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Harnessing Social Innovation for a Just Transition: A Case Study of Tea Industrialization in China's Era of Ecological Civilization

Abstract: The narrative of 'just transition' has gained significant traction in arenas of transition research and policymaking. Social innovation can play a central role in delivering a just transition, fostering social change and providing social arrangements that enable adjustment to change. Engaging with the 'shapeshifting' nature of social innovation, this research conceptualizes social innovation at the core of the just transition. Through an in-depth empirical case of tea industrialization in Enshi, China, this research explores how a locally born social innovation, Enshi Yulu, has gained momentum in advancing a just transition *in-the-making* in a new era of ecological civilization. The empirical analysis reveals that the key to the empowerment of Enshi Yulu in driving a just transition in Enshi city lies in the introduction of updated forms of the social innovation at opportune moments. This finding underscores the importance of comprehending the context- and time-sensitive nature of social innovation in navigating the directionality of transition towards more just outcomes. The core analytical question lies not in characterizing the ultimate shape of social innovation, but in understanding how certain initiatives come to be understood as social innovation and with what implications.

Keywords: just transition; social innovation; shapeshifting; ecological civilization; China

1 Introduction

The global transition to sustainability entails the reconfiguration of economies, societies, and infrastructures. Just transition, understood as 'a fair and equitable process of moving towards a post-carbon society' (McCauley & Heffron, 2018), addresses how transitions are and will be experienced, especially by groups who are already marginalized or vulnerable (COP24, 2018; Delina & Sovacool, 2018). A just transition will require proactive and sustained engagement with social innovation to foster new ways of thinking and governing (Hiteva & Sovacool, 2017).

While the concept of just transition has garnered considerable attention in academic and policy discussions, the role of social innovation in facilitating this transition remains a relatively underexplored area in the existing transition literature. Particularly unclear is why some social innovation initiatives take root in certain periods and contexts, only to fade, and later re-emerge in new societal contexts with the capacity to influence broader social and ecological shifts toward greater justice (Pel et al., 2020). In response to recent calls for a more profound integration of social innovation within the field of transition studies (Van der Have & Rubalcaba, 2016; Wittmayer et al., 2024), this research positions social innovation at the core of just transitions. Drawing upon the concept of 'shapeshifting', it delves into the complexities and temporal dimensions of social innovation in navigating a transition toward just outcomes. The shapeshifting nature of social innovation is constituted by the two characteristics of plasticity and temporality, denoting the contingency of social innovation upon both context and timeliness. This shapeshifting quality also reflects the directionality of social innovation processes. While the transition literature has long acknowledged the plurality and temporality of transition processes (Delina & Sovacool, 2018; Stirling, 2011, 2015), the critical question posed here is how to govern the directionalities of social innovation to achieve more desirable outcomes in terms of just transitions. As an empirical endeavor

to address this question, this research presents an in-depth empirical analysis of a just transition currently unfolding in Enshi, China. Specifically, it explores the generative mechanisms underlying the shapeshifting of the social innovation, as well as its empowerment in the delivery of a just transition *in-the-making*.

Enshi Yulu is a social innovation originating from the ancient tradition of tea-steaming practices documented in the Classic of Tea. It has a history spanning several thousand years. For local residents, the social innovation had long served as a means of self-consumption or modest trade. In the 1980s, amidst the wave of industrialization in tea production techniques, this traditional tea-making craft nearly disappeared. The fate of Enshi Yulu could have mirrored numerous locally born social innovations, which have just emerged, existed for a period of time in a quite invisible way within the daily lives of local communities, and eventually faded away without leaving any traces of their existence. Nevertheless, in a new era of ecological civilization and rural revitalization in China, Enshi Yulu experienced a remarkable revival in Enshi. Notably, its strategic integration into the poverty alleviation scheme has endowed it with a significant role in the unfolding just transition in the city.

The Enshi case shows how a locally born social innovation is crucially empowered through its embedding in broader urban, regional and national transition agendas. Awareness of the shapeshifting of social innovation fosters a sensitivity to the necessity for actively governing social innovation processes, taking into account directionality, uncertainties, and potential unintended consequences (Wittmayer et al., 2024). It demonstrates that comprehending the context- and time-sensitive nature of social innovation is imperative in navigating the directionality of transition towards more just outcomes. Here, the plasticity ensures the conceptual openness and practical diversity of social innovation (Moulaert et al., 2017), while the temporality relates to the emergence of social innovation at a moment of opportunity. Therein, social change depends both on the reappropriation and malleability of social innovation and its dynamic transformation through different instances in which change is possible. Through this empirical exploration, the research significantly enriches our understanding of the intricate dynamics at play in how social innovation can actively broaden and open up existing processes of change (Wittmayer et al., 2024).

The remainder of the article is structured as follows. Section 2 reviews the existing literature on social innovation within transition studies. Section 3 provides a theoretical discussion on the 'shapeshifting' nature of social innovation and explains why comprehending the plasticity and temporality of social innovation is conducive to achieving a just transition. Section 4 details the research methodology and data. Adopting a critical-historicizing approach, Section 5 presents an in-depth case study of tea industrialization in Enshi, China, demonstrating how a locally-originated social innovation has been mobilized to address changing societal and ecological goals in an era of ecological civilization. **Section 6 provides an in-depth discussion of the case, and Section 7 concludes the article.**

2 Literature review

The core mission of the field of sustainability transitions is to explore the mechanisms underlying the structural transformation of socio-technical systems. Nevertheless, when it comes to innovation, that is often regarded as a key catalyst for change, transition studies have predominantly focused on technical forms of innovation instead of societal ones (Wittmayer et al., 2024). Specifically, more

attention has been placed upon how the emergence and development of technological innovations disrupt established regimes, thereby shaping the trajectory of socio-technical transitions. This techno-centric perspective is reflected in mainstream conceptual frameworks such as the technological innovation system (TIS) (Bergek et al., 2008) and the multi-level perspective (MLP) (Geels, 2002).

Recent years have seen growing interests in social innovation in transition studies (Wittmayer et al., 2024), with a significant focus on individual behaviour, household practices, and initiatives at the community levels, particularly in the realm of energy transitions (Hewitt et al., 2019; Slee, 2020; Wemyss et al., 2023; Wittmayer et al., 2020). When setting out the agenda for sustainability transitions research, Köhler et al. (2019) call for greater attention to the transformative processes driven by 'more socially-embedded model of innovation'. Resonating with this call is a notable emerging strand in transition studies that looks at the transformative potential of social innovation in sustainability transitions (Avelino et al., 2017; Avelino et al., 2019; Haxeltine et al., 2016; Pel et al., 2017; Pel et al., 2020). 'Transformative social innovation', defined as "the process of social innovation challenging, altering, or replacing dominant institutions in a specific social-material context" (Pel et al., 2020) (p. 1), emphasizes the role of social innovation in driving transformative changes, through the fostering of new social relations and networks (Pel et al., 2020). Very recently, a special issue published on EIST edited by Wittmayer et al. (2024) engages social innovation from a variety of perspectives, encompassing the socio-political dynamics of social innovation processes (Avelino et al., 2023; Pel et al., 2023), the measurement of social innovation (Krlav & Terstriep, 2022), as well as the policy implications of social innovation for sustainability transitions (Rogge et al., 2023; Strumińska-Kutra et al., 2023).

Despite initial efforts by scholars to explore the possibilities of integrating social innovation in transition studies, the current research landscape is still emerging, requiring further conceptual and empirical studies to unravel its full potential and impact. As recently called for by Wittmayer et al. (2024), "more research efforts need to go into investigating how, to what extent and under what conditions social innovation can contribute to broadening out and opening up existing processes of change" (p. 7). Van der Have and Rubalcaba (2016) also note that "more research is needed to get a better understanding of the causal role social innovation plays in shaping, accelerating or decelerating change trajectories" (p. 1933). In response to these calls, this research situates social innovation at the core of the Just Transition narrative.

The concept of 'just transition' encapsulates the ethical imperative driving sustainability transitions towards principles of social justice, inclusivity, and equity (Köhler et al., 2019; Raven et al., 2019). Researchers in the field of transition studies have delved into the identification of injustices within these processes, scrutinizing the marginalized segments of society and investigating the existing mechanisms aimed at addressing and rectifying these disparities (Fjellså et al., 2021; Grimley et al., 2024; Kuhmonen & Siltaoja, 2022; van Bommel & Höffken, 2023). The core concerns of a just transition revolve around the what (outcome), how (procedure), and who (recognition) questions. These explore the possibilities of ensuring the equitable distribution of transition outcomes, the transparency of transition procedures, and the inclusiveness of transition actors (Castán Broto & Westman, 2019; Holemans & Volodchenko, 2022; Jenkins et al., 2016).

The theme of innovation has long been central to the literature that informs debates on how to deliver just transitions. Compared to technological innovation, social innovation is more intimately

related to social issues, often considered as potential solutions for poverty, social inequality, and social exclusion (Bartels, 2017; Borzaga & Bodini, 2014). With growing interests in social innovation in transition studies in general, it is also increasingly recognized that advancing just transitions entails a wide variety of innovative solutions that extend beyond the technical arena (Stephens, 2021).

Stirling (2015) notes that to ensure social justice, transitions need to embrace more diverse, distributed, and open-ended social practices and innovations, fostered by vibrant flows and experiences of social agency. Social innovation solutions for the transition hold the potential to enhance individuals' involvement in the process, empowering them as active participants and catalysts (Carroll et al., 2023). These solutions contribute to the development of location-specific innovation approaches that hold significant local relevance. Social innovations can create more equitable processes of decision-making, for example, by opening forums for the delivery of procedural justice, such as climate assemblies and other emerging mechanisms of public engagement (Sandover et al., 2021). In the energy sector, research shows that it is essential to deploy social innovations such as energy democracy to ensure the fair distribution of energy resources and the empowerment of vulnerable communities (Stephens, 2021). In Tanzania, informal associations, a product of local social innovation, acted as important institutions for strengthening the adaptation capacity of vulnerable communities (Rodima-Taylor, 2012). Similarly, Wright and Nyberg (2019) show how climate activism as a form of social innovation had emerged spontaneously from within local communities, which has explored possibilities for a 'just transition' away from fossil fuel-based energy systems.

Despite growing momentum of the narrative of just transition in both academic and policy circles, the implications of social innovation on the delivery of a just transition is still under-researched within the transition literature. Transition scholars attempting to incorporate social innovation into their research frequently encounter an immediate challenge in comprehending the meaning of the term due to its inherent conceptual ambiguity (Van der Have & Rubalcaba, 2016). As a result, existing research within transition studies on social innovation tends to confine to straightforward and easily identifiable cases that often operate on individual behaviour and practices (see for instance: Wemyss et al, 2023; Carroll et al., 2023). This has, to a significant extent, limited the potential and scope of social innovation research in transition studies.

This research is positioned as an empirical endeavor to bridge this gap. Through an in-depth case study of tea industrialization in Enshi, China, the research aims to explore how a local social innovation has been mobilized to enable a just transition *in-the-making*. Echoing Moolaert et al. (2017), this research posits that the conceptual ambiguity of social innovation should not be seen as a weakness but as a strength. This ambiguity signifies the openness of the concept to realworld practices and experimentation, particularly against the backdrop of a fundamental transition. Grasping this requires understanding the '*shapeshifting*' nature of social innovation. In next section, before delving into the empirical investigation, we first elucidate the inherent 'shapeshifting' nature of social innovation and why it is important to actively engage with this nature of social innovation so as to harness its power in the delivery of a just transition.

3 Comprehending the ‘shapeshifting’ of social innovation

Social innovation scholars have long recognized the dynamic and evolutionary feature of social innovation (Murray et al., 2010; Westley & McGowan, 2017). Bartels (2017) conceptualizes ‘dynamic becoming’ as one ontological principle of social innovation. This evolutionary ontology rejects the impose of static views or fixed positions on social innovation and highlights instead the dynamics of social innovation characterised by ‘a multiplicity of forms’ (Bartels, 2017). Based on an empirical exploration of 20 social innovation initiatives, Pel and Kemp (2020) reveal the ‘shapeshifting’ nature of social innovation, and describe it as “the different ‘shapes’ and social constructions that social innovations go through over the course of their existence in society” (p. 1189). Therein, the concept of ‘shapeshifting’ illustrates how social innovation can manifest in different forms (plasticity) and may shift between these forms over time (temporality).

The ‘shapeshifting’ nature of social innovation demonstrates that social innovations are highly context-dependent, shaped by territorial arrangements such as natural endowments, infrastructural configurations, social norms and power relations (Moulaert, 2016). This strong context-dependency of social innovation means that it is contingent not only on the specific conditions of different locations but also on the evolving social, economic and political circumstances within a single location over different historical periods. This reveals both the contextual and the temporal dimension of the shapeshifting of social innovation. In this section, we elucidate the two constuting characteristics of the ‘shapeshifting’ of social innovation, namely its plasticity and temporality, and explain how comprehending the shifting shapes of social innovation is important for the delivery of a just transition.

Plasticity is central to social innovation, a concept that can be moulded to fit intentions and ideas. Social innovation is open to conceptual transformations that may even erase its original meaning or purpose. Because of its plasticity, social innovation is routinely appropriated and reinterpreted, thus constituting a vehicle for the materialization of diverse aspirations and ideas. The plasticity of the concept of ‘social innovation’ relates to its inherent conceptual imprecision as a concept that emerges from a multidisciplinary research field with a plurality of definitions and perspectives (Ayob et al., 2016; Domanski & Kaletka, 2017; Van der Have & Rubalcaba, 2016). A review of the vast body of literature on social innovation reveals diparate understandings of the concept, with different conceptions of its ends and means. The ‘pure social innovation’ strand, for instance, understands social innovation in the narrowest sense by defining it as “innovations that are social both in their ends and in their means” (BEPA, 2010). Alternatively, there is an understanding of social innovation as innovation for social good but is less strict about whether the means are social or technological (Borzaga & Bodini, 2014; Cajaiba-Santana, 2014; Domanski & Kaletka, 2017; Howaldt & Schwarz, 2010). Adopting a more economic perspective, ‘corporate social innovation’ represents a type of profit-seeking social innovation, which combines social benefits with economic gains (Baptista et al., 2019; Borzaga & Bodini, 2014; Tabares, 2020). Lastly, the sociological view of social innovation considers it as new relations and practices shaped by social context (Cajaiba-Santana, 2014; Van der Have & Rubalcaba, 2016). Varied conceptions of social innovation demonstrate its inherent plasticity. In physics and material science, plasticity is the capacity of a material to retain a shape achieved through pressure. This plasticity allows social innovation to adapt and transform while preserving its foundational principles, equipping it to flexibly respond to various challenges and opportunities.

At the same time, the impact of social innovation does not depend on its repetition, but on its timeliness (Westley, 2008). Regardless of whether we view social innovation as an event, an initiative, a product, or a process, there is a temporal dimension inherent to it (Westley, 2008). In Rwanda, for instance, the city of Kigali launched the Car-Free Day Initiative in 2016. The initiative is now being held in other cities of Rwanda and also in other African countries such as Kenya, Uganda, and Zimbabwe (Gahigi, 2019). What appeared initially to be a one-off event has become an institutionalized social practice. It is also noteworthy that the temporality of social innovation goes beyond the linear conceptualizations of scaling up. Many social innovation initiatives start small and stay small or start big and end small (Rodima-Taylor, 2012). These diverse temporalities mean that social innovations may grow upwards and downwards, generating greater diversity and complexity in their patterns and trajectories. It is through those dynamics that a particular alignment of social innovation may occur, as timelines are adjusted to existing contexts. The concept of time 'kairos,' derived from ancient Greek, represents a sense of the opportune moment to achieve something as opposed to the chronological time when it takes place (Hulme, 2016). The key reflection is not whether social innovation attains a particular scale or moment, but rather whether it emerges at the most opportune moment in time. This requires rethinking the temporalities of social innovation as related not with quantity (how much an innovation expands through time) but with quality (the deployment of social innovation at an appropriate time). Social innovation relates to a sense of appropriate and opportune moment, an intervention that can be moulded to generate a sense of newness and the achievement of social good.

Understanding the shapeshifting nature of social innovation helps relating social innovation more clearly to the delivery of a just transition. The transitions literature has long recognized the directionality of transition processes (Avelino & Wittmayer, 2016; Köhler et al., 2019; Schot et al., 2016; Smith, 2007), suggesting that transitions are not confined to a single or linear path but are characterized by a variety of potential directions, intended or unintended (Stirling, 2011). Drawing upon the concept of 'transitions directionality', Pel et al. (2023) show how social innovation is not a one-dimensional process but rather a multifaceted one, with the possibilities for both desirable and undesirable outcomes. The interrogated question here is, thus, how to govern the directionalities of social innovation toward a more desirable scenario in terms of social justice. As urgently called for by Wittmayer et al. (2024), "more work needs to go into social innovation processes and their directionalities, in particular possible ways to govern these processes and more open and transparent ways on deciding which directions to take" (p. 7). In transition literature, it remains unclear how the transformative potential of social innovation can best be mobilized to enable more just outcomes for a transition. The identification of early patterns of social innovation, its socio-material embeddedness, as well as the relationship with broader societal change are crucial mechanisms that require deeper empirical research. Comprehending the plasticity and temporality of social innovation helps explaining how social innovations emerge, mutate into varied forms, and seize a moment of opportunity to influence wider systemic transitions towards more just outcomes.

4 Study area, method and data

The case of tea industrialization in Enshi, China, shows that social innovation has been mobilized to respond to broader societal and environmental challenges from a local positioning. Enshi city is located in Hubei province in China. The total area of Enshi is 3971.58 km² with a population of 0.82 million (2022) (People's Government of Enshi Municipality, 2023). Located in a mountainous region,

although Enshi possesses abundant natural resources, disadvantageous geographical factors such as an underdeveloped transport and logistics network have kept Enshi as one of the most impoverished areas in China. Since 2012, ecological civilization, a state-led narrative aimed at facilitating a nationwide structural transition to sustainable modes of development, has been integrated into China's core national strategies (Huang & Westman, 2021). Ecological civilization emphasizes, for example, that "lucid waters and lush mountains are invaluable assets" (Xi, 2014). The Rural Revitalization Scheme targets the holistic enhancement of rural industries, talent, culture, ecology, and governance, with the ultimate aim of achieving agricultural and rural modernization (Zhou et al., 2020). Poverty alleviation is a core task of the Rural Revitalization Scheme. For an impoverished city like Enshi, it faces dual challenges of ecological transition and livelihood improvement. It is against this background that the production of Enshi Yulu, as an environmental friendly social innovation, experienced a remarkable revival.

In China, the city of Enshi is renowned for its famous tea brand 'Enshi Yulu'. Enshi Yulu, a historical Chinese tea from Enshi, is well known for its unique traditional fixation technique, steaming (Zheng Qing), used to deactivate the enzymes of tea leaves. Born as a pure social innovation (Borzaga & Bodini, 2014) and rooted in the everyday practices of local people, Enshi Yulu experienced a gradual decline over its centuries-long history, nearing the brink of disappearance in the 1980s. Actors such as government, industry leaders and local farmers have seized the discourses of ecological civilization and rural revitalization to leverage this locally-born social innovation to address Enshi's transition challenges, both ecological (ecological civilization) and social (rural revitalization and poverty alleviation). Enshi Yulu has been endowed with new ecological, economic and social roles, leading to its vibrant revival. Industry leaders have molded Enshi Yulu into new 'shapes' through significant technological and institutional innovations in various dimensions of doing, knowing, framing and organizing (Avelino et al., 2019; Pel et al., 2020), supported by substantial institutional and financial resources from the government and active participation of local farmers. In Enshi, the tea industry has become a cornerstone of the city's green economy. With its deep integration into the urban agenda of poverty alleviation, the transformative potential of Enshi Yulu is being harnessed by local transition actors to contribute to a just transition *in-the-making* in Enshi. Echoing the call of Wittmayer et al. (2024), understanding how exactly this transition has unfolded is a significant question to investigate. Therefore, the Enshi case offers an ideal setting for the empirical exploration of the processes and mechanisms underlying the shapeshifting of a place-embedded social innovation that fosters a more just transition.

The evolving view of the shapeshifting of social innovation points towards a critical-historicizing analytical approach to social innovation, which, as noted by Pel and Kemp (2020), accounts for the diverse manifestations of social innovation (plasticity) over time (temporality). The critical-historicizing approach offers a methodological lens that enables a deep critical analysis of historical data to understand the 'shapeshifting' of social innovation. Building upon the critical-historicizing approach, our empirical case study offers a historical account of the socio-political construction of Enshi's tea-making practice. We examine the historical evolution, contextual embedding, and adaptive responses of this social innovation to various socio-political and cultural influences. This analysis critically assesses how the innovation has "shapeshifted" in reaction to changing societal needs and challenges, revealing how social innovation has been constructed and reconstructed within different time periods and settings. Moreover, this empirical investigation will act as a tangible demonstration of the dynamic relationship between social innovation and the concept of

just transitions. It will highlight how the adaptable and time-sensitive nature of social innovation facilitates its role in fostering a just transition.

Data collection took place in August 2023. Government reports and various archival materials were gathered for document analysis. Semi-structured interviews took place with key stakeholders, encompassing government officials, industry experts, and local farmers, as detailed in Appendix A. The interviews with government officials were designed to explore the historical development of Enshi's tea-making practices, recent policy initiatives in support of the tea industry, and the challenges faced in a new era of ecological civilization. This included discussions on how policies are crafted to ensure a just transition for all stakeholders within the industry, particularly considering the impact on local farmers and the community. For local tea companies, the interviews focused on the technological innovation activities undertaken to upgrade tea-making processes and their collaborative efforts with local tea farmers. Interviews with local tea farmers, a critical group in the industry, focused on the significance of tea-making in their everyday lives and the personal impacts of the recent evolution of the Enshi tea industry. These discussions provided insights into the social and economic changes experienced by the farmers and their households, emphasizing the human and mundane aspects of just transitions. The data collection and analysis process culminated in a periodization of various stages of innovation within the Enshi tea industry, offering a nuanced perspective on the historical development and current state of the industry. This periodization helped to identify key moments of transformation and the interplay between technological, socio-political, and cultural factors, all within the broader context of striving for a just transition.

5 Empirical study

5.1 Enshi Yulu shapeshifts as a social innovation

The traditional fixation technique of Enshi Yulu can be traced back to the Han and Wei periods (25-266) in ancient China (W. Zhang, 2021). In the Tang Dynasty's 'Classic of Tea' (Cha Jing), Lu Yu documented the details of the ancient social practices of steaming green tea: "To begin the steaming, first put the tea in the receptacle. Then pour it into the steamer. Continue stirring it with a three-forked branch in order to spread out the shoots and buds and allow the juices to flow" (Carpenter, 1974, p. 64). Interviews with tea farmers reveal that until the end of the 20th century, many residents still retained the habit of using household cooking tools, such as steamers and steaming sieves, to steam tea leaves and make their own "local tea" for personal consumption. The social practices of steaming tea were integrated into the daily lives of residents in Enshi. The steps of steaming tea described in the 'Classic of Tea' closely resemble the leaf fixation method employed in the production of Enshi Yulu today. Enshi Yulu is a living relic of traditional steamed green tea.

During the wartime period (1937-1949), as one of the few old tea-producing regions not occupied by the Japanese military forces, Enshi's production of Enshi Yulu met the demand of the upper social strata for high-end green tea consumption at that time. In 1938, the China Tea Corporation established the Enshi Experimental Tea Factory and set up branch factories in various locations within Enshi. Due to the complexity of the process, making Enshi Yulu was semi-mechanized and involved a significant amount of manual labor. Following the demand for premium tea during the wartime period, Enshi Yulu experienced rapid development. Yet, the high price tag of Enshi Yulu tea limited access to this luxury item to a privileged few.

Beginning in the 1980s, there was a widespread shift towards mechanized processing for renowned teas across China. However, the unique steaming process and the intricate needle-shaped crafting of Enshi Yulu could not be replicated by machinery, leaving the product uncompetitive in the market. Additionally, most tea enterprises in Enshi relied on imitating famous teas from other regions for raw material output to sustain their livelihoods. By the 1990s, apart from a very small amount of handmade production by local people, the processing of Enshi Yulu had essentially come to a halt (W. Zhang, 2021).

In the 2000s, the cultural value of Enshi Yulu has been re-recognized by the local government. As recalled by a government official:

“In 2007, the Secretary of the Enshi City Committee established Enshi Yulu tea, the Enshi Grand Canyon, and the Tujia Daughters' Gathering as the three major city cards of Enshi.” (Interviewee 4)

Since then, Enshi Yulu has been highlighted as part of Enshi's cultural branding. In 2008, it was certified as "Hubei Province's First Historical Famous Tea." By 2011, the People's Government of Hubei Province had recognized the "Enshi Yulu Tea Making Technique" as part of the provincial intangible cultural heritage listings. This recognition was further elevated in later years when the traditional Enshi Yulu tea-making technique was included in the "National Intangible Cultural Heritage List" and the "UNESCO's Representative List of the Intangible Cultural Heritage of Humanity".

Against this background, local tea enterprises also attempted to restore the traditional manual batch production and semi-mechanized processing of Enshi Yulu. Nevertheless, the successful revival of this traditional social innovation requires modernizing its processing technology. Among the pioneers in this endeavor is Ruibom, a prominent local enterprise known for its technological innovations and commitment to preserving cultural heritage.

Since its establishment in 2005, the company has dedicated significant resources to the innovation and development of contemporary processing methods for Enshi Yulu. In 2008, Ruibom initiated the project 'Research and Demonstration of Mechanized and Continuous Processing Technology for Enshi Yulu Tea', resulting in the establishment of China's first continuous production line for steamed needle-shaped green tea. This milestone achieved the mechanization, continuous operation, standardization, and scaling of Enshi Yulu tea production (figure 1). Initially, technological upgrading relied on technologies from countries such as Japan. In recent years, Ruibom has invested more in the independent research and development of modern processing and storage equipment. As told by the manager of Ruibom:

“Initially, the semi-automatic production line was imported from Japan, and now we have a machine that has been jointly developed with a Japanese company.” (Interviewee 56)



Figure 1. The mechanized processing equipment of Enshi Yulu (photo taken by the first author)

The mechanization and standardized production of Enshi Yulu has greatly improved production and processing efficiency, which has laid the foundation for large-scale industrialization. This phase of significant technological improvement of Enshi Yulu production parallels with nationwide advancement of China's ecological civilization construction and rural revitalization.

Enshi had long been classified as a national-level poverty-stricken city and was located in the region with the largest and most severe poverty in Hubei Province. This situation has imposed significant political pressure on the local government to address and alleviate poverty, especially under the national agenda of rural revitalization. To align with the overarching objectives of ecological civilization and rural revitalization, the development trajectory of the tea industry necessitates not only economic and ecological considerations but also the integration of social dimensions. This broader perspective has endowed the tea industry in Enshi with a multifaceted societal mandate, which extends beyond its primary commercial and environmental functions. A paradigmatic instance of this expanded role is the industry's significant contribution to poverty alleviation endeavors, a core component of the rural revitalization framework. As indicated by a government official:

“The government supports and cultivates the growth and expansion of enterprises through poverty alleviation funds and helps to build strong brands to increase the value of tea. Yet, alongside support to enterprises, it is also imperative to carry out poverty alleviation efforts among the farming households.” (Interviewee 14)

Another government official described how the tea industry can play a role in Enshi's poverty alleviation:

“Our biggest industry is our tea, with Enshi Yulu as our flagship product. There are several ways in which it helps the local people alleviate poverty. First and foremost, our leading enterprises and cooperatives purchase fresh tea leaves from the local residents at guaranteed prices and distribute year-end bonuses. Another way is through employment opportunities created by these enterprises, which increase the income of local farmers.” (Interviewee 9)

Local tea enterprises have played an active role in Enshi's economic upliftment agenda. For instance, the leading enterprise in the production of Enshi Yulu tea, Ruibom, has initiated a 'business incubation' program targeting impoverished farmers, providing paid apprenticeship skill training and one-on-one guidance in tea processing techniques. Over five years, this incubation program has

spawned three tea enterprises and increased the income of thousands of farming households (Q. Zhang, 2021). Another entrepreneur described how his tea company helped local employment:

“Our tea gardens have contributed significantly to local employment. We employ around 600 workers for tea leaf picking, and many of them are women over 60 years old who would otherwise have limited employment opportunities. For example, I know a woman whose father-in-law also works with us, and she herself is employed here, supporting two children through their college education. The tea industry is a classic example of an industry that increases the income of farmers.” (Interviewee 45)

In terms of poverty alleviation, a role model in Enshi is the Huazhishan Company. As introduced by a government official:

“Tea companies play a significant role in poverty alleviation...The poverty alleviation in Huazhishan Village has been quite successful. The Huazhishan Company has effectively built its brand, which has led to an increase in the added value of the tea.” (Interviewee 9)

Huazhishan Company has established the Huazhishan Organic Tea Cooperative, pioneering an innovative approach through a "company + cooperative + base + farmer" model to support underprivileged tea farmers. The essence of this model lies in the implementation of unified management standards for tea gardens, the delivery of consistent technical training and guidance, centralized procurement and distribution of agricultural supplies, and the establishment of uniform standards and pricing for the acquisition of fresh tea leaves. The company also streamlines the processing and sales of tea to ensure the benefits of local tea farmers, by entering into protective price agreements with economically disadvantaged households for the procurement of Enshi Yulu tea raw materials. A government official described the success of this model:

“Leading enterprises and cooperatives purchase tea from local farmers, ensuring a minimum income plus year-end dividends. At Huazhishan, with over 240 households and an average of more than one mu (approximately 0.165 acres) per person, there are over 1,000 people cultivating more than 1,000 mu of land. The cooperative provides technical guidance and formulaic fertilization. At the end of the year, a dividend of 5% based on the transaction volume is distributed to the farmers. One farmer received a dividend of over 80,000 RMB, although this amount includes additional labor costs. Generally, a net income of 8,000 RMB per mu is achieved. The Huazhishan Company saw its output value increase from several million RMB in 2016 to over 40 million RMB by 2019, thanks to policy support. This growth in corporate revenue has, in turn, driven an increase in farmers' income.” (Interviewee 11)

Within the "company + cooperative + base + farmer" framework, a robust sense of engagement and participation has been fostered among both tea enterprises and farmers. The tea companies, through their proactive involvement in targeted poverty alleviation and rural revitalization initiatives, have cultivated a profound sense of social responsibility and ownership. This commitment is instrumental in driving investments into sustainable, long-term strategies that are mutually beneficial for the community and the company's growth. For the local farmers, the model offers a dual advantage: they reap economic rewards and are also deeply integrated into all facets of the production process. This active involvement enhances their stake in the industry, contributing to their empowerment and the overall sustainability of the tea production cycle. The collaborative

approach ensures that the benefits of the industry are equitably shared, promoting a more inclusive and resilient rural economy. As described by an entrepreneur:

“The tea industry can lead to the prosperity of local residents. The tea cooperatives have a different model for purchasing tea, which allows local residents to be actively involved across various segments of the supply chain.” (Interviewee 45)

The vice president of the Huazhishan Company also indicated the following:

“The ‘company + cooperative + base + farmer’ model has been widely adopted in the tea industry. Although farmers own and manage their own land, they have closely joined cooperatives, achieving a tight coupling of interests.” (Interviewee 53)

In Enshi, a fundamental transition, in both ecological, economic and social terms, is *in-the-making* in which the social innovation of Enshi Yulu has played a transformative role. Originated from the social practices of steaming tea in ancient times, Enshi Yulu has continuously adapted to changing socio-economic circumstances. A critical-historicizing analysis of the shapeshifting trajectory of Enshi Yulu shows that the social innovation has mutated from more pure forms of social innovation in ancient times, to profit-oriented social innovation during wartime and to diverse manifestations as ‘new ways of doing, knowing, framing and organizing’ in the context of ecological civilization and rural revitalization (Avelino et al., 2019; Pel et al., 2020).

As an environmentally friendly social innovation, Enshi Yulu has successfully embedded itself within the political agenda of the city. In particular, its prominent role in poverty alleviation has added a significant and important layer of social justice to Enshi's green transition. The benefits of this transition are experienced in a visible way by local communities. Along with the development of the tea industry in Enshi, local communities have seen a broader array of benefits distributed. These benefits encompass not only tangible gains, such as increased income, but also intangible ones such as training and business opportunities. In 2020, Enshi was removed from the list of poverty-stricken cities in China, marking a significant milestone in poverty alleviation efforts. This impact goes beyond mere economic benefits, addressing broader social inequalities by providing local farmers and communities with new economic opportunities and improved living standards.

Therefore, the Enshi case represents a just transition *in-the-making*, at the core of which is the mobilization of the transformative potential of a locally born social innovation to drive broader ecological and social transformations. In what follows, we explore the underlying mechanisms that have enabled this mobilization, reflecting on the dual characteristics of plasticity and temporality inherent in social innovation.

5.2 How is Enshi Yulu empowered to foster a just transition in-the-making?

The critical-historicizing analysis of the social innovation of Enshi Yulu has exhibited its remarkable plasticity and temporal evolution. The crafting of Enshi Yulu represents a profound indigenous social innovation, deeply embedded in the locale of Enshi. However, with the wave of industrialization in the 1980s, this traditional practice, which is difficult to be mechanized, was on the brink of extinction. It was the cultural significance of Enshi Yulu that initially captured the attention of local authorities, sparking a renewed appreciation for this social innovation. The local government's reevaluation of its cultural value has been instrumental in driving the recognition and subsequent revitalization of this once-endangered social innovation. Meanwhile, also initially driven by a

profound mission to preserve the cultural value of Enshi Yulu, local tea enterprises, represented by Ruibom, embarked on a journey of technological advancement in the mechanized production of this social innovation. The mechanization and standardization of Enshi Yulu production have greatly enhanced production efficiency. This critical technological advancement has endowed Enshi's tea industry with the economic potential and viability to evolve into a regional pillar industry, thereby establishing a robust foundation that underscores the pivotal role of this social innovation in the broader ecological and socio-economic transformation of the region.

Historically an underdeveloped area, Enshi's sustainability transition is not solely an environmental endeavor; it also carries broader societal goals such as rural revitalization. Against this backdrop, the successful industrialization of Enshi Yulu has prompted the local government to reacknowledge the substantial economic potential of this traditional environmental friendly social innovation. The development of Enshi's tea industry is now regarded as a cornerstone initiative, integral to the broader strategic goals of fostering ecological civilization and propelling the comprehensive revitalization of rural communities. This renewed recognition of Enshi Yulu's dual ecological and economic values has catalyzed the influx of substantial institutional and financial resources into the industry. Moreover, the government's endorsement of the tea industry as part of the broader initiatives for ecological civilization and rural revitalization has endowed the sector with additional societal roles. In particular, the role of Enshi Yulu in Enshi's poverty alleviation strategy has added an important layer of social justice to Enshi's ongoing transition. The "company + cooperative + base + farmer" model innovated by the Huazhishan Company has introduced institutional changes to the production of Enshi Yulu, facilitating novel organizational methods and practices that better serve the ultimate goal of poverty alleviation (Chilvers & Longhurst, 2015; Haxeltine et al., 2015). Consequently, the social value of the Enshi tea industry has been realized by embracing objectives aligned with societal well-being, such as poverty alleviation and fostering common prosperity. This resurgence of socially oriented goals underscores the dynamic nature of Enshi Yulu's social innovation, where the interplay between technological advancements and evolving societal needs continually reshapes its temporal narrative.

In the case of Enshi Yulu, the plasticity of this social innovation manifests not only in its acknowledgment of indigenous methods reliant on localized knowledge and resources, but also through its adoption of novel technological and institutional contributions from diverse stakeholders in later phases. Here, the conceptual ambiguity of social innovation has acted as an advantage instead of as a disadvantage that ensures Enshi Yulu's remarkable openness and adaptability to realworld circumstances. It is this plasticity of social innovation, fueled by the continuous interplay and contributions of a wide array of actors, crucially underpins its ability to contribute effectively to just transitions, especially when aligned with national policies on ecological civilization and rural revitalization that impose new social responsibilities on such innovations. On the other hand, the temporal dimension of social innovation is crucial as it grants a sensitivity to the timing of innovation adoption which might enable greater social justice. The concept of temporality in social innovation highlights the role of transition actors in ongoing learning, adaptation, and enhancement, thus creating pivotal opportunities for transformation. By comprehending both its plasticity and temporality, Enshi Yulu has successfully aligned its efforts with the broader national goals and strategies, thereby achieving more significant social benefits for local communities.

6 Discussion

Resonating with recent efforts for a more profound integration of social innovation within the field of transition studies (see, for instance, a recent special issue published on EIST edited by Wittmayer et al. (2024)), this research positions social innovation at the core of just transitions. Through a case of a just transition unfolding in Enshi, China, this research reveals how a locally born social innovation—the steaming tea Enshi Yulu—has emerged, shifted to different shapes, and eventually seized a moment of opportunity to steer broader ecological and social processes of transformation towards the goal of ecological civilization and rural revitalization.

Drawing on a critical-historicizing perspective, the research distinguishes the historical shapes of the social innovation of Enshi Yulu. It shows how it has mutated from more pure forms of social innovation in ancient times to profit-oriented social innovation during wartime and to diverse manifestations as ‘new ways of doing, knowing, framing and organizing’. In a new era of ecological civilization and rural revitalization, the revival of Enshi Yulu can be attributed significantly to technological progress in earlier stages, accompanied by substantial financial and institutional support from local and national authorities. This support is driven by the strategic alignment of Enshi’s tea industry with overarching national agendas, notably those concerning ecological civilization and rural revitalization. This amalgamation of ecological, economic, and social aims has enriched the implications of Enshi Yulu as a social innovation, and constructed the technique into a means to advance a transition to sustainability based on local produce and technology.

The journey of the emergence, decline and subsequent revival of Enshi Yulu demonstrates the directionalities of social innovation (Pel et al., 2023). Here, social innovation is not a helm to steer the transition boat, but rather it is a modest but malleable lever that can be adjusted to different positions to keep the boat afloat. The impact of modest levers may not always be noticeable in sudden shifts of direction (often signaled by vociferous policies and targets that lose their force amidst the sound of the sea). They may, however, have significant importance when examined from a long-term perspective, when those pieces that kept the boat together are examined. In the case of Enshi Yulu, the key to the empowerment of Enshi Yulu in the delivery of a just transition lies in the introduction of updated forms of the social innovation at opportune moments. In particular, its deep embeddedness into the local poverty alleviation scheme has propelled its development forward, broadening its mandate to encompass wider societal objectives. In Enshi, social innovation processes have been actively governed, navigating the directionality of transition towards more desirable outcomes regarding social justice.

7 Conclusion

Recent years have witnessed growing momentum of the narrative of ‘just transition’ in both transition research and policymaking. Social innovation can play a crucial role in facilitating a just transition. The central question lies in how to govern the directionalities of social innovation. This research, positioned as an empirical endeavor to address this critical question, demonstrates that recognizing the shapeshifting nature of social innovation fosters sensitivity to the need for actively governing social innovation processes, in which the plurality of values (cultural, economic, social) of social innovation has mobilized the agency of transition actors at moments of opportunity. Here, the shapeshifting nature of social innovation is constituted by the two characteristics of plasticity and temporality: the plasticity of social innovation allows it to be shaped by various transition actors into

forms that align with external conditions, while the temporality of social innovation manifests as a sensitivity to the temporal opportunities. A key message sent by this research is that the context- and time-sensitive nature of social innovation facilitates its role in fostering a just transition. The core analytical question lies not in characterizing the ultimate shape of social innovation, but in understanding how certain initiatives come to be understood as social innovation and with what implications.

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Appendix A. Basic information of semi-structured Interviews

Interview type	No.	Actor Category	Duration (minutes)	Date
Focus group	1	Government official	180	01 August 2023
	2	Government official		
	3	Government official		
	4	Government official		
	5	Government official		
	6	Government official		
	7	Government official		
	8	Government official		
Focus group	9	Government official	120	01 August 2023
	10	Government official		
	11	Government official		
	12	Government official		
	13	Government official		
	14	Government official		
	15	Government official		
Focus group	16	Government official	115	02 August 2023
	17	Government official		
	18	Government official		
	19	Government official		
	20	Government official		
	21	Government official		
Focus group	22	Government official	104	02 August 2023
	23	Government official		
	24	Government official		
Focus group	25	Government official	120	03 August 2023
	26	Government official		
	27	Government official		
Focus group	28	Government official	90	03 August 2023
	29	Government official		
	30	Government official		
	31	Government official		
Focus group	32	Government official	60	04 August 2023
	33	Government official		
Focus group	34	Government official	114	04 August 2023
	35	Government official		
	36	Government official		
	37	Government official		
	38	Government official		
	39	Government official		
One-on-one	40	Government official	118	07 August 2023
One-on-one	41	Industrial expert	150	02 August 2023
Focus group	42	Industrial expert	90	02 August 2023
	43	Industrial expert		
Focus group	44	Industrial expert	120	03 August 2023
	45	Industrial expert		

	46	Industrial expert		
	47	Industrial expert		
Focus group	48	Industrial expert	75	07 August 2023
	49	Industrial expert		
Focus group	50	Industrial expert		
	51	Government official	30	31 July 2023
One-on-one	52	Industrial expert	30	31 July 2023
One-on-one	53	Industrial expert	120	31 July 2023
One-on-one	54	Government official	60	31 July 2023
One-on-one	55	Industrial expert	60	04 August 2023
One-on-one	56	Industrial expert	60	04 August 2023
	57	Local farmer		
Focus group	58	Local farmer		
	59	Local farmer	60	04 August 2023
	60	Local farmer		
One-on-one	61	Government official	60	04 August 2023
Steet interview	62	Local resident	10	05 August 2023
Steet interview	63	Local resident	10	05 August 2023
Steet interview	64	Local resident	20	05 August 2023
Steet interview	65	Local resident	20	05 August 2023
Focus group	66	Local resident		
	67	Local resident	30	05 August 2023
Steet interview	68	Local resident	20	05 August 2023
Steet interview	69	Local resident		
	70	Local resident	20	05 August 2023
Steet interview	71	Local resident	10	05 August 2023
Steet interview	72	Local resident	15	05 August 2023
Steet interview	73	Local resident		
	74	Local resident	20	05 August 2023
Steet interview	75	Local resident	10	05 August 2023
Steet interview	76	Local resident	10	05 August 2023
Steet interview	77	Local resident	15	05 August 2023
Steet interview	78	Local resident	15	05 August 2023
Steet interview	79	Local resident	10	05 August 2023