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Value Co-creation for Smart Villages: The Institutionalization of Regional Service Ecosystems

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Abstract

Building a versatile portfolio of public and private digital-enabled services is vital in rural and sparsely populated regions, where traditional market mechanisms alone cannot guarantee the availability of essential services. However, contemporary services tend to build on prevalent institutions, often governed by decisions based on market mechanisms, such as economies of scale – service-by-service and village-by-village. A shift is suggested towards networks of smart villages co-creating value as regional service ecosystems. We draw from institutional theory and employ the Service-dominant logic (SDL) framework in investigating value co-creation in rural villages in Sweden. Analyzing 53 laddering interviews, we derive encoding scripts showcasing institutional principles for innovating bundles of digital-enabled services. The study brings forth novel insight for e-government research and practice, and the SDL discourse therein, on outlining required institutional practices and institutional work to counteract plain market mechanisms for governing value co-creation on smart rural service portfolios.

Keywords

Smart villages, institutionalization, regional service ecosystems, value co-creation

1. Introduction

Norrbottnen, the largest region in Sweden, covers 25% of the country area, while its population represents only 2.56% of the Swedes (Regionfakta 2020). Suboptimal availability of local services affects livability in such rural regions in developed countries. Livability refers to the degree to which the physical and social features of a living environment fit an inhabitant's requirements and desires. High livability improves individual and community well-being (Newman 1999). Vast distances to public and private service hubs pose challenges to inhabitants. Fortunately, the Internet and fast broadband connections have become widely available allowing integration of local and digital service resources (McKinsey & Company 2014; Regionfakta 2020). Thus, opportunities for innovating smart services for inhabitants' needs have increased. For instance, on-demand delivery of goods and health services can be provided in rural regions as service constellations combining public and private services, such as a mobile service booth for distributing health and convenience services as well as appointments for unemployment services and leisure activities.

However, designing, developing, and providing services for sparse village populations is challenging due to the scarcity of municipal resources. Given these villages' low population densities and distance from larger cities and towns, traditional market mechanisms may not sustainably secure the availability of public or private services on site. Further, each inhabitant has their personal needs, values, and goals, and therefore, one service model may not fit all, which may create tension between the actors involved. For instance, while some of the inhabitants seek to maintain face-to-face social connections with service providers, such as health care professionals, some may perceive the transition to a digitalized or hybrid service model most beneficial. Structures and processes at the regional, national, and global scales significantly influence the development of small towns and municipalities (Leetmaa et al. 2015, p. 148). However, also public and private service providers across sectors may have conflicting priorities, potentially preventing the establishment of collaboration structures. Thus, smart services are needed in rural areas to develop and facilitate synergies, connecting individual inhabitants with government and businesses at the micro-level, as well as networks of rural actors at the meso level (inhabitants, businesses, and municipalities) and municipalities at the macro level.

Such value co-creation with smart services may be crucial in maintaining rural, sparsely populated regions in developed countries livable by facilitating both individual and community well-being (Newman 1999). Connections are also needed between emerging smart city initiatives and the initiatives of surrounding rural regions, with a focus on higher-scale innovation and sustainability (Kar et al. 2019). However, extant literature on smart city and regional initiatives tends to focus on large cities or densely populated regions, overlooking rural regions in developed countries (e.g., Markkula and Kune, 2015). Typically, the larger the population of the area, the more urgently the need for smart services is considered (Dwivedi et al. 2011).

Thus, an improved understanding of how to create value in regional service ecosystems is needed. We address this need by answering the following research question: How can value be derived for actors in regional service ecosystems through smart services? To attain an understanding of what is of value for inhabitants and the municipality, we employ the Service-Dominant Logic (SDL) framework (e.g., Vargo and Lusch 2004, 2016) and investigate value as an outcome of a co-creation process in which actors integrate available resources into a joint venture. Due to sparse customer bases in rural areas, transformation of the prevailing ways and means of providing and consuming services may be required for enabling such co-creation. Thus, we draw from institutional theory (Barley and Tolbert 1997) in innovating smart, sustainable services for regional service ecosystems (Vargo et al. 2015).

To understand how to create value using smart services in regional service ecosystems, we conducted qualitative interviews (n = 53) in Norrbotten County, Sweden. Utilizing the laddering interview method (Reynolds and Gutman 1988; Peffers et al. 2003), we establish an understanding of the regional service ecosystem's value structures to inhabitants by constructing thematic maps of the laddering chains. We employ the concept of scripts, i.e., the "observable, recurrent activities and patterns of interaction characteristic of a particular setting" (Barley and Tolbert 1997, p. 98) in understanding value co-creation in a regional service ecosystem. Depicting links between institutionalization and actors' practices we observe institutional work (Wieland et al. 2016) that may be employed in developing sustainable public and private services in smart villages for the purpose of attaining a regional service ecosystem.

The findings contribute to the e-government literature with a novel investigation of the development of smart villages in rural areas capturing the interplay between higher-order scales and individual actors. We also contribute to the SDL discourse with empirical evidence of institutionalization for potential value co-creation in a regional service ecosystem. Our findings showcase that also disruptive innovations are required for co-creating value with novel combinations of digital-enabled services to maintain rural regions' livability.

2. Theoretical Background

The Service-Dominant Logic Perspective and Service Ecosystems

One of the main interests of service providers when designing, developing, and providing services is to determine how value can be derived from the service. Over the past two decades, research has begun to emphasize the role of customers in the creation and determination of value (e.g., Prahalad and Ramaswamy 2004). Interactivity and relationship-focused perspectives have emerged, suggesting that companies ought to consider customers as active co-creators of experience and value (e.g., Ballantyne 2004; Prahalad and Ramaswamy 2000). According to SDL (Vargo & Lusch 2004) service providers may merely propose value propositions to their customers, which customers may choose to accept by integrating their resources into a value co-creation process. Here, products and services have no embedded value. Instead, value is co-created through the process of resource integration between the involved providers and customers (ibid.). In other words, SDL underscores operant resources (e.g., knowledge and skills) as primary subjects of economic and social exchange. Furthermore, institutions—the rules, norms, and beliefs set by people (Scott 2001)—coordinate the actions and experiences of individual actors, thus constraining or enabling the co-creation of value (Vargo and Lusch 2016). Accordingly, each benefiting actor determines derived value contextually and phenomenologically.

As actors integrate possessed resources, they fundamentally become connected to other actors by those resources, and vice versa. For instance, actors can build on one another's knowledge through the collective innovation of services. Such processes occur not only in dyads between two actors but also in triads and networks of multiple connected actors (Vargo and Lusch, 2016). These networks form service ecosystems, which are fundamental to understanding value co-creation (Chandler and Vargo 2011) and are defined as “relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange (Vargo and Lusch, 2016, pp. 10-11).” Service ecosystems involve “large-scale social structures and institutions” that evolve with actors' unique service efforts in dyads, triads, and complex networks (Chandler and Vargo 2011, p. 44). Thus, to understand how value is derived by individual actors (at the micro level), it is essential to understand meso- and macro-level influences. This understanding may include institutionalized meanings of practices and public procedures. To make sense of such discrepancies in deriving value, understanding the context and acknowledging value as a contextually contingent concept are essential (Vargo, Maglio, and Akaka 2008).

Institutional Change in Re-forming Service Ecosystems

We adopt the SDL lens and view that institutional arrangements guide actors' sensemaking of service situations and the emerging value for beneficiaries in nested and overlapping service ecosystems (Vargo and Lusch 2016). The institutionalized view draws from the social systems perspective, which claims that actors draw meaning from social systems and societal beliefs and norms (Edvardsson et al. 2011). Barley and Tolbert (1997, p. 96) discuss institutions as having “shared rules and typifications that identify categories of social actors and their appropriate activities or relationships.” Vargo and Lusch (2016, p. 6) offer a more simplified definition in which institutions consist of “rules, norms, meanings, symbols, practices, and similar aides to collaboration.” Wieland et al. (2016) state that institutions are the glue in service ecosystems enabling and constraining value co-creation within these social systems.

Barley and Tolbert (1997) modelled how institutions are created, altered, and reproduced. They posit that “scripts” may be viewed as bridges that gauge how institutions affect actions and, at the same time, how actions iteratively maintain, modify, and create new institutions. The authors structure a

methodology, stating that scripts may first be used to encode institutional principles in specific settings and then enacted on to maintain or enforce such principles (Barley and Tolbert 1997). In a similar vein, Wieland et al. (2016) argue that value co-creation practices, which are enacted by actors, simultaneously shape those very same practices by creating, maintaining, or disrupting the institutions that are guiding their (re)enactment. Wieland et al. (2016, p. 5) define such value co-creation practices as “sets of overlapping and interlinked bundles of integrative, normalizing, and representational practices through which actors make sense of and integrate public, private, and market-facing resources.” Furthermore, Barley and Tolbert (1997) suggest that a setting that involves disturbances (e.g., new technological developments or regulations) can be particularly fruitful for observing institutional change through scripts.

Value Co-creation in Regional Service Ecosystems – Need for Institutional Work

While localizing public services in sparsely populated (but highly connected) areas may be ineffective with the traditional market mechanisms (McKinsey & Company 2014), government-driven reformation of service ecosystems is needed to support inhabitants’ well-being. Accordingly, e-government research has acknowledged that future challenges require a shift in conducting and organizing innovation, and embracing technological advancements, such as artificial intelligence and big data (Liu and Peng 2014; Mulder 2014). Drawing from the SDL lens, collaboration between individuals as well as governmental, commercial and other stakeholders may be key for co-creating such service innovations and public value in the era of digitalization. Previous research has attempted to obtain an understanding of technology-enabled public value co-creation (Cronemberger and Gil-Garcia 2019) and citizen value co-creation in smart cities (e.g., Owais et al. 2017). While value co-creation with smart services may be particularly crucial in maintaining rural, sparsely populated regions livable, the literature tends to focus on large cities or densely populated regions, overlooking rural regions in developed countries (e.g., Markkula and Kune, 2015). More research is needed also for linking smart city initiatives with surrounding rural regions, focusing on sustainable higher-scale innovation (Kar et al. 2019).

Further, while acknowledging the network of multiple stakeholders is considered essential to the e-government domain (e.g., Axelsson et al. 2013; Balta et al. 2015), previous research has provided little knowledge of public sector value co-creation in rural villages on the service ecosystem level, which involves networks of villages, municipalities, citizens, businesses, and citizen organizations. Co-creation of value by utilizing new technologies in smart cities also remains understudied (Cronemberger and Gil-Garcia 2019). At the same time, it is well-understood that the most significant challenge in developing smart city services is not technological, but rather attitudinal (Mulder 2014). Thus, to understand how to facilitate ecosystem-level value co-creation in smart villages, it is essential to understand interconnectedness between actors’ (i.e., inhabitants’, public/private service providers’ and other stakeholders’) practices and institutions as a means to identify the government-driven institutional work required for the transformation (Wieland et al. 2016). For instance, institutions such as the norm of having a face-to-face doctor’s appointment in a hospital, may need to be disrupted in order to successfully provide public digital health care services for rural regions—and this may be established by creating new norms through governmental institutional work, which includes practices such as providing and using digital services in the public sphere and inviting/facilitating new era collaborations.

3. Methodology

Our objective was to investigate rural residents’ preferred practices for value co-creation building on Barley and Tolbert’s (1997) guidelines for observing scripts. Scripts illustrate how individual actors construct and commit to new rules and interpretations of appropriate behavior in particular settings. The authors suggest that a setting that involves disturbances (e.g., new technological developments

or regulations) can be particularly fruitful for observing institutional change through scripts (ibid). Thus, by employing the uncovered scripts, we were able to depict institutional work required for value co-creation in the interplay between particular smart service offerings (the micro-level) and the regional service ecosystem of Norrbotten County (the macro-level). We conducted laddering interviews with citizens of nine rural villages and towns in Sweden's Norrbotten County, one of the EU's most sparsely populated regions (Regionfakta 2020). Employing the laddering interview technique (Peffer et al. 2003; Reynolds and Gutman 1988; Tuunanen and Peffer 2018), the goal of the interviews was to map the villagers' views regarding what kinds of public or private digital-enabled services would provide opportunities for value co-creation in the region and why.

Norrbotten inhabitants of different occupations and age groups (ranging between 24 - 78 years) were interviewed in fifty-three individual interviews. In accordance with the laddering technique, informants were first introduced to a stimuli collection of six written scenarios (Peffer et al. 2003). The informant then selected two most appealing scenarios, and the researcher asked the informant to describe a particular desired use experience with regard to the first-selected scenario; this was briefly recorded as attribute ladders. Thereon, the researcher continued asking "Why would this be important for you?" (Reynolds and Gutman 1988). The informant continued providing their reasoning to a series of "why" questions; these were recorded as consequence ladders. When no further reasoning could be provided, the ultimate personal goal of the informant was identified as value ladders. Then, the researcher moved on to asking questions related to the second stimulus, continuing until both stimuli were thoroughly covered.

In total, 688 chains (laddering structures) were collected showcasing potential future institutional innovations required for the sustainability of villages in Norrbotten, with a particular focus on service portfolios for citizens and livability. Moreover, another level of analysis emerged with respect to the service ecosystem. For instance, a localized digital-enabled service point would require rethinking of service models, and collaboration between the public domain as well as private sector actors, e.g., transportation. Following Peffer, Gengler and Tuunanen (2003), the coded dataset totaled 873 laddering structures, derived from the original chains. A clustering analysis was conducted on these coded chains, graphing thematic maps for each emerging digital service theme by connecting "pathways" between attribute-, consequence-, and value-level constructs (Peffer et al. 2003; Tuunanen and Kuo 2015)¹. The following eight unique thematic maps emerged: (1) digital health services, (2) service points, (3) digital services for tourism, (4) service buses, (5) accelerating social life, (6) logistics of goods, (7) service portals, and (8) facilitating citizen transportation. Investigating the pathways (i.e., connections between the constructs) in the thematic maps, we found diversity across attribute-level constructs, but also overlap of the consequence and value constructs across the thematic maps.

Labelling each unique pathway on the formed thematic maps, we derived institutional scripts (Barley and Tolbert 1997), illustrating informants' descriptions of the perceived structures behind co-creation practices enabled by digital service innovations. Each emerging script comprehended structures showcasing how particular service features (attribute constructs) may benefit the focal actor (consequence constructs) and co-create value establishing an ultimate goal of service use (value constructs). The emerging value constructs were, subsequently, clustered according to their contents and their appearance in the laddering chains. For instance, the value constructs comfort and easiness in life, right to choose, coping with daily life, independence, ease of use, and prosperity were all clustered under the title "Comfort and easiness in life."

¹ Additional details on the conduct of the study can be retrieved by contacting the authors and from Lintula et al. (2020).

As an example, altogether 10 scripts emerged in the thematic map of “Digital health services” (cf. Figure 1). For instance, in the first script, the attribute constructs access to public health services, and access to related educational resources therein, were found important, as they allowed for improved interaction with health services. Thus, the first script indicates that the creation of new institutions would lessen the related frustration, stress, and workload. Consequently, informants claimed that it would aid in enhancing competence, thus leading to the ultimate the values of public resource and service efficiency, accessibility, saved time, comfort and ease of life, health benefits, and social inclusion. The second script was constructed with similar consequence- and value-level constructs; the difference was in the focus on creating new institutions in the digital booking of health services. The third script had an identical value-level structure as script 2; however, at the consequence level, it delved into the informative aspects of the access and booking of health services, reasoning that these are important for seeking advice directly from health care personnel and thus have more services available and are better able to work from rural villages. The script showcased that creation of new institutions by remotely consulting health care personnel may trigger a new challenge in which urgent care needs may be recognized too slowly in remote mode. Thus, we identified the need to maintain current institutions, i.e., the option of physical appointments. The scripts seven and eight suggested the creation of new institutions that would allow more efficient use of public health care resources due to less expensive consultation and faster access to such services, thus saving time and lowering infection risks. In turn, the script six suggested disrupting prevalent institutions as by accessing and booking digital services, on-demand services could be provided on site. This would reduce the need for current types of face-to-face services, as the new practices would be formalized. Moreover, the institution of driving a car to a city to receive health services would also be disrupted in script six.

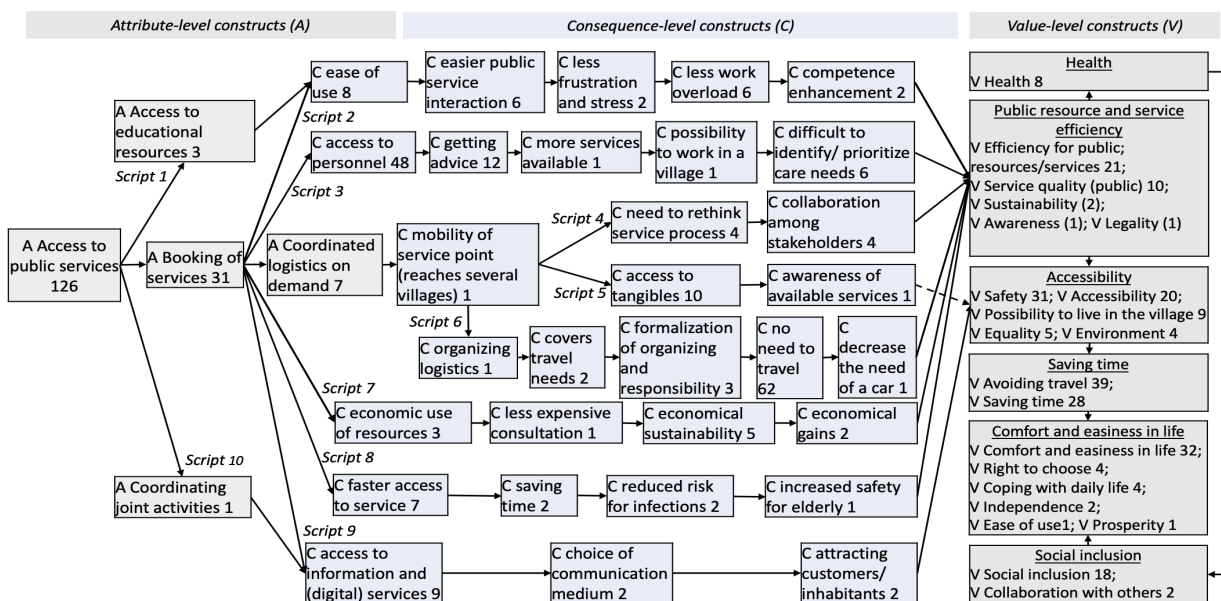


Figure 1: Thematic map, “Access to public health services” scripts 1–10: constructs and their frequency (hits)

In the analysis, cross-thematic script overlaps were considered particularly fruitful in terms of defining smart, sustainable joint service offerings relevant across seemingly distinct service themes. Thus, we set to employ the overlapping value co-creation scripts across divergent themes for developing *encoding scripts*, that may be utilized for formulating bundles of digital services and creating institutional change in the form of a rural service ecosystem (Barley and Tolbert 1997; Wieland et al. 2012). For theory building purposes, we focused on connections that were relatively frequent across the divergent digital service themes. Through several threshold tests, ≥ 3 was selected as an

appropriate threshold for ensuring that the emerging scripts were not overly cluttered, while a suitable level of detail remained. Thereafter, we assessed all the connections between linked attribute, consequence, and value constructs appearing with the threshold of ≥ 3 (i.e., scripts overlapping in at least three distinct service themes), which derived altogether six encoding scripts (Barley and Tolbert 1997). As manifestations of institutional work, the value co-creation practices that underlined the emerging encoding scripts simultaneously shaped those very same practices by creating, maintaining, or disrupting the institutions that are guiding their (re)enactment. Accordingly, the shared encoding scripts between distinct themes were considered to have high potential to build institutional change through value co-creation practices suggested by the informants not only at the level of a single service idea but also at the level of bundled service exchange at the level of the rural service ecosystem (Wieland et al. 2016).

4. Encoding Scripts for Innovating Bundles of Digital-enabled Services

In our analysis, we derived six encoding scripts, each overlapping across at least three divergent digital service themes. The scripts were distributed across the digital service themes with six hits in the theme of local service point; four hits in the themes of health services, and service bus; two hits in the theme online service portal; and single hits in the themes of tourism and recreation, logistics of goods, and social life. Each encoding script, comprehending connected attribute (service feature), consequence (reasoning), and value constructs (ultimate goals and outcomes) (Peffer, Gengler, and Tuunanen 2003; Reynolds and Gutman 1988). As institutional arrangements guide actors' sensemaking of the emerging value for beneficiaries of service exchange (Vargo and Lusch 2016), each of the emerging encoding scripts showcase the value co-creation potential of the script in question across the linked digital service themes. Such value co-creation synergies manifesting across divergent digital service themes as the emerging encoding scripts showcase institutional principles for innovating bundles of digital-enabled services for a regional service ecosystem. Table 1 presents the six emerging encoding scripts overlapping across the divergent digital service themes. In the following, we depict each emerging encoding script one by one.

Encoding scripts (connected attribute, consequence, and value constructs)			Overlapping digital service themes (threshold ≥ 3)						
Attribute constructs	Consequence constructs (number of connections)	Value constructs (number of connections)	Health services	Local service-point	Online service-portal	Service-bus	Tourism and recreation	Logistics of goods	Social life
1. Access to Internet & services	No need to travel (5)	Avoiding travel (5)		X	X	X			
2. Access to public services	Access to personnel (34) No need to travel (32) Access to information and (digital) services (5) Access to tangibles (3)	Accessibility (14) Avoiding travel (21)	X	X		X			
3. Coordinated logistics on demand	Access to tangibles (14) No need to travel (13)	Accessibility (8) Comfort and easiness in life (13) Avoiding travel (14)	X	X		X		X	
4. Digital service portal and website	Access to information and (digital) services (3)	Accessibility (5)		X	X		X		
5. F2F/hybrid public services	End-user support needed (5) Access to personnel (14) No need to travel (26) Preserving human interaction (8)	Self-efficacy (3) Accessibility (7) Avoiding travel (7) Comfort and easiness in life (10) Safety (8) Social inclusion (3)	X	X		X			
6. Social informing and meeting	Preserving human interaction (8)	Social inclusion (8)	X	X					X

Table 1: Encoding scripts overlapping in divergent digital service themes (threshold ≥ 3)

In the first encoding script, the service offering is based on providing access to information and services, meaning the construction of infrastructures that allow fast broadband connections and digitalized services that can be accessed through devices the inhabitants possess. The requisite institutional work involves creating a shift from the need to travel long distances for public and private services toward enjoying such services from the convenience of one's home or another local access point. Thus, the encoding script is connected with the digital service themes of local service point, online service portal, and service bus, which indicate a roadmap for developing the offering of

internet connections not only through personal hotspots and broadband connections, which would allow at-home access to a versatile online service portal, but also through publicly constructed physical sites, such as a local booth where village inhabitants may visit and have access to digital public and private services. Furthermore, a service bus circulating between villages was also elevated as a focal corner stone for providing access to internet and services. The service bus may offer access to physical services, such as personalized advice and municipal services, as well as digital services through provision of internet access and devices required for accessing public and private services. A commonly shared value and goal was the avoidance of travel, meaning having requisite services available locally and online. Thus, the synergies in bundling public and private services in accessible physical and digital outlets was found particularly important due to its negative impact on the traveling needs in the investigated rural communities.

The second encoding script focuses on institutional work on creating and improving access to public service offerings, such as employment, health, and social services. Due to sparse populations, such services are often located distances away from rural areas, which means that services may not be equally accessible to rural inhabitants. While access to digital services (provision of digital public service offerings and access to an internet connection) may partially address the dilemma, some public services are required to be provided face-to-face. For instance, the informants were keen to consume some health services (such as doctors' appointments for diagnoses) more likely at a local service point or a service bus. Our findings indicate that institutional work is required to create a shift in the appropriate manner of using and consuming public services, and particularly the conduct of information intensive tasks such as managing one's job seeking profile and booking of appointments, which do not necessarily require face-to-face service. Bringing public service and infrastructures close to the rural inhabitants was seen important as it improved inhabitants' access to information and (digital) services, and tangibles, such as in-person service, and equipment. Overall, these were seen to meet the values and goals of accessibility and avoiding traveling long distances.

The third encoding script revolves around physical goods relating to both public and private services, from clinical health equipment to convenience shopping. The interviewed inhabitants agreed that a systemic solution to coordinated logistics is needed. As a result, our findings point toward a need for institutional work toward creating a shift in the application of logistics systems that simultaneously serve the needs of public services as well as firms operating locally and globally. For instance, it would be beneficial to distribute heart rate monitoring equipment to rural homes ad-hoc, while the villagers' private online purchases and convenience goods could be shipped to rural households using the same logistics mechanisms. Our findings suggest that a circulating service bus could be one solution in coordinating such logistics, and a local service point offering access to digital services may be beneficial also in providing a local collection outlet for the shipped tangibles. Such mechanisms open for any market actors would be highly needed due to rural inhabitants' limited access to goods and products without traveling. Our findings illustrate that a coordinated logistics system operating on demand without restrictions between ecosystem actors would increase the rural inhabitants' comfort and easiness in life as well as accessibility, also serving the purpose of avoiding travel.

The fourth encoding script is based on the development of an accessible digital service portal open for divergent ecosystem actors such as tourism operators and other local companies, as well as public services. The umbrella of an open online service portal and website holding together all available services would improve the accessibility to not only existing service providers, but also the entrance of new market actors. Implementing such a service would require institutional work with respect to creating new practices for gaining access to information, and divergent public and private services. Thus, the traditional means of providing physical services could be digitalized to an appropriate extent, and new digitalized features may also be used for complementing the extant physical (yet less accessible) ones. For instance, citizen consultation could be provided via chats or built-in conference calls, and simultaneously, local private service providers could display and

distribute their services digitally. Further, our findings indicate that an open digital service portal and website may allow for facilitating the growth of a local sharing economy by improving the visibility of closely available resources, such as accommodation units and produce. Here, a local service point was considered an important structure not only making the service portal physically visible for locals and visitors, but also by providing access to the online services.

In the fifth encoding script, a requirements-based combination of face-to-face and hybrid service offerings emerges as a focal requisite institutional work for both creating new and maintaining extant practices. The complexity of the need and potential of hybrid service offerings is highlighted with respect to health services, such as doctors' appointments and physical checkups. While some of the offerings requiring traditionally physical appointments may be dealt with online tools, the use of digital services is not equally possible for all inhabitants, especially with respect to the need of support and guidance. Such facilitation is needed particularly to increase accessibility and inhabitants' skills, improving their self-efficacy. Thus, a local service point is needed, wherein hybrid services may be provided with technical and other support at hand. With attentive service at a local service point or a circulating service bus, some of the otherwise physically facilitated appointments could be organized in a hybrid mode. For instance, blood pressure could be measured by a physical person at the service point whereas a doctor's control consultations could be organized virtually when appropriate. At the same time, face-to-face service offerings were found crucial in a variety of service offerings. For instance, public services ought to be not only available through online channels, rather, physical face-to-face interactions ought to be preserved to some extent. Our findings underscore that such locally available physical appointments and assistance would not only improve safety and accessibility, but they would also increase social interactions and improve rural inhabitants' comfort and easiness in life.

Finally, the sixth encoding script focused on mitigating the potential adverse effects of digitalization on personal interactions. Especially in rural areas, public and private services may make up a great proportion of the social interactions an inhabitant has outside the family. Thus, institutional work is required for maintaining human-to-human interactions, which was found particularly integral with respect to facilitating social inclusion. Accordingly, the local service point was depicted a focal physical structure at the village, providing face-to-face interactions on site not only between service providers (such as the municipality), but also among the inhabitants. It was found particularly important that public services, such as employment advice, or social and health consultation were alternatively provided also in person to ensure social inclusion. The service point was also viewed as a local meeting point, where resources could be integrated and exchanged.

4. Discussion

The goal of the study was to investigate synergies between script structures emerging from divergent digital service themes, indicating constellations of smart services promoting overreaching value for a regional service ecosystem. Having conducted a detailed analysis of all the scripts emerging across the eight divergent thematic maps, we dissect six encoding scripts overlapping across the digital service themes of health services, local service point, online service portal, service bus, tourism and recreation, logistics of goods, and social life. The emerging encoding scripts bring forth evidence of practices for digital value co-creation (as structures of linked attributes, consequences and ultimate values/goals) suggested by rural village inhabitants in Norrbotten, Sweden. Accordingly, our findings illustrate how several attribute constructs within the encoding scripts lead to overlapping consequence and value constructs, showcasing potential synergies in bundling smart services. Here, resultant values are contributed by small streams of several attributes and consequences, concretizing the village-level value as a whole. Drawing from institutional theory (Barley and Tolbert 1997), we argue that the depicted encoding scripts may be viewed as bridges for understanding and planning actions that may maintain, modify, and create new institutions

manifesting as new appropriate practices for sustainable bundling of public and private services. Investigating synergies between the encoding scripts is particularly important as their underlying institutions may act as glue enabling value co-creation in the developed regional service ecosystem (Wieland et al. 2016).

<i>Encoding script (Attribute construct > Consequence construct > Value construct)</i>	<i>Digital value co-creation potential</i>	<i>Implications to practice</i>
1. Access to Internet & services > No need to travel > Avoiding travel	Progressive digital value propositions and fast broadband infrastructures at the smart village support digital resource integration between public/private service providers and inhabitants, allowing inhabitants to avoid travel and engage in digital value co-creation from the place and time of their choosing.	An emerging need to facilitate digital value creation through construction of infrastructures for fast broadband connections and digitalized services that can be ubiquitously accessed employing the devices possessed by the inhabitants.
2. Access to public services > Access to personnel > No need to travel > Access to information and (digital) services > Access to tangibles	Fully or partially digitalized service offerings locally available at the smart village supports digital resource integration between public/private service providers and inhabitants, allowing for digital and physical resource integration and inhabitants engaging in digital/hybrid service exchange from home or in the local neighbourhood.	An emerging need to develop and provide locally accessible digital and hybrid value propositions, such as a service point or a service bus for facilitating synergies and bundling public and private services.
3. Coordinated logistics on demand > Access to tangibles > No need to travel	Inclusive logistics coordination between public/private service providers and inhabitants allows inhabitants to access physical goods without traveling, which increases the inhabitants' comfort and easiness in life as well as perceived accessibility in the smart village.	An emerging need to coordinate smart and systemic logistics of necessities and conveniences to and from villages through a local smart service hub or a mobile service point (such as a service bus).
4. Digital service portal and website > Access to information and (digital) services	A ubiquitous and accessible digital platform for enabling and facilitating digital and physical resource integration between and among public and private service providers and inhabitants.	An emerging need to develop an open digital service portal for facilitating engagement, interaction, and delivery between and among public and private stakeholders of the regional service ecosystem.
5. F2F/hybrid public services > End-user support needed > Access to personnel > No need to travel > Preserving human interaction	A locally situated or mobile physical service point proposes on-demand value in face-to-face and hybrid resource integration between the inhabitants and public/private service providers improving patient safety and accessibility, and increasing social interactions, comfort and easiness in life for rural inhabitants.	An emerging need to facilitate the omni-channel model in public services through implementation of physical on-demand service points complementing a variety of services offered via a digital platform.
6. Social informing and meeting > Preserving human interaction	In the era of digital services, a locally situated or mobile service point proposes social and inclusive value through face-to-face interactions between the service provider (such as the municipality) and inhabitants and also among inhabitants.	An emerging need to allocate physical structures for fostering social face-to-face interactions between and among service providers and inhabitants.

Table 2: Digital value co-creation potential of encoding scripts and implications to practice

For practitioners, the depicted encoding scripts and their implications illustrate concrete recommendations concerning interrelated stakeholder ensembles for ecosystem-level institutionalization practices. Table 2 illustrates how digital value co-creation may be facilitated through the emerging scripts, and respective actions needed from the (public) facilitator of the regional service ecosystem. In the era of digitalization, accessibility is one of the most recurring values focal to inhabitants. The value of accessibility touches on the topic of digital connectivity, but also the tacit and tangible resource exchange taking place between and among human actors and technology. We can see that fostering digital accessibility may link to the values of self-efficacy, safety and comfort and easiness, and even social inclusion, for rural inhabitants. While our findings highlight the manifold value co-creation potential of the regional service ecosystem, continuous strategic actions, such as construction of infrastructures, development of digital and hybrid offerings, fostering of human interactions and coordination of logistics are needed from the facilitator role. The local service point emerged as the single most recurring digital service theme within the six encoding scripts, indicating strong value co-creation potential and synergies with other digital service themes. As implications, we find that the values of accessibility, self-efficacy, avoiding travel, comfort and easiness in life, safety, and social inclusion may evidently be co-created for village inhabitants through local availability of physical service points. With a close connection with the local service point theme, our findings indicate that the rural service ecosystem would benefit from developing hybrid and face-to-face health services, which could be distributed through the physical service points locally available. Thus, our findings suggest the local service point as the most prominent steppingstone for practitioners toward innovating bundles of digital-enabled services particularly with

respect to public and private health services. In the related encoding scripts, access to information, services, and tangibles, as well as mitigating the need to travel emerged among the most focal consequence constructs in such health services provided through the physical service point. Further, also social inclusion and the need for end-user support were elevated as focal consequence constructs for co-creating value through health services at a physical service point. Thus, we see that the practices related to organizing physical service points for health services ought to be harnessed not only for providing access, but also for fostering social inclusion, connectedness, and support.

However, such initiatives may not be effectively facilitated with the means of traditional market mechanisms in sparsely populated rural areas, such as Norrbotten, Sweden. For example, a village-based service point providing health services may not attract a critical mass of users unless it offered a diverse bundle of other service features. Informants' ideas emerging for service-bundling include involvement of social meeting places (e.g., a café or shared office space), commercial services (e.g., a village shop or self-service kiosk) or tourism/recreation services, combining deliveries of goods and even transportation hubs, etc. However, a new ecosystem value facilitator role is required for active development and bundling of adjacent service offerings. Thus, to enhance well-being for the individual inhabitants as well as the public and private service providers and other stakeholders, we recognize a need for adopting institutionalized value co-creation practices for involving multiple stakeholders in smart service portfolios (cf. Wieland et al. 2016). To facilitate such synergies, smart services ought to connect individual inhabitants with private and public stakeholders at the micro-level, as well as networks of stakeholders at the meso level and municipalities at the macro level. For instance, the digital service theme of tourism and recreation surfaced with respect to the encoding script of digital service portal and website, manifesting the need to bundle private services with the local digital service portal and website as well as the physical service point. While the economic sustainability of local actors was one of the key drivers indicating the need to bundle both public and private services in a physical service point, interestingly, the variety of services in one physical place was also seen as a focal institutional work for maintaining human-to-human interactions and fostering social inclusion in rural areas.

Further, our findings indicate that while digital service provision deserves great attention in the design of a rural service ecosystem, also tangibles, such as goods and physical services offered by public and private actors ought to be integrated in the service portfolio. Accordingly, the service bus emerged as another focal digital service theme for organizing logistics of goods and tangibles. In practice, the service bus ought to be closely connected with the physical local service point, which could be adopted as a platform for the bus. Furthermore, the service bus was found to relate to the digital service theme of logistics of goods, indicating a strong connection also to the open market actors and the shipping of goods, such as convenience products and produce to the rural areas operated by the service bus.

According to our analysis and the emerging six encoding scripts and the underlying ecosystem-level institutional work practices, we argue for considering the development of smart villages as regional service ecosystems (Vargo and Lusch, 2016) for several, initially even seemingly unconnected, stakeholders. Overall, to establish a shift toward regional service ecosystems, our findings indicate that a smart village would require institutional work (maintaining, creating new and simultaneously disrupting prevalent institutions) and institutionalized practices at the ecosystem level. For example, when bringing health services to the village service point, ecosystem-level actions are required for a mutual understanding of appropriate levels of availability of physical or online health services at the service point. This would cover the creation and maintenance of (new) adequate norms and practices of service behavior for both the customers and service providers. For example, individual customers, and healthcare and service point providers would be included, further connecting with logistics providers for shipping medicines to customers. Thus, as implications we see that institutionalized service innovation at the ecosystem level would likely require new institutionalized actor roles to

orchestrate heterogeneous service portfolios. This may disrupt prevalent institutionalized practices, traditional producer-initiated service models, and assumptions held by service providers and citizens alike. Thus, a “positive disruptor” role may be needed—beyond the roles suggested by Wieland et al. (2016), let alone stakeholder roles in typical e-government projects (e.g., Balta et al. 2015)—to operationalize ecosystem-level service portfolio institutionalization. Establishing and maintaining such an ecosystem-level stakeholder role would require wide acceptance in co-operation of policymakers, public and private service providers, and active citizens, among other actors.

With our analysis, we contribute to the e-government literature by bringing forth novel insights into the development of smart villages as regional service ecosystems viewing institutionalization at the level of particular digital service themes and their interconnections. To understand how to facilitate ecosystem-level value co-creation in smart villages, it is essential to understand interconnectedness between actors’ practices and institutions as a means to identify the institutional work required for the transformation (Wieland et al. 2016). Considering the employed analytical framework (Wieland et al. 2016), smart villages require institutional work and institutionalized practices at the ecosystem level, including integrative, normalizing, and representational practices to guide the integration of public, private and market-facing resources in the smart villages. For example, to bring health services to the local service point (partially on-line, partially face-to-face), ecosystem-level actions are required to reach a joint understanding of appropriate levels of availability of physical or on-line health-services at the service point, establishing and maintaining adequate (new) behavioral norms and practices of the customer, service provider and facilitator in the new service contexts, and altogether ecosystem-level work on continuous development of both a particular service domain and the whole regional service ecosystem. We propose that such institutional work and related actors’ practices may drive institutional change for co-creation of digital-enabled value such as inhabitants improved safety, accessibility, self-efficacy, and social inclusion.

Further, we contribute to the SDL (Vargo and Lusch 2004, 2016) discourse with an empirical study that analyzes institutional work and practices for value co-creation in smart villages through the derived encoding scripts. As research implications, we see our findings provide opportunities for future action design research initiatives on practices. While institutionalization is a well-established area of investigation, harnessing the understandings of prevailing institutions for new service design remains understudied. As our study reveals that institutionalization may be the underlying key for developing bundled service ensembles for rural service ecosystems, more research is needed in particular toward building reflexivity, i.e., “an awareness of existing social structures” in this context (Vink and Koskela-Huotari 2021 p. 1). While a contextualized study brings forth important contextual insights, it may also pose a limitation for development of theoretical knowledge. As such, our study may not be generalizable to all rural areas in developed countries. Accordingly, we see that we have only scratched the surface investigating institutional work required in transforming rural areas into smart villages. Thus, we call for more studies to investigate value co-creation for regional service ecosystems.

5. Conclusions

Our study concretized the essence of considering smart villages from the viewpoint of regional service ecosystems. Due to tensions between different stakeholders’ priorities and scarce public resources, we propose that smart services for rural villages cannot be developed on the prevailing basis of single-service offerings and their market mechanisms. An ecosystem facilitator role ought to be established by a public stakeholder to create an open agora for building a sustainable, many-sided, service portfolio of mutually dependent, smart service offerings. As one model does not fit all, research is needed for obtaining insights on potential tensions between rural inhabitants’ as well as divergent public and private service providers’ preferences. Once obtained, the new insights may be harnessed for establishing and managing a rural service ecosystem for co-creation of digital-enabled

value. However, we find that the design of such a rural service ecosystem requires institutional work and openness to potentially disrupting prevalent public and private-sector institutions. Further, smart services are needed for connecting rural villages and larger cities, meaning that smart city initiatives ought to increasingly stretch toward the peripheries. It follows that new roles and co-creation practices are required between actors at the ecosystem level, and such practices ought to be commonly acknowledged among several actors. Currently, such ecosystem-level institutionalization practices seem to be missing in establishing public and private services in the context of rural villages in developed countries. This may partially explain the prevailing challenges in developing smart villages, despite the availability of necessary technological solutions and infrastructures. Our study and analysis presented one way of scrutinizing such latent synergies across divergent digital service themes and derived six encoding scripts for developing value co-creation practices that complement a smart service portfolio for a regional service ecosystem. The study depicts in a novel manner institutional work and actors' practices required for institutional change and for co-creation of digital-enabled value. Pinpointing overlap between encoding scripts across the digital service themes for developing the Swedish Norrbotten area, our findings indicate that the suggested institutional work may facilitate co-creation of digital-enabled public value when implemented at not only the level of particular services but also at the level of the regional service ecosystem.

Key Takeaways

- Sustainable digital-enabled value co-creation in rural yet digitally connected areas require development of smart service bundles and adoption of new institutionalized value co-creation practices
- As a means to facilitate regional service ecosystem-level value co-creation in smart villages and identify the institutional work required therein, it is essential to understand interconnectedness between actors' practices and institutions
- A new ecosystem value facilitator role is required for active development and successful bundling of adjacent service offerings.
- Laddering interviews were found a helpful technique for deriving institutional scripts required for institutional change and for understanding actors' practices required for digital-enabled value co-creation

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