



TOWARD YOUTH-DRIVEN SUSTAINABLE DIGITAL FUTURE: EMBEDDEDNESS OF LOCAL WISDOM IN RURAL TRANSFORMATION

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Abstract. Studies on rural digital transformation rarely highlight the relationship between youth, local wisdom, and the vision for a sustainable future community. This study examines how cultural values and the role of youth can be embedded in rural digitalisation. This research was conducted in Karangtengah Village, Cilacap Regency, using qualitative methods and Manuel Castells' theory of modernisation, which emphasises modernisation as a transformation towards an information technology-based network society. Karangtengah Village is an agricultural village that produces rice and sticky rice, with a spirit of cooperation that supports food security, MSMEs, and local culture. This study found that rural digital transformation can be synergised with local wisdom and youth as catalysts. Local values, youth, and digitalisation are strengths offered as a new conceptual framework in village development. These three elements have the potential to produce what is known as digital cultural preservation, digital entrepreneurship, cultural resilience, and digital participation and governance. This study concludes that to carry out digital transformation, there needs to be a shift in focus from mere digital inclusion to youth-driven digital sustainability integrated with local wisdom.

Keywords: Digital sustainability, local wisdom, modernization theory, rural digital transformation, youth agency

1. Introduction

Digital transformation cannot be separated from the socio-cultural dynamics of local communities [1], [2]. Karangtengah Village, Sampang Subdistrict, Cilacap Regency, Central Java, is known as an agricultural area producing rice and sticky rice, supported by a socio-economic foundation rooted in farming activities, family-based micro, small, and medium enterprises (MSMEs), clay-based craft production, and close interpersonal relations among residents. The agrarian life of Karangtengah is strongly grounded in the traditions of gotong royong (mutual cooperation) and local wisdom. Gotong royong is not only practiced as collective labor but also functions as a value system that sustains the continuity of community life in Karangtengah.

Karangtengah represents a relevant social setting because it simultaneously presents challenges and opportunities in the digital era. Challenges arise from limited technological infrastructure, varied levels of digital literacy, and the common assumption that digitalization is solely about technology. Meanwhile, major opportunities lie in the community's capacity,



especially among youth, to integrate technology with local wisdom passed down across generations. The communal character of village life creates conditions in which digitalization does not simply appear as modernization, but as a form of social transformation that preserves cultural continuity.

At the national level, digital transformation has become part of Indonesia's strategic development agenda emphasizing digitalization as a catalyst for accelerating development [3], [4], [5]. This agenda targets the expansion of internet access, digital-based public service delivery, and the integration of digital systems in the economic sector, particularly among informal workers and MSMEs [6], [7]. However, discussions often focus on infrastructure—such as internet network development, device provision, or administrative digital platforms—while the social and cultural dimensions that determine the success of digital transformation receive far less attention. In fact, community participation, youth involvement, and the recognition of local values shape whether digitalization merely becomes a formal program or transforms into a sustainable movement [8], [9], [10].

Indonesia, with more than 74,000 villages, faces a significant development gap between rural and urban areas [11]. Villages are often treated as objects of development, while digitalization models tend to replicate urban approaches [12], which risks generating forms of digitalization that do not align with village contexts. Therefore, studies that position villages as active subjects in designing their own digital transformation are critical, particularly through youth participation and strengthening social capital rooted in local wisdom.

Globally, digital transformation has been a major development agenda over the past decade [13], [14]. The United Nations, through the Sustainable Development Goals (SDGs), places digital inclusion as a key strategy for reducing inequality (Goal 10), building industry, innovation, and infrastructure (Goal 9), and strengthening global partnerships (Goal 17) [15], [16], [17], [18]. In this context, village digitalization is not merely a technical necessity, but also a global strategy to address digital divides between urban and rural regions. In many developing countries, villages face limitations in infrastructure, market access, and human resources. Digitalization is considered capable of addressing these challenges by providing access to information, digital marketplaces, and innovative public services [19]. However, critiques highlight that global digitalization models often follow a uniform logic rooted in digital capitalism, which—when applied without contextual adaptation—can exacerbate rural marginalization. Thus, alternative models of digitalization that are grounded in local values and youth participation are necessary, so that digitalization becomes a culturally-aligned social transformation rather than an urban technological replication.

Previous studies on digital transformation in rural regions have developed extensively. However, trends show fragmentation along several thematic divides. First, literature on rural digitalization commonly centers on access, infrastructure, and economic impacts [20], [21], [22]. Second, literature on youth agency highlights that youth, as digital natives, possess higher capacity to adopt and develop technology [19]. Youth are often positioned as drivers of social innovation, digital entrepreneurship, and social change in rural communities [23], [24]. However, studies that specifically examine youth involvement in village digitalization processes remain limited. Youth are frequently described as individuals who migrate to cities for employment, while their role in shaping rural digital ecosystems receives insufficient scholarly attention. Third, literature on local wisdom as social and cultural capital emphasizes its importance in rural development. Gotong royong, solidarity, and environmental sustainability remain key values in village life [25], [26]. Previous studies on cultural resilience highlight how rural communities maintain identity amid modernization pressures [27]. Yet, only a few studies link local wisdom directly with digital transformation. In practice, local wisdom has served as the foundation for more contextual, inclusive, and sustainable forms of digitalization.



To understand the phenomenon of rural digitalization, this study draws on Manuel Castells' theoretical framework on modernization and network society. Castells (1996; 2000) argues that modernization is no longer merely industrialization, but a transformation toward a networked society shaped by information flows. Key concepts in Castells' approach—such as informationalism (information as a central resource), identity (identity formation in the face of globalization), and timeless time (alterations in temporal experience in the digital age)—are highly relevant in examining digital transformation in rural settings. In Karangtengah, local communities are confronted with global information flows mediated by digital technologies. The central question becomes how youth can participate in global networks without losing their local identity. Here, the integration of youth as digital agents, local wisdom as identity foundation, and digital technology as the medium of transformation becomes essential.

While studies on village digitalization are abundant, few specifically link youth agency and local wisdom in the digitalization of rural communities. This raises a critical question: how can village digitalization be understood as a process that integrates technology, youth, and local wisdom within the framework of the network society? This study introduces the concept of youth-driven digital sustainability, which asserts that sustainable rural digitalization depends not only on technological accessibility but also on the involvement of youth as agents, local wisdom as cultural identity, and digital technology as a medium of transformation. Modernization, therefore, is not Westernization, but a networked transformation rooted in locality. The integration of youth, local wisdom, and digitalization offers a new framework for designing digital transformation models that are more inclusive, participatory, and sustainable.

2. Methods

This study employs a qualitative approach to gain an in-depth understanding of the role of youth in promoting sustainable digital transformation in rural areas while preserving local wisdom. A qualitative approach is appropriate because it enables the exploration of experiences, perspectives, and social practices in a contextual and holistic manner. Given that the main focus of this research is on youth involvement and the preservation of local values within rural digitalization processes, a phenomenological approach was selected to capture the depth, richness, and wholeness of each informant's lived experience.

The research setting is Karangtengah Village, Cilacap Regency, Central Java Province. This site was chosen because it represents a social context in which, on the one hand, youth actively utilize digital technology, while on the other, they continue to uphold deeply rooted local values. Informants were selected purposively, consisting of youth considered to have relevance and adequate understanding of the issues being studied. The number of informants was estimated between 10 and 15 individuals, including active youth, cultural figures, village officials, and other relevant community members. This number remained flexible and adjusted according to data saturation.

Multiple data collection techniques were employed to complement one another. In-depth interviews were conducted with youth, cultural figures, village officials, and local digital actors to obtain rich and contextual individual perspectives. Meanwhile, Focus Group Discussions (FGDs) were utilized to capture collective views among youth regarding their roles in digital transformation. Non-participatory observation was conducted to directly observe digital activities and their interaction with local values in daily life. Additionally, documentation review was carried out through village archives, community activity records, and local digital platforms. Digital ethnography was also applied to trace digital practices occurring on social media or within the village's online community spaces.

Data were analyzed inductively using thematic analysis through three phases: data reduction, categorization into thematic clusters, and meaning construction. All analytical processes were guided by modernization theory to interpret how digital transformation shapes new social

dynamics within the village. Conclusions were drawn reflectively and continuously throughout the research process and validated using triangulation of sources and techniques. The final outcome of this study is expected to offer a model for digital transformation grounded in local wisdom, along with policy recommendations for village development driven by youth-led innovation.

3. Results And Discussion

3.1. Karangtengah in the Landscape of Digital Modernization

Karangtengah Village has significant potential in agriculture, plantations, MSMEs, and local cultural heritage. Most residents continue to work in the agricultural sector through land-lease and bengkok land systems, while commodities such as cassava, sticky rice, and red bricks remain key economic products. In addition, tobacco and coconut plantations serve as major commodities with domestic distribution networks to the Cilacap and Banyumas regions, while sand mining areas are still managed individually. However, the agricultural sector currently faces a shortage of labor, prompting a gradual transition towards the use of modern tools through farmer groups, which become markers of the village's shift from a purely agrarian system to one that is increasingly adaptive to modernization.



Figure 1. Agricultural Potential in Karangtengah Village

Source: Primary data

Karangtengah has also introduced a communal goat livestock program as part of its food security strategy. Village funds are allocated with 20% directed to support this initiative through the Village-Owned Enterprise (BUMDes), while the remaining 80% is allocated for other productive ventures. The management scheme is still under discussion, particularly regarding the risks of livestock mortality and mechanisms of distribution, although the proposal has already been submitted to the subdistrict office. This program is also envisioned to expand beyond breeding and fattening to include reproductive systems with digital-based recordkeeping to ensure greater transparency and accountability.



Figure 2. BUMDes Activities in Karangtengah Village

Source: Primary data

BUMDes itself has developed into the economic driving force of the village, managing various business units ranging from funeral supply services, office stationery sales, groceries, WiFi services (Wifian Solution), tax service counters (Budiman), to digital payment services. MSME potential is also growing, particularly through clay crafts such as water jars (padasan), mortars (cobek), pitchers (genuk), flower basins (jembatan), and piggy banks. The establishment of a public green space (RTH) serves as both a social gathering space and an economic arena where vendors sell and introduce MSME products. However, the village does not yet have a local marketplace platform, meaning social media and commercial e-commerce remain the primary marketing channels.



Figure 3. Internet Accessibility in Karangtengah Village

Source: Primary data

Digital modernization plays a crucial role in shaping these dynamics. Internet access in Karangtengah is relatively high, with 97.5% of households connected to a 4G LTE network due to the presence of a BTS tower within a 700-meter radius. The village government also provides free internet services at the village hall, primarily to support educational needs. Internet use has expanded to product promotion, public communication, and educational activities, although digital literacy remains limited. To address this, the village government routinely conducts digital literacy training, illustrating the gradual

transformation of village identity from an agrarian base into a digitally connected ecosystem.

Health and social welfare services are also well supported. The village has a community health center (puskesmas/polindes), hospital access, clinics, doctor and midwife practices, and pharmacies. Fourteen posyandu centers for toddlers and six posyandu centers for the elderly operate actively with village funding for volunteer incentives and training. Most households have access to proper sanitation and clean water supplied by PAM/PDAM, while settlements are generally permanent and habitable, with 2,796 households residing in adequate housing.



Figure 4. Community Activities in Karangtengah Village

Source: Primary data

Socially, youth, women, and the elderly play active roles in village development. Karang Taruna develops youth capacity through involvement in village events, external partnerships, and the establishment of a village football school with regular training schedules. Support also comes from Karangtengah community associations in Jakarta, many of whom work as architects and contribute to village sports facilities. Women and elderly groups participate through PKK, women farmer groups, cooperatives, and various skills training programs such as sewing, baking, barista workshops, and bamboo crafts. These forms of participation not only strengthen social solidarity but also reflect inclusivity within the modernization process.



Figure 5. Cultural Traditions in Karangtengah Village

Source: Primary data

Despite being connected to digital modernization, Karangtengah continues to preserve its cultural identity. Traditions such as sedekah bumi, wayang kulit performances, gunungan processions, collective prayer ceremonies, pilgrimage, seasonal thanksgiving



(Krapyak), and the Suran celebration remain practiced regularly. These cultural practices have not disappeared; rather, they have found new expression through documentation and dissemination on social media. The village government also allocates funding to support cultural preservation. Cultural life is further enriched by the presence of four ethnic groups and two languages, alongside a religiously diverse community dominated by Islam with Christian, Catholic, and indigenous belief minorities.

Strategic planning initiatives also shape the village's modernization trajectory. A key program is the planned construction of a village reservoir (embung) behind the local hospital, intended to serve as an irrigation source and as an integrated tourism, fishing, and culinary destination connected to the green public space. This Rp10 billion project has been deemed feasible by relevant agencies and is expected to not only strengthen food security but also serve as an emblem of integrated physical development, creative economy expansion, and digital modernization.

Karangtengah thus stands at an important crossroads where local government and residents maintain agrarian and cultural traditions while simultaneously opening themselves to digital modernity. Through the integration of agriculture, MSMEs, health, social participation, and cultural preservation within a digitally connected development framework, Karangtengah seeks to build a renewed identity as a village that is economically strong, socially cohesive, and culturally resilient in the midst of ongoing societal change.

3.2. Youth Agency as the Driver of a Networked Community

Youth are positioned as strategic actors who do not merely function as technology users, but also as agents of social change. The concept of youth agency refers to the capacity of young people to act independently and make autonomous decisions [28], [29]. Youth agency is a critical aspect of youth development and participation across various social spheres [30], [31]. In the context of the networked society, youth are viewed as having particular advantages because they have grown up as digital natives who are accustomed to the global circulation of information [32], [33]. In the era of globalization and digitalization, youth are therefore positioned not only as technology adopters but as drivers of social transformation [34], [35], [36].

The youth in Karangtengah Village display these characteristics as digital natives who are not only proficient in accessing technology but also capable of adapting it to local needs [37]. Their ability to interpret and operationalize digital knowledge enables them to act as catalysts for innovation, creating new opportunities in areas such as village product marketing, ecotourism development, and the strengthening of creative economic networks [38]. Technology thus functions not merely as a communication tool but as a transformative space where global knowledge is translated into practices relevant to the village's social, cultural, and economic realities. In this way, youth open channels that allow Karangtengah to remain connected to broader external networks without losing its local rootedness.

The strength of youth agency lies in the ability of young people to serve as bridges between the global and the local. In this capacity, youth act as interpreters who translate global issues—such as climate change adaptation, digital entrepreneurship, and sustainable agriculture—into everyday practices relevant to village life. Youth in Karangtengah do not merely follow global currents; they actively shape them into contextually grounded innovation. This enables the formation of hybrid knowledge, where global information is not simply adopted but reworked to align with local needs, further enriching existing cultural wisdom.



The role of youth as drivers of the networked community has broader implications for village development [39]. Youth digital literacy must continue to be strengthened not only to optimize technology use but also to anticipate risks associated with digital ecosystems. Youth involvement in social entrepreneurship reaffirms their role as pioneers of community-based solutions while cultivating collective awareness of sustainability. Moreover, their participation in village deliberative forums and collaborative planning practices contributes to new forms of leadership that are not hierarchical, but cooperative and participatory.

Youth agency in Karangtengah therefore reflects not only the adaptive capacity of young people amidst digital transformation, but also the mobilization of youth energy to move the community toward a sustainable digital future. They represent a generation capable of negotiating global flows while remaining grounded in local identity, bridging modernity and tradition, and ultimately reviving the village as an active and integral space within broader patterns of social transformation.

3.3. Embeddedness of Local Wisdom in Digital Practices

The accelerating wave of digitalization has reshaped not only modes of communication but also the structure of social interaction and collective life. As digital platforms increasingly mediate social relationships, practices once rooted deeply in local wisdom have begun to shift. Human interaction is now often perceived as more practical when conducted through digital means such as social media, representing new forms of digital-era interaction. This shift raises a critical question: to what extent can digital spaces sustain communal values, given that digitalization reduces face-to-face interaction and gradually alters the communal character of society?

Within this transformation, the case of Karangtengah Village demonstrates that local values such as *gotong royong* (mutual cooperation), food security, and solidarity—which typically rely on physical interaction—have instead become foundational elements of digital practice.

The first value is *gotong royong*. In Indonesian cultural context, *gotong royong* emphasizes cohesive, collective cooperation. Sibarani [40] explains that it is deeply rooted in social organization and enacted across life cycles and livelihoods. When integrated with digital practice, digital platforms can enhance reciprocal cooperation by facilitating communication and coordination among community members. Charoenloasiri et al. [41], studying food delivery workers, show that digital platforms can serve as new public spaces for building community and advocacy, enabling the sharing of experiences and the pursuit of improved working conditions. This notion can extend to rural communities, where digital platforms may assist in organizing and managing cooperative activities.

The second value is food security, which arises from human adaptability. Strong social networks, trust, and communal norms significantly shape agricultural production and food resilience in rural contexts. Yusriadi [42] notes that these elements of social capital improve cooperation and agricultural efficiency, which are crucial for food security. In relation to digital transformation, digital technologies play a vital role in enhancing food security by expanding market access, reducing geographical barriers, and encouraging innovation. Awatara et al. [43] highlight that digital platforms can support climate adaptation and mitigation efforts, contributing to sustainable food resilience. Similarly, Chowdhury et al.



[44] emphasize that AI and digital tools optimize agricultural practices, improving yields and resource management.

The third value is solidarity. Solidarity in community-based agriculture requires social inclusivity, shared responsibility, and sustainability. Stehrenberger and Schneider [45] explain that digital technologies facilitate these practices by enabling information exchange and task coordination among members. Duracka [46] further suggests that the transition toward digitally mediated collaborative economies can strengthen social bonds by intensifying trust and mutual engagement. Digital mediation thus becomes essential in maintaining solidarity in rural communities, ensuring that traditional values remain preserved while adapting to modern practices.

The interconnectedness of these three forms of local wisdom is reflected in various initiatives, such as Indonesia's Proklim digital platform, which promotes climate education and sustainable practices by integrating local community efforts with digitalization [44]. In Karangtengah, digital technology can be utilized to reinforce gotong royong, food security, and solidarity. By embedding local wisdom within digital practices, the community can work toward sustainable development while safeguarding cultural heritage. Digital platforms can facilitate communication, coordination, and education, ensuring that traditional values remain intact while being adapted to contemporary contexts.

3.4. Informationalism and Village-Based Digital Entrepreneurship

The digital economy presents significant opportunities to transform local economic structures, particularly through the empowerment of rural MSMEs. In Karangtengah Village, Cilacap, the integration of local wisdom into youth-led digital entrepreneurship plays a pivotal role in this transformation. The process of informationalization in rural MSMEs can be observed in three main areas.

The first is empowerment through digital literacy and application-based skills. When training is carried out systematically and continuously, it strengthens the capacity of MSMEs to utilize marketing platforms, networks, and online sales systems. Nugroho et al. [47] highlight that such training enhances confidence in using social media and e-commerce tools, which leads to expanded market reach and improved product competitiveness. Similarly, Ramadhani et al. [48] emphasize that mobile-based digital applications enable MSMEs to overcome challenges related to market access and digital visibility, thereby strengthening brand presence and positioning.

The second is the integration of local cultural elements into MSME products, such as traditional crafts and culinary heritage. Diatmika and Rahayu [49] argue that cultural internalization in product development not only preserves local traditions but also enhances MSME competitiveness in digital markets by creating culturally distinctive and market-relevant innovations.

The third aspect involves youth participation in entrepreneurship. Youth in Karangtengah utilize digital tools to initiate and develop business ventures. Shi et al. [50] note that social media and e-commerce significantly influence entrepreneurial intentions among young people by providing accessible platforms for business experimentation and expansion. Moreover, Pop-Cohuț and Dodescu [51] stress that digital literacy and



entrepreneurship training programs are essential for equipping youth to navigate the digital economy and contribute to local economic development.

Integrating local wisdom into digital entrepreneurship, particularly through active youth involvement, can substantially transform the economic foundation of villages like Karangtengah. By leveraging digital tools alongside cultural heritage, MSMEs can expand market reach, improve competitiveness, and support sustainable local development. Therefore, strategic policy intervention from village governance is necessary to realize the broader potential of the digital economy, with youth positioned as central actors in this transformative process.

3.5. Identity, Cultural Resilience, and Networked Governance

The integration of digital technology into cultural heritage preservation has significant implications for sustaining and promoting village cultural identity within global digital landscapes. The first aspect relates to cultural resilience through digital storytelling. Digital storytelling enables communities to document and share cultural narratives, preserving heritage while reinforcing collective identity. Ali et al. [52] suggest that digital storytelling bridges cultural gaps and fosters inclusive learning by integrating local cultural knowledge with contemporary digital practices. Similarly, Holmes, McEwen, and Hansen [53] highlight that digital storytelling supports reflection and intergenerational learning, contributing to cultural resilience.

The second aspect concerns youth participation in technology-based governance. Digital participation is increasingly recognized as essential for strengthening youth engagement and political agency. In the case of Karangtengah Village, digital storytelling not only serves cultural preservation but also functions as a medium for engaging wider audiences and strengthening cultural representation. Encouraging youth to participate in digital governance initiatives enhances their involvement in community decision-making processes. Utilizing digital platforms for civic engagement can bridge the divide between traditional governance structures and the expectations and capabilities of younger generations.

Through the integration of cultural heritage preservation and digital civic participation, Karangtengah demonstrates how identity, resilience, and governance can evolve in interconnected digital environments. This approach ensures that cultural traditions remain dynamic and relevant, while empowering youth as active contributors to the governance and future development of their community.

3.6. Toward Youth-Driven Digital Sustainability

Manuel Castells' modernization theory emphasizes that modernization is not synonymous with Westernization, but rather a process of transformation rooted in networked social relations characterized by local cultural contexts. This theoretical perspective is relevant to examining the integration of youth, digitalization, and local wisdom in Karangtengah Village, Cilacap.

First, local wisdom and community empowerment play a central role in fostering social integration. In Karangtengah, the development of agro-tourism rooted in local cultural knowledge requires careful planning, multi-stakeholder collaboration, and



community education [54]. This aligns with Castells' argument that modernization must be grounded in local identity and community-based social structures.

Second, digitalization in the educational sphere, particularly through Project-Based Learning (PjBL), enhances student autonomy by integrating technological tools with learning activities rooted in local culture [55]. This approach not only preserves cultural heritage but also creates learning experiences that are meaningful and relevant, enabling a form of education that is contemporary yet grounded in locality.

Third, youth engagement and social cohesion are strengthened through community-based initiatives that integrate local values such as gotong royong (collective mutual cooperation). Such initiatives bridge social divides and reinforce communal solidarity [56]. This integration situates young generations as agents of positive social transformation, affirming that modernization can evolve through locally driven networks.

Fourth, economic development emerges from the synergy between local characteristics and technological innovation. When local heritage and village-specific knowledge are integrated with digital tools, they can significantly enhance rural economic development [57]. This demonstrates how local wisdom can support sustainable economic growth, aligning with Castells' conception of modernization as networked transformation rather than cultural assimilation.

The integration of youth, digitalization, and local wisdom in Karangtengah reflects a localized modern transformation consistent with Castells' theoretical orientation. By leveraging cultural knowledge alongside digital technologies, communities can achieve sustainable development and social cohesion. This synthesis reinforces the idea that modernization does not require Westernization; rather, it can emerge as a locally driven process rooted in networked society dynamics with distinctive local identity.

4. Conclusion

Digital transformation in Karangtengah Village is not solely oriented toward infrastructure development or technological access, but represents a broader social transformation that unites three essential elements: youth, local wisdom, and technology. Youth serve as key agents who mediate the flow of global information with local realities, while local wisdom provides the cultural foundation that sustains village identity amid modernization. In this context, local wisdom functions as cultural capital supporting digital sustainability.

The convergence of these three elements positions digitalization as more than technological adoption; it becomes a process that strengthens collective cooperation, social solidarity, and food security as foundational aspects of community life. Karangtengah thus illustrates that village digitalization can evolve toward youth-driven digital sustainability, in which the future of the digital village is shaped by the vitality of young people rooted in tradition and local identity.

This study underscores the need to develop digital transformation models for rural areas that are contextual, inclusive, and sustainable. Such models must not simply replicate standardized global digital capitalism, but instead integrate digital entrepreneurship, cultural preservation, and community participation in accordance with local needs.

With youth as catalysts and local wisdom as the grounding force, villages can utilize digital technologies to strengthen creative economies, expand social networks, and preserve cultural sustainability. This offers an important policy lesson for rural development in Indonesia:



digitalization cannot be limited to infrastructure provision but must evolve into a social movement that revitalizes the village as a space of innovation, identity, and resilience.

5. Acknowledgement

The author would like to sincerely thank the community of Karangtengah Village, Cilacap Regency, for their warm hospitality and valuable insights that greatly contributed to this research. Appreciation is also extended to colleagues who provided constructive feedback during the preparation of this paper, as well as to the organizers of the 8th ICMA SURE (International Conference on Multidiscipline Approaches for Sustainable Rural Development) for the opportunity to present and enrich this work.

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