

Chapter

ACTORS OF RURAL INNOVATION: BAMBOO CRAFT INITIATIVES FROM NORTHEAST INDIA.

*Serkan Bayraktarođlu, PhD**

Department of Industrial Product Design, Kadir Has University,
Istanbul, Turkey

ABSTRACT

The purpose of the chapter is to identify the nature of innovation practiced in rural organizations. Accordingly, this study focuses on the processes of innovation in bamboo craft initiatives in rural territories of Northeast India. The study examines the craft economy in the region and involvement of main actors in the process from making to marketing via tracing the impact of a decades-old successful development intervention. Based on the neo-endogenous development theory and rural capital framework, the chapter investigates distinct business models emerged through a multi-actor intervention. Identification of actors and their roles in the network reveals the four phases of the process of rural innovation.

Keywords: Rural innovation, Bamboo craft, Business models, Product design

* Corresponding Author: b.serkan@yandex.com

INTRODUCTION

Rural territories are facing severe societal and economic challenges such as climate change, unemployment, and urban migration. For decades, development policies using innovative and inclusive approaches to deal with such problems often try to utilize exploitation of human and natural capital. Additionally, an increased number of researches associate innovation and creativity with territorial development. Neo-endogenous development, embracing the advantages of the endogenous approach, emphasizes a hybrid model of creative destruction in which both local and extra-local actors and knowledge are appreciated as crucial factors (Gkartzios and Lowe 2019; Shucksmith 2010; Atterton, Newbery, and Bosworth 2011).

Similarly, rural development policies and practices gradually embody an aspect of innovation aiming to improve wellbeing and to increase potential livelihoods while exploiting and sustaining rural capital. Rural is more a social term than a geographical notation, and innovations targeting rural development often requires a socio-economical perspective. For long, modernization of farming has pointed out and practiced as the means of technological innovation in rural but advancement in agricultural tools and processes was not sufficient enough to overcome complex obstacles faced in development initiatives. With a more comprehensive understanding, the concept of rural innovation should both embrace societal and practical aspects.

Compared to the urban environment, diversity of actors and intensity of knowledge creation are limited in rural, but innovation still exists as an essential element of organizations aiming regional development (Torre, Polge, and Wallet 2019). For instance, the introduction of e-business practices and access to the internet is emphasized as vital for rural as adopting new manufacturing techniques dictated by the changing paradigm of the agricultural industry. Depending on the needs of the region, almost all types of input could be an opportunity for innovation in rural organizations. In the literature,

rural capital is a prominent and comprehensive framework for rural studies (Castle 1998). Thus, it is relevant to examine and investigate rural innovation as a socio-technical phenomenon exploiting and improving rural capital.

From the perspective of rural development interventions, governance of the innovation process is rather complicated than direct infrastructural investments since rural territories are highly sensitive to the severe effects of economic and social changes. The social cohesiveness of small communities dispatched from the center corresponds to the character of rurality. Thus, interventions overlooking social aspects usually miss the opportunity for long-term impacts. Unlike urban communities, rural have their way of dealing with problems that constitute territory-specific tacit knowledge brewed by local experiences. For instance, often rural communities are able to develop things with extreme efficiency in terms of material and energy use. Such embedded knowledge is an important asset for innovation and entrepreneurship. Similarly, using such knowledge and flexibility, entrepreneurs from China, India, Brazil, Indonesia, and many other countries stand out not only due to their accelerated economic growth but also with their small, brave, innovative enterprises, employing new business models without hesitation to compete with the large multinational companies (Bildirici and Bakirtas 2014; Chandler et al. 2002; Sinkovics, Sinkovics, and Yamin 2014).

Rural production is often associated with farming, while non-agriculture products and services criticized for having a low level of innovativeness and inability to answer market needs. Nevertheless, in order to increase the resilience of rural communities, it is rewarding not to limit development interventions only with the agriculture sector. In practice, rural entrepreneurship might have the potential of covering a wide variety of non-agricultural activities. Moreover, due to the diverse effects of climate change, encouraging and supporting alternative income generation activities might eventually improve the resilience of rural economies. Accordingly, contemporary development policies

underline the importance of diversification of livelihood opportunities using knowledge and resources indigenous to the region.

Craft production is still a potential income-generating activity for numerous rural communities. Art and craft practices in rural are often a consequence of the lack of formal economic activities meeting the needs of local communities. Craft making is a centuries-old practice to find local solutions to local problems by employing indigenous resources. In this manner, art and craft in rural is a social and innovative practice. Additionally, handcrafted products occasionally constitute an important part of commercial goods exchanged in an informal rural economy.

Although the act of making is related to the indigenous knowledge, regional resources, and communities; the success of these strategically organized efforts to survive, and in some cases to re-emerge crafts, are linked to their ability to adapt to global markets and contemporary economic structures. Thus, the lack of market knowledge and expertise, the smallness of production in amount and size, absence of right quality materials, limitedness of networking capabilities necessitates the involvement of external actors. To this extent, in a neo-endogenous rural innovation project focusing on craft practice, product design could be a bridging and facilitating factor for enabling the local economy in a global context.

Among many others, India is a noteworthy country for its traditional craft practice glorified for developmental approaches. In India, over 70% of the population lives in rural areas covering over 500.000 villages characterized by extremely different geographical conditions, life customs, and resources (Mehta 2012). Most of these villages are underserved and lack of fundamental needs. In addition to that, non-farm artisanal activities form the backbone of the rural economy. According to the Handicraft Report, approximately 200 million in total, 6,7 million registered artisans live in India with an expected export rate of US \$ 6 Billion in 2017 (Ministry of Textiles 2011). While almost 40% of the rural population is landless, 95% of non-farm rural manufacturers are in the unregistered sector (Das 2015).

Though the craft economy is relatively vivid and diverse in India, the rural population shares developmental challenges similar to other developing countries, such as lack of livelihood opportunities, inadequate infrastructures, lack of accessibility to technology and services. Moreover, Indian artisans, similar to many other artisans of developing countries, are faced with the loss of market share to mass-manufactured products and had to move to urban cities to work as unskilled employees. In India, development policies suggest social, technological, marketing, financial, and infrastructure-related interventions of education institutions aiming to harness the potential of the handicraft sector. However, according to Das (2015), these policies were never successful enough to grow institutional innovation in the rural handicraft industry. Rural handicraft clusters in India usually associated with low-end products with very little innovativeness, which results in poor added value for rural entrepreneurs.

As an example of innovation in rural, appropriate technology had been part of India's development practices in village industries even before the 1930s (Akubue 2000). Mahatma Gandhi, the moral leader and perhaps one of the most influential figures of the country, was the pioneer of appropriate technology with its symbolic spinning wheel, the Charkha, representing not only the ideal appropriate technological device but also freedom and self-reliance or 'Sawadeshi.' Gandhi never underestimated the power of modern industrial production, but he insisted on the effectiveness of small-scale industries compared to mass manufacturing enterprises for fighting poverty in the periphery.

Gandhi's vision on small-scale village industries was an alternative development approach in his time, proposing bottom-up independence, which asserts every village as an autonomous republic (Gandhi, Kumar, and Marsh 1999; Ishii 2001). This paradigm was looking for an endogenous, efficient way of using existing resources and local knowledge. Later, a similar efficiency-oriented innovation approach was named after him; Gandhian innovation. Along the way, India has developed many distinctive ways of novelty including Jugaad,

Gandhian innovation, and frugal innovation. Common point of these approaches is often bringing low-cost solutions to local problems.

Gandhi's self-reliant systems mission was adopted by the National Institute of Design (NID) in 1961; the idea was designing state-of-the-art products using local materials, manufacturing techniques, and labor force (Vyas 1991). Similarly, several government policies have employed local knowledge and artisanship for rural development projects, while management, art, and design schools took their role as catalyzers in these projects. With the close cooperation of UNIDO, ICSID, and NID in 1979; the very first UN conference on design and developmental goals held in Ahmedabad and the famous 'Ahmedabad Declaration on Industrial Design for Development' was published which puts particular emphasis on endogenous capacities and craft-oriented rural manufacturing activities (Chatterjee 2005; Balamram 2009). According to 1989 dated 'Design as a Strategy for Developing Economy' report prepared by International Design Center Bombay (and updated in 2009 with minor modifications to accommodate recent facts and figures) in addition to fostering innovation in the industry, the recognition of craft sector is highlighted as vital for India (IDC and IIT Bombay 1989).

Among all other actors, educational institutions take roles in several projects aiming to revive local resources and knowledge on craft production and to integrate them into modern markets. The bamboo craft intervention conducted by NID at Northeast transcends as a best practice stemming from its historical mission and iconic role in the history of design-oriented development approaches. The bamboo intervention was far beyond simple developmental support by influencing national policies and attracting international funds. The intervention underlined the importance of bamboo as a renewable resource while shedding light upon Northeast India for having vast natural resources and craft skills.

Drawing on the ideas from the literature on innovation networks, social innovation, and rural development, this chapter seeks to explore following questions; (i) how rural innovation is fostered through

relationships of actors and (ii) how knowledge flow could be sustained to foster innovativeness in rural organizations. The purpose of this research is to identify key actors and their roles in facilitating innovation for the development of rural areas. In this manner, the research tries to illustrate how the actor-network is shaped to sustain social and business innovation.

Therefore, this chapter investigates institutional intervention of development policies in a craft-oriented rural economy via tracing the major actors involved in a decades-old successful example conducted by NID in North East India. This chapter focuses on a single intervention, the Katlamara Chalo Initiative, and three business models that emerged. Findings show that inaugurating, as a government-supported strategy, bamboo craft development project in the region, triggered an intensive flow of bamboo-craft know-how and entrepreneurship throughout the country.

By employing a mix of qualitative and quantitative research methodologies to investigate the case, the study initially concentrated on literature, documents, and archives dealing with bamboo intervention in Northeast India. Primary data gathering methods include semi-structured interviews conducted with identified major actors, and participant observations in the field. Findings suggest that business networks, family associations, and educational channels play an essential role in the innovation process. The bifocal nature of rural innovation and four phases of the innovation process discussed in the chapter. Moreover, the role of institutions is underlined as vital for improving social and intellectual capital through knowledge exchange between existing and new actors.

The second part of the chapter visits the literature on innovation in the context of neo-endogenous development in order to conceptualize the interactive process of rural innovation. The systems and network approach to governance of innovation are discussed to illustrate how a network of actors facilitates social and business innovation in rural. The third part of the chapter presents the background of the Katlamara Chalo Initiative as a single case study, also presents the method of

analysis employed in the research. The following part conveys the findings through elaborating on the role of actor-network in the innovation process.

RURAL INNOVATION IN THE CONTEXT OF NEO-ENDOGENOUS DEVELOPMENT

Discussions in development studies are shaped around a quite technical understanding of innovation and economic growth. Rural development approaches frequently emphasize agriculture and forestry centered local resource exploitation processes as means of improving quality of life, increasing employment opportunities, advancing farming practices and procedures, building infrastructures, and introducing new public services. In terms of innovation, urban settings act as the dynamic driver of the national economic growth with industrialized manufacturing establishments and dense consumer markets, while rural areas became technically, economically, and culturally distanced. Urban migration is a common consequence of neglected rural geographies globally. Perhaps, rural markets were never attractive enough for urban manufacturers, although most of the natural resources are located in rural areas.

Criticized for having a top-down approach, creating urban dependency and underestimating the uniqueness of the value embedded in rural, endogenous development approach highlights the importance of the rural capital while making a distinction between local and external actors. Endogenous development seeks a territorial approach based on the locals exploiting regional resources for internal and external markets. However, in a purely endogenous development approach, local entrepreneurs cannot gather any information from urban markets. Although such an approach would increase the efficient use of tacit knowledge and expertise in the use of local resources, consequently, innovation process would become inward-looking and limited in terms of reaching global markets.

The role of innovation in the rural development approaches could be better elaborated within the notion of ‘creative destruction’ which could be conceptualized as utilizing rural capital with the involvement of external actors in transformation process (Chevalier and Vollet 2019; de Fátima Ferreiro and Sousa 2019; Gamito and Madureira 2019; Losada, Gómez-Ramos, and Rico 2019; Rantamäki and Kattilakoski 2019; Madureira and Torre 2019). Every territory has its characteristics consist of distinctive assets, and the rural capital is a comprehensive framework to study them (Castle 1998). The relationship between entrepreneurship and the spatial context is the potential to exploit territory-specific resources, including natural, human, built, and social capital, with the contribution of essential extra-local factors (Bosworth and Atterton 2012; Torre and Wallet 2013).

Development policies trying to link local with global often suggest conduction of multilayer fragments of interventions. Such fragments include facilitating research centers, vocation schools, and other well-tailored institutions responding to the local dynamics; and developing a network of actors aiming to sustain innovation (van der Ploeg et al. 2000). Establishment of such institutions and linking local actors with the network is an innovation for rural territories. Thus, innovation can be understood both as an outcome and driver of creative destruction in rural.

Studies usually underline the importance of commercialization for an invention to be nominated as innovation (Fagerberg 2005), but don’t restrict the process within business organizations (Baregheh, Rowley, and Sambrook 2009), and explain the process as crucial part of entrepreneurship, which drives economic and social change (Reinert and Reinert 2006). Since the 1960s, researchers tested numerous definitions to explain innovation. Taxonomies identify a wide variety of novelties, from technical improvements to nontechnical advancements in marketing, management, and social problems (Garcia and Calantone 2002). Schumpeter (1934) defines four distinct types of innovation as follows: new products, new methods of production, new sources of supply, exploitation of new markets, and new ways to organize a

business. Moreover, with the rise of the service economy and the increased role of information technologies in business practice, new types of innovations were introduced, such as network structures and service channels (Keeley, Pikkell, Quinn, and Walters 2013).

The context of innovation influences the way we conceptualize the term. In a broad view, innovation is a process of making a change to add value and exploitation of new ideas from creation to implementation. Therefore, innovation includes a series of activities, particularly scientific, technological, organizational, financial, and commercial (OECD 1999). Furthermore, according to its context, innovation might be a new but also an existing knowledge introduced into and used in a socially or economically relevant process.

Whether exogenous or endogenous, innovation is the driver of an effective rural development intervention, but it does not necessarily indicate scientific break-through products or processes. The primary goals of the neo-endogenous rural development approach are improving wellbeing and rural livelihoods, building a resilient rural, sustaining socio-spatial justice, and harmonizing local needs while strengthening cooperation between rural-urban and local-global (Gkartzios and Scott 2014; Lowe, Phillipson, Proctor, and Gkartzios 2019). Supporting the multi-functionality of the rural regions, rural capital-driven entrepreneurship as the creation and implementation of new ideas or solutions corresponding to rural problems are distinctive aspects of rural innovation (Sonne 2010). In this manner, rural innovation either stems from extra-local actors to bring solutions for local issues or breed from locals.

As the importance of innovation became more and more evident, development policies have been transformed from pure infrastructure-oriented interventions to approaches underlining importance of network structuring and knowledge transfer aiming to foster innovation in rural areas. Hence, network structuring and knowledge transfer methods used in an urban ecosystem cannot be applied directly to rural organizations. Moreover, top-down approaches to innovation networks may have a negative influence on the development of the region in the long run.

Compared to a rather liberal approach of well-organized urban corporations, in rural careful nourishment and regulation of knowledge flow is required.

In fact, innovation is an integral element of rural life. For the underserved rural population, novelty does not only mean having competitive power or economic growth, but also it is a part of life dealing with the obstacles in resource constraint circumstances. Thus, rural inhabitants have to be creative in using natural and human capital available to them. Often, rural communities have the most efficient and effective ways of solving problems by employing embedded knowledge, which is not familiar in urban life. Local knowledge constitutes knowledge derived from own experiences of rural community, knowledge received from earlier practitioners, and knowledge gathered from external sources (Knierim et al. 2015).

In order to invest in rural capital through innovations, different forms of local knowledge need to be translated between actors of the network. Employing diverse forms of rural capital is very much dependent on the quality of social networks in the utilization of these resources. Thus, social capital is emphasized as an informal norm to foster cooperation since employing diverse forms of rural capital is very much dependent on the quality of social networks in the utilization of these resources (Woolcock and Narayan 2000; Bosworth and Atterton 2012). Furthermore, whenever rural innovations utilizing local knowledge lose their connection with the region's core social necessities, they are prone to institutionalization and they become vulnerable to bureaucratization (Moulaert, Martinelli, Swyngedouw, and Gonza 2005). In this manner, it is necessary to discuss rural innovation with both social and business perspectives.

SOCIAL INNOVATION AS A BRIDGING CONCEPT

Rural development approaches focusing solely on economic growth through innovation and entrepreneurship, without investing in the social

pillar of sustainability, would not increase the overall wellbeing. In this manner, social innovation could work as a bonding element between business innovations and the social needs of rural life. Social innovation is defined as a new idea or a better alternative which is more efficient or more sustainable than existing (Hubert 2010), that addresses unmet social needs and problems (Howaldt and Schwarz 2010; Murray, Caulier-grice and Mulgan 2010; Phills, Deiglmeier and Miller 2008; White 2008). The term social innovation usually discussed in four characteristics:

- Intending common good (Mulgan 2012; Phills et al. 2008; Pol and Ville 2009)
- Aiming behavioral change (Jegou and Manzini 2008)
- Having a social purpose (Cajaiba-Santana 2014)
- Meeting unmet needs (Cajaiba-Santana 2014; Phills et al. 2008; Pol and Ville 2009)

However, those characteristics do not reveal a clear path for identification of a social innovation. Attempts to draw a contrast between social innovation and profit-seeking nature of business innovation focus on the impact on the quality of life. The literature stresses that in comparison to pure business innovations, genuine social changes do not focus on needs that can be satisfied by market structure, instead, usually focus on the type of requirements that are under-investment in free-market society (Borzaga and Bodini 2014; Pol and Ville 2009). All business innovations also, if not aiming, are capable of improving the quality of life who are consuming those products or services. In this perspective, describing pure business innovation or genuine social innovation becomes problematic.

Moreover, conditions of a free market economy are much more attainable to various shades of bifocal changes having both business and social purposes (Pol and Ville 2009). While commercial innovations are developed for competitive expectations, social innovation is developed and bred by society to have an impact on their

problems. Thus, the community is the innovator and receiver of the positive influences of the innovation. Social innovation usually tackles the conflicts stemming from the traditional welfare system and development model based on two actors; market and state (Borzaga et al. 2012) to heal the burden of unsustainable development practices (Seelos and Mair 2005).

In the context of regional - rural development, pure social innovations usually occur through the intervention of governments, NGOs, or corporate social responsibility projects. However, such interventions might be unsustainable if the primary impetus shifts its intentions. Coupling pure social innovations with livelihood opportunities, such as bifocal innovations, and tailoring according to the needs of local communities, could be a valid strategy to sustain the positive effect. In this perspective, social innovation could be defined as a structuring concept and a bonding element for engaging people in rural development strategies through supporting people's ability to develop sustainable structures, mobilization of endogenous potentials to outweigh different interests, and strengthening regional identity. For instance, Butkevičienė (2009) identifies nine possible social innovation themes in the rural context, which are:

- New services
- New education courses for rural people
- New ways of farming such as ecological farming
- Formation of local action groups
- Electronic social innovations; public internet access points, digital promotion and advertisement
- The change in attitudes
- Consolidation, community development, making things together
- New knowledge for making a profit
- Environmental protection, new organizational forms, and improvement of life quality

The list of social innovation themes mentioned above includes both tangible and intangible solutions that might emerge through pure social and bifocal innovations. Moreover, introduction of such social innovations fosters business innovations too. For instance, availability of public internet would help craft community to reach and understand needs of external markets; new manufacturing courses and financial services improve capabilities.

In sum, the nature of rural innovation is (i) bifocal for combining business and social perspective, (ii) neo-endogenous for bridging local and extra-local actors in a network, (iii) vernacular for exploiting territory-specific capitals and knowledge while wisely transferring external knowledge, (iv) interactive as the innovation occurs through the relationships of actors. In this manner, the process in rural needs to be investigated by analyzing the governance of innovation, which includes interactions and relationships between actors, why and how the networks are form, and how roles of actors are transformed over time.

INTERACTIVE PROCESS OF RURAL INNOVATION

The way we illustrate the process of innovation has changed a lot since the 1950s. In the beginning, the innovation process has explained and studied as a linear process triggered either by technological push or market pull, subsequent models embrace the importance of non-linear interaction of various actors and milieus (Marinova and Phillimore 2003; Rothwell 1994). One of the significant streams of innovation research, the 'Systems of Innovation' approach, underlines the critical role of networks and institutions. In the systems of innovation concept, coordination and collective action of actors are the main enhancers of the interactive process of change (Torre and Wallet 2013). Both individuals and organizations, such as firms, universities, research institutes, and governments, are acknowledged as potential actors interacting in the system. (Balzat and Pyka 2006; Fagerberg and Srholec 2008; Galanakis 2006; Godin 2009).

Additionally, concepts of industrial districts, regional innovation systems, and innovation milieu recognize an evolutionary process of innovation, which is based on general creative know-how and competence executed by actors from local organizations and regional clusters (Marinova and Phillimore 2003; Moulaert and Sekia 2003). The emphasis on proximity in the innovation process is stemmed from the ease of contact and availability of built trust between actors, which reduces uncertainty in the development of new technologies and proves to be a catalyzer of tacit knowledge exchange. Moreover, knowledge spillover breed by local innovators facilitates neo-endogenous entrepreneurship activities and helps the development of regional clusters (Kesidou and Szirmai 2008).

According to Murdoch (2000), in rural development, vertical networks simply emerge between producer, consumer, and suppliers. Hence, horizontal connections emerge among local producers. Effective translation of knowledge between the actors of a vertical network would support market-oriented innovations. Nourishing knowledge flow in horizontal networks enables opportunities for learning and experimentation while fostering resilience. However, this chapter considers rural innovation as an interactive process involving a network of actors, including local and extra-local entities interacting with each other in order to develop new products, processes, services, organizations for economic or social use, which eventually creates benefit for locals as well as non-locals. Developmental benefit for locals could be either the goal of rural innovation or byproduct of the process. It is necessary to analyze the governance of innovation as interactions and relationships between actors by answering following questions: why and how the networks are formed, and how roles of actors are transformed over time.

Butkevičienė (2009) identifies three levels of actors which are (i) governmental-administrative level, (ii) customer level, (iii) local community level. While local community level actors help generation, coordination, maintenance, and promotion of innovations, customer level actors show interest and financial support. In such a system,

governmental-administrative level actors sustain political and economic support to contribute to the governance of the innovation system. Among all, vernacular expertise is highlighted as place-based expertise enriched with external sources and negotiations focusing on rural capital (Lowe et al. 2019). Vernacular expertise plays a crucial role in knowledge translation, especially in vertical networks.

Rural innovation is not a linear or mechanical process, and the efficient translation between actors remains as a crucial determinant of success. Recent studies stress the importance of the broker of a network (also mentioned as intermediaries or facilitators) as a person or an organization having an essential role in the innovation process (Klerkx and Gildemacher 2012). Brokers often facilitate the process and translation, instead of directly contributing to the production or dissemination of innovation. Innovation brokers might be a public or private organization with a unique skillset of brokering functions listed below (Heemskerk, Klerkx, and Sitima 2011; Klerkx and Gildemacher 2012).

- Facilitating the engagement of stakeholders
- Development of shared language and meaning
- Linking and strategic networking
- Articulation of the need of innovation
- Management
- Technical backstopping
- Capacity building
- Mediation
- Advocacy
- Learning and documenting
- Championing

In order to grasp a better understanding about the roles of brokers in a macro perspective, it might be helpful to discuss a biological term, 'ecosystem'. An ecosystem is defined as a sum of complex relationship

structures in which a sense of community exists, nutrient and energy cycles occur between stakeholders. Similarly, innovation ecosystems are a comprehensive concept to observe the diverse stakeholders fulfilling distinct functions to facilitate innovation (Hautamäki 2010) and brokers help facilitation of the ecosystem. Often, the strength of the interaction in networks, diversity of actors, and feedback loops are critical features of an ecosystem. It is necessary to observe the ecosystem as a macro entity, while actors, networks, and their relationships are recognized as micro-entities of the system.

KATLAMARA CHALO INITIATIVE

Located at Tripura, Katlamara is a small village known with bamboo plantations and bamboo craft practice. China, Bhutan, Bangladesh, and Myanmar surround the region where the only connection with the rest of the country is a narrow corridor called 'the chicken's neck'. The village itself is located at the border of Bangladesh. The physical disadvantage of the region brings geopolitical and emotional isolation, which were addressed by the Indian government in 1991 with the 'Look East' policy nominating the region as a probable gateway to Southeast Asia (Gangte 2011). While low urbanization and below the country average income levels demonstrate the main obstacles; significant assets of the region are the large bamboo plantations and bamboo craft traditions. Katlamara Chalo Initiative, constitute the main scope of the research while all actors identified in the study were once a part of the development interventions conducted in this village.



Figure 1. Location of Katlamara village on the map of India.

Underlining a severe imbalance created by government-oriented development processes and region's traditional products, skills, and techniques which were mostly used to satisfy the daily needs of local communities; 1999 dated UNDP report points out the potential of pro-poor entrepreneurship based neo-endogenous development strategy (Ranjan 1999). Proposed action scenarios mentioned in the report call participation of local agencies and government for the implementation

of development plans. The report underlines 'Farm to Market' strategy as region-specific strategies and operations including:

- Supporting sustainable bamboo cultivation
- Conducting training and workshop programs for local people to facilitate their entrepreneurship
- Creating, supporting and managing craft clusters
- Promoting, consolidating and strengthening the value chain
- Expanding the production base and improving returns for all stakeholders
- Facilitating marketing activities

The report identifies bamboo craft as the strength of the region and a possible leverage point for the development of entrepreneurial attitude. Not surprisingly, during the early 2000s Indian government observed bamboo as a key for national developmental strategies. At the same time, the National Mission on Bamboo Technology and Trade Development pointed out as a part of the multi-disciplinary bamboo development network (Ministry of Agriculture Government of India 2005). 1999 dated UNDP report was a conclusion of decades-long intensive fieldwork and accumulated tacit and implicit knowledge in regards to the region. Thus, this study identifies the report as a milestone in the process.

Playing a critical role in initiating and governing the process, NID Outreach Program had a closer relationship with the region since then. The conceived strategy helped to reform the functions of the Bamboo and Cane Development Institute (BCDI), which was set up in 1974 by Development Commissioner of Handicrafts, Ministry of Textiles, and Government of India. A vital concern of BCDI is empowering people through enhancing bamboo handicraft skills in order to generate self-employment. Tripura Bamboo Mission (TBM) launched by the Government of Tripura in 2007 is another local institution facilitating rural entrepreneurship and supporting the marketing of bamboo

products such as baskets, incense sticks, mats, decorative objects, and furniture (TBM 2014).

Despite its higher market value, a limited number of artisans worked on bamboo and cane furniture craft due to its sophisticated manufacturing processes and lack of design know-how. Moreover, cane furniture designs were simple repetitions of a few common archetypes. Thus, Katlamara Chalo Initiative intentionally emphasizes furniture craft targeting external markets.

THE METHOD OF ANALYSIS

The research discussed in this chapter is revised version of a part of the Ph.D. study held in India for five months between 2013 to 2014 (Bayraktaroğlu 2014). This chapter focuses explicitly on single intervention and examines the major actors, their roles, and relationships in order to identify the innovation process. The case study method was employed to investigate the innovation network that emerged through the Katlamara Chalo Initiative since it is an appropriate way to convey the complexity and unique nature of a phenomenon (Stake 1995). In order to identify actors, their roles, and relationships in the innovation ecosystem, both qualitative and quantitative data were used. Data collection methods conducted in this study constitutes (i) face-to-face semi-structured interviews with key people of the projects, (ii) archival research at the libraries of NID and other organizations related to the initiative, and (iii) personal observations.

The research focuses on organizations initiated or engaged following the development intervention in order to identify emerged business and social innovations. Among all NGOs, Self Help Groups (SHG) and commercial organizations, according to their organizational models and distinct relationships of actors, three cases were selected (SHG1, C3, and C4) as sample business models for the two-phased analysis. The first phase includes a micro-level analysis, in which

chosen three organizations were investigated in detail to explore their business models and their relationships with other actors. The micro-level analysis of organizations involves four steps using three different tools to explore the strategies, activities, and other components of business models.

Hence, each case is part of a complex social system, which should be analyzed with a macro-level perspective. In this sense, mapping is an excellent way to visualize a system, its actors, and their interrelationships. In the second phase, gathered data and knowledge derived from the first phase of the analysis iteratively used for illustrating the relationships of actors at the macro level.

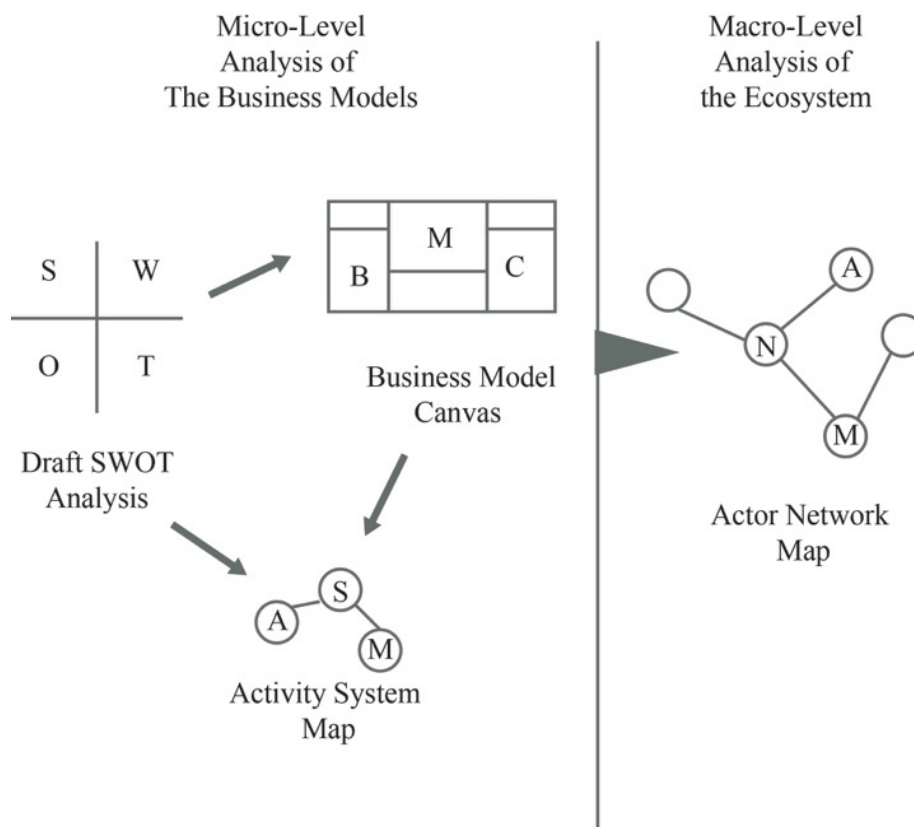


Figure 2. The Data Analysis Process.

For the micro-level analysis initially, a SWOT analysis was conducted to identify each organization's strategic position through their strengths, weaknesses, opportunities, and threats. Afterward, the Activity System Map (ASM) and Business Model Canvas (BMC) were employed to investigate each organization.

Business Model Canvas scheme is a prominent tool to gather an in-depth understanding of an organization. While Osterwalder and Pigneur's (2011) canvas is quite useful to show valuable assets on one chart, it lacks information concerning the business processes. On the contrary, many other approaches concentrate on processes to represent a business logic, such as the Board of Innovation's business model visualization toolkit (Board of Innovation 2014). The toolkit portrays the relationship between actors through financial, material, and service flows, which are similar to system maps used for representing Product Service Systems (PSS) (Manzini and Vezzoli 2003). Such relationship maps were frequently used by researchers from different disciplines to manifest actors, activities, relationships, and processes as a system (Casadesus-Masanell and Ricart 2010; Kwon, Lee and Hong 2019; Porter 1998). Activity System Map (ASM) as a visualization tool facilitates observing conflicts and compatibility between strategies and actual activities easier than the canvas. Thus, in addition to the BMC, ASMs were illustrated as a complementary tool for understanding each case.

Nevertheless, understanding a complex phenomenon demands a higher level of analysis than exploring sub-systems in an isolated way. Often actors change their roles in a different stage of the network. Using the logic behind PSS maps illustrated by Morelli (2007), the actor-network map was developed to grasp a holistic view of the bamboo innovation network.

ACTORS OF THE INNOVATION NETWORK

Four Phases of the Intervention

The success of the Katlamara Chalo Initiative highlights the role of a design institution involving proactively in a mission targeting the rural community of Northeast India. The intervention is a top-down to bottom-up development approach shaped with the strategies stressed in the milestone report. The formulation of the strategy exhibits the facilitation process of rural business models while enabling both social and business innovations. The research identified the following categories of actors playing critical roles in the initiative:

- Intergovernmental development agencies and governments: UNDP, UNIDO, Government of India, Government of Tripura
- Local development support organizations: BCDI, TBM, IL&FS
- Education and research organizations: NID (Outreach Program and Center for Bamboo and Cane Initiatives), CEPT (DICRC), NIFT
- NGOs: Eklavia and TBDC
- Self Help Groups: SHG1, SHG2
- Enterprises (commercial or social): C1, C2, C3, C4
- Master artisans: A1, A2, A3, A4, A5
- Students: S1, S2
- Professors: P1, P2
- Activist: A1

NID Outreach Program has two apparent purposes in Katlamara Chalo Initiative; facilitating industrial design education to enrich students' understanding and capabilities, and supporting the mission of rural development of India. The network formation and changing roles of the actors point out that the influence of intervention grows beyond educational purposes. Furthermore, the bamboo craft ecosystem

encourages students, artisans, professors, and other actors to participate as entrepreneurs. Figure 3 illustrates key actors and their relationships within a reasonable timeframe.

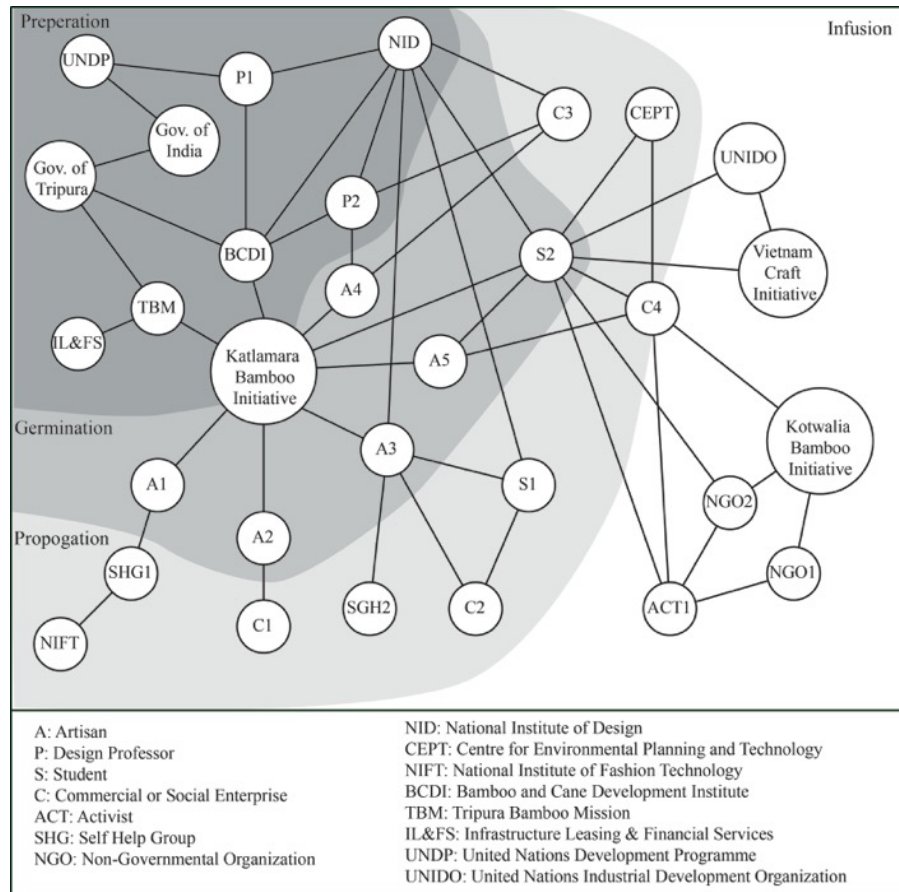


Figure 3. Katlamara Chalo Initiative – Actor-Network Map.

The map reveals that intervention process composed in four phases; preparation, germination, propagation, and infusion. The preparation phase constitutes all efforts concerning with building the context of the intervention, such as (i) accumulating and translating tacit and implicit knowledge about the region, (ii) conducting design experiments, market

researches, craft documentation, and ethnographic researches, (iii) and formulating implementation strategies and development policies according to the political and economic climate. The initial network is set between governmental actors, intergovernmental actors, and NID authorities.

The richness of the pre-intervention phase is expected to positively influence in the potential success of the intervention but does not guarantee a victory since the process entirely depends on the actors and their relationships. The first phase includes the translation of knowledge derived from various resources and domains. Based on the capability of the actor(s) playing the strategist role, the formulation process might continue ceaselessly. Eventually, this phase ends with the identification of the intervention strategy, including actors and resources.

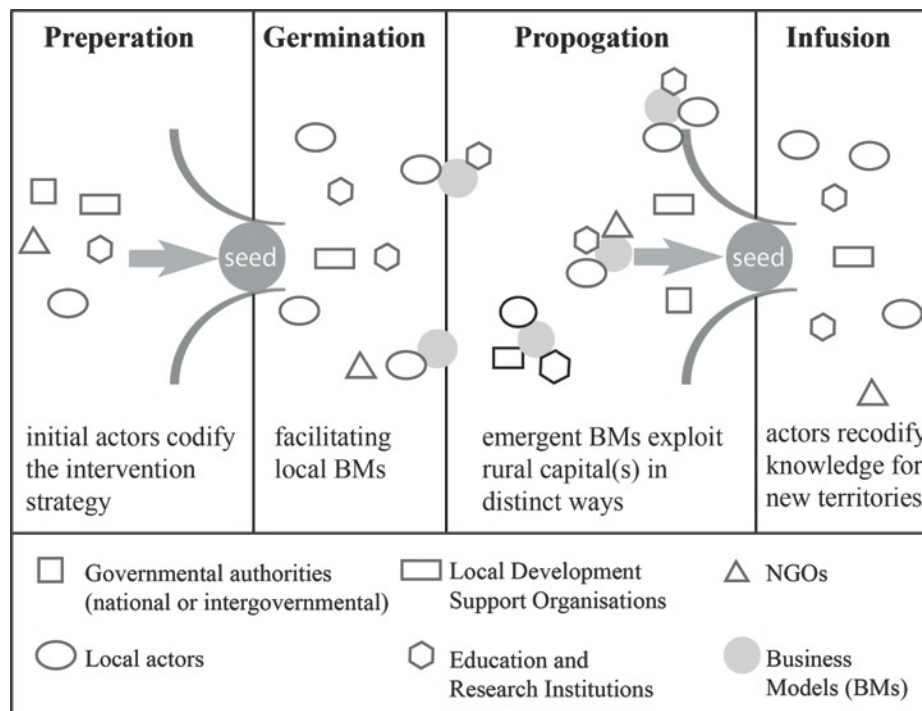


Figure 4. Four Phases of the Intervention.

The first phase is like preparing seed balls to be initiated on appropriate grounds. A seed ball often stores seeds in its core covered with a mixture of materials, including clay, fertilizers, and other components aiming to protect and promote seed for germination. Moreover, a seed ball provides enough nutrients to keep seeds to grow for a short period of time without any ingredient gathered from the location. In the case of the Katlamara Chalo Initiative, the seed represents business models designed to carry the DNA of future organizations exploiting rural capital. However, in the absence of the available components, actors, and their network, a business model remains as a conceptual idea. In this case, availability of UNDP support, attachment of initial actors, transformation of institutions, developed appropriate manufacturing methods, tools and facilities act like a mantle, which protects the business model in the beginning, and provides enough material to be exploited for initial growth. Seed balls can be carried away with other actors of the ecosystem. Similarly, bamboo craft-based business models that emerged in Katlamara village spread around the country. Moreover, a nutrient-rich fertile external cover of the seed ball also helps germination of other types of plants existent hereabout.

Accumulated knowledge concerned with the region, local communities, bamboo plantation, and craft traditions constitute the background of the farm to market strategy. Then, during the second phase of the impact, a well-elaborated strategy is germinated in Katlamara village with the support of all actors and institutions. It is possible to claim that industrial design professor P1 (M.P. Ranjan), was the primary strategist and innovation broker of the mission until this phase by establishing the relationship between UNDP, Government of India, and NID (Outreach Program and CFBI).

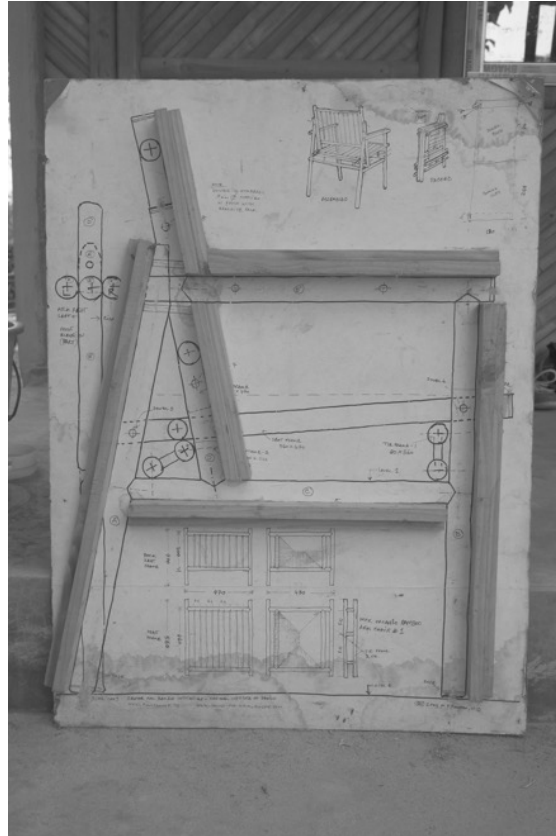


Figure 5. Drawings Preserved from the Initial Workshops. Bamboo Chair Designed by and Named After P1, SHG1, Agartala.

The ecosystem involves various innovation brokers, but throughout time, P1 acts as an initial catalyst for interaction and plays almost all of the brokering roles. Hence, the following roles stand out as the prominent values P1 adds to the network:

- Documenting learning (and researching): NID and P1 as the key actor carrying the farm to market strategy, built the context of interventions through documenting decades-long systematic research concerning with the region

- Strategic networking: Linking government, local institutions, and intergovernmental development agencies for a bamboo-based rural development strategy
- Articulating the need for the innovation: Not only technical innovations aiming to improve the tools and techniques for manufacturing bamboo but also articulating the social innovations missing in the region, including livelihood opportunities
- Championing: P1 became an iconic and exemplary person for other academicians, students, and even for artisans who are willing to overcome obstacles of rural life through craft-oriented business models fostering neo-endogenous development. Moreover, his loyalty-free furniture designs delivered to the region are still called with his name around the country
- Advocacy: P1 advocated his development strategies around the country through lectures, websites, publishing, and meetings
- Enabling entrepreneurship: P1 supported artisans with loyalty-free furniture designs; appropriate tools, and techniques for bamboo manufacturing; and even business models for potential start-ups

Significant components of the intervention include; supportive national policies, financial support of an intergovernmental organization, willpower of the state, availability of rural capital, enabling know-how of local institutions, and knowledge accumulated through researches. In 2001, BCDI was transformed according to the strategies illustrated at the Bamboo Mission Report. It is possible to claim that BCDI was the key actor of the second phase, germination, in which the planned intervention strategy was actually conducted. This phase represents the operational efforts including (i) capacity-building activities for locals, (ii) facilitating local and external actors to initiate in the network, (iii) improving quality and quantity of resources, (iv) developing and disseminating innovations related to manufacturing methods, tools and processes, (v) marketing of local products, (vi)

introducing and adapting bamboo craft-related business models. In the second phase, BCDI outstands as the key actor enabling the process.

Transformation of BCDI into a research, experimentation and training hub improved the capabilities of local artisans. On average, 80 artisans were trained each year based on a three to six months long curriculum formulated and supported by NID (Ranjan 2004).



Figure 6. Bamboo Craft Trainings Conducted by BCDI, Agartala.

The idea was not only about increasing the capabilities of local artisans concerning bamboo craft, but also about connecting them with university students and other professionals in order to foster entrepreneurship. Thus, students from different cities were also a part of the training and workshops through internships, which allowed them to understand the region and find potential product innovations. Frequently, workshops were attracting various individuals, which allows network formation for further business opportunities. Product and process innovations derived through the works of BCDI include

extending the use of bamboo in various forms, including weaving fibers, flattening, block-printing, coal production, and furniture making. In this manner, the primary functions of BCDI as an innovation broker include:

- Facilitating the engagement of stakeholders including engineers, researchers, and higher education institutions
- Technical backstopping for bamboo crafting tools and techniques
- Capacity building through intensive and systematic trainings held at BCDI
- Articulating the need for innovation in terms of advancements in bamboo cultivating and manufacturing techniques
- Supporting the dissemination of innovation. Most of these innovations were well documented and disseminated throughout the country via printed materials, videos, workshops and training programs (Ranjan et al. 2001)
- Improving rural capital. In addition to the product innovation, bamboo and cane plantations were improved with the immersive researches related to the bamboo cultivation at BCDI

Prior to the intervention, bamboo was a common material for the locals, and almost everything was made of bamboo, but value-added products targeting urban markets were missing. Workshops were a chance to get information about urban markets for locals. Established in 2007 with the facilitation of Delhi based finance company IL&FS, TBM focused on the marketing guidance for local bamboo artisans. While BCDI often conveyed a resource-based endogenous approach by improving the capabilities of artisans, TBM concentrated on a market-oriented entrepreneurship approach and clustering efforts. The institution gathers internal and external market demands and supports artisan communities with design expertise, process management, and promotional activities.



Figure 7. Bamboo Craft Trainings Conducted by TBM, Agartala.

The Katlamara Chalo Initiative fostered the establishment of numerous bamboo craft-related organizations, six of them identified and illustrated on the actor-network map. Fostering bamboo-craft based rural business models was one of the major aims of the intervention, which represents the third phase of the process, propagation. As mentioned in the previous section, in order to have a better understanding of how innovations emerged in this phase, three organizations were further investigated based on their business models.

As a social business model, SHG1 was founded in 2004 by a BCDI trained local artisan, A1 (Manna Roy) in the Katlamara village. Since then, SHG1 have helped training local artisans, created employment for them, supported them with bamboo manufacturing facilities including appropriate tools and machinery. SHG1, similar to other local organizations, uses product innovations initiated by BCDI but continues to innovate new products and manufacturing processes. Moreover, having a manufacturing facility, bamboo nursery and a guesthouse for

visitors; SHG1 acts as a laboratory for designers from all around the country willing to be a part of the network such as students from National Institute of Fashion Technology (NIFT).



Figure 8. SHG1 Bamboo Workshop, Agartala.

SHG1 connects local products with the national market through the website, follows market trends, and gathers demand from hotels and architecture firms. A1 is also the founder of the local charity organization, which financed the establishment of the first English primary school in the village next to the manufacturing facility A1 contributes to the development of the village through several social innovations including

- Founding the SHG1 as a local action group
- Creating training and employment opportunities for local artisans
- Providing manufacturing facilities for locals

- Facilitating foundation of a charity organization which initiated establishment of the first English primary school at the village (Kathia Baba Mission School)
- Improving initial loyalty-free furniture designs
- Developing new joints for furniture manufacturing
- Investing in a borax treatment facility that improves the village's manufacturing capability
- Opening the manufacturing facilities and guest house to students all around the country for training and experimenting with bamboo craft
- Connecting local producers with external markets through ICTs

As a market-oriented business model, C3 was founded by P2 (Sandeep Sangaru), who was a design professor at NID and worked with BCDI for training local artisans. Based on his experience and compassion on traditional crafts, he was invited by P1 to be a part of the network. Due to his creativity and expertise in using unconventional forms made of bamboo, eventually P2 became a design celebrity. He globally advocates the survival of artisanship and the use of bamboo as a contemporary and renewable material in furniture making.

Moreover, collaborating with various artisans all over the country, P2 conducts product experiments by mixing materials and manufacturing techniques derived from various craft traditions, including bamboo works, wood carving, and metalworking. In this manner, it is possible to claim that P2 proactively fosters product and process innovation and builds the showcase for contemporary use of craft in furniture making. Innovations delivered in the ecosystem by the contribution of C3 as follows:

- Improving the contemporary image of bamboo furniture in global markets through the creative use of material
- Developing innovative products through experimenting with various crafts and manufacturing techniques

- Introducing artisans to craft techniques unfamiliar to them, thus, improving their capabilities
- Facilitating internships and supporting graduation projects of design students willing to experience craft practice
- Strategic networking for innovation and experimentations



Figure 9. Bamboo Furniture Designed by P2 at His Workshop, Bangalore.

Among all, one actor pushes the boundaries of the third phase and move to the next stage described as the infusion. The fourth phase represents actors utilizing and re-coding the knowledge and experience accumulated within previous phases, as a novel and tailored strategy implanted seed ball to be initiated in a new territory. Every territory has its distinct layers of economic, social, and environmental problems and opportunities. Thus, gathered strategies required to be formed according to the needs of the new realm.

S2 (Rebecca Rubens) is an inspiring innovation broker and strategist of the network who had been in contact with the Katlamara community since her graduation project during her studies at NID. Following her graduation, she collaborated with an activist (A1) to establish the NGO1 and the commercial enterprise (C4) for supporting the sustainable development of the Kotwalia community. Located in another part of the country, the Kotwalia was fighting poverty due to a lack of livelihood opportunities and misleading rural policies. In this case, it is possible to claim that S2 reforms the initial strategy embedded in the Katlamara bamboo intervention based on her own experience and invaluable contribution of A1 derived from her expertise in the field of developmental problems of rural India. As claimed by S2, C4 is a social enterprise collaborating with two NGOs, and as expected often acts as a stage of bifocal innovations including:

- Contributing research and documentation related to bamboo craft, preservation of traditional culture, and rural development
- Development of labor-intensive technologies that support employment in Kotwalia community
- Skill and capacity building for rural communities through training and workshops
- Linking local production with the market knowledge
- Supporting students for their work on bamboo and rural development projects
- Conducting bamboo craft workshops at CEPT (DICRC)

- Developing neo-endogenous strategies for another UNIDO to be implemented in craft economy of Vietnam

S2 extends the typical boundaries of a traditional commercial enterprise and experiments her way of social business which she calls as the Rhizome approach (Rubens, Brezet, and Christiaans 2010). The Rhizome framework seeks indigenous knowledge to be exploited by design interventions aiming to stimulate sustainable value chains. During this research was conducted, in addition to the social business interventions, S2 was working on her Ph.D. research. Moreover, the scientific knowledge produced through her studies opened new horizons for the network. Her role at the UNIDO project in Vietnam introduces a new dimension to the ecosystem. The intervention planned for Vietnamese artisans includes creating methods and tools for organizing trade activities in a more fair and supportive condition for rural artisans.

Such efforts represent the fourth phase of the intervention project; the infusion of learned lessons are codified as strategies to be conducted in other territories and geographies. In this phase, local knowledge and the experience derived from the development intervention spilled over to new problem realms. Moreover, S2 nourished the ecosystem by engaging a new research institute (CEPT) into the network. Breeding the network with students as new actors of the innovation process increases the novelty potential.

Governance of the Network

The bamboo craft ecosystem represents how actors and their relationships reinforce the system through the dissemination and transformation of embedded knowledge. The establishment of social and commercial enterprises cultivates social innovations and fosters neo-endogenous development in rural India and beyond. The process of innovation in the bamboo craft network follows four phases in which

the initial strategies, knowledge, and roles of actors transformed at each level. The roles of each actor category are summarized in Table 1.

Table 1. Category and roles of the actors

Category of Actors	Roles
Intergovernmental agencies and national governments	funding, management, strategy development
Local development support organizations	capacity building, technical backstopping, linking strategic networks, innovation promoter, innovation disseminator, facilitating interaction
Education and research organizations	strategy development, championing, innovator, linking strategic networks, documenting and learning, analyzing context and articulating demand
NGOs	documenting and learning, analyzing context and articulating demand, mediation
SHGs	facilitating collective action, empowerment of locals, employment opportunities for the community, triggering social innovations
Emergent enterprises (commercial or social)	empowerment of locals, employment opportunities for the community, triggering social innovations, innovation dissemination, craft promotion

The governance of the network depends on the types and roles of actors, their interests, and coalitions. During the initial phase of the intervention project, direct but strong ties between actors representing the density of the network, are vital factors for governance. In this relatively less crowded state of the network, the translation of knowledge accumulated at each domain is crucial for building effective development strategies.

The research indicates that the involvement of new actors into the network at the second phase creates a rich brainstorming environment where learning, researching, and making occur asymmetrically. The territory itself acts as a laboratory that facilitates and receives benefits of innovations. Students sometimes stay in the village for months due to their product design projects. Such visits often alter students' understanding of the region and improve their practice in the utilization of bamboo as a material. Learning by doing also creates strong bonds between collaborating actors. At this stage, one of the most critical obstacles in front of creating novel and mutual knowledge is the dissimilarity of language derived from the roles of actors. In this manner, spending enough time in a collaborative work fosters developing mutual trust and meaning.

Social and commercial enterprises that emerged in the second phase of the intervention exploits product innovations and trust built between actors. The introduction of new manufacturing tools and methods such as bending territory specific Kanakkaich bamboo shoots with heat treatment extends the everyday use of bamboo as a resource in furniture production. Similarly, the establishment of local action groups, charity organizations, and educational institutions serving locals are examples of investment in social capital embedded in the territory.

An increase in social capital, diversification of actors, availability of natural and financial resources, access to loyalty-free product designs and manufacturing tools set the ground for local entrepreneurs. Noticeably, similar to urban examples, the success of rural businesses lies in their capability of innovation. Three enterprises elaborated in this research keep their hunger for innovation while C1 falls short of delivering novel products to the market. In contrary to other business models, C1 is not a part of diverse actors, which might be the reason behind the lack of innovativeness.

The knowledge spillovers occur through an increase in relationships built with new actors. However, the fourth phase can only occur with a dramatic change in the roles of an actor such as the case of S2. In addition to the enterprise exploiting gathered bamboo craft know-how

as a student, she collaborates with the activist A1 to adopt the strategy developed for Katlamara Chalo Initiative to new territories. In this case, the sociopolitical discourse and the field experience provided by the engaged NGOs have crucial contribution in sustaining the link between economic and developmental goals of Kotewalia interventions.

CONCLUSION

Rural areas in developing countries suffer from urban migration, global warming and depletion of natural resources. However, indigenous knowledge embedded in rural can be an asset for local enterprises targeting competitive markets. Innovation is integral part of entrepreneurship and success in contemporary markets. Yet, rural areas have their own characteristic process of innovation.

The governance of rural innovation in Kalamara Chalo Initiative depends on crucial roles played by well-known design education institutions (NID and CEPT), bamboo producers, professionals, and development associations, intergovernmental entities, and public administration organs. Tools and practices of designers of the ecosystem proved to help companies for overcoming uncertainty at the fuzzy front end of innovation. The sustainability of the bamboo craft innovation is conducted with the vital roles continuously played by new designers entering in the network.

A multi-actor and multi-phase innovation ecosystem involve formal and informal institutions governing the innovation process. Actors play a set of roles in the network, and relationships among them constitute a unique governance system related to the innovation processes. The intervention process reveals the bifocal nature of rural innovation constituting novel products, manufacturing methods and processes, and social innovations such as local action groups, charity organizations, education institutions, rural livelihoods, ICT services.

The analysis highlights that while bamboo production and fundamental craft know-how are territory-based assets, the initial

transformation of rural capital is a collaborative work of local and extra-local actors. The four phased intervention process constitutes various combinations of actors collaborating in business models exploiting rural capital distinctive ways.

Having a better understanding of the rural innovation would help policy makers to tailor efficient and effective intervention projects. Moreover, increase in the availability of advanced technologies and internet, bring new possibilities for diversification of rural livelihoods through creative destruction.

Acknowledgments

The research presented in this chapter is a part of author's PhD dissertation titled as 'Investigating design for social innovation through business models in Rural India: A model proposal for developing countries', which was submitted to Istanbul Technical University in 2014.

In loving memory of India's design guru, Prof. M. P. Ranjan.

REFERENCES

- Akubue, Anthony. 2000. "Appropriate Technology for Socioeconomic Development in Third World Countries." *The Journal of Technology Studies* 26 (1): 33-43. doi:10.21061/jots.v26i1.a.6.
- Atterton, Jane, Robert Newbery, Gary Bosworth, and Arthur Affleck. 2011. "Rural Enterprise and Neo-endogenous Development." In *The Handbook of Research on Entrepreneurship in Agriculture and Rural Development*, edited by Gry Agnete Alsos, Sara Carter, Elisabet Ljunggren, and Friederike Welter, 256–80. Cheltenham, England: Edward Elgar.

- Balaram, S. 2009. "Design in India: The Importance of the Ahmedabad Declaration." *Design Issues* 25 (1): 54–79.
- Balzat, Markus, and Andreas Pyka. 2006. "Mapping National Innovation Systems in the OECD Area." *International Journal of Technology and Globalisation* 2: 158–76. <https://doi.org/Article>.
- Baregheh, Anahita, Jennifer Rowley, and Sally Sambrook. 2009. "Towards a Multidisciplinary Definition of Innovation." *Management Decision* 47 (8): 1323–39.
- Bayraktaroğlu, Serkan. 2014. "Investigating Design for Social Innovation through Business Models in Rural India: A Model Proposal for Developing Countries." PhD diss., Istanbul Technical University.
- Bildirici, Melike E., and Tahsin Bakirtas. 2014. "The Relationship among Oil, Natural Gas and Coal Consumption and Economic Growth in BRICTS (Brazil, Russian, India, China, Turkey and South Africa) Countries." *Energy* 65: 134–44.
- Board of Innovation. 2014. "Business Model Brainstorm Kit." Accessed August 10, 2013. <http://www.boardofinnovation.com/business-revenue-model-examples/>.
- Borzaga, Carlo and Riccardo Bodini. 2014. "What to Make of Social Innovation? Towards a Framework for Policy Development." *Social Policy & Society* 13 (3): 411–421. doi:10.1017/S1474746414000116
- Bosworth, Gary, and Jane Atterton. 2012. "Entrepreneurial In-Migration and Neoendogenous Rural Development." *Rural Sociology* 77 (2): 254–79. doi:10.1111/j.1549-0831.2012.00079.x.
- Butkevičienė, Eglė. 2009. "Social Innovations in Rural Communities: Methodological Framework and Empirical Evidence." *Socialinės Inovacijos Kaimo Bendruomenėse: Metodologinė Prieiga Ir Empirinės Iliustracijos*. 63 (1): 80–88. Accessed December 15, 2019. <http://esc-web.lib.cbs.dk/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=37276220&site=ehost-live>.

- Cajaiba-Santana, Giovany. 2014. "Social Innovation: Moving the Field Forward. A Conceptual Framework." *Technological Forecasting and Social Change* 82 (February): 42–51. <https://doi.org/10.1016/j.techfore.2013.05.008>.
- Casadesus-Masanell, Ramon, and Joan Enric Ricart. 2010. "From Strategy to Business Models and onto Tactics." *Long Range Planning* 43 (2–3): 195–215. doi:10.1016/j.lrp.2010.01.004.
- Castle, Emery N. 1998. "A Conceptual Framework for the Study of Rural Places." *American Journal of Agricultural Economics* 80, no. 3: 621–31. Accessed December 15, 2019. doi:10.2307/1244569.
- Chandler, W., R. Schaffer, Z. Dadi, P. R. Shukla, F. Tudela, O. Davidson, and Alpan-Atamar S. 2002. *Climate Change Mitigation in Developing Countries: Brazil, China, India, Mexico, South Africa, and Turkey*. VA: Pew Center on Global Climate Change. <https://www.c2es.org/document/climate-change-mitigation-in-developing-countries-brazil-china-india-mexico-south-africa-and-turkey/>
- Chatterjee, Ashoke. 2005. "Design in India: The Experience of Transition." *Design Issues* 21 no. 4: 4–10.
- Chevalier, Pascal, and Dominique Vollet. 2019. "LEADER 2007–2013: An Innovation Dependent on Local and National Institutional Arrangements? Some European Illustrations." *Regional Science Policy and Practice* 11 (2): 219–34. <https://doi.org/10.1111/rsp3.12156>.
- Das, Keshab. 2015. "Institutional Constraints to Innovation: Artisan Clusters in Rural India." *Asian Journal of Innovation and Policy* 4 (2): 132–53.
- Fagerberg, Jan. 2005. "Innovation: A Guide to the Literature." In *The Oxford Handbook of Innovation*, edited by Jan Fagerberg, David C Mowery, and Richard R Nelson, 1–26. New York: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199286805.001.0001>.

- Fagerberg, Jan, and Martin Srholec. 2008. "National Innovation Systems, Capabilities and Economic Development." *Research Policy* 37 (9): 1417–35.
- Fátima Ferreira, Maria de, and Cristina Sousa. 2019. "Governance, Institutions and Innovation in Rural Territories: The Case of Coruche Innovation Network." *Regional Science Policy and Practice* 11 (2): 235–50. <https://doi.org/10.1111/rsp3.12147>.
- Galanakis, Kostas. 2006. "Innovation Process. Make Sense Using Systems Thinking." *Technovation* 26 (11): 1222–32.
- Gamito, Teresa Maria, and Livia Madureira. 2019. "Shedding Light on Rural Innovation: Introducing and Applying a Comprehensive Indicator System." *Regional Science Policy and Practice* 11 (2): 251–77. <https://doi.org/10.1111/rsp3.12167>.
- Gandhi, Vasant, Gauri Kumar, and Robin Marsh. 1999. "Agroindustry for Rural and Small Farmer Development: Issues and Lessons from India." *International Food and Agribusiness Management Review* 2 (3/4): 331–44. [https://doi.org/10.1016/S1096-7508\(01\)00036-2](https://doi.org/10.1016/S1096-7508(01)00036-2).
- Gangte, Margaret. 2011. "Sustainable Community Development Alternative: Unlocking the Lock (Case Study of Northeast Region of India)." *Journal of Sustainable Development* 4 (2): 61–71. <https://doi.org/10.5539/jsd.v4n2p61>.
- Garcia, Rosanna, and Roger Calantone. 2002. "A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review." *Journal of Product Innovation Management* 19 (2): 110–32.
- Gkartzios, Menelaos, and Philip Lowe. 2019. "Revisiting Neo-Endogenous Rural Development." In *The Routledge Companion to Rural Planning*, edited by M. Scott, N. Gallent, and M Gkartzios, 159–69. New York: Routledge. <https://doi.org/10.4324/9781315102375-17>.
- Gkartzios, Menelaos, and Mark Scott. 2014. "Placing Housing in Rural Development: Exogenous, Endogenous and Neo-Endogenous

- Approaches.” *Sociologia Ruralis* 54 (3): 241–65.
<https://doi.org/10.1111/soru.12030>.
- Godin, B. 2009. “National Innovation System: The System Approach in Historical Perspective.” *Science, Technology & Human Values* 34 (4): 476–501. <https://doi.org/10.1177/0162243908329187>.
- Hautamäki, Antti. 2010. *Sustainable Innovation*. Helsinki: SITRA.
- Heemskerk, Willem, Laurens Klerkx, and James Sitima. 2011. “Brokering Innovation.” In *Putting Heads Together: Agricultural Innovation Platforms in Practice*, edited by Suzanne Nederlof, Mariana Wongtschowksi, and Femke van der Lee, 43–54. Amsterdam: KIT Publishers. <https://doi.org/10.1093/nq/s10-I.17.326-d>.
- Howaldt, Jürgen, and Michael Schwarz. 2010. “Social Innovation: Concepts, Research Fields and International Trends.” Accessed January 15, 2019.
https://pdfs.semanticscholar.org/7384/3671651b23a2bce86c29ff34214765866b53.pdf?_ga=2.32416318.1686082106.1583148164-172972102.1583148164
- Hubert, A. 2010. *Empowering People, Driving Change: Social Innovation in the European Union*. Brussels: BEPA – Bureau of European Policy Advisers. Accessed January 15, 2019. <https://ec.europa.eu/migrant-integration/librarydoc/empowering-people-driving-change-social-innovation-in-the-european-union>.
- IDC and IIT Bombay. 1989. “Design as a Strategy for a Developing Economy.” Accessed January 15, 2019.
<http://www.idc.iitb.ac.in/resources/reports/desing-as-a-strategy-developing-economy.pdf>
- Ishii, Kazuya. 2001. “The Socioeconomic Thoughts of Mahatma Gandhi: As an Origin of Alternative Development.” *Review of Social Economy* 59 (3): 297–312. <https://doi.org/10.1080/00346760110053914>.
- Jegou, Francois, and Ezio Manzini. 2008. *Collaborative Services: Social Innovation and Design for Sustainability*. Milano: Politecnico Di

Milano. Edizioni POLI.design. Accessed January 15, 2019.
<http://www.experimenta.es/en/noticias/depth/collaborative-services-social-innovation-and-design-sustainability-3715>.

Keeley, Larry, Ryan\ Pikkell, Brian Quinn, and Helen Walters. 2013. *Ten Types of Innovation: The Discipline of Building Breakthroughs*. New York: Wiley.

Kesidou, Effie, and Adam Szirmai. 2008. "Local Knowledge Spillovers, Innovation and Export Performance in Developing Countries: Empirical Evidence from the Uruguay Software Cluster." *The European Journal of Development Research* 20 (2): 281–98.
<https://doi.org/10.1080/09578810802060769>.

Klerkx, Laurens, and Peter Rein Gildemacher. 2012. "The Role of Innovation Brokers in the Agricultural Innovation Systems." In *Agricultural Innovation Systems: An Investment Sourcebook*, 221–30. Washington DC: World Bank. Accessed January 15, 2019.
<http://documents.worldbank.org/curated/en/140741468336047588/pdf/672070PUB0EPI0067844B09780821386842.pdf>

Knierim, Andrea, Alexandros Koutsouris, Syndhia Mathé, Tim H Ndah, Ludovic Temple, Bernard Triomphe, and Eelke Wielinga. 2015. "Support to Innovation Processes: A Theoretical Point of Departure." WP 1, deliverable 1.2 report of the AgriSPIN project. Accessed January 15, 2019.
https://agritrop.cirad.fr/581607/1/652642_An%20overview%20of%20theories%20and%20concepts%20and%20a%20comprehensive%20analytical%20framework%20.pdf

Kwon, Minkyu, Jihwan Lee, and Yoo S. Hong. 2019. "Product-Service System Business Modelling Methodology Using Morphological Analysis." *Sustainability* 11 (5): 1-16.
<https://doi.org/10.3390/su11051376>.

Losada, Rocío, Almudena Gómez-Ramos, and Margarita Rico. 2019. "Rural Areas Receptivity to Innovative and Sustainable Agrifood Processes. A Case Study in a Viticultural Territory of Central Spain." *Regional*

- Science Policy and Practice* 11 (2): 307–27.
<https://doi.org/10.1111/rsp3.12187>.
- Lowe, Philip, Jeremy Phillipson, Amy Proctor, and Menelaos Gkartzios. 2019. “Expertise in Rural Development: A Conceptual and Empirical Analysis.” *World Development* 116: 28–37.
<https://doi.org/10.1016/j.worlddev.2018.12.005>.
- Madureira, Livia, and André Torre. 2019. “Innovation Processes in Rural Areas.” *Regional Science Policy and Practice* 11 (2): 213–18.
<https://doi.org/10.1111/rsp3.12215>.
- Manzini, Ezio, and Carlo Vezzoli. 2003. “A Strategic Design Approach to Develop Sustainable Product Service Systems: Examples Taken from the ‘environmentally Friendly Innovation’ Italian Prize.” *Journal of Cleaner Production* 11 (8): 851–57. [https://doi.org/10.1016/S0959-6526\(02\)00153-1](https://doi.org/10.1016/S0959-6526(02)00153-1).
- Marinova, Dora, and John Phillimore. 2003. “Models of Innovation.” In *International Handbook on Innovation*, edited by Larisa V. Shavinina, 44–53. Oxford: UK, Elsevier.
- Mehta, Shashank. 2012. “Design To Connect | Encouraging Social Innovations And Sustainability In The Indian Context.” In (Social Innovation and Sustainability: Local Development, Entrepreneurship) *Inovação Social E Sustentabilidade: Desenvolvimento Local, Empreendedorismo*, edited by R. Bartholo and C. Cipolla, 177–86. Rio da Janeiro: E-Papers Serviços Editoriais Ltda. Accessed August 10, 2013. http://www.shashankmehta.com/Research Papers pdfs/Design_to_Connect-_Shashank Mehta_ India _24.02.2011.pdf.
- Ministry of Textiles, India. 2011. “Working Group Report for Handicrafts for 12th Five Year Plan.” Accessed June 15, 2014. <http://hdl.handle.net/123456789/4342>.
- Ministry of Agriculture Government of India. 2005. “National Mission on Bamboo Technology and Trade Development.” Accessed June 15, 2014. <http://agricoop.nic.in/PolicyIncentives/Bamboo.htm>.

- Morelli, Nicola. 2007. "Social Innovation and New Industrial Contexts: Can Designers 'Industrialize' Socially Responsible Solutions?" *Design Issues* 23 (4): 3–21. <https://doi.org/10.1162/desi.2007.23.4.3>.
- Moulaert, Frank, Flavia Martinelli, Erik Swyngedouw, and Sara Gonza. 2005. "Towards Alternative Model (s) of Local Innovation." *Urban Studies* 42 (11): 1969–90. <https://doi.org/10.1080=00420980500279893>.
- Moulaert, Frank, and Farid Sekia. 2003. "Territorial Innovation Models: A Critical Survey." *Regional Studies* 37 (3): 289–302. <https://doi.org/10.1080/0034340032000065442>.
- Mulgan, Geoff. 2012. "Social Innovation Theories: Can Theory Catch up with Practice?" In *Challenge Social Innovation*, edited by Hans-Werner Franz, Josef Hochgerner, and Jürgen Howaldt, 19–42. Berlin Heidelberg: Springer. <https://doi.org/10.1007/978-3-642-32879-4>.
- Murdoch, Jonathan. 2000. "Networks - A New Paradigm of Rural Development?" *Journal of Rural Studies* 16 (4): 407–19. [https://doi.org/10.1016/S0743-0167\(00\)00022-X](https://doi.org/10.1016/S0743-0167(00)00022-X).
- Murray, Robin, Julie Caulier-grice, and Geoff Mulgan. 2010. *The Open Book of Social Innovation. Young*. The Young Foundation. Accessed January 15, 2019. <https://doi.org/10.1371/journal.pcbi.0030166>.
- OECD. 1999. *Managing National Innovation Systems*. Paris: OECD.
- Osterwalder, Alexander, and Yves Pigneur. 2011. "Aligning Profit and Purpose through Business Model Innovation." In *Responsible Management Practices for the 21st Century*, edited by Guido Palazzo and Maia Wentland, 61–75. Pearson International.
- Phills, James. A., Kriss Deiglmeier, and Dale T Miller. 2008. "Rediscovering Social Innovation." *Stanford Social Innovation Review* (Fall 2008): 34–43. <https://doi.org/10.1111/j.1369-7625.2010.00656.x>.
- Ploeg, Jan Douwe van der, Henk Renting, Gianluca Brunori, Karlheinz Knickel, Joe Mannion, Terry Marsden, Kees de Roest, Eduardo Sevilla-Guzman, and Flaminia Ventura. 2000. "Rural Development:

- From Practices and Policies towards Theory.” *Sociologia Ruralis* 40 (4): 391–408. <https://doi.org/10.1111/1467-9523.00156>.
- Pol, Eduardo, and Simon Ville. 2009. “Social Innovation: Buzz Word or Enduring Term?” *Journal of Socio-Economics* 38 (6): 878–85.
- Porter, M.E. 1998. “Clusters and the New Economics of Competition.” *Harvard Business Review*, (November-December): 77–90. Accessed January 15, 2019.
http://www.wellbeingcluster.at/magazin/00/artikel/28775/doc/d/porters_tudie.pdf.
- Ranjan, M. P. 1999. “From Land to the People. Bamboo as a Sustainable Development Resource for India.” Ahmedabad.
- Ranjan, M. P. 2004. “Achievements of the NID-BCDI Initiatives. An Executive Summary: 2002 January to 2004 June.” Ahmedabad.
- Ranjan, M. P., Meghna Ajit, Kuntal De, Richa Ghansiyal, C S Sushanth, and Deborah Zama. 2001. “BCDI Feasibility Report.” Ahmedabad.
- Rantamäki, Niina, and Mari Kattilakoski. 2019. “On the Trail of Local Welfare Innovations in Rural Finland.” *Regional Science Policy and Practice* 11 (2): 329–43. <https://doi.org/10.1111/rsp3.12213>.
- Reinert, H, and ES Reinert. 2006. “Creative Destruction in Economics : Nietzsche, Sombart, Schumpeter.” In *Friedrich Nietzsche (1844–1900) Economy and Society*, edited by Jürgen G. Backhaus and Wolfgang Drechsler, 55–85. New York, NY: Springer.
- Reubens, Rebecca. 2013. “Achieving, Assessing and Communicating Sustainability. A Manual towards Branding the Vietnamese Handicraft Sector.” Vienna.
https://www.researchgate.net/publication/304705178_Achieving_Assessing_and_Communicating_Sustainability_A_manual_towards_branding_the_Vietnamese_handicraft_sector.
- Reubens, Rebecca, Han Brezet, and Henri Christiaans. 2010. “Sustainable Value Chains for Bamboo Working Communities. Integrating the Tenets of Sustainability through the Rhizome Approach.” Papaer

presented at the Knowledge Collaboration & Learning for Sustainable Innovation: 14th European Roundtable on Sustainable Consumption and Production (ERSCP) conference and the 6th Environmental Management for Sustainable Universities (EMSU) conference, Delft, The Netherlands, October 25–29.

- Rothwell, Roy. 1994. "Towards the Fifth-Generation Innovation Process." *International Marketing Review* 11 (1): 7–31.
<https://doi.org/10.1108/02651339410057491>.
- Schumpeter, J. A. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle*. Harvard Ec. Cambridge, MA: Harvard College.
- Seelos, Christian, and Johanna Mair. 2005. "Social Entrepreneurship: Creating New Business Models to Serve the Poor." *Business Horizons* 48 (3): 241–46.
- Shucksmith, Mark. 2010. "Disintegrated Rural Development? Neo-Endogenous Rural Development, Planning and Place-Shaping in Diffused Power Contexts." *Sociologia Ruralis* 50 (1): 1–14.
- Sinkovics, Noemi, Rudolf R. Sinkovics, and Mo Yamin. 2014. "The Role of Social Value Creation in Business Model Formulation at the Bottom of the Pyramid - Implications for MNEs?" *International Business Review* 23 (4): 692–707.
- Sonne, Lina. 2010. "Pro-Poor, Entrepreneur-Based Innovation and It's Role in Rural Development." MERIT Working Papers 037, United Nations University - Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT). Accessed January 10, 2013.
<http://collections.unu.edu/view/UNU:264>.
- Stake, Robert E. 1995. *The Art of Case Study Research*. Thousand Oaks, CA: Sage Publications, Inc.
- TBM. 2014. "Annual Progress Report 2013 - 2014." Agartala. Accessed January 15, 2014.

http://www.tripurabamboo.com/Reports/APR/TBM_A_P_R_2013-14.pdf.

- Torre, André, Etienne Polge, and Frederic Wallet. 2019. "Proximities and the Role of Relational Networks in Innovation: The Case of the Dairy Industry in Two Villages of the 'Green Municipality' of Paragominas in the Eastern Amazon." *Regional Science Policy and Practice* 11 (2): 279–94. <https://doi.org/10.1111/rsp3.12151>.
- Torre, André, and Frédéric Wallet. 2013. "Innovation and Governance of Rural Territories." In *Renewing Innovation Systems in Agriculture and Food: How to Go towards More Sustainability?*, edited by Coudel E., Devautour H., Soulard C.T., Faure G., and Hubert B., 240. Wageningen Academic Publishers. Accessed January 15, 2020. <https://doi.org/10.3920/978-90-8686-768-4>.
- Vyas, H. Kumar. 1991. "The Designer and the Socio-Technology of Small Production." *Design History Society* 4 (3): 187–210.
- White, Sarah C. 2008. "But What Is Wellbeing ? A Framework for Analysis in Social and Development Policy and Practice." In *Regeneration and Wellbeing: Research into Practice*, 1–18. http://people.bath.ac.uk/ecsscw/But_what_is_Wellbeing.pdf.
- Woolcock, M., and D. Narayan. 2000. "Social Capital: Implications for Development Theory, Research, and Policy." *The World Bank Research Observer* 15 (2): 225–49. Accessed January 15, 2020. <https://doi.org/10.1093/wbro/15.2.225>.