collaborative tools help public employees to complete their objectives in a co-production process."
	Efficiency	A & B): "The extent to which the use of INTERLINK collaborative tools allows co-producers to perform the steps involved in co-producing a public service in a faster way."
		A & B): "The extent to which the use of INTERLINK collaborative tools helps to invest fewer monetary and/or personnel resources in co-producing public services."
	Usefulness (added value)	A & B): "The extent to which the use of INTERLINK collaborative tools allows co-producers to better engage in the process of co-producing public services."
		A & B): "The extent to which the use of INTERLINK collaborative tools reduces the (general) difficulty in co-producing public services."
	Ease of use (comfort/usability)	A & B): "The extent to which most co-producers would learn to use INTERLINK collaborative tools quickly."

		A & B): "The extent to which a co-producer feels that they can use INTERLINK collaborative tools in an intuitive manner (it goes without saying)."
Quality (user-based) *continued*	Flexibility	A): "The extent to which INTERLINK collaborative tools increase the options to realise the design (service development) AND/OR delivery (service execution) of a public service." B): "The extent to which INTERLINK collaborative tools increase the options to design (service development) AND/OR to deliver (service release) a public service."
		A & B): "The extent to which INTERLINK collaborative tools can be used without being bound to a certain time (e.g. office hours), a certain place (e.g. possible to use it from home), a certain technical prerequisite (e.g. a certain app)."
Quality (value-based)	Inclusiveness	A): "The extent to which the co-production process is sensitive to digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different." B): "The extent to which the co-production process is adapted for digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different."
		A & B): "The extent to which the INTERLINK collaborative tools need to be improved with regards to digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different."
	Security/Privacy	A & B): "The extent to which during the co-production process, there was transparency about (personal) data usage, data storage, opt out options (right to be removed), different."

		A & B): "The extent to which INTERLINK collaborative tools ensure that only necessary data is collected allowing for a high level of privacy."
Quality (value-based) *continued*	Democratic values	A & B): "The extent to which the co-production process allows for active citizen participation (in terms of equal power and responsibilities)".
		A & B): "The extent to which there is transparency on how to file a complaint/suggestion and how it is processed."
	Weberian criteria of public administration	A & B): "The extent to which the INTERLINK collaborative tools are based on transparent rules and regulations."
		A & B): "The extent to which the INTERLINK collaborative tools provide an equal treatment of all people collaborating within/contributing to the co-production process."
Acceptance	Relative acceptance	A): ''The extent to which individuals think that the INTERLINK collaborative tool(s) will be used frequently by citizens.'' B): ''The extent to which individuals think that (public) organizations will make frequent use of the INTERLINK collaborative tool(s).''
	Absolute acceptance	A): ''The extent to which individuals think that they will use the INTERLINK collaborative tool(s) frequently themselves.'' B): ''The extent to which individuals think they will use the INTERLINK collaborative tool(s) frequently within their own work.''
Trust	Interpersonal trust/ generalised trust	A & B): ''The extent to which individuals would say that most people can be trusted, or that you can't be too careful in dealing with people.''

	Institutional trust/ inter-institutional trust	A): ‘‘The extent to which individuals personally trust each of the following institutions: local/ regional/ national/ European public authorities.’’ B): ‘‘The extent to which individuals personally trust the work relation to each of the following institutions: local/ regional/ national/ European public authorities.’’

3.2 Indicators for the survey for end-users

The indicators for the survey for end-users are presented in Table 2. A distinction is made between the indicators for *consuming end-users* (C) and *co-delivering end-users* (D).

Table 2. Indicators for end-users

Concept	**Dimension**	**Indicator**
Quality (user-based)	Effectiveness	C): “The extent to which the INTERLINK-powered public service increases the satisfaction of engaging with a public service.” D): “The extent to which the INTERLINK-powered public service contributes to meeting (everyday work) objectives.”
		C): “The extent to which the INTERLINK-powered public service helps users to complete their objectives.” D): “The extent to which the INTERLINK-powered public service helps people who contribute to executing the service.”
	Efficiency	C): “The extent to which the use of the INTERLINK-powered public service helps end-users invest less resources (e.g. time or money) in consuming the service." D): “The extent to which the use of the INTERLINK-powered public service helps end-users invest less resources (e.g. time or money) in co-delivering the service.”
		C): “The extent to which the use of the INTERLINK-powered public service helps me invest less time in consuming the service.” D): “The extent to which the use of the INTERLINK-powered public service helps me invest less time in co-delivering the process.’’

	Usefulness (added value)	C): "The extent to which the INTERLINK-powered public service helps/allows me to better engage with it." D): "The extent to which the INTERLINK-powered public service helps/allows me to better engage in its co-delivery."
		C): "The extent to which due to INTERLINK the general difficulty in consuming a service reduced." D): "The extent to which due to INTERLINK the general difficulty in co-delivering a service reduced."
Quality (user-based) *continued*	Ease of use (comfort/usability)	C): "The extent to which end-users would learn how to consume the INTERLINK-powered public service quickly." D): "The extent to which end-users would learn how to co-deliver the INTERLINK-powered public service quickly."
		C): "The extent to which end-users feel that they can engage in the process of consuming the INTERLINK-powered public service in an intuitive manner (it goes without saying)." D): "The extent to which end-users feel that they can engage in the process of co-delivering the INTERLINK-powered public service in an intuitive manner (it goes without saying)."
	Flexibility/Access	C): "The extent to which the options to consume the service are increased due to INTERLINK." D): "The extent to which the options to co-deliver the service are increased due to INTERLINK."
		C): "The extent to which the INTERLINK-powered public service can be used without being bound to a certain time (e.g. office hours), a certain place (e.g. possible to use it from home), a certain technical prerequisite (e.g. a certain app)." D): "The extent to which the INTERLINK-powered public service can be co-delivered without being bound to a certain time (e.g. office hours), a certain place (e.g. possible to use it from home), a certain technical prerequisite (e.g. a certain app)."

Value-based Quality	Inclusiveness	C: "The extent to which the INTERLINK-powered public service is sensitive to digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different." D): "The extent to which the INTERLINK-powered public service is adapted for digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different."
		C & D): "The extent to which the INTERLINK-powered public service needs to be improved with regards to digital literacy, people with disabilities (e.g. visual impairment), people with a language barrier (e.g. immigrants), internet access (offline possibilities to engage with the co-production), different."
Value-based Quality *Continued*	Security/Privacy	C & D): "The extent to which the INTERLINK-powered public service is transparent with regards to (personal) data usage, data storage, opt out options (right to be removed), different."
		C & D): "The extent to which the INTERLINK-powered public service ensures that only necessary data is collected allowing for a high level of privacy."
	Democratic values	C): "The extent to which the INTERLINK-powered public service allows for active citizen participation in politico-administrative processes." D): "The extent to which the INTERLINK-powered public service allows for active participation in the co-delivery process."
		C & D): "The extent to which there is transparency on how to file a complaint/suggestion regarding the INTERLINK-powered public service and how it is processed.
	Weberian criteria of public administration	C & D): "The extent to which the INTERLINK-powered public service is based on transparent rules and regulations."

		C & D): "The extent to which the INTERLINK-powered public service provides an equal treatment of all public service users."
Acceptance	Relative acceptance	C): ''The extent to which individuals think that the INTERLINK-powered public service will be used by citizens''. D): ''The extent to which individuals think that (public) co-delivering organisations will frequently use the INTERLINK-powered public service.''
	Absolute acceptance	C): ''The extent to which individuals think that they will use the INTERLINK-powered public service frequently''. D): ''The extent to which individuals think they will use the INTERLINK-powered public service frequently in their own work.''
Trust	Interpersonal trust/ generalized trust	C & D): ''The extent to which individuals would say that most people can be trusted, or that you can't be too careful in dealing with people.''
	Institutional trust/ inter-institutional trust	C): ''The extent to which individuals personally trust each of the following institutions: local/ regional/ national/ European public authorities.'' D): ''The extent to which individuals personally trust the work relation to each of the following institutions: local/ regional/ national/ European public authorities.''

4 Conclusions and next steps

Based on the conceptual framework presented in this deliverable, the indicators have been translated into actual survey questions (see appendix for survey questions). We now entered a validation phase of the surveys in which the pilot owners will comment and provide feedback on the contents of the survey for possible tuning of the questions. Thereafter, the pilot owners will collect some measures of the current situation related to the creation, consumption and delivery of public services to define a baseline against which to evaluate the changes determined by INTERLINK solutions, both with respect to the provided support to co-production as well as the quality, acceptance and trust of public services. Importantly to note, the governance performance indicators will be measured after the iteration 1 of pilots. Subsequently, an analysis will be conducted of the collected feedback. In case evidence emerges from the previous point that a revision of the governance performance indicators is necessary, an update will be made to serve the second iteration of pilots.

Please see the following figure for the process of the survey (Figure 3) The designed questionnaire validation will take place in pre-pilot subphase and the actual usage in pilot execution sub-phase. D5.3 (Use-case deployment and operation report) due in M20 (August

2022) according to the Grant Agreement , will be responsible for reporting the results of deploying, operating and evaluating the pilots' use cases in iteration 1

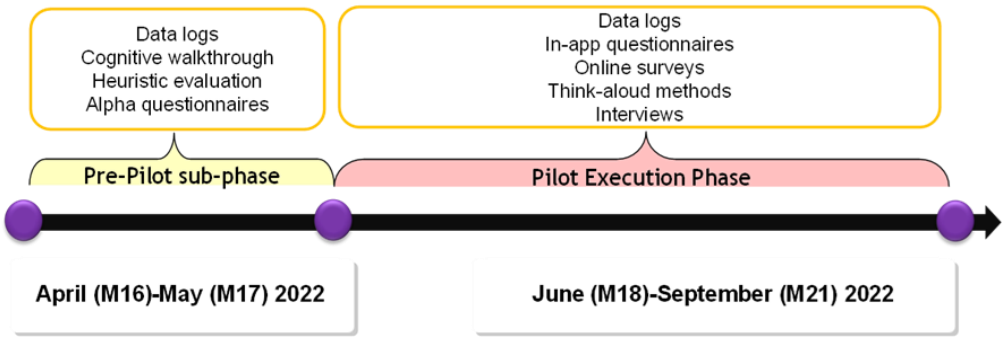

Figure 3. Survey planning

5 Literature

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6 Appendix

The appendix includes an IRSPM conference paper, 19-22 April, P14 - Digital transformation in the public sector. This is a preliminary draft version. Do not circle or cite without permission of the authors.

6.1 IRSPM paper

How to assess digital co-production in public services? Towards a survey among co-producers and end-users.

The digital transformation of society raises high hopes for the improvement of designing and implementing public services which might lead to higher levels of acceptance and trust. It is often said that technological advancement may foster co-production practices, promote citizens' engagement and lead to higher efficiency and effectiveness of public services. Yet and despite a growing number of studies on the role of ICT's on co-creation practices, the knowledge on how digital technologies actually impact the quality of co-production processes and citizen engagement is still limited. Same is true for our understanding of how the quality of digitally co-produced services influences acceptance and trust of end-users. This paper thus aims to 1) understand the notions of trust and acceptance as well as quality with respect to digitally co-produced public services, 2) to discuss the different perspectives of stakeholders and resulting tensions in this context and 3) to develop a multi-dimensional conceptual framework for an analysis of stakeholders' perceptions of trust and acceptance and how there are linked to perceptions of the quality of co-produced public services. We will hereby address the following question: *How does the perceived quality of digitally co-produced services influences levels of acceptance and trust among civil servants and citizens?*

To get a grip on the impact of digital technologies on co-production and citizen engagement, we need to disentangle the concepts of acceptance and trust. We understand 'acceptance' as the attitude towards a specific service and 'trust' as a broader attitude towards institutions and public services. Building on the literature of both technology studies and public administration research, we argue that acceptance and trust of digitally co-produced public services can be understood as an effect of the quality of such services. With respect to quality, we will propose a comprehensive understanding therof that includes a whole range of already existing product- and user-based indicators (e.g. effectiveness, efficiency, access, reliability). Additionally, we argue for the inclusion of value-based indicators to account for the specific context of digitally co-produced services in in the public sector (e.g. inclusiveness, participation). The objectives of this paper have been developed as an interdisciplinary effort and we therefore incorporate different concepts that are not always easily compatible. In our discussion of the stakeholders'

perspectives on quality, we further argue for the importance of a sensitivity to quality being a contested terrain. It is difficult to find objective means to assess quality in regard to co-produced (digital) public services as it takes place in complex multi-actor settings with varying stakeholders' perspectives based on their values and interests and resulting selective perceptions. In our development of a conceptual framework to analyse the link between trust/acceptance and quality perceptions, we overall fill a gap in research as we overall lack a multi-faceted approach (and in particular in the inclusion of a value-based perspective) to understand quality in the digital coproduction of public services.

The paper is structured as follows. In the next section, we outline the empirical context for the development of our conceptual framework, i.e. the coproduction of digitally co-produced services. Subsequently, we discuss the notions of trust and acceptance in this context. We then move on to understand the multi-faceted concept of quality and discuss challenges of 'managing' quality with respect to digitally co-produced services. We conclude with a discussion of challenges of such an inter-disciplinary conceptualization.

Digital technologies for co-production and citizen engagement in public services

The term 'public services' can be found in several disciplines and has various interpretations. According to Guarino (2017), there is still no standard way of describing and documenting public services. Basic definitions on what constitutes a public service differ and there is no standard global interpretation of what types of public services exist. Here we need to reduce the conceptual fuzziness around the term 'public services', by capturing the core notion that underlies this concept. Guarino (2017) offers a refined definition of (public) services, which we will here follow, which emphasizes the continuous commitment of public authorities in making services available: "*A public service is an aggregation of all activities that realize a public authority's commitment to make available to individuals, businesses, or other public authorities some capabilities intended to answer their needs, giving them some possibilities to control whether, how and when such capabilities are manifested*" (Guarino 2017).

It is not difficult to come up with examples illustrating that the relationship between citizens and public administrations has changed significantly under the influence of digital technologies. With respect to public services, the term of e-services has been coined as "*activities provided by provider to a recipient; these services are non-material; they are provided by means of information and communication devices and the result of their consumption can be a benefit, service or acquisition of property*" (Kvasnicova et al. 2016: 193). A distinction can be made between wholly digital services and human services that are digitally supported, but which also rely heavily on 'social technologies'. An important challenge for the project is to clarify to what extent a service depends weakly or deeply on particular software to be

provided effectively.

Sheth & Sharma (2007) further distinguish different types of e-services by the degree to which a service can be digitised (1) and the ability for co-creation (2), involving citizens in aspects of the (co-)design and (co-)delivery of the service. Citizens fill out forms from their own homes or can report dirt, loose paving stones and broken lampposts. But also more substantive contact takes place online. Think for example of citizen forums and referendums. The frequent use of digital technologies raises the question of how these tools affect the interrelationship between citizens and public administrations. Lember (2018), for example, states that it is often assumed that new technologies will foster co-production and co-creation, by making these processes more effective and more efficient. They, for example, lower barriers for citizens to engage in such processes. In order to be able to understand the impact of digital tools on public services, we need to define coproduction.

The use of the terms ‘co-creation’ and ‘co-production’ is varied and there is no uniformly accepted standard, although some definitions are regularly used (see for a discussion, e.g. Bovaird & Loeffler 2020; Brandsen et.al. 2018). Co-creation will here refer to a process in which services are jointly designed and/or delivered by public authorities and other stakeholders. The term ‘co-production’ is in practice often used interchangeably with co-creation, but is generally seen as referring to the delivery stages of a service (Brandsen & Honingh 2018). According to this conceptualisation, there are two main phases in the process: (1) one during which the service is (re-) designed and (2) one during which it is delivered: design and delivery, respectively. To add the prefix ‘co’ to concepts, there must be active involvement of users of a service at one or several points in the process:

1. Co-design concerns of activities that incorporate “the experience of users and their communities” into the creation, planning, or arrangements of public services” (Bovaird and Loeffler 2012).

2. Co-delivery is a joint effort by public authorities and stakeholders to provide and improve public services (Alford 2014; Nabatchi et.al. 2017).

Within the two main phases, different types of subphases must be identified, because they are very different in nature. This leads to the identification of four subphases: engagement, design, implementation and sustainability (see Table 1). As regards the design phase, there can be both an open, participatory part that involves many actors as well as one focused on the development of concrete service design and tools within smaller teams. In addition, delivery can consist of an active piloting/testing phase and a routine phase in which the original participants are less or no longer

involved.

Table 1. Phases and sub-phases of co-production.

Approach	Phase	Subphase	What occurs during each phase
Co-production	Co-design	Engagement	This is an open process during which users and/or other stakeholders interact to define the nature of the problems and the direction of the solution.
		Design	This is a closed process in which the solution is developed within a smaller team, which may or may not include stakeholders, from a basic concept towards tools and modules (instantiation).
	Co-delivery	Implementation	The service is first piloted, evaluated, and if necessary re-designed. Users may have a role in producing the service.
		Sustainability	The service is continued as a routine process and is periodically evaluated

Source: Own compilation.

Understanding acceptance of and trust in public administrations

Previous studies suggest that the quality of services and systems influences general levels of trust (Bouckaert & Van de Walle 2003; Kundu & Datta 2015). Trust can thus be considered as an effect of quality. In addition to an effect, trust is often considered to be a factor influencing acceptance within the field of Information Systems. Not surprisingly, many researchers that focus on e-Government study the concept of trust in relation to the concept of acceptance (Hofmann et al. 2012). Within this research, we consider the relationship between quality, trust and acceptance as follows (see Figure 1):

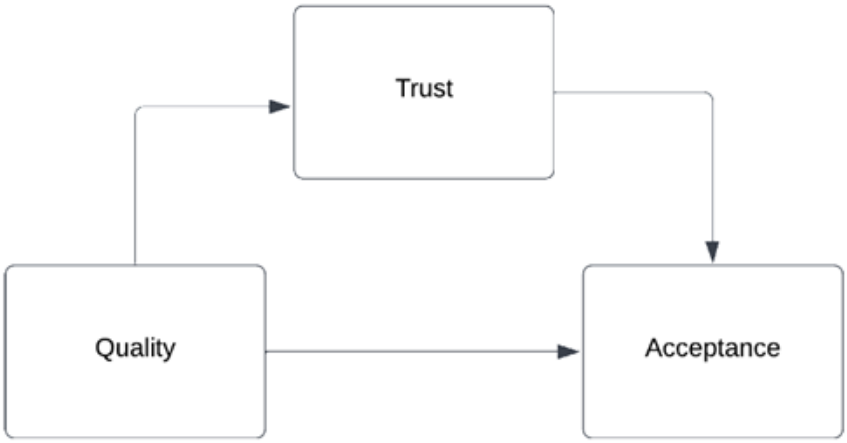

Figure 1. Conceptual model

Source: Own compilation.

Acceptance

The concept of acceptance is widely used within the field of Information Systems (IS), in relation to the adoption of Information Technologies (ITs) within organizations (Renaud & Van Biljon 2008; Nadal et al. 2019). This concept can be used in different settings and is often applied to study the acceptance of e-Government services. Whilst being similar to adoption, acceptance refers to an attitude or perception after using a specific tool or system whereas adoption often refers to the decision to adopt (committing to use). Various 'technology acceptance models' propose a set of factors that are assumed to determine the attitude or perception of service users regarding the acceptance of a certain technology. These models are especially adopted for the domain of Information Science (Davis et al. 1989). The technology acceptance model described by Sang & Lee (2009) is based on various theoretical foundations, such as the Theory of Reasoned Actions (TRA). Acceptance is assumed to be influenced by intention to use a certain technology, whereby the intention to use can be seen as a mediator. In addition, the intention to continue using refers to acceptance. The TRA approach claims that the intention to use is determined by subjective perceptions regarding the nature of technologies. In addition to intention to use, perceived ease of use and perceived usefulness are common constructs that relate to acceptance as well. The focus on the factors influencing the ultimate attitude concerning acceptance suggests that IT researchers pay limited attention to the process towards adoption or the acceptance process as a whole.

Additionally, acceptance can also understood in terms of satisfaction (Bouckaert & Van de Walle 2003). This interpretation of acceptance focuses on the process rather than the outcome and is very service-specific, as it is based on the literature on good governance originating from the field of public

administration. Since the beginning of the 1980s, increased attention for customer orientations stimulated the interest in researching user satisfaction within the public sector. Via surveying a large amount of data was generated, collected and analyzed in order to evaluate and compare public services. These measurements focus on how something is done, not necessarily on what is done. The level of satisfaction is determined by user's sympathy for the mission of public organizations. It should be noted that satisfaction should be approached with care within survey research, as the level of satisfaction depends on the context and is likely to reflect a certain mood.

By combining the different definitions of acceptance, we focus on the acceptance of digitally co-produces services. In line with the technological perspective, acceptance is understood as the attitude towards a specific digital tool OR process supported via digital tools. Even though the concept of acceptance constitutes different meanings within the scientific literature, acceptance is considered to be positively affected by quality (of services and systems) in both public administration and technological studies (Bouckaert & Van de Walle 2003; Renaud & Van Biljon 2008). The relationship between quality and acceptance is, however, not always direct and causal as this relationship can be influenced by different views on quality, changes in perceptions and varying service characteristics (Bouckaert & Van de Walle, 2003). Regardless of the direct and causal linkage between quality and acceptance, studies show that acceptance and quality are related. Since we propose a new, comprehensive understanding of quality, it is interesting to study the relationship between quality and acceptance once more.

Trust

Similar to acceptance, the concept of trust can be understood in different manners and is often studied within the field of Information Systems as well as the field of public administration (Bouckaert & Van de Walle 2003; Sang & Lee 2008). IT researchers mainly focus on trust in technologies, referring to trust as the sense of confidence that a certain technology will work in a conscious, calculated, and intentional manner. To give an illustration, trust is considered to be an aspect of user satisfaction within the ISO framework and is defined as ''the degree to which a user or other stakeholder has confidence that a product or system will behave as intended'' (ISO framework). The ISO framework provides standards for effective Information Security Management Systems. Trust is thus understood as a user characteristic, often focusing on trust in certain technologies. In addition to the focus on trust in technologies, trust can also refer to trust in a person or an organization in the field of Information Systems (Hofmann et al.,). Researchers studying trust in relation to e-Government services focus on trust in governmental organizations as well as trust in technologies. Trust in governmental organizations refers to the trust with regard to the ability and integrity of the organization providing the service (Bélanger & Carter 2008). Furthermore, these studies show that trust in governmental organizations is

a direct antecedent of intention to use e-Government services.

In line with research focusing on trust in relation to e-Government services, trust is mostly understood as trust in a person or an organization from a social science perspective. Public administration scholars often follow the OECD (2017) guidelines and study the trust of individuals in other individuals or in (governmental) institutions. Trust constitutes of personal beliefs that a person or institution will behave consistently with peoples' positive expectations. Following the OECD guidelines (2017), we refer to trust as the broad, general attitude towards individuals or (public) institutions (respectively: interpersonal/generalized trust and institutional trust). A high level of institutional trust does not necessarily indicate that a governmental organization is functioning in an effective or efficient manner,in relation to public sector performance. A high level of institutional trust only indicates that a governmental organization is perceived to function in a preferable manner. Trust in government thus indicates congruence between the perceived functioning of governmental organizations and citizens' preferences (Bouckaert & Van de Walle 2003).

Interpersonal/generalized and institutional trust have already been studied in relation to co-production processes, for example by Fledderus (2016). The author shows that co-production processes can be linked to higher levels of trust between public institutions and citizens, and even to positive effects on trust in society in general (Fledderus 2016). However, the co-production of public services as such does not automatically lead to enhanced levels of trust. Contrastingly, it appears to matter how co-production processes are organized. Whilst interpersonal trust and institutional trust have already been studied in relation to co-production processes (Fledderus 2016), these studies did not focus on digital co-production processes. It is, therefore, relevant to research the relationship between quality and trust in a digital setting, based on our proposed comprehensive understanding of quality.

Conceptualising quality of public services

As stated above, the quality of services is becoming an increasingly important focus to measure the performance of the public sector and with respect to public services (Bauer 1996; Luschei & Trube 2000; Power 2000; Power 2003; Reichwein & Broekmate 2010). Quality can be considered as what Pollitt and Hupe (2011) have termed a 'magic concept'. The very high degree of abstraction and the notion's solely positive normative connotations overcome any opposition and have meant that aiming for qualitative services has become an important objective across domains. However, its blurriness also means that defining and implementing a framework in the attempt to 'manage' quality is difficult.

To understand the difficulties in defining - and ultimately measuring - quality of digitally co-produced

public services, it is important to understand its origins: The concept of quality management spilled over from the industrial sector to the service sector and finally to public services leading to distinct problems (Cole 1994; Reichwein & Broekmate 2010). This means three main difficulties in defining and measuring quality as performance indicators in the public sector (Donabedian 1988).

First, many public services are delivered in complex settings. This means that stakeholders with different perspectives are involved spanning public administration at the national, regional and local level as well as contracted-out public, not-for profit and private service providers. They all have been touched by the wand but see the colours of the quality prism filtered through their lenses. They do so because quality assessments are normative judgements based on the values of the respective stakeholders (Oechler 2009; Beckmann et al. 2004) . Defining quality thus usually includes the coordination of different perspectives rooted in divergent values and interests. This becomes even more difficult in the context of digitalised public services with new players, e.g. IT-service providers, counselling firms, entering the stage.

Second, responsibilities for quality (failure) are difficult to determine in public services. Not only because of interdependent actor constellations including various of the above mentioned stakeholders, but also because the consumer of public services is a co-producer (Beckmann et al. 2007). Thus, her collaboration is necessary for the production of services and, moreover, the acts of producing and consuming coincide. Who then is responsible (for which parts of) quality in public services? This is considered to be a difficult quest (Gosfield 1997).

Third, the pursued standardisation of quality, common in the industrial sector, is more complicated in the case of public service provision as hardly predictable human interactions are often an integral part of these kinds of services (Oppen 1995: 20–31) This leads to a number of issues when trying to identify objective (quantifiable) performance indicators of quality, e.g. the immateriality and intangibility of the 'product' or the non-existence of uniformity in service provision. Others are inherent in the public sector, like the centrality of legal requirements, the client being less independent when compared to services in the private sector and most importantly, the very aim of public services to influence societal processes instead of a focus on an organisation's survival on the market. At the same time, the quality discourse in the public sector is highly embedded in a trend towards rationalization, marketization and mangerialization of public services (Hoggett 1996; Speck 1997; Power 1997) .

Taking these difficulties into account, the quantitative approach of quality management systems in the attempt to objectivise an understanding of quality seems unnatural in regard to public services. Yet, it is justifiable if we take into account the above outlined difficulties into the conceptualisation process. While designing indicators of quality it thus needs to be taken into account the differing emphasis on

quality, varying perspectives of co-producers and end-users and the specific requirements of quality in public services. We do this by 1) developing a multi-dimensional perspective on quality, 2) developing distinct indicators for co-producers and end-users, 3) incorporating specific indicators for quality in public services.

Given the outlined difficulties, the indicators have two important limitations. First, public services differ in regard to contextual settings. Hence, the proposition of general indicators might not always capture the specific understanding of quality in a public service under investigation. Second, as quality is a result of negotiation processes wherein the definatory power and the role as quality guardian(s) are rooted in existing accountability relationships, it is also a time-sensitive measurement. Changes in assessments of quality can thus not only be stemming from changes in the quality but also from a change in dominant perspectives in judging quality.

Definitions on quality differ in the literature regarding their focus. They can be grouped into three main categories (Walsh 1991; Loeffler 2002; Alzaydi et al. 2018):

- a product-based definition understanding quality as the degree to which a particular service or product conforms to its specification;

- a user-based definition understanding quality as being determined by the extent of how attributes of a product meet the customer's requirements;

- a value-based definition understanding quality as services being in line with normative expectations towards public services (e.g. legal treatment) and broader societal norms (e.g. democratic values)

By taking up a multi-dimensional understanding of quality, we combine all three different focus points that can be found in the literature of public administration and computer science with a particular emphasis on the specific context of public services.

Within the different focus points in the definitions of quality, many ways of specifying the notion of quality into analytical dimensions can be found in the literature. One of the most important differentiation among the literature of computer science and public administration is a focus on technical terms of quality management on the one hand and the human aspects of quality management on the other hand (Lucas 1996; Alzaydi 2018). Another one is applying a process perspective on quality differentiating a physical environment quality from an interactions quality and an outcome quality (Parasuraman et al 1985; Brady & Cronin 2001). In our design of quality indicators, we included both

of these perspectives with their respective differentiations to achieve a comprehensive measurement of quality.

In the conceptualisation of the specific indicators, we took into account already existing measurements, indices and indicators on quality, most notably the PSQ and SERVQUAL models (Sabadie 2003; Tan et al. 2008; Guenon et al. 2016). They are important reference points for observing product-based and user-based quality in public services with constituent dimensions that take into account the specific context of the public sphere (e.g. tangibles, reliability, responsiveness, comprehension). We further included insights from the literature on service design and satisfaction in the context of digitalised services (Frank et al. 2020) as well as the often referenced ISO frameworks on Product Quality and Quality in Use. As there is a lack of specifications of a value-based understanding of quality in the literature, we could not refer to existing measurements in this respect but designed items based on the literature of public values and on the specific requirements of service delivery in the public sector (Weber 1922; Li & Shang 2020; Kim et al. 2021). Figure 2 shows our overall multi-dimensional conceptualization of quality.

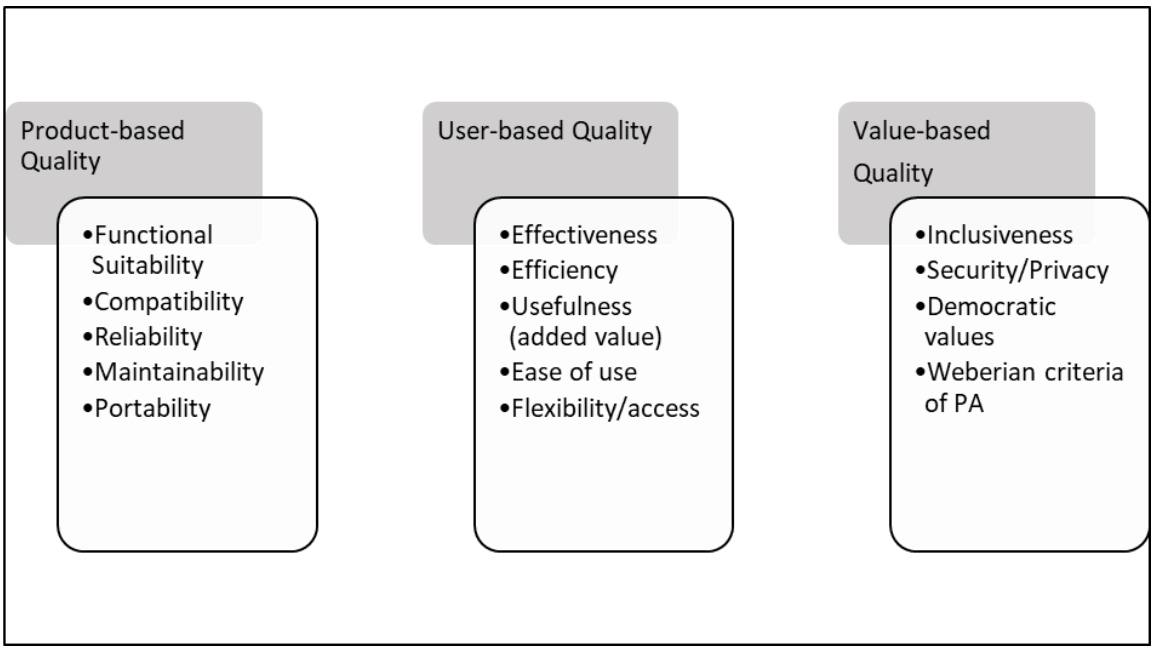

*Figure 2: A multi-dimensional approach to quality of digitally co-produced services. (*Source: Own compilation).

Concluding Discussion: Inter-disciplinary conceptualization and related challenges

In developing an interdisciplinary framework for quality measurement, we have encountered various issues. Broadly speaking, the tensions already present in such discussions within public management

research are considerably exacerbated.

One such difference concerns what values the term quality represents, an issue that even within disciplines is a complex one. The literature identifies various such values: effectiveness, efficiency, satisfaction, inclusion, and more. Disciplines tend to stress some values over others, which complicates discussions. For instance, in the development of technical systems, efficiency and ease of use are dominant values, a frame which is then transplanted to a service context. In working towards a reconciliation of different values within an interdisciplinary team, there is a logical tendency to compromise by adding different categories of values. Yet that can be problematic, first, because it gives no clear guidelines on how to reach an overall assessment, and second, because it tends to favour those values which can be more easily measured.

A related issue is how the role of users is perceived. Where they are seen as customers, quality is interpreted as a measure of how satisfied they are and the likelihood of their loyalty. Of course, in a public service context such an approach is in itself problematic, because the use of services is often not voluntary and there is no effective competition. This has indeed been one of the major criticisms of market-oriented public sector reforms. A more fundamental issue is whether use of the service is the only type of involvement that should be measured. Although in a business context there are many examples of users co-designing products and services, this is usually seen as a way of raising the perceived quality of those products and services, but kept separate from the quality measurement itself. In a public service context, the inclusion of users in the design and delivery of services can be a democratic aim in itself, apart from whether that leads to better services in a more technical sense.

Public services are also part of a more political context, in which the way that services are delivered, or the fact that they are delivered at all, is seen as an expression of democratic choices. That means the assessment of a service partly derives from a wider context, beyond the specific characteristics of the service, and that the assessment in turn affects this context. To some extent this is always the case: one's satisfaction with a company's services may be influenced by one's feelings about the brand, perhaps the reputation of the company. In the public sector, such a connection is especially strong: assessments of services have sometimes been found to be mostly unrelated to their technical quality. There is known to be a strong connection between general trust in and expectations of the public sector, and the evaluation of services. If so, choosing quality measurements that only incorporate aspects of the service itself is a mistake.

All of this influences how the measurement of quality is set up, with respect to indicators, but also with respect to process: how and when users are approached. Achieving a unified approach in an

interdisciplinary context is hard work, for various reasons. The concerns of one discipline can seem marginal in the eyes of another. Specifically, the emphasis in both IT and business on efficiency can lead to a dominant place of this one value in an evaluation. Furthermore, the concepts used by various approach are overlapping and fuzzy, which means it takes long and difficult discussions between scholars who do not really understand each other, who may regard each other's concerns as either shallow or overly finicky. Nevertheless, to reach a comprehensive framework, it is necessary. This paper was an attempt to disentangle some of the most important concepts encountered when measuring the quality of digital co-production.

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