




Article

Designing Platforms for Micro and Small Enterprises in Emerging Economies: Sharing Value through Open Innovation

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Abstract: While innovation is essential for sustainable development, micro, small, and medium-sized enterprises (MSMEs), which account for more than 90% of firms in Latin America, face the challenge of benefiting systematically from innovation due to capability and negotiation asymmetries when compared with large organizations. In this context, open innovation holds promise to enable shared-value creation in terms of developing MSME capabilities, operations, and the organization of activities, especially when mediated and supported by public sector actors. It may also hold promise for the development of MSMEs when there is a lack of well-developed ecosystems with multiple central actors, as is the case in many less-developed Latin American countries, such as Nicaragua. Open innovation ecosystems support platforms that form the delivery vehicles for the offerings of firms, providing a framework of processes, rules, and policies for the purpose of co-creating value. These platforms also offer a development gateway for the participating MSMEs, impacting the achievement of the Sustainable Development Goals (SDGs) created by The United Nations. Despite the potential for open innovation and its application in entrepreneurship ecosystems, few cases document the essential elements for designing these supporting platforms. In this case study, we aim to provide a framework for mediated, shared-value open innovation platforms by applying design science and case study approaches. Our work contributes to the field of knowledge-based ecosystems and open innovation platforms and considers best practices that can be applied in similar contexts.

Keywords: innovation ecosystems; knowledge ecosystems; open innovation; platform design; SDGs; sustainable development



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1. Introduction

The economic development of Latin American countries is heavily dependent on the performance of micro, small, and medium-sized enterprises (MSMEs) [1], which account for more than 90% of formal sector organizations and 60% of employment. These organizations, especially those involving early-stage entrepreneurs, start-ups, and micro-enterprises, confront multiple challenges related to capabilities, operations, the organization of activities, and the complexity of the systemic context in which they operate. Realizing the importance of the sector, a variety of mechanisms have been set up over the years to support the development of MSME capabilities and operations, including ones that enable innovation with early-stage actors in enterprise development. In this paper, we examine the case of the evolution of an open innovation (OI) platform that aims to support Nicaraguan early-stage entrepreneurship. More specifically, we examine how a mediated shared-value open innovation (OI) platform can be conceptualized and designed to cater to the needs of MSMEs in less-developed economies, such as that of Nicaragua.

Understood here as the conception, development, and diffusion of novel, useful products, services, and practices, innovation requires human, material, and technological

resources that are usually within the reach of medium-sized and large organizations [2–4]. MSMEs, especially those operating in emerging economies, face specific challenges associated with capabilities, processes, and resources in developing their offerings and innovating their products, services, and practices, suggesting that bespoke mechanisms and pathways for internal development and enhanced competitiveness need to be identified and applied. A key challenge for these organizations is related to their ability to access and participate in ecosystems in equitable ways [5]. While medium and large organizations create ecosystems around themselves as anchor or lead organizations, capturing a significant part of the value in the process [6,7], MSMEs need to either be rule-takers in these systems or to participate in ecosystems that operate with alternative models. Investing in the building of innovation capabilities in conventional ways often strengthens larger firms that already have processes and resources in place.

In this study, we initially propose that applying open innovation (OI) to these MSME ecosystems is beneficial, as interactions resulting in equitable value sharing appear to be both desirable and achievable, especially in the less economically developed Latin American contexts, such as that of Nicaragua [8]. OI, as proposed by Henry Chesbrough [9] and later studied in the context of small organizations by Baldwin and von Hippel [2], presents a potentially encouraging scenario in the context of systemic value sharing, given the fact that it considers, from its conception, the exchange of resources between actors of all sizes for the purpose of creating value through new products and services. This favors interaction and knowledge flow between actors and relies on interdependence and multiple connections between actors to form ecosystems [10] to exchange resources, talent, and technologies [11] that generate value for most of their members [12]. However, the equitable development, participation, and well-being of the actors in these ecosystems are not a given at any point in time, and we further propose that mediation in the systems through, e.g., active stewardship in ecosystems (e.g., through public enabling and support) can enable equitable access to opportunities and shared-value development in MSME capabilities, operations, and the organization of activities. In order for ecosystems to move their services into practical applications as offerings, modular structures known as platforms (physical or digital) are necessary for processes, protocols, and the provision of certainty and clarity in relations [13].

Building on this initial framing, in this paper, we thus place our attention on the twin concepts of shared value on platforms and the mediation required to successfully apply OI principles. There has been extensive theoretical development in the field of ecosystems, OI, and platforms [14–16] with categorizations of ecosystems and characterizations of features, actors, and roles (e.g., universities as knowledge brokers). Similarly, platforms and the services that sustain value co-creation on them in service ecosystems have been studied extensively [13,17,18]. However, in the context of OI and value and knowledge sharing, unresolved issues remain with respect to the identification of factors that affect performance [19], the integration of technology [20], as well as the impact of platforms and OI on entrepreneurship in this type of ecosystem [21]. Particularly relevant to this study are the discussions on knowledge ecosystems that promote innovation, entrepreneurship, and talent creation in universities and research centers [15] and work on the potential of OI in the development of regions with significant economic constraints [22–25]. In this context, we found that concrete examples for designing, validating, and launching OI platforms that involve purposeful and mediated shared-value considerations for emerging economy MSMEs are still scarce. This prompted us to inquire about the key considerations that require attention when conceptualizing and designing an effective mediated shared-value open innovation (OI) platform to support MSMEs within the context of less-developed economies in Latin America.

The notable and particular circumstance present in the case context is the lack of significant existing central anchor companies that dominate their ecosystems, leaving space to explore alternative arrangements without the classic incumbent–challenger framing. This created the opportunity to conceptualize and design a platform that is mediated by both an

enabling public authority and a set of universities working through local hubs, focusing on students, universities, research centers, and local MSMEs to jointly engage in projects to create shared value. In this study, we applied design science principles [26,27] within a case study approach [28,29] to an OI project in Nicaragua. Through a three-year period of participatory action research and observation, we reconstructed the project's context and theorized about best practices. Our work contributes, both in theory and practice, a framework for the design and implementation of platforms that support shared-value OI ecosystems in Nicaragua and also more widely in the Latin American context.

2. Literature Review

Innovation is recognized as a relevant factor for the development of companies, organizations, and regions, resulting in extensive academic production addressing the science, processes, practices, and tools that facilitate its management. Despite the extensive attention on innovation development in companies, until recently, it has been mediated by the capacity of organizations to sustain intensive research and development processes as producers [30], which has set the pace of innovation for most of the recent century. While the organization-centric model of innovation still prevails in the industry, new forms of networked collaboration and value creation have emerged [2], driving industrial evolution [3]. These collaborative networks have found a powerful way to create and deliver new products and services in society [9]. OI is seen to enable opportunities for companies and organizations to collaborate by sharing resources, risks, and benefits through connections that create value while, according to Henry Chesbrough [9], requiring that organizations be permeable in order to generate input–output flows of knowledge and value. These flows require connections to share and exchange knowledge, talent, resources, products, services, and technologies to jointly create value [8].

Micro, small, and medium-sized enterprises (MSMEs) often have limited access to resources to manage innovation [5,31], which is why the open model presents them with a means to expand beyond their own limits and to access the resources and capabilities they require to innovate and prevail [3,32–35]. OI appears to be within the reach of MSMEs with restricted access to resources [9,36,37], providing them with the opportunity and potential to boost growth. Despite this recognition, potential participants may lack knowledge required for decision-making [38] and for articulating both flexible as well as structured relationships between organizations that complement resources, talent, knowledge, and technologies [13]. With medium-sized or large companies, government organizations, universities, research centers, or even individual users [39,40], this articulation between actors leads to the creation and consolidation of networks, also known as ecosystems.

Ecosystems and networks enable OI and aim to create value [41]. Iansiti and Levien [10] defined an ecosystem as “a community of entities that co-evolve in their capabilities and roles, depending on each other to achieve the effectiveness and survival of all”. Lusch and Nambisan [13] visualized ecosystems from service-dominant logic as actor–actor networks in which there is a series of institutional structures that facilitate the dynamic integration of resources, suggesting that these ecosystems must have institutional structures and rules that allow them to interact. Scaringella and Radziwon [15] reviewed the taxonomy of ecosystems, their characteristics, and the most relevant actors, recognizing the relevance of both knowledge exchange and research centers and universities in this exchange. The conceptualization of ecosystems includes business ecosystems [42], innovation ecosystems [43], and knowledge-based ecosystems [44], promoted by universities [33,36] and clustered around knowledge-generating actors [45]. Isenberg [46,47] identified the need to take advantage of this type of ecosystem to trigger entrepreneurship and to understand their most relevant components and the relationships between them: markets, universities, government, infrastructure, companies, among others. Costa et al. [48] argued that open innovation can enhance sustainable innovation ecosystems. The work of Korcia et al. [23] and that of Osorno-Hinojosa, Korcia, and Ramírez-Vázquez [24] illustrate a clear strategy for the implementation of open innovation (OI) within innovation and entrepreneurship

ecosystems in emerging economies. In these contexts, universities and research centers serve as knowledge brokers [15], with the government acting as the orchestrator of the quadruple helix [49,50], aiming towards development and economic growth [51,52]. Examples of this can be seen in projects that the World Bank have promoted in countries such as Mexico, Kenya, and Nicaragua [53–55]. Despite this, the theoretical modeling of ecosystems remains in its nascent stages [56].

Ecosystems are usually supported by modular structures composed of physical and digital elements. These structures, called platforms, facilitate interactions between actors, allowing them to interact, integrate resources, participate in an orderly fashion, and innovate [13,18]. Platforms enable the association of actors and resource interchange, allowing their proper mobilization and liquefaction as well as the exchange of protocols [17]. Both physical and digital platforms have the potential to create new innovation networks [57], which is essential for them to be sustainable and competitive [37,58]. Since information sharing and knowledge management are essential factors in ecosystems, platforms must have elements that provide interoperability and integrity [13,59]. The combination of platforms and OI creates significant opportunities for entrepreneurs and companies [39] and poses new and challenging models of competitiveness [60]. The design of the platforms must consider a relevant number of risks and follow the logic of components that properly support the processes involved in innovation [25,61].

From the service-dominant logic (SDL) perspective, the basis of exchange lies in service provision [62–64]. Hence, services are the fundamental basis of exchange and a means through which involved stakeholders dynamically integrate resources, co-creating and generating new resources [65]. This view was echoed by Lusch and Nambisan, who proposed that ecosystems should be viewed as actor-to-actor networks that integrate resources with the purpose of creating value through services [13]. SDL proposes that ecosystems can be understood as a set of service systems in which actors interact, create value, and exchange resources [62,64–66], also allowing for constant re-conceptualization of the ways that actors connect, exchange, and integrate resources. Within the SDL perspective, value can be co-created in terms of use (e.g., applying resources), exchange (e.g., business transactions), and context (e.g., ecosystems). In ecosystems, actors connect and exchange resources, having previously identified and designed services as intermediaries, which serve as a means for the actors involved to meet their needs. Knowledge, in its various manifestations, is seen as the most relevant component, serving a central role in developing the dynamic capabilities of participants and fostering innovation within ecosystems [67,68]. Therefore, in terms of platform design, the identification, categorization, and design of services become highly relevant activities. Services are also the bridge for understanding value creation in ecosystems related to MSMEs. The central caveat for shared-value ecosystems in emerging economy contexts is the lack of centralized key actors or anchor companies that need to be substituted by public sector actors or other focal organizations (or a mix of the two, as in the study case). The platform must be able to support exchanges in value [2] between the MSMEs and larger companies, while enabling value in use for the different manifestations of knowledge [52,67], capabilities, and networked resources [13]. At the same time, the value creation of the context is enabled through the OI ecosystem as a whole. The equitable value captured [67] by the parties is also a central feature of this specific type of ecosystem and its related platform(s).

There is a wide array of practices and tools that can be employed to design services. On one hand, some authors emphasize the life cycle [69], while others propose tools and reference frameworks [70,71]. Alter [72] developed an interesting view of service design on the basis of work systems, while Stickdorn, Schneider, Andrews, and Lawrence [73] proposed a recursive feedback-based life cycle. Finally, there is Hiles [74], who not only proposed design tools but also provided the grouping of services through catalogs. Service catalogs are an interesting source of classification according to the needs they address. The convergence between ecosystems and services presents us with the opportunity to

apply both the tools proposed in the literature as well as the theoretical principles of the well-known service-dominant logic (SDL) in the development of ecosystems and platforms.

3. Methodology

Our study is situated at the intersection of the knowledge and practices related to open innovation, ecosystems, platforms, and service-dominant logic. In the study, we applied the design science research (DSR) methodology, building on the recommendations of Gregor and Hevner [26], Sein et al. [27], and Peffers et al. [75]. This qualitative research approach was chosen to allow for an abductive and stepwise examination of a new, somewhat ill-defined, and emerging phenomenon (OI applied to a new context of developing shared-value platforms in an emerging economy). Table 1 illustrates the six stages of the research project, framed within the double diamond logic, which is widely used in user-centered design [76] to research, understand, design, and implement solutions [23]. Additionally, we applied the principles of the case study methodology to pull the various elements together [29,77,78] within a three-year longitudinal study that engaged with all nine open innovation (OI) centers with differing configurations. This prolonged involvement facilitated direct interaction and, on occasions, complete immersion within the contexts. Utilizing multiple research methods at distinct stages, including participatory observation [79], action research [80], interview methods [81], and collaborative auto ethnography [82,83], allowed for a rich compilation of empirical material from diverse sources.

Table 1. Methodology of the project based on the DSR and case study framed on double diamond design practices.

1. Problem Definition	2. Objectives of the Solution	3. Theory Review	4. Design and Development	5. Evaluation	6. Discussion and Contribution
Analysis terms and scope of the project	Definition of platform goals and project life cycle	Generation of theoretical constructs	Double diamond design steps:	Double diamond design steps:	Discussion with initial theory
			1. Exploration of ecosystem and stakeholder needs	3. Reflection, first knowledge transfer, and deliverable validation	Development of the design blocks
			2. Creation of the design and development framework, service systems, and strategy	4. Implementation through second validation	
				Information systematization and analysis	
				Results and lessons learned	

In the wider, longitudinal study context, following the recommendations of Yin [78], we conducted a triangulated information analysis based on the nine innovation centers implemented during the project. The data collection at the units was carried out between 2018 and 2021 and included 34 key stakeholder interviews and observations of 35 transfer events (these were in addition to the process-related data points described below). The strategic grouping of information, derived from both the transfer of practices between sites and the implementation of events and activities at each site, enabled a detailed analysis of the many-sided and, at times, complex influences that various factors exerted upon the implementation process. Finally, in order to provide a foundation for the proposed theoretical model, we performed a series of validation discussions around the proposed model and theoretical insights from the literature, in line with the recommendations of Yin [78] and Eisenhardt [28]. In the data analysis process, we merged the primary data, which also included the authors' direct observations shaped by past experiences with

similar initiatives, notes, and documents, with secondary data related to the initiative, including emails, meeting minutes, proposals, reports, and guidelines. The reduction in information was carried out using the tools recommended by Miles and Huberman [81], while the ecosystem assessment was based on Barroca et al. [84]. Taken together, these data offered profound insights into the intermediaries' practices and roles and their temporal relationships.

As shown in Table 1, the starting point of the study was framed through the the original definition of the problem, motivation, and objectives of the studied case (Stages 1 and 2), as described in the documentation developed by the sponsoring organizations and consolidated under the terms and scope of the funding and contractual arrangements of the project, as well as through a preliminary diagnosis conducted by third parties. The theoretical constructs that frame the design of a platform within an ecosystem were drawn from the literature review (Stage 3) by the researchers. During the design and development (Stage 4), a more detailed diagnosis of the Nicaraguan ecosystem and the Caribbean region was made, as well as a diagnosis of the project's context. As part of the process, at this stage, a total of 90 documentary pieces of evidence were analyzed, with 52 initial front-end interviews conducted with people involved in the project. The results of this critical analysis were incorporated into a platform design and development framework and the service system strategy, which together formed a revised research construct that aimed to inform further work on the development of appropriate and informed solutions for future OI centers. The design evaluation (Stage 5) was carried out through four visits to different points of Nicaragua, during which this revised research construct of the platform elements was disseminated, reviewed, and validated through 10 workshops with 216 participants. The subsequent implementation was performed in four transfer and launch workshops and included the participation of 93 members of the different stakeholder groups. The launch included the opening and start-up of operations of two OI centers. With the aim of supporting our contribution (Stage 6), we analyzed the project's findings in light of the theory applied [28], framed in ecosystems, platforms, and services. The key stages and results related to the research process are shown in Table 1. The insights from the study support the design of a block platform model with four operational layers, as shown in Figure 1.

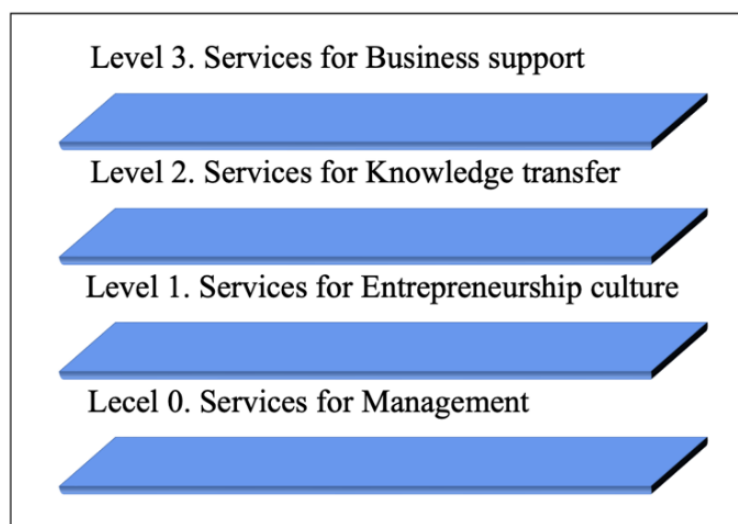


Figure 1. Platform levels of value creation.

3.1. Towards Shared Value: The CARCIP Platform

3.1.1. The Context, Motivation, and Goal of the Project

A combination of factors are at play in the case study context. In the first place, in Nicaragua (and in the Caribbean countries in general), progress in innovation, entrepreneur-

ship, and the creation of ecosystems is incipient; in the words of the project sponsor, *“the applications of scientific knowledge in productive sectors according to the regional reality are still very limited”*. As an example, while there are nearly 60,000 students enrolled in programs related to technological development, this still only positions the country near the bottom of the rankings in terms of people receiving technology-related professional training. This implies significant needs in terms of human resource development and future talent to enhance the capabilities of firms to innovate. With a population of 6.6 million people, a 1.02% growth rate, and a nominal GDP per capita (2021) at USD 2102, Nicaragua is among the least-developed economies in the Americas. At the same time, more than 85% of Nicaragua’s companies are MSMEs [85]. The situation is further complicated by a low formal employment rate (46.9%) with (formal) unemployment at 5.6% and underemployment at 47.5%. Key exports include beef, coffee, gold, and textiles, with fisheries and tourism services adding value to the national economy. According to CEPAL [86], the structure of the economy has participation rates of 46.5% in the services sector and 37.3% in the primary sector, while transformation accounts for 15.6% and specialized manufacturing accounts for 1.4%.

Although scientific production remains low, it tends to develop with international collaboration and support. While Nicaragua was not among the 127 countries included in the Global Innovation Index (2020), this report recognizes government efforts and investments in technology. The pursuit of mechanisms that can trigger the integration of economic sectors in the search for innovative solutions is an ongoing concern in the region. As noted earlier, there are opportunities (and evident need) to generate novel conceptualizations in the area of mediating shared-value ecosystems due to a lack of significant existing central anchor companies in many sectors of the economy. In line with this thinking, the Government of Nicaragua, in association with the World Bank, developed the Caribbean Regional Communications Infrastructure Improvement Program (CARCIP), seeking to boost regional development in Nicaragua, Saint Vincent, and the Grenadines and Granada by developing regional communication networks, forming talent, and strengthening the information technology industry. The CARCIP program involved the creation of a collaboration platform that involves the academic sector, industry, and government organizations in order to boost already-existing sectors and new potential sectors for the purpose of generating innovative solutions and allowing the potential of the entrepreneurial community to be delivered. Through this platform, the Government of Nicaragua intended to connect young talent, scientific production, and the productive sectors in order to spur on the creation of new companies and to strengthen MSMEs while solving real-life problems by applying technology, integrating different regional sectors, and developing promising ideas that benefit at least 100 companies. Underpinning this idea is the notion that shared value could be equitably generated through the application or use of knowledge in the exchanges that take place between actors and through the context of engaging in the platform and the ecosystems as a whole [23,24].

From its onset, the sponsoring team posed the hypothesis of OI as a potential means to achieve its objective [55] of mediating the development of the local ecosystem and related platforms, connecting universities, companies, organizations, and government organizations to produce meaningful value creation through a quadruple helix scheme [87]. As a starting point, this involved the integration of the national network of public universities, as the initial hosts of the platform, with companies of potentially any size (but mostly small in practice) and other types of nonprofit organization. Furthermore, the government, as an orchestrator of actors and a convenor with resources within and outside the country, was integrated into the model. Although the actors were clearly identified, a lack of common objectives among different actors was identified as leading to barriers to collaboration and the duplication of initiatives and projects, inhibiting the development of innovation and entrepreneurship in the country. As one key project stakeholder noted, *“we have enormous potential in the country, we have resources and institutions, however we still need one more step, we urgently need a common vision and a strategy to achieve it”*. The structure of the economy,

linked with scarce existing ecosystems that would enable sharing value for MSMEs while developing capabilities, operations, and organizing activities, led to a need to rethink how OI ecosystems would be delivered and the practical platform solutions that could enable the concurrent co-creation of shared value in use, exchange, and context.

3.1.2. Design and Development: Shared Value and Mediation Shared-Value Creation

The case findings presented two key challenges in terms of shared value in the Nicaragua context, which have partly also been identified in the literature. First and foremost, significant challenges exist in understanding the value of collaborative practices and building up the confidence between actors to share, participate in [25], and adopt these new ways of working. The experience showed significant resistance to OI models and the knowledge flows required for a shared-value ecosystem [21]. While there was an emerging understanding that the competitiveness of firms needs to be seen from the perspective of creating value in networks and partnerships, the culture of openness was undeveloped, limiting the willingness to concurrently engage in both competition and collaboration. Over time, however, there were positive signs of collaboration being reinforced through first-hand experiences over various project cycles and iterations. This challenged traditional local business thinking.

The second key insight that emerged from the study was related to the relationship between shared value and services. Understanding the OI platform as the underpinning structure for the delivery of services made the offerings of the platform understandable and measurable. This helped to clearly identify the clients and their needs that were being served on the platform. Linking SDL with this insight also enabled the concept of shared value to be defined through the lens of the co-creation of value in use (e.g., between teams, clients, and other stakeholders), in exchanges between parties, and through the idea that the platform itself and the related ecosystem help to co-create value in context. As the concept of value is highly abstract at times, implying different things to different actors, these three basic notions of value creation helped to create a baseline that was understandable to the parties. Based on this approach, the platform's service catalog was subsequently designed, taking into account the most pertinent domains and dimensions of the ecosystem to be addressed [47]. As the OI leader noted, *"collaborating through services, gave to us a lot of clarity: what to do, why and with whom. Open innovation projects is another service to provide to society, and that is clearer for us"*. The scale of the project was built on the OI service provided in the university centers. Since the innovation projects and challenges connect the different actors, they naturally identify the interactions that take place in the ecosystem. The innovation leader of the CARCIP project stated, *"having launched the platform from the innovation centers and coordinating seasons with student teams, made it clear to us how we should work to better promote the entrepreneurial environment in each location"*.

In addition, the multi-level design provided clarity, allowing the services to be cataloged based on the components of the ecosystem that the platform supports. The design that emerged involved grouping the projected services and determining the multi-layer design of the service catalog into four layers (Figure 1): (0) platform management services, (1) services for the development of an entrepreneurship culture, (2) knowledge transfer services, and (3) business support services [23]. Each service in the catalog was designed at a high level, facilitating the subsequent creation of interfaces and interactive elements at the local level. The nature of the service and its underlying architecture determined its manifestation as either physical, digital, or a hybrid of the two. A user-centric design approach [73] enabled the crafting of personalized pathways tailored to individual profiles and needs, with each service strategically situated at the relevant juncture within these pathways. This approach ensured coherence among each customer's profile and their personalized journey addressing specific needs, corresponding services, and the unique architecture of each of these services [23].

Mediation Structures

The mediation structures formed the second focus of the study, as these were seen to be needed to ensure that shared value was equitably distributed. To overcome the confidence gap in understanding the value of OI and applying it in the hub contexts, clear policies, rules, and protocols were needed, especially when working under networked conditions, a factor identified as critical in the literature [24]. While the servitization process of the platform was an essential element for providing the codification of the practices (also very useful for shaping the practices on the platform), this does not imply that informal perceptions were not important, and the various workshop and validation exercises (see below) were essential for shaping the attitudes, perceptions, and responses of the stakeholders. Typically, the key actors got to know each other over time, and personal, informal relations between actors were essential building blocks in confidence building. The implementation of innovation centers as well as the platform management model also presented challenges in knowledge transfer and decision making, making it important to maintain close monitoring after the launch. The participation of different management levels is essential, as also established in the literature [23]. Additionally, emerging from the research was the observation that there is a need to shape and maintain a vision focused on wider-than-financial resources for the platform to succeed in mobilization and integration across the platform [21]. On another level, it was also observed that intellectual property requires dedicated management structures and approaches. The current policy framework related to the management and protection of intellectual property is outdated or absent in some cases and has become an important barrier to the sustainability of the OI model [15].

The design of the platform framework in Figure 2 joins the service delivery model, which is essential for creating value, with the platform model, which is needed to deliver value distribution. These two elements are joined through a component of mediation, involving the definition of desirable future states through strategic intent; managing practice through operation management; and dealing with novelty, knowledge, and the diffusion of practices through innovation management. The lack of significant existing central anchor companies poses both a challenge for mediation, through a potential vacuum in capabilities and sustainability, as well as an opportunity to create novel structures through locally highly relevant structures. The operations of the innovation center network are located at universities and research centers. The innovation centers use digital platforms designed to support the management of innovation projects, events, and knowledge dissemination and the delivery of the four layers of services, as seen in Figure 1. The interactions between actors are based on a service model that specifies the categorized catalogs as well as the design of each one. These components are linked to support network growth. As CAR-CIP project manager stated, *“this effort must be sustainable and scalable to reach all regions in the zone”*.

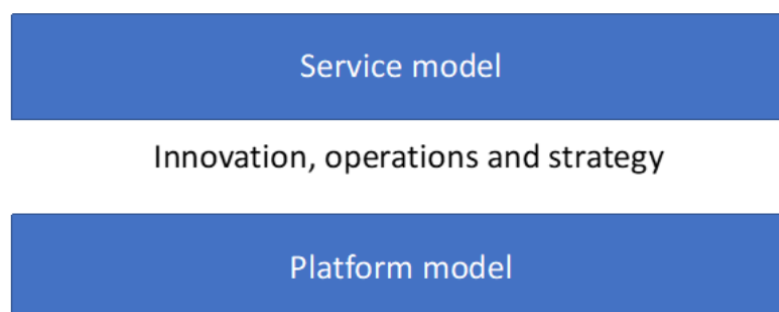


Figure 2. Components of the platform.

A key challenge identified by the stakeholders is linked to the long-term sustainability associated with maintaining the mediation structure over time and continuing to enable the public authority to work with a range of universities to create a network of OI delivery platforms through local hubs, focusing on students, universities, research centers, and local

MSMEs to jointly engage in projects to create shared value. The platform needs to support a knowledge-based collaborative network with a shared vision, in line with Scaringella and Radziwon [15]. There is evidence that this is happening, notwithstanding the complex socio-political processes that exist in the country. Since practical operation of the innovation centers has been the responsibility of the universities, these, together with the personnel participating in the project, have integrated them into university life. This has allowed the project to remain in force, regardless of changes in central leadership. The administrator of one of the innovation centers stated, *“professors and students have integrated open innovation as part of our innovation and entrepreneurship activities, our academic department is a frequent user of the center”*. The adoption of the model in the university network shows healthy signs of sustainability in the future.

3.1.3. Design Validation and Evaluation

Key stakeholders validated the design of the platform through ten workshops, eight of which were held in Managua City and two of which were held in the town of Bluefields, located on the Caribbean coast of Nicaragua. Knowledge transfer activities were integrated in the workshops as well as the launch of the OI service in the cities of Bilwi and Bluefields. After design validation, launch and strategy documents were reviewed and approved. The double diamond [73] strategy and prototyping work were used to validate and transfer knowledge to participants. As the leader of the first OI center in Bluefields declared, *“workshops were a key success factor in learning open innovation as well as validating all the processes. We could adjust activities to our reality in an iterative manner, we co-designed some particular activities”* The project was evaluated by the sponsors (the CARCIP team and the World Bank) through two workshops held in Managua with document and results reviewed, validated, and approved.

Three years after its launch, the platform has continued to extend its operations, adding services to its offerings. With nine OI centers distributed across Nicaragua and the Caribbean Coast, the platform has contributed to the participation of more than 250 students over six seasons, with 28 projects successfully being implemented throughout the country (Table 2). More than 150 events have been organized, contributing to the socialization of innovation and the entrepreneurship culture. The project has scaled a national initiative coordinated by the country’s Ministry of the Creative Economy, to which the head of the agency reported, *“the platform on which our innovation centers operate has allowed us to have a standardized method and the best practices in innovation. We are opening new innovation centers along the country; our people are changing their mindset about innovation”*. The platform has been integrated into the country’s public university centers with a encouraging approach for real potential future growth.

Table 2. OI centers’ opening years.

Location	2018	2019	2020	2021
Bilwi	X			
Bluefields	X			
Bonanza		X		
Las Minas		X		
El Rama		X		
Esteli			X	
Leon			X	
Managua				X
Nueva Guinea				X

4. Discussion

This study aimed to understand theoretical and practical considerations that need to be taken into account when conceptualizing and designing effective shared-value OI platforms aimed at supporting MSMEs in Nicaragua and, more widely, in the Latin American context. The study indicates that OI can be seen as a valuable approach to enable new forms of collaboration, shared-value creation, and the mediation of value distribution on platforms and related ecosystems. The original working notion of the case project is seen to have been validated. We argue that the study results also validate the mixed methods and longitudinal design research approach adopted by the research team in examining the not-well-known, ill-defined, and emerging phenomena of applying OI into the context of shared-value platforms in an emerging economy. Furthermore, we argue that the emergent focus of the study on two key issues, shared value and mediation, allows for the wider question of the application of OI to be put into practice through an externally oriented service provision perspective and more internally oriented mediation. This captures the essential elements of creating value in use, exchange, and context within an SDL perspective. Perceiving services as the dominant form of creating value in the case context was validated through the extensive consultation conducted with the stakeholders.

Noting that equitably shared value needs to be mediated through platform functions, attention needs to be given to overcoming the confidence gap that is present when ideas travel to new places, through extensive exposure and peer engagement in workshop and similar events. While we recognize the importance of informal adaptation and individual perceptions around novelty, we also emphasize the need to codify knowledge, e.g., through the service catalogs and similar process documents that are measurable in terms of their impacts. This also applies to intellectual property that may be generated in the processes. Through the two separate modeling exercises, the service levels related to the platform were identified (Figure 1), noting that the services move from internal management towards enabling entrepreneurial cultures, knowledge transfer, and more formalized business development activities. The results show that a multi-level design of the platform allows the diverse set of service needs of the participating ecosystem actors to be addressed, even within different domains [23,47], through a modular, multi-layered architecture [13]. Furthermore, the application of service-dominant logic [62,65,66] allows for a platform design from the perspective of service ecosystems and the technology that can sustain them [13]. The results also demonstrate that the interactions between actors in the innovation centers work through the definition of services cataloged by levels. The services, in turn, promote these interactions, the satisfaction of needs, as well as the dynamic integration of the resources available to the actors in the ecosystem [17,62].

Similarly, Figure 2 illustrates the relationship between the service and platform models, noting that the management areas of strategy, operation, and innovation form the binding elements that maintain the mediation between the externally oriented services and more internally oriented platform functions. These services need to extend beyond financial dimensions to allow for shared value also from the context of developing the capability, operations, and organizational structure. OI, as a strategy to collaborate around problem solving in MSMEs, has been found to trigger the exchange of resources, including knowledge, between participants, which suggests that this innovation logic reinforces collaboration in the ecosystem and allows actors to participate in innovation, even with limited financial resources [9,22,36]. The role of universities as hubs and as centers of convergence for ecosystem actors helped to configure the foundations of the OI ecosystem around knowledge, building on [15], enabled by a public authority, such as the CARCIP project. These configurations allow the delivery of benefits that go beyond enabling competitiveness, including nontangible benefits such as learning and change in practices. It is worth highlighting that the convergence of factors, such as dynamic resource integration, learning appreciation, the dominant logic of service, and OI, make the designed platforms suitable for environments where resources are scarce and where current ecosystems may be lacking central actors.

The results of the study enable us to propose three generic platform design elements to consider when developing shared-value OI platforms in ecosystems in the context of MSMEs in emerging economies and scarce-resource environments, as shown in Figure 3. We thus argue for the 3A principles:

1. Adopt open innovation as the foundation and strategy for creating platforms or similar structures. These platforms are meant for exchanging knowledge and resources, offering solutions to challenges, and connecting different participants through value propositions. This enables the foundational proposal of value to be created through collaboration and interchange. We note that an implemented platform is not merely a technological artifact but involves the integration of physical spaces, organizations, and a digital space with multiple components, diverse agendas and actors, and varying resource bases [13].
2. Apply service-dominant logic principles to shared-value co-creation in use (e.g., teams), exchange (e.g., organizations), and context (e.g., the ecosystem interaction) to bring together the multi-level services provided to manage the platform, enabling the emergence of entrepreneurial culture, knowledge transfer, and formalized business services. Services can be seen as the tangible and measurable offering and the means of interaction and delivery of value, leading to the identification and dynamic integration of resources to drive innovation. Furthermore, a multi-level design enables the grouping and offering of services aligned with the components of the ecosystem and priorities, sparking the transfer of knowledge and improving products and services.
3. Ascribe the role of focal integrator to universities, research centers, or similar knowledge-intensive service providers (in collaboration with the government) to manage the innovation, operations, and strategy of shared-value platforms in ecosystems. This is especially true in resource-scarce contexts and where central ecosystem actors are otherwise lacking or fully missing. These are the long term organizations where talent is trained, research is conducted, and future wealth is generated through knowledge and skills, and where the mediation of shared value may take place. Furthermore, this systemic emergence can be enabled through the provision of adequate resources and support.

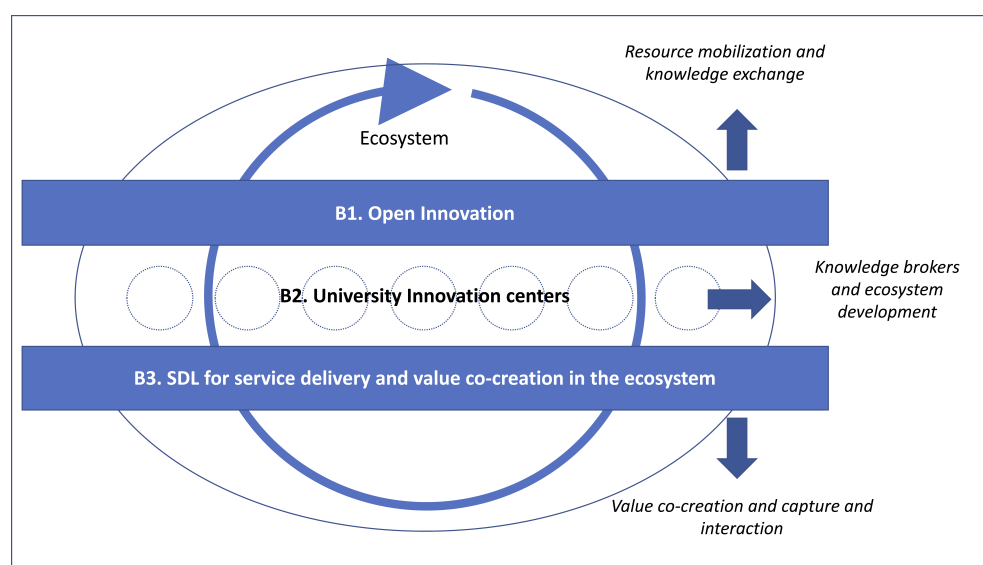


Figure 3. The 3A design blocks.

5. Conclusions

In this paper, we examined a mediated, shared-value OI platform supporting Nicaraguan early-stage entrepreneurship. More specifically, we asked how a platform such as this can be conceptualized and designed to address the needs of MSMEs in resource-scarce environments. Recognizing the multiple challenges associated with

emerging economy contexts and the lack of developed innovation ecosystems, we adopted a dual focus on the creation of shared value and the mediation required to equitably distribute it. The case study demonstrates the challenges that actors have in building up confidence to share and participate while also recognizing the need to support the development of intellectual property rights, to focus on wider-than-financial resources, and to understand the value creation in networks, which involves both competition and collaboration at times. We also recognize the importance of informal peer connections and sharing of knowledge, while making the case that codified knowledge and processes are needed to successfully mediate shared value. We propose that OI practices on platforms become tangible and measurable through services, and we extend the dominant logic of services to underpin value co-creation through use, exchange, and context, in line with SDL. We see platforms providing services through multi-level structures while linking service models with the platforms through the management of strategy, operations, and innovation.

Through the 3As of adopting OI, applying SDL, and ascribing integration, we propose three key principles for setting up and managing mediated shared-value OI platforms. We argue that OI should be the foundation and means of exchanging knowledge and resources, while proposing that SDL serves well as the basis for the creation of shared value, and we further posit that universities and research centers are well placed to act as mediating actors, ensuring equitable value sharing through talent training, research and ecosystem development hubs, and future wealth creation. Despite employing a range of methods in our study, the qualitative approach and the single context present limitations to its theoretical generalization. In order to engage with the complexity of the emerging and as yet ill-defined phenomenon, we applied an abductive, stepwise, and iterative approach to the research at hand, uncovering our findings and insights through an interplay between theory and practice. Moreover, we reached across nine local innovation centers, thus enabling a comprehensive, embedded, multi-case perspective within the wider study. Nonetheless, we acknowledge that the generalizability of such a multi-contextual model remains limited due to the complexities associated with the single case context. Our work explored the incorporation of theoretical elements proposed by service-dominant logic in the implementation of OI platforms embedded in platforms and ecosystems. Future research would be well placed to explore the theoretical and practice implications of the dynamic integration of resources for value co-creation at the intersection of the three fields. Furthermore, acknowledging the limitations of our current study, we propose that subsequent research should direct its attention towards multi-case applications, particularly emphasizing qualitative studies. Further, we posit that an extensive, long-term investigation that meticulously evaluates the ecosystem's impact outcomes would greatly contribute to the solidification of a universally applicable design model.

This paper contributes the proposed 3A principles for setting up and managing shared-value OI platforms. The design elements proposed in the multi-level value creation (Figure 1) and the platform components (Figure 2) may also be useful for scholars and academics as tangible guidance on lessons learned for the development of future OI platforms. The work at hand provides comparative strategies for the development of complex projects aimed at the design and implementation of innovation platforms embedded in ecosystems. This is an important step for practitioners to reduce risks and to make better decisions. Furthermore, we hope it sets valuable future directions in research in the context of knowledge and technology ecosystems in MSME and scarce-resource emerging economy contexts. We have seen that new development strategies that take advantage of the potential of OI and the creation and fostering of shared-value ecosystems are significantly needed. Having said all that, we believe it is appropriate to also update the status of the case country in terms of the Global Innovation Index, which, as of 2022, places Nicaragua at 108th. There have been suggestions that initiatives such as the case at hand have been instrumental in enabling this development. We note that digital platforms are an opportunity for organizations to gain access to the resources they require and to

share those they already have with others. Therefore, it is a priority to create proposals that facilitate technological development aimed at making needed resources and knowledge available for MSME organizations, so that they can prevail and compete in an environment that will continue to become increasingly complex.

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