Pairing Social Innovation and Resilience to Achieve Trans-formative Change:

From innovative solutions to innovative ways of understanding problems

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Pairing Social Innovation and Resilience to Achieve Transformative Change

From innovative solutions to innovative ways of understanding problems

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Abstract

This paper is a reflection on broadening understandings of innovation, using preliminary data on individual and collective repertoires of resilient practices in the context of multiple crises across Côte d'Ivoire. It explores how conceptual linkages between resilience thinking and social innovation (SI) can shift from innovative solutions to innovative ways of understanding problems to achieve transformative change. It argues that current conceptualisations of innovation are constrained within dominant technological and Western-centric paradigms that exclude vernacular innovation practices. Drawing from the relational dynamics between multiple crises in Côte d'Ivoire and vernacular responses thereto, it is observed that resilient practices harnessed through the complexity of social problems constitute innovative solutions that are perpetuated across time, scales and space. It, therefore, argues that pairing resilience and innovation uncovers how SI can be both transformative and continuous.

Keywords: resilience, social innovation, vernacular, crisis, Côte d'Ivoire

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[1]https://www.ids.ac.uk/projects/islands-of-innovation-in-protracted-crises-a-new-approach-to-building-equitable-resilience-from-below/

1. Introduction

In Côte d'Ivoire, like in most countries, responses to COVID-19 have fostered many innovations. This has ranged from making data-driven policy decisions with the RECOVR survey[2] to designing an electronic nano-server, serving as hotspot and storage device, through which midwives – with or without internet access – can access learning materials and training regarding COVID-19[3]. There is, however, a case to argue that these innovations, based mainly on "hard" science and technology, tend to occlude the part played by innovations resulting from new societal arrangements. For example, in the case of RECOVR, nothing is said about the background of the midwives accessing this nano-server technology for COVID-19 training. Yet the outcomes of the training and their impact on local public health are shaped in greater part by the prior experiences of these midwives as social products from communities that have used vernacular strategies to address other crises such as war, pandemic, or lack of health infrastructures.

Arguably, these technology-driven innovations do benefit from the societal context of multiple crises, for example in the case of Cote d'Ivoire where responses to COVID-19 build on existing (non)technological innovations. Nevertheless, the narrative around innovation in the COVID-19 context has predominantly reflected a scientific and technological bias. For example, Dr Matshidiso Moeti, the WHO Regional Director for Africa, stated that:

> *"Innovation propels human advancement. In times like these when we are confronted with a major public health emergency such as the COVID-19 pandemic, we know that our hope for a better tomorrow lies in finding creative, ground-breaking or avant-garde solutions" (WHO, 2020).*

Perhaps it would be fair to assume that the solutions Dr Matshidiso Moeti discusses here are of scientific and technological orders. Most innovation discussions in the current COVID-19 pandemic context have been framed in this way. This does not, however, cancel the fact that this "major public health emergency" unfolds alongside other pressing problems, such as food crises and health emergencies (e.g. malaria) faced by many populations, with little or no support from their national governments, nor the benefits of science and technology-based innovations. Innovations based on vernacular social practices are not usually paid enough attention because they are not considered products of scientific knowledge or technologies that can directly be linked to economic growth (Coad, et al., 2018; Griliches, 1960). Leading organisations likely to influence various innovation policies continue to see "hard" science as the key driver of innovation (Tushman, 2002). The OECD (2020, p. 2), for instance, views "distance from the technological frontier" as one of the key factors weakening the ability to innovate. Thus overlooking non-technological innovations not only embeds the dominance of a particular epistemology of innovation; it also limits their ability to contribute to transformative change.

Strictly speaking, technology does not necessarily refer to the sophistication of high-tech combinations or even low-tech artefacts but any sort of cognitive arrangement. Technology

[2] https://www.poverty-action.org/recovr-study/recovr-c%C3%B4te-divoire-tracking-effects-covid-19-pandemic
[3] https://cotedivoire.unfpa.org/

can be broadly defined as any type of "useful knowledge" (Mokyr, 2011, p. 4), and innovation understood as new methods, ideas, or products derived from an improved codification of existing useful knowledge or, simply, as a "better vehicle or understanding and creating social change in all of its manifestations" (European Commission, 2010; Phills, et al., 2008, p. 34). However, despite this one-size-fits-all understanding of both technology and innovation, there is a case to argue that its reigning epistemological paradigm imposes a strong bias towards scientific solutions over other forms of innovations, especially those based solely on new societal arrangements – i.e. Social Innovations (SI).[4]

In contradiction to this restrictive scientific and technological bias, imaginations of disasters are limitless. As generally illustrated in popular culture, cinematographic scenarios of disasters or Frankenstein-type epidemics, and graffiti representations of other man-made calamities; the paradox is striking between an infinite world of problems on the one hand, and the limited scientific spectrum within which the search of solutions is confined on the other hand. Yet, "the history of life is a history of innovations" (Wagner, 2011, p. 1), and indeed "useful knowledge" seems to be ubiquitous equipment common to all humans in "our game against nature" (Horn, 2018; Mokyr, 2011, p. 284). This contrasts with imaginations of solutions to human problems that appear to be constrained within the scientific paradigm of innovation. Technological innovation as synonymous with a useful mobilisation of "hard" sciences or high-tech has led to a distinction, and indeed, a tension between technology-based innovations and non-technology-based approaches (Schmidt & Rammer, 2007).

Non-technology-based approaches to innovation, as understood in this paper, simply frame a process of finding solutions, which is not heavily restricted by the scientific parameters defining innovation. This understanding of innovation also subscribes to a perspective that eschews the linkages between technology and its desired impact on the market economy in terms of growth or revenues. Instead, we find Social Innovation (SI) to fit an apposite description in the understanding that SI remains committed to its definition as "a large revitali[s]ation of the social aspects involved in any kind of innovation, technological innovation included" (van der Have & Rubalcaba, 2016, p.1924). This is still framed within the parameters of sustainability science which is driven "by the problems it addresses rather than by the disciplines it employs" with a focus on "creating a dynamic bridge between [knowledge and action]" (Clark, 2007, p. 1737). The type of knowledge that interests us here is embedded in non-technological vernacular practices, and as such, our focus on non-technology-based innovations does not reject the notion that "hard" technologies and other artefacts such as Information and Communication Technologies (ICTs) can redirect innovation capacity towards goals of social development (Fals-Borda & Rahman, 1991). This simply means that SI does not always have to rely on "hard" technology and that the impact of innovative social practices cannot be measured only through the lens of revenues or growth in the market economy or significant changes in the dominant Western-centric material culture.

[4] Even SI, understood as a subfield of innovation that focuses primarily on social transformation goals, tends to prioritise high-tech solutions and artefacts such as ITCs (Smith, 2017).

Significant transformations occur as human societies constantly seek innovative solutions to various crises they face at local levels by simply adjusting their collective habits and conventions or adopting new ones. These innovative practices imply crafting new sets of behaviours that transform the existing social organisation (Godin, 2008). We argue that the dominant understanding of innovation as driven mainly by technology and scientific knowledge[5] is somehow counterintuitive and restrictive of our insights into the potential of transformative change embedded in innovative social arrangements, as we shall argue in later sections of this paper. Innovation emerged initially as a very broad concept, speaking to the development of new ideas in multiple fields (education, aviation, healthcare, etc.) (Meissner, et al., 2017). Therefore, the ubiquitous human equipment of innovation contrasts with the narrowness of its "current tools" (OECD, 2020, p. 3), despite insistent calls to broaden and diversify understandings of innovation (Radjou, 2009; Vrande, et al., 2010; Wieczorek, et al., 2015). An analysis of popular responses to the COVID-19 pandemic teaches us that non-technological SIs as framed in this epistemological context are also at least as important as the technology-based innovations and as well as the SIs assessed only through their impact on the dominant Western material culture (Yoka Lye & Ngaki Kosi, 2020). Broadening and diversifying our understanding of innovation for transformative change involves paying more attention to non-technological forms and ideally non-Western contexts.

We argue that this broadening of understandings can also be enriched by pairing innovation with resilience thinking on a more conceptual level. Resilience is understood as the capacity for a system (community, group, nation, etc.) to deal with incremental or abrupt change through adaptative, coping, or transformative strategies. Walker, et al. define resilience as "the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks" (2004, p.4). Beyond its initial notion of 'bouncing back', current thinking on resilience includes its conceptual relation to adaptive capacity and long-term transformation (Carpenter & Folke 2006; Pelling 2011). This paper argues that we can achieve a clearer path for transformative change by pairing up resilience and SI as an emerging proposal in both academic and policy contexts (Moore & Westley, 2011; Westley & Antadze, 2010). In other words, we can explore the ways in which SI, as the capacity to adapt and cope in the face of given problems, articulates with the capability to innovate over and over again. This path is predicated upon the ways in which SI actors factor the wider context of multiple crises into their problem-solving strategies. In this paper, we seek to obtain the lessons that resilience thinking can offer from analysing some examples of SIs. Studying this path is also an answer to the call for unorthodox, interdisciplinary and potentially controversial approaches to studying innovation (Coad, et al., 2021).

This paper seeks to answer the central questions: how do we establish and substantiate the conceptual linkages between SI and resilience? What does a resilience lens teach us about innovation? How do lessons from pairing resilience and innovation illuminate the conditions or impediments for transformative change? Examples in this paper are drawn from

[5] See this current framing in our case study on Cote d'Ivoire:
https://www.gsma.com/mobilefordevelopment/blog/akwaba-to-the-cote-divoire-tech-ecosystem/

preliminary research undertaken in Côte d'Ivoire under a new Global Challenge Research Fund (GCRF) project called Islands of Innovation in Protracted Crises.

In the second part, we start by providing a brief overview of the current constraints on broadening innovation. The third part of this contribution examines the similarities and connections between SI and resilience within a framework of transformative change. We then use our illustrative case of Côte d'Ivoire in the fourth part to discuss how the context of resilient practices drives the outcome of SI initiatives and how the resilience systemic approach can illuminate the broadening of the SI specific-problem approach. Before concluding this paper, the fifth part offers a brief analysis of how pairing resilience and innovation illuminate the conditions or impediments for transformative change.

2. Does innovation stand in the way of transformative change?

A cursory survey of SI frameworks available online readily reveals a suppression of vernacular knowledge and experience, supplanted by top-down processes targeting communities as mere recipients and not producers of innovative knowledge (see framework samples: Fig. 2 & 3 below). The World Health Organisation (WHO) recently hosted a series of discussions that engaged directly with African innovators, with accordingly a more open-minded approach to "home-grown creative solutions aimed at addressing critical gaps in response to COVID-19" (WHO, 2020). In fact, according to the WHO, 12.8% of the 1000 new technologies and new modifications to existing technologies in responses to the COVID pandemics come from Africa (OMS, 2020). However, these leading African innovations remain in the scientific and technological domain (Woods, 2020), thus reinforcing the ongoing bias towards technology-based innovative solutions. At the same time, this points to a problem Drucker (1985) highlighted almost half a century ago, i.e. the inability of innovative science and technology to solve all human problems, especially when the infatuation with new technology-based innovation is detrimental to other important SIs. Indeed, based on the prevalence of technology in the type of African innovations celebrated by WHO as per above, one could rightly argue that these innovative responses from Africa are merely the adapting of technology and strict scientific knowledge to the context of Africa.

With the difficulty of formulating a universal response to the COVID-19 pandemic and its effects in the aftermath, it seems everyone is looking to achieve innovation, yet there is a context-dependent hierarchy in the production of innovative knowledge, which tends to minimise ideas from non-Western milieus. Diverging COVID experiences and success stories of innovation out of Africa during this pandemic are underscoring the need for an innovation framework, which goes beyond just "including" African innovative contributions to technology. Otherwise, the inclusion of non-Western examples of technological innovation appears to be just decorative as reflected in much of the way in which examples of African innovation are associated with the narrative of innovation generally, and SI in particular. For instance, explanations of the health innovations/successes/resilience in Africa have tended to dismiss African agency by attributing these to fate or the natural

setting (BBC, 2020). This still arguably highlights the dominant Western-centric paradigm in the conceptualisation of innovation.

Similar to the narratives around SARS or H1N1[6], explanations of African resilience to the COVID-19 pandemic essentially revolve around sheer coincidence, ranging from low connectivity to immunising endemic malaria (Hajizadeh & Behnemoon, 2020). Even though they are acknowledged, patterns of social behaviour that might have contributed to these divergences in outcomes are categorised as debroullardise (fending for oneself) in informal settlements (see Ijjasz-Vasquez, et al., 2020).[7] Scientific hypotheses for the contributing factors to a mild COVID impact and low case fatality observed in Africa include warm climate, the predominantly young demography, the cross reactive-immunity resulting from previous infections, and the universal BCG (Tuberculosis) vaccine policy, or malaria treatments. Nevertheless, these hypotheses "have not yet been confirmed by rigorous evaluations" (Umviligihozo, et al., 2020). In other words, strict science is not yet able to explain what could potentially have contributed to the resilience observed in Africa, but the foreground is given to scientific hypotheses rather than non-scientific vernacular pathways. Not only technological contributions from non-Western contexts are deprived of agency, but non-technological examples of SI from vernacular practices in Africa are also not emerging as central to rethinking the innovation framework. Consequently, the confusion still persists as to whether African experiences and innovators are being showcased in narratives of innovation as central elements or simply as geographical footnotes to complement the mainly Western narrative of innovation. This also begs the question regarding the role played by agency as a key driver in the innovation process (Howells, 2006).

However, just highlighting these contradictions, though a worthy effort, is insufficient. It is important to go beyond just showing that the term "revamp" utilised by Radjou (2009) in his discussion of "polycentric" innovation leaves the impression that the inclusion of non-scientific models and non-western forms of innovation cannot be central in the conceptualisation of broadened innovation. The adverse impacts of the technology-driven and the Western-centric paradigm of innovation pose the question of the epistemic significance of reaching out to African innovations. At a time when the limits of technology-driven innovation have been evidenced and the problems facing the world too complex to fit within Western-centric solutions alone, emphasis should be diverted to non-technological and non-Western social practices that could strengthen the ability to manage crises. In the absence of scientific certitude as to differing COVID-19 outcomes, for instance (Umviligihozo, et al. 2020), it is the African contextual discrepancy that centralises its experiences and indeed innovative ideas. However, much as this contextual question cannot be presented as a marginal mimicry of technological novelty unfolding in the context of Africa, it can neither be limited to articulating a specifically Afrocentric epistemological alternative to the question of SI, supported by the unmuting of the local transformative agency. In relation to COVID-19, for example, the public health lens for resilient epidemics responses needs to be widened towards a vernacular non-technological SI perspective to

[6] SARS (severe acute respiratory syndrome). H1N1 (strain of the flu (influenza) virus also known as "swine flu").
[7] See also https://africarenewal.exposure.co/youth-engagement-for-global-action-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbsp-nbspnbsp?source=share-africarenewal

deepen our understanding of the human ability to respond to crises. An entry point to this perspective is the study of the intersections between SI and resilience and how these contribute to broadening innovation.

3. SI and resilience: similarities, connections, and constraints

Resilience and SI are conceptually related because, as systems approaches, they both deal with the thinking on how human systems (communities, regions, groups, etc.) organise to face major crises or disruptions (Walker, et al., 2004, p. 5). Just like resilience, SI is indeed also particularly needed in contexts of crises (Ganin, et. al., 2016; Horn, 2018; Ijjasz-Vasquez, et al., 2020). Similarly, the exploitation phase in the Systems Dynamics Model (Fig. 1 below) represents the time and/or space where, following a rapid change after a destabilising event (crisis), new systems are created through mobilisation of social and other forms of potential capabilities that the system had produced from past crises, i.e. previous resilience cycles. From an SI perspective, new institutions and practices may emerge at this stage (see Fig. 2 "idea generation" and Fig. 3 "participative and collaborative approaches" below), in the same way, that new political, cultural, and social relationships offer a coherent interpretation of linked human and environmental processes for resilience (Cochrane, 2015).

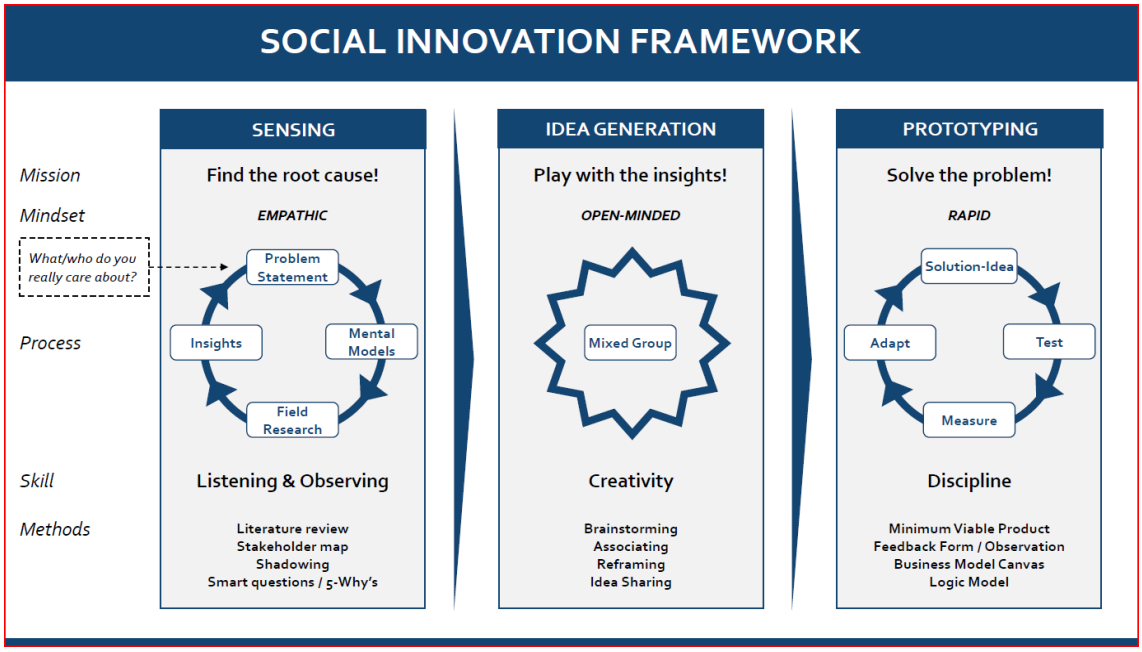
Figure 1. Holling's Systems Dynamics model.

Source: Adapted from Holling, et al., (2002) (credit: Mcafee et al., 2010).

In other words, the *exploitation* phase of the resilience-building process mirrors innovation in its implementation of newly harnessed social practices that help address one or more problems. In both its interdisciplinarity and systemic approach (Masten, 2001), resilience thinking also fits well in the sustainability science within which SI is framed (Clark, 2007). Within this framework focused on change, Figure 1 (as originally created by Holling) represents the behaviour of a resilient system going through cyclic stages of change. However, while the focus of Fig. 2 and Fig. 3 below remains the notion of change, their

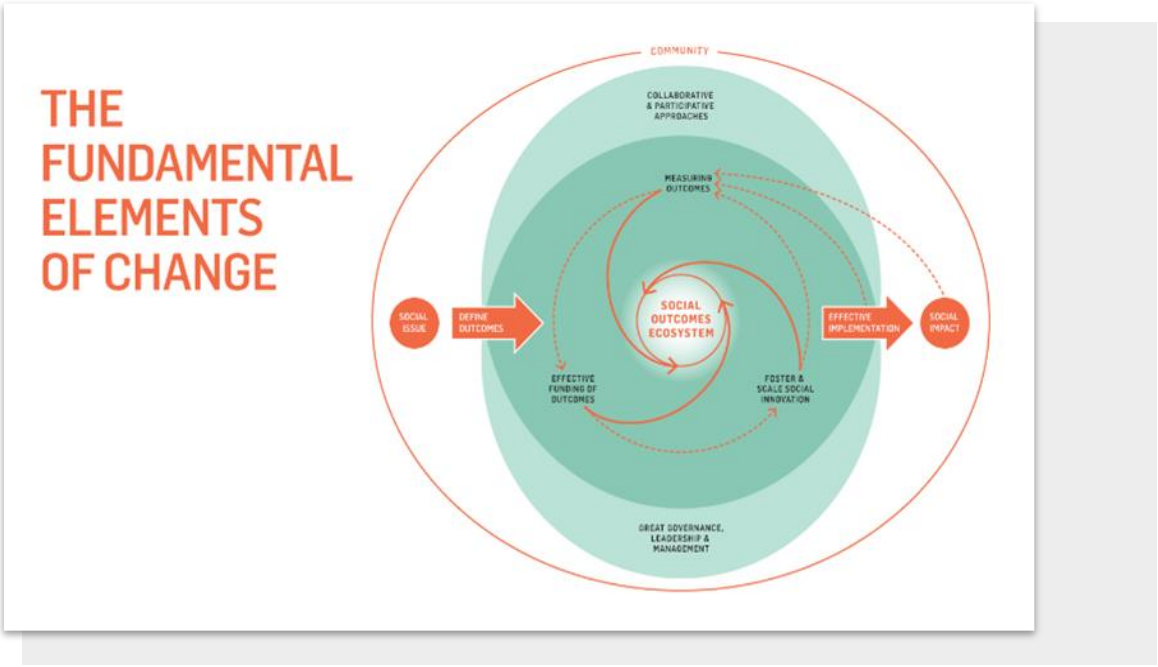
representation is more of a snapshot of the instrumentalities of effective/efficient change rather than its durability and continuity conditions. Even though transformability and sustainability are leading principles in SI, not much is expressed in Fig. 2 and Fig. 3 regarding the conditions under which these principles can stand the test of time under varying conditions.

Figure 2. Social Innovation Framework, Gianmarco Marinello © 2021.



Source: Retrieved from www.gianmarco-marinello.com

Figure 3. The Fundamental Elements of Change.



Source: Available at https://www.csi.edu.au/media/uploads/Social_Impact_Framework_852.png

So, according to these figures, resilience and SI can rightly be said to differ in their respective outlook on change. While SI focuses on change and transformability from the recent past to a not-too-distant future, resilience posits more on the inextricable links amongst the components within the system that ensure the balance between system change and continuity. Put differently, whereas resilience is interested in the conditions under which a system (e.g. a human community) survives major disruptions within a specific environment, SI is focused on the instrumentalities of novel solutions that address these disruptions at the social level. More specifically, SI is framed differently as aligned better with the process of finding solutions to challenges that impede societal welfare (Schot & Steinmueller, 2018, p. 1554), whereas resilience is invested in the patterns that enable the system to undergo change without disbanding. Nevertheless, rather than contrasting these two concepts, these subtle divergences can come together to complement one another within a transformative change ethos.

Several scholars have explicitly engaged the relationship between resilience and SI (Fougère & Meriläinen, 2021; Westley, 2013). One of the main connecting points identified between SI and resilience is their ability to embrace solutions for complex problems by juxtaposing elements that do not normally belong together, to address intractable problems (Moore & Westley, 2011). Westley further contends that while "the similarity between the cycle of innovation and the cycle of the release and renewal of resilient ecosystems is striking", the main pillars of resilience theory suggest that for the broader system to innovate effectively, closer attention should be paid at how society builds the "capacity for repetition – over and over again, forever" (2013, p. 7). Fougère and Meriläinen (2021), on their part, suggest that pairing up resilience with innovation can help illustrate the "dark sides" of SI, such as its adverse impacts on marginalised communities. This is indicative of the complementarity between SI and resilience thinking across three main

themes: complexity, sustainable change, and continuity. So, while resilience thinking enhances the ability of SI to look at problems systematically, SI illuminates the instruments by which social systems become resilient or are eventually transformed for continuity, especially by foregrounding the actors behind these processes (Westley, 2013). In the COVID and post-COVID eras, the complex socioeconomic ramifications of crises and their overlapping impact on various sections of society mean that SI will need to be more and more tuned to the requirements of a transformative change.

Inasmuch as transformability addresses social problems and refers to change as conceptualised in the sustainability transitions literature (Kivimaa & Kern, 2016; Turnheim & Geels, 2012), many SI transformative pathways also resonate with resilience processes as change management at system level. But, the framing of SI and resilience within a transformative change agenda somehow encompasses a reflection beyond addressing specific social problems or studying how resilience strategies come together to maintain and perpetuate a system. Instead, it requires a different focus on how to add a renewable dimension to innovative solutions, making SI a continuous process rather than a mere temporal device. The transformative change framing of innovation sees experiments "as temporary spaces for actors working together on a variety of concrete pathways" (Schot & Steinmueller, 2018, p. 1563). It is the SI's transformative agenda that projects it further into the resilience cycle by suggesting that, in addition to experimentation/exploitation, provision should be made to look at the impact of SI at system level. With a particular focus on how individual examples of SI pull themselves together into cross-context resilient practices, the next section argues that synergising these two lenses (SI and resilience) can help us to better understand transformative change. This is illustrated through examples drawn from the context of Côte d'Ivoire, where communities facing multiple crises come up with sustainable solutions while building the capacity to recreate such solutions over and over again.

4. Formations and "trans-formations"

The ways in which crises are formed, related, and constituted from many sources also reverberate on the many facets they develop as social problems. Hence socially innovative practices produce transversal transformative effects across several sectors. This "trans-formation" effectively gestures to the transversality of the resilience process over time, along with the notion of continuity in future constructions of such transversal resilience. As of 2018, Côte d'Ivoire was holding the 147th place (out 178) of countries most at risk of climate change-related disasters, according to a World Bank report (Banque Mondiale, 2018, p. 33). Other disruptions over the past three decades have included two major waves of armed violence (1999-2002; 2010-2011) (Huff, et al., 2016, pp. 59-63), natural hazards such as floods and landslides (Ketcha, et al., 2017), eco-environmental stresses, especially in the West (most notably the degradation of protected forest areas) and in the North, as well as chronic zoonotic diseases affecting livestock, farming, and livelihoods (Bassett & Koné, 2017; Kiewisch, 2015), and regular outbreaks of epidemics (such as cholera, meningitis and now COVID-19). Furthermore, climate change prediction around rising temperatures could seriously disrupt the region with its reliance on cocoa production

(Comoé & Siegrist, 2015). Given the concomitance of these crises, we have sought to look at innovative practices in relation to multiple crises.

The above crises or disruptions affecting the social dimension of life can be illustrated by obvious intersections such as those constituted between climate change, livelihoods and epidemics, or between conflicts and agriculture. Apart from underscoring the multiplicity of crises that the same communities may face and for which they demonstrate various forms of innovation, the literature on resilience in Côte d'Ivoire brings into sharp relief the relationship between conflicts and resilience (Bearth & Baya, 2010), or between eco-environmental stresses and disruptions to the livelihoods of communities that depend on farming or livestock to sustain their living (Kiewisch, 2015)[8]. For instance, Chérif explains how climate change and associated consequences on agriculture increase the vulnerability of rural farmers in the mountainous region of Goh (2013, pp. 1-5) – more details below. Another example is how the socio-political crisis in Abidjan prompted farming populations to change the way fresh produce was grown and marketed, and this resulted in the emergence of sustainable peri-urban agriculture as a form of social innovation. In fact, before the year 2000, fresh food production in the city's periphery was low and consisted mainly of food produced for home consumption rather than market sales. Starting in 2000, and particularly after the beginning of the socio-political crisis in 2002, many additional cultivation sites emerged on the periphery of Abidjan. Farmers were thus able to make up for income loss due to the political situation by innovatively reorienting their capacities and assets in ways that met their essential needs (Babo, 2010). The argument here is that recognising the intersections between the COVID pandemic and climate change, for instance, is not the apanage of high-level policymakers. In a multiple-crisis context, citizens perceptively factor in all the crises in their design of innovative solutions to one problem. We find that streamlined within these bottom-up social innovation practices, a strong acknowledgement of intersections between these crises is present since they are addressed as such.

Hence, the ability of human communities to find innovative ways to manage economically in the face of multiple crises implies perhaps a more intuitive understanding of how the crises develop, intersect, and overlap into multifaceted problems. In other words, bottom-up vernacular SIs in these contexts cannot be dissociated from the formation of the crises. A long-term perspective over these forms of SI with built-in awareness of how crises are constituted offers to move from a strictly problem-specific paradigm of SI to a system's approach with broader impact. When, for example, we consider "rain rituals" performed by rural farmers in the mountainous region of Goh (2013, pp. 1-5), a transversal reading of this performance reveals that it not only addresses climate change and its associated consequences on agriculture, it is also a spiritual tool to deal with the psychological impact of vulnerability. This practice seeks and certainly achieves transformation across multiple aspects of the same social problem or several social problems. Hence, the notion of "trans-formation" is gesturing to the transversality of these dynamics. As these rituals can be renewed every year, the systemic resilience perspective thus also enables a view of a series

[8] See also subsistence agriculture (Comoé & Siegrist, 2015), or the swollen shoot disease that causes a sharp and rapid decrease in cocoa output, as the disease eventually kills cocoa plants, leaving farmers in very vulnerable economic positions (Kouakou, et al., 2012).

of SI instances as a vast array of resilient strategies hinging upon a localised matrix of never-ending innovation. Hence, pairing up resilience and SI can contribute to better addressing the intersections between crises and provide a more sustainable framework for contextual solutions.

4.1. Knowledge of SI context drives the outcome of system resilience

It is crucial to envisage SI as inscribed within a wider social context and structured by a multitude of other problems. The significant number of studies that have indeed focused on resilience in Côte d'Ivoire (Banque Mondiale, 2018; Bearth & Baya, 2010; Chauveau, 2000; Comoé & Siegrist, 2015) can be revisited from a SI perspective to see how vernacular innovative practices emerge in the face of various crises and produce innovative arrangements to combine and integrate multiple solutions to different (facets of) problems.

There are many examples of how the adverse impact of resource scarcity and climate change is mitigated locally, especially in the agricultural sector. Already in 1996, a paper by Léonard & Oswald (1996) demonstrated how farmers were innovating and putting into place a more sustainable form of agriculture in the context of this resource scarcity crisis, developing what they have termed as forest-agriculture without any forest anymore. This entails diversifying types of crops and different practices for better soil management. Another recent project led by CIRAD[9] on farmer innovations and resilience in the face of climate change on cocoa farms has examined the adoption and impact of the use of chicken dung in cocoa farms in a context of massive deforestation, loss of soil fertility, more frequent droughts, and the relatively high price of fertilisers.[10] Finally, a study by Golou, et al. (2019) focused on farmer innovations in the context of land saturation caused by migratory flows. The study shows how different communities have implemented innovative agricultural strategies based on the introduction of cashew nut cultivation, normally adapted to savannah areas, used by farmers in the southern forest as an alternative crop to restore impoverished land. Here we see that innovative practices brought about at the community level do not only show an awareness of concurrent and related problems (such as the combination of deforestation, soil fertility, the high price of fertilisers), they are also cast as part of much wider transformative efforts against certain structural dynamics, even though they are not explicitly articulated as such.

Other scholars have also investigated how communities have developed their own mechanism to avoid violence, faced with military crises and violence (see Allouche & Jackson, 2019, Allouche & Zadi Zadi, 2020). As an example of the awareness of how crises are constituted, some rural communities quickly realised the potential ramifications of the 2002 political violence into land-related violence. As soon as the conflict started in 2002, these communities endeavoured to implement clear and consensual mechanisms for land usage (Allouche & Jackson, 2019). This was the case of the Yacoli Dabouo village, a large 7000-inhabitant village located in the Soubré department. A village council representing the

[9] Centre de Coopération Internationale en Recherche Agronomique pour le Développement (Center for International Cooperation in Agricultural Research for Development)
[10] https://umr-innovation.cirad.fr/en/projects/cedeao

different communities was put in place to sensitise the illegal nature of selling land. The management committee administered all the land-to-land management and tenure transactions and then sent them to the sub-prefect office for registration procedures only. This means that at any point, discords arising after these transactions can be arbitrated by the sub-prefect office more transparently and neutrally. Apart from being an example of SI on the part of communities embroiled in multiple crises with various ramifications (war, land dispute, deficient legal framework, state absence, etc.), the timing of the initiative in the case of the Yacoli Dabouo village demonstrates an acute awareness of the problem formation process as well as a community-led innovative practice. In the specific political context of 2002, where state resources would have been reoriented towards the political crises, this IS preemptively mitigated the negative outcome of the political crisis, based on the knowledge of its potential ramifications and an understanding of participating actors in that context.

Another study that considers the potential of vernacular innovative practices to achieve peace in the Ivorian context was conducted by Kofi, et al. (2014). Although the study was more conceptual rather than referring to specific examples, it reflected on the collective capacity to transcend trauma through ethical vernacular values. It specifically looked at the non-institutional aspects of forgiveness, reconciliation, and dialogue as tools to progressively recover "national social cohesion" that had been lost to the multiple economic and socio-political crises. Referring to post-electoral and political violence in the country, Kofi, et al. recognise that the effective "social durability" (2014, p. 30) of these innovations cannot be dissociated from the process of containing the multidimensional vulnerability of the national community. Put differently, forgiveness as an innovative solution to protracted conflict, for example, must work better alongside measures to tackle economic hardship. Hence, the notion that the passage of time will help address war-related trauma is predicated upon the shared value of forgiveness but steeped in the shared assumption that other aspects of the problem are addressed as per contextual knowledge. Post-conflict periods are also critical moments of SI during which collective self-introspection can help re-centre certain values that elicit community-based forms of social innovation. Interestingly, the ability of these vernacular SIs to embrace multiple (facets of) problems is an enduring understanding of how these innovations reach beyond a specific problem and are conjugated amongst themselves based on contextual vernacular knowledge.

Thus, looking at these vernacular SIs from a resilience perspective allows us not only to break down the transformation of social systems into their constituting sequences and actors but also examine how the mutual linkages ensure the sustainability of transformative change thereafter. It becomes clearer how the implementation of successful bottom-up SIs articulate with a more resilient social system in the long term. This is because looking at these SIs using a resilience lens also allows us to identify who the social actors are and what roles they play to challenge established conventions and problem causes so as to bring about immediate transformative change and potentially future transformative changes in new contexts. At the same time, the systemic and cyclic perspective of resilience with a long-term view over these actors and sequences of SI allows us to identify amongst these actors those likely to leverage innovative ideas for much greater system impact, maybe extending from community level to regional level. The resilience lens does this by

identifying key elements of the SI device, likely to sustain the renewal and diffusion of innovative practices across space, scales, and in the future. By combining the problem-focused SI approach with the system-focused resilience perspective, as is going to be the case in the next section, we can study innovative ideas and actors, as well as how certain types of actors operating at system level work to make transformative change a renewable occurrence.

4.2. The specific problem approach vs. the systemic problem approach

As demonstrated by the interplay between various aspects of many crises in the Ivorian context above, the ways in which problems facing human communities are constituted across space and time cannot accommodate a framing of SI that looks at a problem without its relationship to other concurrent problems. Yet, SI is usually seen as focusing on the specific problem, albeit by bringing together many elements into innovative solutions. Resilience thinking, on the other hand, problematises problems as disruptions that need to be overcome by the combined efforts of elements within the resilient system itself. For instance, there are two complementary ways of looking at SI in the area of micro-economics observed in the village of Assoum (Côte d'Ivoire), a social space heavily impacted by the COVID-19 pandemics. The agricultural sector in this village especially bore the brunt of lockdown measures and travel restrictions promulgated by political authorities without much support to populations thus affected. Our preliminary research in Assoum (whose local economy rests mainly on market gardening) has observed that villagers had to stop crop production because they were unable to sell their crops to the cities for many months. Without government assistance, while their livelihoods were thus compromised, the villagers came up with the idea of borrowing money from micro-finance institutions against nothing, if not uncertainty. Of course, like in many countries across the world, these rural micro-finance institutions were set up for the sole purpose of lending money to these market gardeners, but with a system of guaranteed repayment whereby the entire crop production was committed against the loan – a social innovation in and of itself. The other SI emerges because the same loan was being henceforth made against nothing and in times of uncertainty when no one could foretell how long the lockdown was going to last. This challenged the traditional relationship between these micro-finance institutions and the villagers in a way that redefined the lending procedures even after lockdown. By mobilising their social capital, villagers were able to foreground trust and hope as bankable commodities in rural agriculture.

One way of looking at this novel development would be to focus on the financial problem it thus effectively solves and the transformative change brought about in the social setup. The SI perspective allows us to "zoom in" on which social ingredients were combined to arrive at this solution, namely the role played by individual and groups of villagers such as association leaders or ordinary farmers on the one hand, and maybe other actors internal to the micro-finance institutions who were championing this shift in thinking and lending practice on the other hand. In addition, we may also study how and why the social capital constituted by these actors contributed to this transformative change and the extent to which this can be rolled out to other contexts. However, a resilience perspective studies this rural financial sector and the local market gardening community as constitutive parts of the same ecosystem that pulled various elements together to reorganise and avoid collapsing

in the face of a crisis[11]. Furthermore, such an approach, first of all, interrogates the choice of market gardening as opposed to traditional cash crops in Côte d'Ivoire (cocoa and coffee) as a possible track record of how the said "ecosystem" had faced and survived past disruptions. The advantage of bringing these two perspectives together is that they will now enable the analysis to trace, over time and space, those ingredients evidenced from the SI perspective (problem-specific) that are likely to ensure that the "ecosystem" (resilience) continues to find ways of successfully facing crises over and over again (sustainable, transformative change).

The scale of crises and the autonomous capabilities of the communities facing them come together in a complex web of relations that can be used to better understand how those novel ideas challenging conventions come about and the conditions under which similar ideas might emerge again. These sites of innovation provide an opportunity (a) to advance the understanding of innovation as the sine qua non-condition for and an integral part of the resilience process and (b) to posit that the framing of SI can be expanded to mirror the complexity and multiplicity of the problems it seeks to address. Hence, in addition to the uses of the resilience-innovation link (Fougère & Meriläinen, 2021; Westley, 2013), the next section develops a framework to see how this link can provide a path to study the conditions of sustainability and continuity for transformative change.

5. Building a framework to pair SI and Resilience approaches

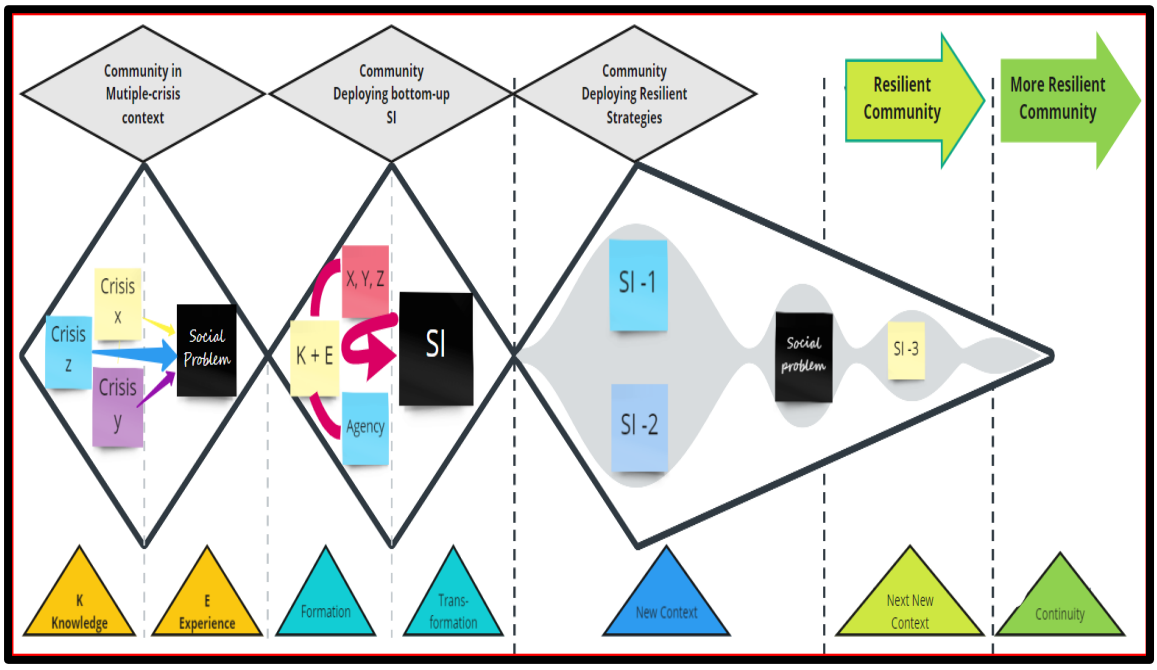
While the focus on African innovations during the COVID-19 era has helped show that broadening is required even within the scientific and technological paradigms (Hajizadeh & Behnemoon, 2020), the question remains as to why this context has had to be excluded in the first place and how much this exclusion now tells us about SI. The explanations given so far are limited. These limited explanations consist mainly in critically acknowledging that: 1) Western-centric assumptions, or indeed any self-absorbed innovation processes, that centralise the producers and geographical loci of innovation, miss out on alternative pathways that could also contribute to transformative change (Fougère & Meriläinen, 2021); 2) innovation policy designs are dominated by strict scientific knowledge even when reality defeats scientific predictions (Umviligihozo, et al., 2020); 3) large national and international institutions tend to respond to the need for innovation by promoting technological breakthroughs while relying on the past in search for solutions to present crises and emergencies (thereby creating restrictive, iterative, and linear relationships between existing solutions and innovation) (Ramalingam, 2013). However, in light of the examples of SI in Côte d'Ivoire and how they articulate with resilience, in the long run, addressing the three explanations above would be helpful but not sufficient. Addressing them might help improve the impact of innovative solutions, but looking at social innovations in multiple-crisis contexts from the combined lenses of resilience and innovation allows us to make an important conceptual change. This combined approach points to the possibility of shifting attention away from the dominant focus on innovative solutions to focusing on innovative ways of understanding problems in the first place.

[11] See Figure 1 above (Holling's Systems Dynamics).

In order to achieve this, we consider the ways in which multiple crises are constituted, related, and dealt with transversally in the examples studied above. In the case of Côte d'Ivoire, the focus on both the relationship between parts of the social system facing multiple crises on the one hand (resilience), and the elements brought together from bottom-up in the process of solving social problems (SI) on the other hand, leads to reimagine SI as not just finding innovative solutions, but also as probing how the plural vulnerability of social groups is streamlined into the innovative process and, more importantly, how this process is repeated over time. Then, we emphasise the continuity of the innovative process over time, i.e., the ability of social groups who find innovative solutions for specific crises to be able to repeat it repeatedly. This second emphasis is the part played by resilience thinking in that it helps foreground such actors and patterns that ensure the adaptability of the whole system across time and space.

The benefit of such a dual approach is that the mutual relationships uncovered between the problems become sites of innovation that bear the seeds of sustainable, transformative change. It is, however, worth noting that our focus on the formation of problems or crises differs slightly from the political line of inquiry that is limited to questioning the structural origins of crises and the ways in which top-down SI policies can lead to further disruption and/or marginalisation as demonstrated by authors such as Fougère & Meriläinen (2021, pp. 7-8). The proposed approach in this paper, as illustrated in Figure 4 below, is about four key objectives: 1) challenging the limits imposed unto our own understanding of SI by the thematic silos, top-down approaches adverse to vernacularity, and sectoral restrictions within which crises are often boxed, 2) conceptualising crises as integral elements of an ecosystem inside which complex relationships provide a space for SI to embrace its constituent parts through the agency of ordinary social actors; 3) rethinking the notion of novelty in SI by questioning the jurisdiction of its timeline; 4) combining a granular examination of SI actors and sequences with a systemic analysis of the conditions under which transformative change repeats itself over time.

Figure 4. Proposed SI-Resilience Approach Pairing Framework.



Source: Authors' own.

The framework above conceptualises SI drawing from a contextual matrix that adds a multidimensional layer to any perceived problem. As seen with the convergence of crises X, Y and Z into a social problem (or the facets thereof), a specific SI process cannot be seen as addressing only one problem or one aspect of a problem. The contextual knowledge and experience (K & E) of innovation actors are intuitively factored in, both in understanding the social problem (its formation) and in the design of the socially innovative solution. Additionally, this intuitive knowledge and experience are carried over in new contexts, thus ensuring the community's ability to recreate new solutions continuously. This framework thus highlights the plurality of facets to a problem to emphasise the agency of innovation actors as ingrained in their knowledge of the problem context. We argue that the outcome of SI processes depends on this intuitive knowledge of the multiple-crisis context. In Figure 4 above, walking backwards on the transformative change trajectory also lays bare the relationship between innovation and resilience: the former being the device and the latter the process through which this device moves across space and time. As Figure 4 indicates, innovative practices based on single paths miss out on the multidimensional nature of each specific problem and the extent to which the contextual matrix feeds into the overall innovative solution. This is one of the blind spots in innovative frameworks that do not create space for non-scientific or intangible variables. A case in point in the African context is a focus on health innovations during the COVID-19 pandemic, that does not give as much attention to the social actors and context shaping the so-called "surprising" resilience of the continent or the vernacular experience of health workers, therefore suppressing from the framework both the agency of innovation actors and their ability to renew or diffuse the innovative process.

In a specific social context, bringing together several facets of problems that feed into the design of specific innovative solutions (see X, Y, Z, Figure 4, second column) enables the

framing of SI to achieve two things: 1) highlight how individual problems are interrelated; 2) intuitively take into account the "blind spots" in the interrelation between different crises. In other words, since specific innovation for one crisis might increase vulnerability to another crisis, a framework should consider how various shocks or disruptions interact with one another over time. A resilience outlook on innovative practices enables us to see this more clearly. Hence, instead of locating a site of innovation in the face of the present crisis, the site is moved one scale-up in the merging point between two or several problems as prompted by individual innovative devices. Therefore, the proposed framework also highlights awareness of how the effectiveness of innovation can be limited or even thwarted by overlooking the relationship between the crisis being addressed and other crises located in different times or spaces. This framework thus situates resilience as mediating the context through innovation so that the innovative process interlocks with the ability to face multiple crises in varying contexts and repeatedly over time.[12] This is a path to effective and lasting transformability because it can be transposed and transferred significantly. This is appropriate for innovation research, not least because the consequences of the current COVID pandemic extend beyond the sphere of public health to generate economic and socio-cultural impacts. In the context of non-scientific knowledge, the difficulty now remains how to excavate the patterns of relationships between these various crises that might not be readily observable through the main problem that a given type of innovation is seeking to address.

We propose that the answer to this conundrum can be divided into three steps. The first step would consist in adopting this multidimensional approach which connects the driving (f)actors of SI to resilience outcome. The second step develops from the main argument of this paper and is based on lessons learned from the African experiences and examples of innovation: bringing together various transformative trajectories for a specific social context into a matrix that can serve as a seed of innovation to build on previous successful examples within the same context. The third step involves foregrounding the agency of innovation actors as indissociable from the SI itself. These three steps aim at harnessing innovation and complement the proposed framework with resilience as an entry point into unknown connections and relationships between crises. Like in the case of the unexplained COVID-19 resilience in Africa, the multiplicity of hypotheses simply indicates that, although no single hypothesis has so far been rigorously evidenced, this resilience is grounded in the plurality of strategies (both scientific and non-scientific) to overcome other multiple crises. Since SI can be understood as an integral part of the resilience process, an effective SI process should mirror this resilience in its identification of the problems it seeks to address. Put differently, since it can at least be demonstrated that effective resilience pulls from multiple innovation sequences addressing separate problems, the SI framework within which communities promote their resilient vernacular practices is one that thus strives to embrace all the potential problems related to the one it is tackling. This results in a systematic look at how human problems are constituted, interconnected, and localised. The proposed framework and the three steps to excavate connections and relationships

[12] See SI-1, SI-2, and SI-3 in fig. 4 above as resilience cycles repeat themselves, carrying innovative capability within.

between crisis consequently offers an insight into understanding what forward-thinking transformative change could look like.

6. Conclusion: Understanding formations to create transformations

This paper contribution has sought to draw lessons from African experiences of innovation in a multiple-crisis context against the backdrop of the COVID-19 pandemic. It argues that widening the scope of innovation must do more than simply expanding the jurisdiction of certain Western-based geographic poles or acknowledging non-technological/non-scientific forms of innovation. It has made a case for a broader conceptual underpinning to study SI beyond a mere loosening of the social dimension in the concept of innovation. Instead, it has examined how allowing the conceptualisation of innovation to mirror the interplay between crises from a system approach can provide a path to transformative solutions that are renewable, and therefore transferrable. In the post-COVID era, both the diverging outcomes of data-based predictions and examples of innovation coming out of Africa, especially in the health sector, refocus the debate on expanding SI. Reflecting on how to ground innovation in the context of Africa, this paper has, first of all, explored known barriers to broadening innovation definitions, such as the dominance of strict scientific knowledge. It finds that other forms of knowledge need to be brought into the SI conceptualisation framework, not just as an addition to existing centralised processes of designing and conceptualising innovation, but rather as a way of decentralising innovation, both geographically and epistemologically. The following empirical analysis supports our recommendation for a framework that harnesses innovation outside the spatial coordinates of a Western-centric world, beyond the data-driven models based exclusively on science and technology, and away from the iterative linearity of innovative improvement by better alternatives.

As laid out in this paper, the consequence of this is that the conceptual underpinnings of innovation generally can be extended to escape the iterative linearity and the narrow focus on the creative process of finding innovative solutions to specific problems. Instead, it advocates innovative ways of understanding problems by pairing up SI and resilience thinking to examine innovative strategies. As a result, bringing various resilience paths into a single matrix constitutes another starting point (a seed of innovation) for a novel SI framework. In this framework, there is conceptual space for envisaging SI as an integral part or tool of the resilience dynamics or conceiving transformative change itself as an outcome or by-product of the community resilience process. As illustrated by empirical data from SI examples and resilience practices observed in Côte d'Ivoire, when the two lines of thinking (resilience and SI) are brought together, the complex relationship that binds multiple problems emerges as the prime target of a truly innovative process. In other words, the relationship amongst social problems and the ability of communities facing them points to sites of innovation where resilience can also be understood as an expression of trans-formative change (across several sectors), i.e. transformative change is related mainly to connectedness in the resilience cycle.

Therefore, the combined approach is not just about applying the most effective approach to learn how survivors organise to successfully recover from major shocks or crises. It is about mapping the complex relationships between these multiple shocks and how these are mediated through the SIs offered so that the potential for transformative change is plotted across a continuum that escapes the current compartmentalisation of challenges faced by individuals and/or communities. This appears as an essential step in alternative efforts to harness innovation. Innovation may therefore be seen as a renewable element of a resilience strategy to overcome problems, especially if the context is allowed to substantiate the agency of actors with intuitive knowledge and experience of how the problems intersect and interrelate. Most importantly, the proposed framework not only breaks down the solution-focused approach when dealing with innovation, but it also centres vernacular experiences as related to multidimensional crises and thus creates the space for shifting the focus, from solutions to problems; from problem formation to resilient trans-formation, and ultimately from present to future.

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