Co-creation service readiness model: a decision support for the selection of public services suitable for improvement through co-creation

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Abstract

Purpose – This paper aims to develop a model that supports public organisations in making informed strategic decisions as to which public services are most suitable to be improved through co-creation. Thus, it first identifies the features that make public services (un)suitable for co-creation and then applies this knowledge to develop a multi-criteria decision support model for the assessment of their co-creation readiness.

Design/methodology/approach – The decision support model is the result of design science research. While its structure is determined by a qualitative multi-criteria decision analysis, its substance builds on a content analysis of Web of Science papers and over a dozen empirical case studies.

Findings – The model is comprised of 13 criteria clustered into two groups: service readiness criteria from the perspective of service users and service readiness criteria from the perspective of a public organisation.

Research limitations/implications – The model attributes rely on a limited number of empirical cases and references from the literature review. The model was tested by only one public organisation on four of its services.

Originality/value – The paper shifts the research focus from organisational properties and capacity, as the key co-creation drivers and barriers, to features of public services as additional factors that affect the prospect of co-creation. Thus, it makes a pioneering step towards the conceptualisation of the idea of "service readiness for co-creation" and the development of a practical instrument that supports co-creation in the public sector.

Keywords Public services, Public service improvement, Co-creation, Drivers, Barriers, Decision support model

Paper type Research paper

1. Introduction

By now, research efforts have been predominantly focused on co-creation drivers and barriers related to the organisational setting and capacity of public organisations as the key conditions for the (un)success of co-creation (Biljohn and Lues, 2019; Rösler *et al.*, 2021; Vestues *et al.*, 2021). For instance, Hughes (2011) deliberated on how organisations changed or planned to change as a result of co-creation. Voorberg *et al.* (2017) attempted to identify which institutional elements influenced co-creation (and how), while Giesbrecht *et al.* (2015) explored the capacity of public servants as a condition for the establishment of an equal relationship with external co-creators. Eventually, significant efforts were invested in identifying organisational and context-related drivers of and barriers to co-creation (Baptista *et al.*, 2020; Gouillart and Hallet, 2015). On this basis, scholars endeavoured to translate this knowledge into the development of practical tools, such as organisational maturity models for co-creation (Jukić *et al.*, 2022; Oertzen, 2018) that assess the existence of an organisational environment conducive to co-creation.

Although this has contributed to valuable academic knowledge and practical information for public organisations interested in transforming to secure a better environment for co-creation, there has been a "blind spot". By focusing on organisational features as the key conditions, scholars have largely overlooked the very nature and features of public services as issues that can affect the prospect of innovation (Alves, 2013) and thus the result of co-creation. Despite general agreement that co-creation can be implemented in a wide range of sectors and settings for the purpose of improving public services (Rodriguez Müller *et al.*, 2021), there have been warnings that the type of public service conditions the set and quality of relationships among co-creators (Casiano Flores *et al.*, 2022). Similarly, it has been argued that the nature of services determines the form of co-creation – e.g. co-ideating, co-diagnosing, co-transforming, etc. (Namisango *et al.*, 2021; Oertzen, 2018). Most importantly, it has been observed that not all services are equally suitable for co-creation (Jarke, 2021).

Hence, as more suitable for co-creation, Jarke (2021) sees information services between a service provider and prospective service users, as well as services of public interest (e.g. social welfare services) where providers have more autonomy over the information they provide. A specific co-creation driver in this context is the type and level of public information (officially) required to be published about a specific service. Moreover, authors (Toots *et al.*, 2017) have referred to open data as a key driver for public service innovation – implying that public services, which enable open access to information and data, are more suitable to be co-created. Mureddu and Osimo (2019) share the same view about the importance of open data and go a step further by arguing that the level of users' interest in improving a service is an additional criterion that makes the service more suitable for co-creation. Eventually, by referring to the level of participation, Damkuviene and Petukienė (2018) conclude that those services whose provision inherently requires wider and more substantial participation are more suited for co-creation. This brief review reveals a prevailing focus on digital services. Thus, the conditions for a successful co-creation of public services have been often related to the use of open government data (OGD) (da Silva Craveiro and Albano, 2017; Purwanto *et al.*, 2020) or other technological innovations, such as blockchain, hackathons, etc. (Kangro and Lepik, 2022; Troisi and Grimaldi, 2022).

Unfortunately, these efforts are far from enough to argue that the issue of co-creation readiness of public services has been systematically approached in the relevant literature. Firstly, this aspect (service readiness for co-creation) has never been explicitly addressed; secondly, research efforts have focused almost exclusively on co-creation of digital services. The latter indirectly distorts the fact that electronic service delivery is a channel that only

complements rather than replaces the existing face-to-face communication (Gerontas *et al.*, 2022). This has further perpetuated an uncritical perception that digital services "can uniquely benefit from co-creation" (Mureddu and Osimo, 2019), in spite of warnings of such generalisations (Dixon *et al.*, 2021) and the lack of hard evidence about the actual impact of digital technologies on co-production and co-creation (Lember *et al.*, 2019).

The paper aims to provide the initial input for the definition of the concept service readiness for co-creation by identifying general features that make public services (regardless of their format – digital or "analogue") more conducive to co-creation.

To achieve this, the paper builds on the following research questions:

RQ1. What are the features that make a public service suitable, i.e. ready to be improved through co-creation?

RQ2. How can we use this knowledge to design a multi-criteria decision support model (DSM) for the assessment of the readiness of public services to be improved through co-creation?

To answer the research questions, we structured the paper as follows. In Section 2, we present the methodological framework of the research. In addition, in Section 3, we outline the DSM for the assessment of the readiness of public services to be improved through co-creation. Eventually, in Section 4, we critically revisit the research questions with a view to discussing the limitations of the research and the need for future research.

2. Methodological framework
We have developed the co-creation service readiness model based on a design science research approach (Hevner *et al.*, 2004; Hevner, 2007). Precisely, the paper presents the model (for the assessment of service readiness for co-creation) developed between 2019 and 2021, and tested in a real-life situation (by the City of Rijeka, Croatia) in 2022. The research conducted for this purpose follows the main prerogative of design science "relevance" by offering professionals access to the results and knowledge generated to solve practical problems within their organisations (Dresch and Lacerda, 2014). The other feature of design science is "rigour", implying valid and reliable research that contributes to increased knowledge in the area of interest (Dresch and Lacerda, 2014). This also implies a solid knowledge base (in terms of "raw materials") taken as the basis from and through which the research is conducted (Hevner *et al.*, 2004). Hence, to build solid theoretical and methodological foundations, the paper relies on the following methods (Figure 1):

- content analysis of Web of Science papers referring to co-creation;
- 14 case studies of promising practices of co-creation; and
- multi-criteria decision analysis (MCDA).

The first and second methods (systematic literature review and case studies) enable data gathering and structured analysis of present knowledge relevant to the development of the model. Precisely, these findings provide the substance, i.e. the criteria of the DSM. The third method (MCDA) sets the structure within which the criteria are placed and determines the algorithm for calculating the readiness result.

2.1 Systematic literature review
As implied in the introductory chapter, the literature on co-creation contains mainly "tacit", i.e. implicit, knowledge about the features of public services that make them (less) suitable
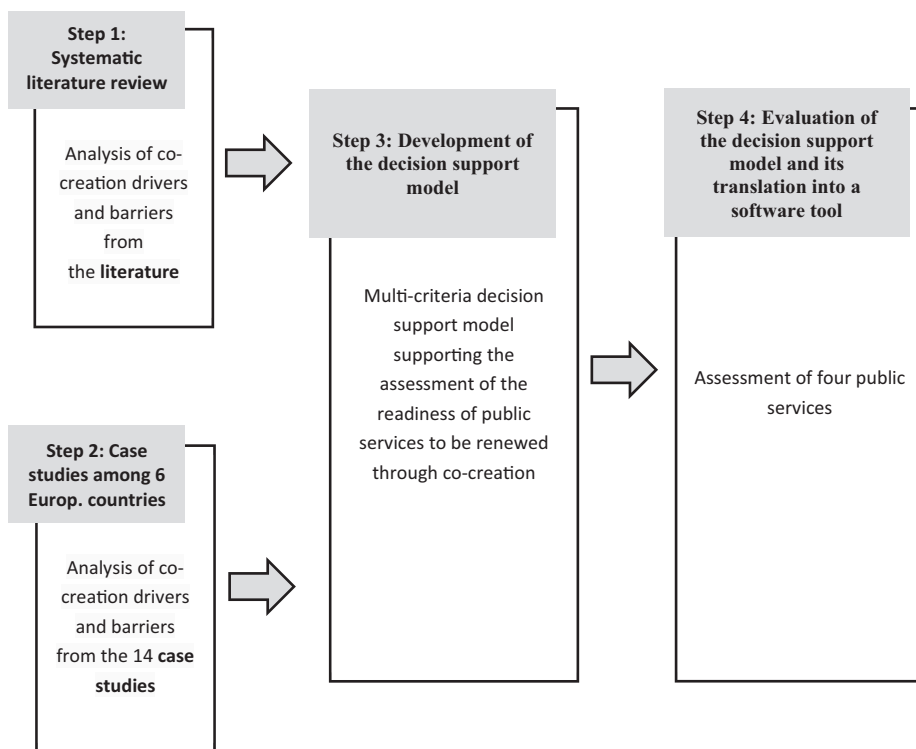
Source: Created by authors

for co-creation. Therefore, the goal of the content analysis was to "illuminate" these hidden data in the relevant literature.

The literature taken into consideration was identified in the Web of Science (WoS) platform. The records analysed were selected based on the following criteria:

- timespan of the records: ten years, between 2009 and 2018 (until the onset of the development of the model);
- including the terms "co-creation" or "co-production";
- type: article;
- WoS category: public administration; and
- written in English language.

Using these criteria, 155 records were identified. In screening the records (i.e. reading the titles, abstracts and keywords), 16 records were excluded from further analysis as they did not address co-creation/co-production in the context of (core) public administration, leaving 139 records to be analysed. When reading the full records for the first time, they were assessed for eligibility in terms of addressing co-creation drivers and barriers. At this stage, another 30 were excluded. Lastly, 109 records were included in the in-depth

content analysis – at this stage, full papers were read for the second time, and the drivers and barriers were extracted (Figure 2).

The coding template consisted of two sections referring specifically to co-creation drivers and barriers. The first section – "Were drivers and/or barriers identified?" – aimed to identify the papers that contained this information. In the second section – "If identified, present the drivers and/or barriers" – all drivers and barriers identified within a specific paper were extracted and coded. The latter provided an extensive list of drivers and barriers affecting different aspects of the co-creation process, which were clustered in five groups referring to: organisational capacity; staff's capacity; the wider context; capacity of external co-creators; and quality of the relationship between co-creators.

The first round of coding the drivers and barriers did not lead to the construction of a specific group of attributes to be directly operationalised and integrated in the model on service readiness for improvement through co-creation. This not only confirmed the lack of academic interest in public services' characteristics as potential factors that affect the prospect of co-creation but also posed a need for revisiting the results and an additional round of coding. Hence, we analysed each driver and barrier from the initial extensive list in terms of the question: "What does a concrete driver/barrier tell us about the nature, i.e.
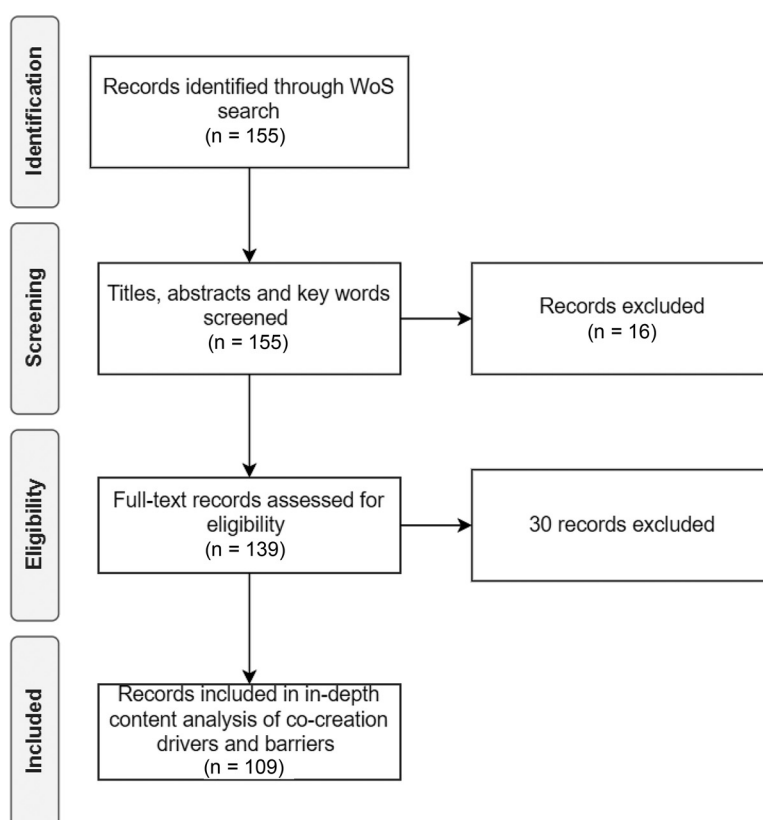
Figure 2.
PRISMA diagram presenting the search strategy for the structured literature review

Source: Created by authors

features of the co-created public service?". On this basis, we identified 12 model attributes to be operationalised in the DSM.

2.2 Case studies

In addition to the content analysis of WoS papers, the definition of the model criteria was based on 14 case study reports about promising co-creation practices produced in the context of the COGOV project (Pluchinotta and Ferlie, 2019; Regal and Ferlie, 2020). The original purpose of the case studies was to analyse a wide range of innovative promising practices within European public institutions reflecting new forms of public participation, new co-creation approaches or successful experiments for an organisation's transition to co-production. They were selected with a consideration of various jurisdictions (countries), policy sectors and governance levels (central, regional and local) and built on qualitative data gathered by means of semi-structured interviews, documentary analysis and in some cases, nonparticipant observation. Project partners conducted the interviews in their respective national context following an interview pro-forma and reported each case study based on the common template (Pluchinotta and Ferlie, 2019).

The development of the model of service readiness for improvement through co-creation relied specifically on the case study reports and their interpretation by the research team. The interpretation of the overall reports implied an analysis of the types and features of public services mentioned in the case studies. We were particularly interested in their co-creation potential and features in light of the reports' conclusions about the effects of the co-creation process. On this basis, we identified 13 model attributes in 12 out of the 14 cases (12 attributes matched those already identified in the literature review), which were verified by the authors of the case study reports.

2.3 Multiple criteria decision model

A DSM supports decision makers in taking decisions of various types – in our case, the decision on whether and which public services to improve through co-creation. Decision problems usually require the consideration of multiple criteria/attributes (Doumpos *et al.*, 2019), which may be conflicting (Boukhris *et al.*, 2017). For such decision problems, a field of MCDA has been established as the most dynamic field in operations research and management science (Doumpos *et al.*, 2019).

A DSM consists of the following components:

- Criteria (or attributes) are symbolic variables that correspond to various aspects of the readiness of a service to be improved through co-creation. Each of them is related to a certain co-creation driver or barrier. The DSM presented in this paper uses symbolic (qualitative) criteria in contrast with the majority of multiple-criteria decision-making (MCDM) methods that use numeric criteria.
- Each criterion has its set of values (e.g. "1/0" indicating "readiness" or "non-readiness") operationalised as a set of possible answers to the questions representing the DSM attributes.
- Weights of the attributes are often used in DSM to express the degree of impact of individual attributes on the readiness score.
- The formula presents the basis on which the assessment of service readiness for improvement through co-creation is calculated.

3. A multi-criteria decision support model for the assessment of the readiness of public services to be improved through co-creation

3.1 Model criteria

Based on the WoS content analysis and the 14 case studies, we identified 13 criteria clustered into two groups:

- Service readiness criteria from the perspective of service users.
- Service readiness criteria from the perspective of a public organisation.

3.1.1 Service readiness criteria from the perspective of service users. The first group comprises six criteria that refer to features of services shaped by or simply related to service users.

- *Number of service users*. A precondition for a successful co-creation is the "salience of the problem", implying a recognition by stakeholders that a problem/topic is important enough for them to get actively engaged (Chaebo and Medeiros, 2017; Durose and Richardson, 2016a; Van Eijk and Steen, 2016). Accordingly, a service that is often used and is considered important by citizens (and their loved ones) is more likely to ensure motivation and involvement of external co-creators (Vanleene *et al.*, 2017). In plain words, this means that there needs to be interest in the service as such (Cvelić *et al.*, 2020) because low interest and thus low level of use of a particular service could reflect in a lack of external input.

- *Clear identification of the target group(s)*. For a successful co-creation process, the organisation needs to have a clear idea of what the target group of a specific service is – in terms of demographic parameters (Ostling, 2017). This implies that public services for which data about the target group(s) exists are more suitable for co-creation. The importance of this criteria is confirmed by four of the case studies (Aagaard, 2020; Pluchinotta *et al.*, 2020; Soldo *et al.*, 2020; Turc *et al.*, 2020). A potential problem in this context is data protection legislation, which can prevent insight into the relevant data and thus clearer identification of the profile of potential co-creators (Soldo *et al.*, 2020).

- *Needs of users tackled by the public service*. Personal services that are responsive to individuals' needs are considered more likely to increase the buy-in and commitment of users (Lindsay *et al.*, 2018a). Thus, as three of the case studies note, services that are (or aim to be) tailor-made to meet the demands and basic needs of users are more likely to provoke interest in co-creation (Daly and Chapman, 2020; Soldo *et al.*, 2020; van Gestel and Grotenbreg, 2020a). By contrast, intermittent and impersonal services – such as tax processing – are seen as less suitable for co-creation with citizens (Martin, 2018).

- *Dissatisfaction with the public service*. Good outcome performance may discourage co-creation (Parrado *et al.*, 2013). Namely, people who are satisfied with the way things are will be less inclined to participate in a process leading to a change than disappointed and unsatisfied people (Edelenbos *et al.*, 2018; Stoudt *et al.*, 2016; Vanleene *et al.*, 2017). This aspect of dissatisfaction is confirmed by one Slovenian and two French cases. It was citizens' dissatisfaction – due to inconsistent and contradictory, delayed or lost/unanswered responses by the municipality – that led to the upgrade of the Service of Citizens' Initiatives (Vrbek, 2020a). Similarly, the French cases indicate that the fear of the effects of economic changes (Turc *et al.*,

2020) or dissatisfaction with the lack of institutional response to the ecological problems (Boutin, 2020) mobilised the most affected parties.

- *Use of technology*. Although technology is recognised as a driver that enables collaboration and makes the inclusion of different stakeholders easier (Daly and Chapman, 2020; Jones *et al.*, 2016; van Gestel and Grotenbreg, 2020a, 2020b), it can also represent a barrier in cases of problematic (or outdated) design of digital tools, or in cases of lack of access and digital literacy among service users (Breit and Salomon, 2015; Soldo *et al.*, 2020; Turc *et al.*, 2020; van Gestel and Grotenbreg, 2020b). The traps of digital technologies, however, can be neutralised by combining traditional approaches, e.g. face-to-face meetings (Turc *et al.*, 2020).

- *Professional expertise*. Public services which require (or are perceived to require) strong professional skills to be provided/delivered (Vrbek, 2020b), or capture too technical issues (Hansen, 2020), leave almost no room for wider citizen participation. A lack of citizen expertise (Palumbo and Manna, 2018; Soldo *et al.*, 2020) and tasks that are too professionally oriented and abstract (Aagaard, 2020; Tuurnas, 2016) represent significant barriers to co-creation. For a successful co-creation, it is crucial that the tasks within the co-creation process are easy and not too complicated from the participants' perspective (Alford and Yates, 2016).

3.1.2 Service readiness criteria from the perspective of a public organisation. The second group comprises seven criteria, which refer to service features that depend on or are shaped by the public organisation – provider of the service:

- *Data availability*. A lack of (access to) meaningful data can undermine the co-creation process (Pluchinotta *et al.*, 2020; Rutherfoord and Spurling, 2016; Soldo *et al.*, 2020). As one of the French cases (Turc *et al.*, 2020) shows, for external stakeholders to be able to co-create, they need to be provided with relevant data about the performance/implementation/reach of the public service so that they can define their position and proposals.

- *Strategic service*. Two of the case studies (Hansen, 2020; Turc *et al.*, 2020) indicated that issues considered to be of strategic interest are more prone to get momentum and provoke wider debate. Thus, public services recognised to be of strategic importance for the public organisation are expected to get more interest, strategic efforts and resources for their improvement with external actors – in particular when they are subject to international/national documents and reports scrutinising their delivery.

- *Service (over)regulation*. Co-creation is more suitable for services where sectoral norms accept "fuzziness" and uncertainty, rather than demanding rigid, defined processes (Burall and Hughes, 2016; Voorberg *et al.*, 2017). Accordingly, overregulated services (relying on "rigid and clear" procedures) leave less room for co-creation.

- *Lack of ideas about the potential solution/result of the improvement process*. Co-creation is suitable in areas that are less defined – where neither government nor other actors have clear solutions (Burall and Hughes, 2016). Loosely defined service goals or lack of a clear idea about the final solution to be implemented may stimulate wider involvement and collaboration (Soldo *et al.*, 2020). This argument relies on the idea of co-creation as an incomplete policy design, open to participants' input (Durose and Richardson, 2016b).

- *Autonomy, i.e. exclusive authority over the public service,* is important for co-creation (Lindsay *et al.*, 2018b). A public organisation that enjoys full authority over the service will more easily conduct improvement through co-creation and operate innovations (Boutin, 2020; Turc *et al.*, 2020; Vrbek, 2020a).

- *Resources for service improvement.* Co-creation requires allocation of both financial and human resources (Lindsay *et al.*, 2018b; Pluchinotta *et al.*, 2020; Soldo *et al.*, 2020).

- *Undisrupted service provision during the process of improvement.* It is important that the process of improvement through co-creation does not unduly disrupt service provision and/or undermine its quality (Blume, 2016). Thus, service improvement should not be a reason (nor an excuse) for disruption of the service delivery or a lower quality of the service (Soldo *et al.*, 2020).

3.2 Structure of the decision support model
Figure 3 presents the tree-like structure of the DSM consisting of two levels of criteria and supporting the assessment of service readiness for improvement through co-creation. The tree-like structure indicates that each subordinate criterion affects a single parent criterion (Bohanec, 2006).

This implies basic and aggregated attributes. The former are model input attributes for which end users are required to enter values (e.g. "Number of service users" 1.1, see Figure 3). The latter are the aggregated nodes of the model (e.g. service readiness attributes from the perspective of service users). These superior attributes are calculated based on the values assigned to the basic attributes. The final score of service readiness for improvement through co-creation is calculated based on the following formula:

$$
\left(
\begin{array}{l}
\left(\dfrac{\dfrac{\text{Number of answers implying "ready" (having value "1")}}{6\ (\text{total number of attributes in category 1})}}{\dfrac{6\ (\text{total number of attributes in category 1})}{13\ (\text{total number of attributes or survey questions})}} * \right) + \\[6ex]
\left(\dfrac{\dfrac{\text{Number of answers implying "ready" (having value "1")}}{7\ (\text{total number of attributes in category 2})}}{\dfrac{7\ (\text{total number of attributes in category 2})}{13\ (\text{total number of attributes or survey questions})}} * \right)
\end{array}
\right) * 100
$$

$$= SCORE\ \%$$

Source: Vrbek *et al.* (2022)

The model designed here represents a simpler DSM consisting of a relatively small number of basic attributes that are assigned with equal weights. Although this decision might seem counterintuitive – as in a real-life situation different service attributes have different impacts on the prospect and quality of co-creation, we regard their degree of impact closely bound to the context in which a service is provided. As the model builds on attributes extracted from the literature review and case studies that capture different (national, policy and governance) contexts, we opted for a rather cautious approach that avoids determining universal weights of the model attributes. Instead, we provided a basic model open to adaptations according to the context specifics, leaving room for each user (i.e.
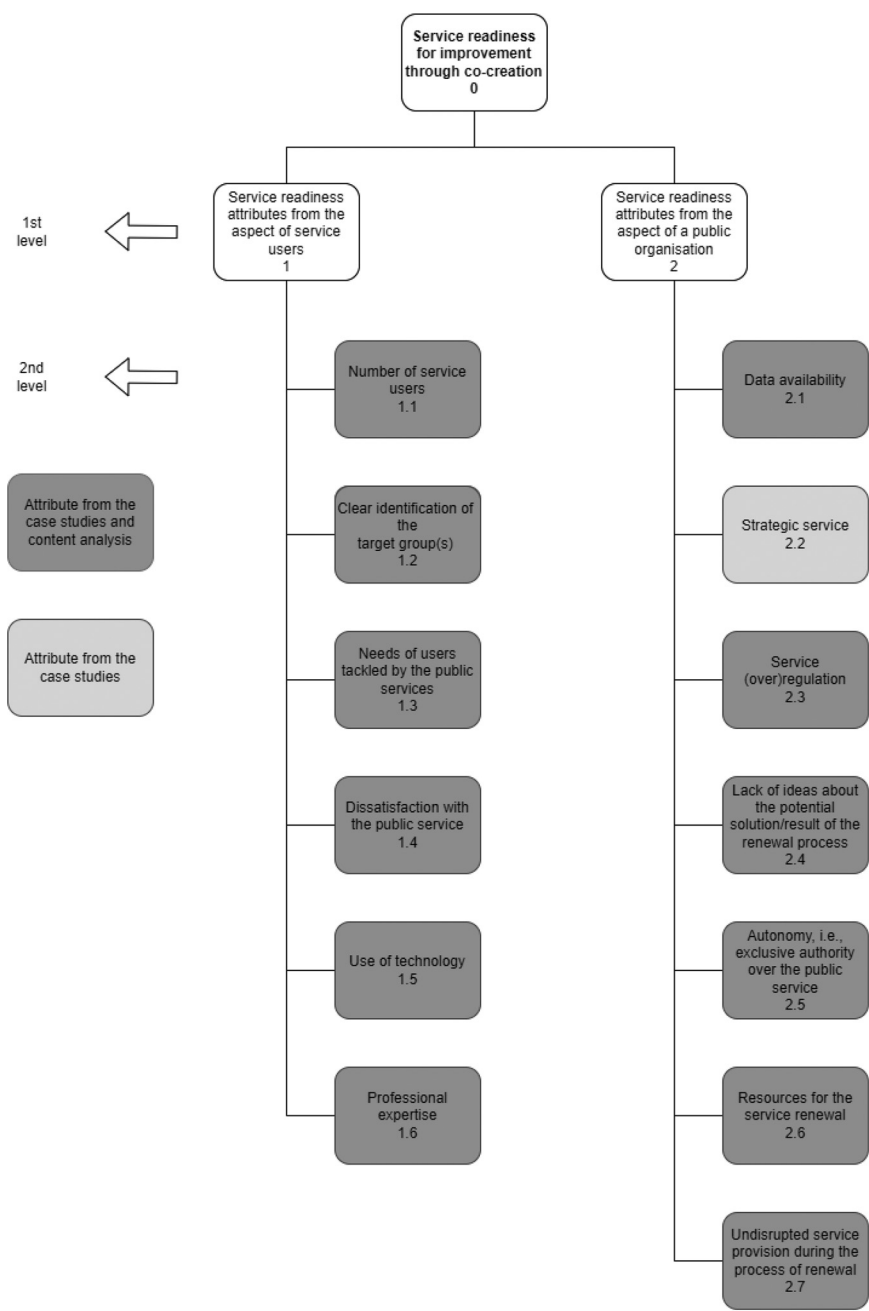
Figure 3.
Structure of the DSM

service owner) to define their own weights and/or interpret the result generated by the existing model in light of their specific situation. Flexibility and openness to adaptations is inherent to the very nature of DSM – thus, it allows easy modifications in terms of adding and/or changing both weights and attributes.

3.3 Operationalisation of the model criteria

The model criteria are operationalised as "Yes/No" questions. Each of the answers offered (Yes and No) has its own numerical value – "1" implying "readiness" and "0" meaning "lack of readiness".

By answering these questions, users provide values at the level of basic model attributes. The score consists of a quantitative result presented as a percentage of service readiness for improvement through co-creation and its textual interpretation. The latter is generated from the operationalisation of the answers implying "lack of readiness" – those with a value "0". The goal of the textual interpretation is to serve as a kind of a warning about the potential challenges that the improvement based on co-creation of that service might face.

Figure 4 presents a hypothetical assessment score from a user perspective. The textual explanation of the result is generated from the pre-prepared explanation of potential risks stemming from the lack of service readiness. This means that the hypothetical user entered value "0" at the level of the attributes 1.4, 1.6, 2.3, 2.4, 2.5 and 2.6 (when answering the survey questions presented in Table 1). Hence, the model provides a dynamic presentation of the score tailored to the specific set of values entered by a user during a particular assessment.

3.4 Evaluation of the model

Once the content, structure and assessment formula of the model had been established, the model was first developed in the Microsoft Excel software program and tested by the Croatian City of Rijeka on four services under its jurisdiction:

The service   **is 54% ready to be renewed with the help of co-creation**

Keep in mind

Service readiness attributes from the aspect of service users

- A low number of complaints could indicate that users are satisfied with the public service as such.
- Overly professionally-oriented and scientific issues are not suitable for co-creation with citizens. They are suitable for co-creation with external actors who are specialised in the topic, i.e., have the required professional knowledge and expertise.

Service readiness attributes from the aspect of a public organisation

- Strictly and extensively regulated services could represent a barrier to co-creation. In case of service renewal on the basis of co-creation, be prepared for the change to take more time and effort.
- Be open-minded to amending the planned solution in the light of stronger arguments provided by external actors.
- You need to ensure that all relevant institutions and 'internal' stakeholders (including political actors) who have authority over the service provision and renewal are 'on board', i.e., support the co-creation process.
- For successful service renewal, you need to designate a skilled team and ensure financial means for the organisation of the co-creation process (e.g., interaction) with external actors.

Figure 4.
Hypothetical
assessment of service
readiness for
improvement based
on co-creation

Source: Jukić *et al.* (2021)

#	Criteria operationalised as "Yes/No" questions[1]	Yes	No
Service readiness criteria from the perspective of service users			
1.1	Is the number of service users relatively high in comparison to other public services provided by the public organisation?	1	0
1.2	Can you clearly identify the demographic profile(s) of the users of the public service?	1	0
1.3	Does the public service tackle the personal needs of users on a regular basis?	1	0
1.4	Is the number of complaints about the service relatively high in comparison to the number of complaints about other services provided by the public organisation?	1	0
1.5	Is the level of use of digital technology high among the users of the service?	1	0
1.6	Does the service refer to (is perceived as) a highly professional/scientific issue that would benefit more from expert advice than from input by laymen?	0	1
Service readiness criteria from the perspective of a public organisation			
2.1	Do you have public, easily accessible and comprehensible data about the performance, implementation and reach of the public service?	1	0
2.2	Is the public service renewal of strategic importance for your organisation?	1	0
2.3	Do you consider the public service to be extensively (over)regulated?	0	1
2.4	Do you have a clear idea about the result (solution) of the service renewal?	0	1
2.5	Is the public service renewal under the exclusive authority of your public organisation?	1	0
2.6	Do you think that you (will) have sufficient financial and human resources to organise and conduct the renewal of the public service on the basis of co-creation?	1	0
2.7	Can you secure unhampered provision of the public service during its renewal?	1	0

Source: Vrbek *et al.* (2022)

Table 1.
Operationalisation of the model criteria and numerical values of the answers

- public needs in technical culture;
- subsidies for entrepreneurs;
- enrolment in kindergartens; and
- RPLP – Rijeka Local Partnership Programme.

The assessment scores showed that all four services tackled specific target groups, indicating a relatively low number of service users (Attribute 1.1). Three services did not tackle the personal needs of users on a regular basis (Attribute 1.3) – a potential risk in terms of motivation of potential co-creators. However, both of these risks were regarded as benign because, although fewer, the users of the three services were highly motivated to co-create, as the services in question affected financial benefits (subsidies or project grants). Therefore, instead of the above (i.e. attributes), the service owners recognised the low number of complaints (Attribute 1.4) in the case of the "Subsidies for entrepreneurs" and "Enrolment in kindergartens" as greater concerns for the motivation and thus participation of potential co-creators.

In addition, two services – "Public needs in technical culture" and "Rijeka Local Partnership Program" – indicated a "lack of readiness" regarding Attribute 1.6. This implied

that due to the nature of the matter (i.e. subject of improvement), the co-creation process would have benefited more from an expert advice. The improvement of both these services affected the highest strategic level in terms of determining guiding goals that were supposed to set the direction of future funding. In the case of "technical culture", this required both understanding of technology as such and of the state of the art regarding its use in society. This "warning" by the model made service owners deliberate on how to include citizens to maximise their input in the debate and avoid tokenism (as their sole physical attendance at the meetings discussing highly technical issues would be fruitless).

Hence, with the exception of Attribute 1.4, the first group "Service readiness attributes from the aspect of service users" did not seem to challenge significantly the prospect of co-creation of the four services assessed.

In the context of the second group of attributes, three out of four services scored lack of readiness regarding Attribute 2.4 (referring to expectations from service improvement). Based on previous experience and good quality data gathered regularly in the context of service provision, the service owners already had a clear idea about the desired outcome of the improvement. Therefore, the model reminded them to tone down these expectations to not overlook constructive ideas requiring a radical departure from their planned solution. However, due to high motivation of public servants to actively include external input and publicly report thereon, this risk was considered rather low in the context of the "Public needs in technical culture" and "Rijeka Local Partnership Program". More serious risks included the lack of strategic importance (Attribute 2.2) of the service "Subsidies for entrepreneurs", which risked translating further into a lack of human and financial resources (Attribute 2.6) for the co-creation process.

Based on the comparison of the quantitative scores and their textual interpretation, the least suitable service to be improved through co-creation (at least until addressing the noted "risks") appeared to be "Enrolment in kindergartens". In the context of the second group "Service readiness attributes from the aspect of a public organisation", it scored "lack of readiness" regarding six out of seven attributes. Similarly as "Subsidies for entrepreneurs", this service was not of strategic importance (Attribute 2.2), which again translated as a risk of allocating insufficient resources for its improvement through co-creation (Attribute 2.6). Additionally, co-creation in this case (i.e. "Enrolment in kindergartens") was challenged by the lack of relevant data available to external co-creators (Attribute 2.1) – inter alia due to data protection concerns. Nevertheless, the greatest risk was the lack of a guarantee that all institutions sharing authority over the service (Attribute 2.5) would invest in and support the co-creation process. Starting a co-creation process without addressing this risk raised concerns about the potential negative spill-over effect on the unhampered provision of the service during its improvement (Attribute 2.7).

On this basis, as the readiest service for improvement through co-creation, the City of Rijeka identified the "Rijeka Local Partnership Programme" with 69% readiness score, followed by "Public needs in technical culture" and "Subsidies for entrepreneurs" with 54% and "Enrolment in kindergartens" with 38%.

4. Discussion and conclusion

Based on the systematic literature review and 14 case studies, the paper answers the first research question and thus provides the substance of the DSM for the assessment of service readiness for co-creation. The 13 criteria identified, referring to different aspects of public service readiness for improvement through co-creation, indicate that the literature already contains knowledge, albeit "tacit", that can contribute to the definition of the concept "service readiness for co-creation". However, as the research focus (of the papers and the

case studies analysed) is not explicitly on public services' features as potential co-creation drivers and/or barriers, the data deduced for the operationalisation of the model attributes might, in some instances, seem self-evident or basic. Moreover, as the time gap between the search criteria of the systematic literature review and the present date could be regarded as a related shortcoming, one can only hope that more recent literature has made a breakthrough in this regard.

Unfortunately, even the latest research endeavours fail to properly address this aspect. Instead, they have shifted the research focus to co-creation drivers and barriers capturing the technical aspects of OGD (driven co-creation), such as clean, accessible or user-friendly portal (McBride *et al.*, 2019) or integration/interoperability of disparate IT systems involved in the service delivery (Attard and Cortis, 2023; Bhattacharya *et al.*, 2022). In this context, particularly conducive services that boost motivation among citizens to take on the role of co-creators include personalised and integrated public services, i.e. those that provide some kind of benefits (Gerontas *et al.*, 2022). By contrast, non-voluntary services targeting vulnerable groups may pose a greater challenge for co-creation (Lindqvist and Westrup, 2020). Nevertheless, in spite of higher risks, e.g. manifested in the form of "digital refugees" (Fu *et al.*, 2022), the very presence of vulnerable groups as service users does not disqualify public services as potential candidates for co-creation (Jalonen *et al.*, 2021; Kuneva and Hough, 2023). Instead, such situations should urge public organisations to find more effective and/or less intrusive ways of including external input – for instance through (traces left on) social networks (Jalonen *et al.*, 2021) or by inclusion of service users relatives (Skarli, 2021). Addressing this kind of built-in asymmetry between service providers and (vulnerable) users is crucial for the prevention of value co-destruction (Parker *et al.*, 2023). In addition, more general drivers of service transformation and thus value co-creation include the existence of conflicts (Rossi and Tuurnas, 2021), strong motivation among service users and institutional support inter alia in the form of a pre-planned allocation of resources (Saha and Goyal, 2021).

Most of these ("new") issues are already integrated and operationalised in the DSM for assessing the readiness of public services to be improvement through co-creation (e.g. Attributes 1.1, 1.3, 1.4, 2.6, etc.). Thus, with the design of the model and its testing in a real-life situation by the City of Rijeka, Croatia, the paper provides the answer to the second research question. Due to the limited data and small number of attributes deduced, the structure of the model (albeit consisting of two levels) is rather simple. Its simplicity is also due to the lack of weights determining the impact of the attributes on the readiness score. However, instead of a shortcoming, the testing of the model showed (that at this point – with the present model structure and substance) this is the most optimal solution. As the impact of the model attributes differs even within the context of one public organisation depending on the specific service assessed, it is left to the model users to interpret the readiness score in light of their specific situation.

Thus, the paper makes a pioneering step towards the conceptualisation of the idea of "service readiness for co-creation" and the development of a practical instrument that supports public servants in making informed decisions as to which services are more suitable to be improved through co-creation. This, however, does not mean that the research is without limitations – both theoretical and practical. The former are most visible in the limited number of references from the literature review and empirical cases providing the basis for the definition of the model criteria. This situation confirms the argument in the introductory section that individual features of public services, as potential co-creation drivers and barriers, represent a largely overlooked issue in the relevant literature.

Moreover, the practical limitations are noted with regard to the DSM. First of all, it is a rather basic model building on limited data. Secondly, it was tested by only one organisation on four of its services. To claim wider relevancy, the model needs to be tested by a higher number of public organisations in different (e.g. policy and national) contexts. This is beneficial for identifying the potential aspects of the model that need upgrading – e.g. adding new criteria, better clarification of the existing criteria or determining their weights. Luckily, the multi-criteria decision method providing the basis for our DSM can easily address this "problem" by intrinsically enabling an easy upgrade with additional criteria and/or weights.

On this basis, we conclude that future research should focus more systematically on identifying the features of public services as potential drivers of and barriers to co-creation. Instead of reviewing the existing literature, efforts should be invested in new original empirical research sensitive to the context – i.e. to different policy areas, organisational settings or countries where services are provided.

Note

1. In the model tested by the City of Rijeka, we used the term "service renewal". Following the review process, "renewal" was replaced by "improvement" — as a more suitable term. Nevertheless, the attributes in the table are left in their original form, as they were tested by the City of Rijeka.

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