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Towards a social-ecological understanding of sustainable venturing

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ABSTRACT

Leveraging social-ecological systems literature and an exemplar case, the Panamanian-American venture *Planting Empowerment,* we introduce the notion of entrepreneurial synchronicity, emerging from an inductive approach, as a key concept for advancing sustainable entrepreneurship theory. Through an exploration of timing and rhythm of the new venture we can start to better explain and understand the degree of connection between the venture and its surrounding human and biophysical contexts.

1. Introduction

Sustainable ventures are commercially viable ventures that advance the causes of environmental protection and social justice (Muñoz and Dimov, 2015). As the volume of, and interest in, sustainable entrepreneurship research increases, the field's boundaries set by entrepreneurship literature can no longer hold the expansion, facing the need of taking the inevitable step forward and crossing the border into its natural fellow field, namely sustainability science. In this paper we seek to take that step forward by deepening our reflection on the sustainable entrepreneurship journey and rhythmic-societal and biophysical-patterns. Doing so inevitably forces us to explore the following conundrum: if nature and society have their own rhythmic patterns and sustainable entrepreneurship is a subset process of these two (presumably more connected to nature and society than other types of entrepreneurial activities), what is the rhythmic pattern of sustainable entrepreneurship (if there is any) and how does the process whereby it comes into being interconnect with broader social-ecological systems?

Drawing on an inductive case-study in Central America and social-ecological systems literature (Ostrom, 2009), in this paper we propose a new way to frame and understand the sustainable entrepreneurial process. We do so by elaborating on the notion of entrepreneurial synchronicity within social-ecological systems. Although embeddedness has been previously tackled in SE literature (e.g. Kibler et al., 2015; Shrivastava and Kennelly, 2013), the concept of synchronicity "within a place" adds to the ongoing – and still emerging – SE discussion by looking beyond the inner "opportunity development" narrative and market interaction (Muñoz and Dimov, 2015), towards considering the rhythmic patterns of the entrepreneur and its venture together with those of the economies, societal groups and natural ecosystem sustainable entrepreneurship relies on. While extant companies interested in advancing their sustainability aspirations are required to developed temporal ambidexterity (Slawinski and Bansal, 2015), we argue that sustainable entrepreneurship, in the act of creating, is uniquely positioned to synchronize their emerging activities with the natural cycles of their social and ecological contexts. This opens up the field to a new set of concepts and constructs, and also to reconsidering the theories we currently use to capture and explain antecedents, processes and outcomes of (sustainability-oriented) entrepreneurial behavior, while adding further depth to our growing understanding of entrepreneurial embeddedness.

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2. Sustainable entrepreneurship and social-ecological systems

Social and environmental threats are at the heart of sustainable entrepreneurial action, as they provide the context for the emergence of perceived venture opportunities (Muñoz and Dimov, 2015). While the entrepreneurship process whereby SE creates social, environmental and economic value has been previously examined in depth by numerous scholars (Hall et al., 2010), the intimate connection between their enterprising actions and the human and biophysical contexts is absent. Social and environmental contexts are frequently treated as the sources of problems, the beneficiaries of the solution or the institutional environments facilitating or constraining entrepreneurial action (Dean and McMullen, 2007; York and Venkataraman, 2010).

The systems in which these entrepreneurs operate are multi-dimensional comprising socio-cultural, institutional and natural contexts (Shrivastava and Kennelly, 2013). The dynamics within such contexts are commanded by attributes of the community, rules in use and biophysical conditions (McGinnis and Ostrom, 2014). Actors operating within the social-ecological system (SES), such as sustainable entrepreneurs, seek to achieve their goals bounded by ubiquitous biophysical constraints and social dilemmas. As such, social, institutional and biophysical factors are inputs to as well as boundaries for the decisions and actions of sustainable entrepreneurs. These contexts are semi-independent but interact and reinforce each other, affecting long-term ecosystem dynamics (Redman et al., 2004). The decisions and actions of actors operating within each of the contexts get intertwined creating patterns of interactions (McGinnis and Ostrom, 2014), The systems where actors are embedded are complex, multivariable, nonlinear, cross-scale and continuously changing (Ostrom, 2007). In making sense of what happens within a given social-ecological system (prospective home for the sustainable entrepreneur), Ostrom (2007) proposes a nested, multitier framework comprising resource systems (e.g. forest), resource units generated by the system (e.g. teak plantation), actors that participate in the system (e.g. smallholder farmers) and governance systems (e.g. farming cooperatives or subsistence farming) that set the rules for actors. These four components of any particular social-ecological system "jointly affect and are indirectly affected by interactions and resulting outcomes achieved at a particular time and place" (Ostrom, 2007:15181).

Most notably, while human and organizational actions are malleable, the behavior of the biophysical world is mostly immutable, yet we have grown the entrepreneurship field without that principle in mind. As such, although these immutable exogenous forces drive changing circumstances and are not under the control of the actor, entrepreneurial decision-making and practice still rely on the idea that natural and social resources are out there to be used and disposed at the pace required by the purpose of the emerging venture, or in the case of sustainable entrepreneurs, with as minimal impact on social-ecological systems as possible. Despite the inherent interconnectedness between contexts and the fact that all human (and entrepreneurial) activity is embedded in complex, social-ecological systems, our thinking is still compartmentalized and the underlying fields do not combine easily (Ostrom, 2009), requiring a further examination of whether and how sustainable entrepreneurship can interconnect with broader social-ecological systems.

3. Research methods

The coauthors of this paper have been engaged in a multi-year qualitative research program exploring different dynamics of sustainable entrepreneurship. We have conducted extensive interviews with more than three dozen sustainable entrepreneurs since 2012 in the UK, United States and Latin America. Our research for this project draws on a single case-study design and qualitative inductive techniques for data collection and analysis. *Planting Empowerment* is a Panamanian-American forestry company founded in 2006 that works with Panamanian farmers living on deforested land to re-forest and generate sustainable household income. It practices tropical forestry in a way that empowers local communities in Panama to profit sustainably from their natural resources. *Planting Empowerment*, we argue, is an exemplar case that provides evidence of a growing stream of sustainable entrepreneurs articulating entrepreneurial practice aligned with SES rather than pre-defined sequences of actions aimed at efficiently moving ideas to markets or scaling their enterprises.

The data stems from a series of interviews with one of Planting Empowerment's co-founders, documentaries, video recordings of Panamanian villagers, testimonials of international investors and an extensive review of documents, such as: internal and external reports, media articles, blog entries and local reports documenting the impact of the venture. Data was collected between 2012 and 2015 (Appendix A). In making sense of the various data, we draw on the Gioia Methodology, which is a systematic approach to new concept development and grounded theory articulation (Gioia et al., 2013). This method emphasizes the delineation of first-order codes, themes, and conceptual categories as a researcher works recursively between the data and emerging themes. In the first part of the analysis, we used open and axial coding to reveal practices connecting the venture, nature and society and then examine the similarities and differences among the many emerging categories. Subsequently, we aggregated the first-order codes into themes, where we identified two clear streams related to the relevance of place and time. Based on the preliminary understanding of the venture journey within social-ecological systems, we conducted a detailed examination of first-order codes and second order themes by looking at those elements or instances where the venture connects to the rhythmic patterns of its societal and biophysical contexts. Finally, we raised the level of abstraction to show the aggregated theoretical dimension grouping the themes (Shepherd and Williams, 2014), which resulted in the emergence of the two conceptual categories: embeddedness and synchronicity, which we consider to be the main underlying principles driving venture's decisions and actions. Fig. 1 illustrates our inductive reasoning leading to these two conceptual categories.

In the next section, we present a more thorough case narrative supporting the emergence of the two conceptual categories, followed by a discussion of embeddedness and synchronicity and their implications for our understanding of sustainable entrepreneurship.

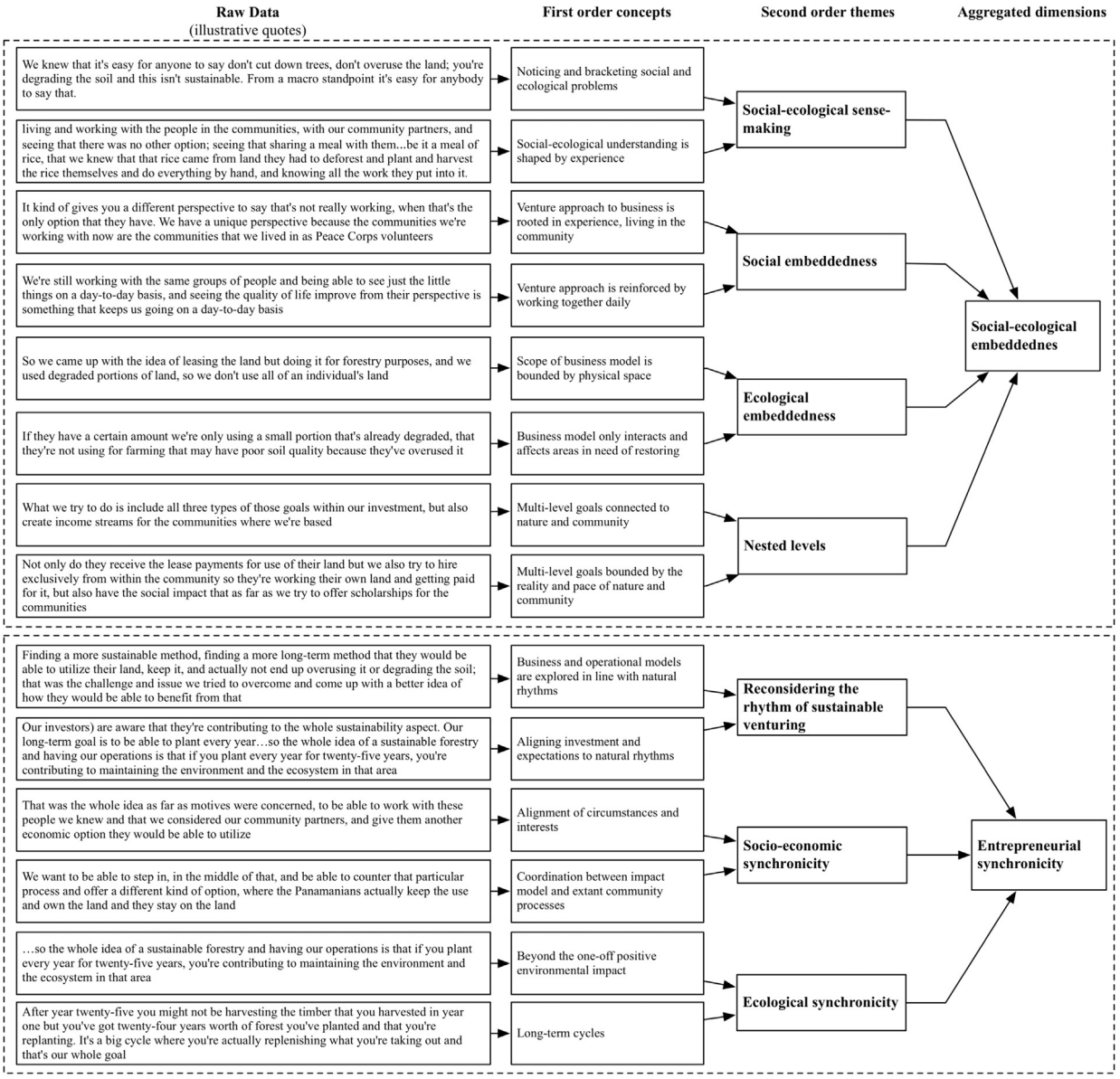

Fig. 1. Illustration of inductive reasoning: raw data, themes and conceptual categories.

4. Findings and discussion

4.1. Case narrative and emerging themes

Survival in rural areas of Panama is a complex issue. Small farmers and indigenous communities depend on what the forest is capable of generating, focusing mainly on livestock, agriculture, logging and burning trees. Despite the efforts of communities to maintain natural capital, farmers and indigenous tribes have resorted to deforestation of the native rainforest to survive, creating major losses in biodiversity over the years. Keeping the forests intact without human intervention is important for anyone working in the conservation arena, but it is different for those who depend on natural resources for survival. Any kind of settlement must consider the needs of environmental protection and at the same time ensuring the economic survival of communities. In this sense, the deforestation-poverty equation poses a dilemma only solvable through aligning practices with social-ecological dynamics.

By 2006, Planting Empowerment had to decide to either keep trying to protect the forest from the world of NGOs, with consequences for communities; or articulate a new type of sustainable entrepreneurship process capable of protecting the environment and improving the well-being of local farmers. The firm grew from the experience of the founding team and the understanding that it is possible to build businesses out of such complex problems and resolve the dilemma between livelihoods and conservation. Thus, the logics they relied on to decide how to operate in the face of such a sustainability problem were inherently tied

to the already existent social life and various activities that this community valued experiencing and the inherent material features of the natural environment.

Instead of buying the farmers out for the purpose of environmental protection, they elaborated a model to develop profitable agroforestry projects that promote land tenure via sustainable farming of a mixture of native tropical forests and species for subsistence. This way, Planting Empowerment aligned the entrepreneurial process with the dynamics of both the Panamanian community and the surrounding natural ecosystem. To achieve this alignment, Planting Empowerment raises capital primarily in North America through a mix of crowdfunding and short-term and long-term investment for forestry projects in subsistence markets countries.

> "Our investments are suited to investors seeking portfolio diversification through a lowly correlated asset class, and who want to maximize the social and environmental impact of their investments."

With investment, Planting Empowerment rents the land from small farmers and indigenous communities to reshape agriculture from monoculture to a mixture of native forest. This lease provides a steady income to farmers; therefore, they no longer have to exploit the forest for their livelihood. Moreover, given that the ownership of the land and the problem (i.e. unsustainable agriculture practices) remains in the hands of small farmers, they are trained and involved in sustainable forest production. This way, Planting Empowerment does not impose production or development aligned with financial expectations, but rather *synchronizes* the entrepreneurial process and business model to fit with the rhythms of the local community. Local knowledge is brought in to deal with plagues and other diseases affecting teak plantations. Because it draws on long-term investments and local engagement, the lease/restore/capacity building model can easily scale to enable the management of thousands of hectares of agroforestry projects in Latin America.

In 2012, Planting Empowerment joined a UN Development Program project with one of their partner communities to oversee the sustainability of planting cacao in a hardwood species timber plantation and to try to find different ways to generate short-term, medium-term and long-term revenue. The short-term would be the cacao; long-term would be the harvesting of the tropical hardwoods, and for the medium-term they partnered with local experts to conduct research in order to explore options for generating carbon credits due to the reduced greenhouse gas emissions emerging from Planting Empowerment´s sustainable harvesting model. In doing so, Planting Empowerment enables co-dependencies between the venture, the community and the natural environment. Environmental restoration, capacity building and income generation in the long-term rely on mutual learning and involvement in the commercialization of the species and also on the endogenous, self-propelled behavioral change of the small farming communities. Through this entrepreneurial process, the sustainable enterprise puts the problems back in the hands of those rural Panamanian communities, transforming a complex ubiquitous social dilemma into a constant income stream for rural farmers, while promoting reforestation and biodiversity.

As such, the process is rooted in a deep alignment between business development and the actual social and ecological rhythm of the local population and surrounding biophysical context. To foster sustainability, this venture enabled development and conservation, firstly, by training farmers as well as improving incomes based on what they are, do and value and through the lease system that improved their power relations against wealthy landowners and large reforesting companies; and secondly by enabling the natural environment to mandate the rhythm of growth making the land more fertile and ecologically sustainable in the long-term.

4.2. Sustainable venturing, social-ecological systems and synchronicity

As surfaced by Planting Empowerment, dynamics within the social-ecological view of entrepreneurship and the degree of connection between the venture and its surrounding contexts can be better explained by looking at the venture's rhythm (i.e. timing of the new enterprise) in relation to the cycles of society and nature. Drawing on case data and insights from social-ecological literature, we argue that the rhythmic patterns conundrum we raise in the introduction can be resolved by integrating the notions of *synchronicity* and *social-ecological embeddedness*. Drawing on our inferences, we define synchronicity in SE as *the degree of temporal connectedness between an enterprise and the social and biophysical cycles for in which the venture is embedded*. In our understanding of synchronicity in SE, the cycles of the enterprise, the social and biophysical contexts are not causally connected, nor do they occur together by chance. Rather, we suggest that synchronicity in SE manifests through intentionality on the agent's side leading to "meaningful coincidences" (Donati, 2004). As such, synchronicity being a time-based element, suggests that the degree of embeddedness in social and natural systems depends on how synchronized the entrepreneur and the venture's rhythm are with the social and natural systems that support the venture´s existence.

As with most entrepreneurial decisions, intentions and actions towards more or less embeddedness and synchronicity stem from the entrepreneurs' motivations, orientation, identity, values, and strategic intent. We believe, that through our inductive case study design, we have potentially uncovered additional criteria which enhances our understanding of sustainable entrepreneurial embeddedness.

Deeply embedded ventures do not merely consider social and ecological systems while planning commercial activities, but also manage to synchronize the entrepreneurial rhythm with socioeconomic and biophysical cycles. In the following, we will elaborate on the notion of synchronicity in sustainable venturing by looking at, first, the interaction between the venture's rhythm as embedded in its socio-economic system and, second, the venture's rhythm as embedded in its ecological system.

As evidenced in the case of Planting Empowerment, synchronizing entrepreneurial activity with social and economic systems concerns two types of connections: namely the broader economic dynamics and social change. Synchronizing the venture's rhythm

with the broader socio-economic dynamics involves considering all types of social and economic actors and entities. The 99 per cent of the world cannot aspire to grow in line with Silicon Valley and Wall Street investors' expectations. It is neither feasible nor sustainable given the amount of resources that growth rate requires. Market-based economies though have tried to synchronize the aspirations and activities of companies with the expectations of fast-flying investors, which the entrepreneurial narrative ended up internalizing as something desirable and presumably feasible in the long run. The inevitable end result is a time-space compression that disconnects the means from the ends (Bansal and Knox-Hayes, 2013) and further distorts what it is actually possible to sustain in the business world.

The compression of time in market-based economies for entrepreneurs may be best explained through what occurs in traditional venture investment. Venture capitalists seek exits with a common goal of obtaining a 10× return on investment within three to five years of initial investment. This inevitably drives a whole host of strategic decisions by the firm, armed with this new infusion of capital, to race to dominate their chosen space as soon as possible, sometimes with little concern for the damage it may leave in its wake, or even if it is the best path towards long term viability and success of the venture.

If we take the informal economy, on the other hand, which represents a substantial portion of the world's economic activity (Godfrey, 2011), investment and return expectations are frequently lower and sometimes not even time-bounded (Peredo and McLean, 2013). In some cases, peer-to-peer loans are repaid when the other person is ready to repay, interest-free. It is unlikely to find Silicon Valley or Wall Street growth expectations in cooperative groups with collective identity working for the common good. Simple set-theoretical reasoning enables us to argue that since the economy as a whole can advance as fast as the slowest of its actors, ventures deeply embedded in their socio-economic system continuously revisit the pace of their financial aspirations and synchronize their commercial activities with the economic reality of the social groups that supported their existence in the first place.

Deeply embedded ventures, as evidenced in the case of Planting Empowerment, are re-conceptualizing purpose away from net profit, towards a more holistic understanding of the role of business in society and its effect on overall human well-being. Applying again set-theoretical reasoning, we argue that since society as a whole is only as strong as the weakest of its members, the latter involves synchronizing entrepreneurial activities with processes of social change across many different social groups, not just the ones considered sufficiently powerful and influential, as classical stakeholder theory of the firm (Donaldson and Preston, 1995) applied to sustainable entrepreneurship (Schlange, 2009) would suggest. The following communication to investors illustrates our argument:

> Planting Empowerment works through long term land leases. These leases encourage smallholders to retain their land by easing their financial dependence on migratory development and demonstrating the potential of forestry as an alternative. Once the 25 year leasing period ends, the land returns to the partner, who can choose what to do with it.

Synchronizing entrepreneurial activity with ecological systems entails connecting the venture rhythm with regenerative systems, contributing to industrial symbiosis and the circular economy (George et al., 2015). In our context of interest, the rhythm of an ecological system can be defined as the sum of biological or biogeochemical processes that have definable periodicities (Scatena, 2001). High-speed ventures disengaged from natural cycles create time-space compression, producing similar effects when disengagement occurs at the socio-economic level. Unlike nature where time is immutable (Whiteman and Cooper, 2000), entrepreneurial rhythm is increasingly faster. Methods aimed at making entrepreneurship more efficient and ensuring higher success rates, such as Lean Startup, emphasize rapid experimentation and even faster failure and learning as keys to success. Learning is certainly relevant since it enables further understanding of the self and the surrounding environment. Yet, while accelerating human learning is possible by putting ourselves under stress, the only way of making a faster return on timber investment is by replacing the species and subsequently affecting the natural ecosystem. The need to synchronize the venture rhythm with ecological cycles, at this stage intuitive, has been at the basis of Planting Empowerment's entrepreneurial process. The following communication to investors illustrates our argument:

> A standard cycle for a timber plantation is 20–25 years. A 15-year cycle is possible, but the intensive management during this short period is likely to drain the land of its fertility, making a second cycle less productive…if it sounds too good to be true, then it probably is. A 7–10% annual return is reasonable – 15% annual returns are pushing it. Higher returns are possible when considering land appreciation and potential high spot prices for timber, but a 15+% IRR should raise a red flag.

The notion of entrepreneurial synchronicity we put forward does not claim that all natural resources are to remain untouched by entrepreneurs in the pursuit of socially and environmentally responsible ventures. It rather argues that further sustainability depends on the venture's embeddedness, which increases by putting the venture in synch with the natural cycles, not the other way around. In the case of sustainable farming, for example, practice has proven possible (and also profitable) the utilization of chicken instead of pesticides to free vineyards from earthworms. It might take longer, but it is cheaper in the end, and more ecologically sustainable since chicken naturally enjoy earthworms for meal; and soil, plants and earthworms do not evolve to create resistance to pesticides. Likewise, by operating over large enough spatial and temporal scales, eco-synched ventures have proven possible to accommodate return expectations (and those of their investors) in line with the time it takes for mixed native species to mature in the Darien province in Panama.

Social-ecological embeddedness and synchronicity are certainly not sole properties of the entrepreneurship phenomenon; they may apply to any type of business or social organization for that matter. We argue, however, that integrating these notions should be central to advancing the field of sustainable entrepreneurship, since SE is ultimately a human activity occurring in a multitude of economic contexts, each supported to varying degrees by social and ecological systems. Drawing on Ostrom (2007) and McGinnis and Ostrom (2014) and the inferences made from our case study, in Table 1 below we propose a normative framework for venture

Table 1
Normative framework for venture synchronization.

Understanding of contextual factors				
Factors	**Biophysical context**		**Social context**	
Focus of assessment	Attributes (e.g. bio capacity and lifecycle) of the resource system where the venture is embedded	Interaction within and between resource units of the system interacting with venture	Attributes and local socio-cultural circumstances of the community where the venture is embedded	Governance system and rules in use of the place where the venture is embedded
Diagnostic Dimensions*	Sector System boundaries Size of resource system Human-constructed facilities Productivity of system Equilibrium properties Predictability of system dynamics Storage characteristics Location	Resource unit mobility Growth or replacement rate Interaction among resource units Economic value Size of resource Distinctive characteristics Spatial & temporal distribution	Number of relevant actors Socioeconomic attributes History or past experience Location Leadership & entrepreneurship Norms and social capital Cognitive frames Dependence on resource Technology available	Government organizations Nongovernment organizations Network structure Property-rights system Operational-choice rules Collective-choice rules Constitutional-choice rules Monitoring and sanctioning rules
	Set the Conditions for… ⇩	***Are input to…*** ⇩	***Participate in…*** ⇩	***Set the Conditions for…*** ⇩
Articulation of synch model Setting expectations and decisions related to…	Commercial activity, business model, return prospects, investments and specific practices whereby the venture is set to be part of a natural system with clear biophysical constrains. ⇨	Commercial activity, business model, return prospects, investments and specific practices whereby the venture is set to interact with natural resources within a context of biophysical constrains. ⇨	Commercial activity, business model, return prospects, investments and specific practices whereby the venture is set to interact with the community within a context of social dilemmas, cognitive limitations and cultural predispositions. ⇨	Commercial activity, business model, return prospects, investments and specific practices whereby the venture is set to interact with the community within a context of formal and informal rules enabling and constraining action.
⇩	⇩	⇩	⇩	⇩
Interactions and outcomes				

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* For a detailed view of diagnostic dimensions see (Ostrom 2007) and (McGinnis & Ostrom 2014)

synchronization, comprising assessment of biophysical and social contexts, specific diagnostic dimensions, and how those should be considered in setting up the expectations and decisions related to commercial activity, business model, return prospects, investments and specific venture practices. In setting up their proposed synch models, prospective sustainable ventures in pursuit of further synchronicity should ask themselves: What patterns of interactions and outcomes are likely to result from using such a proposed synch model? what is the degree of temporal connectedness likely to result from using such a proposed synch model? and finally, how robust and sustainable is that particular configuration?. In line with *Carl Jung,* we also believe that *synchronicity is an ever present reality for those who have eyes to see*, and a simple set of normative guidelines can help see and get there.

4.3. Implications

The social-commercial-ecological trifecta in SE is not simply about overlapping circles, as the infamous triple bottom line model would lead us to believe. The SE process, including the decision and practices implemented as the venture unfolds, is getting closer and closer to intimately interact with biophysical and societal systems and their inner rhythms, and our field has been slow (at best) in reacting to this more nuanced and integrated framing.

One of the major implications of our findings and theorization pertains to our current understating of process in SE and entrepreneurship more broadly, still dominated by an "opportunity development" narrative (i.e. pursuit of perceived opportunities to bring into existence x,y,z for the sake of the planet and people) (Patzelt and Shepherd, 2010; Shepherd and Patzelt, 2011), despite recent efforts to re-conceptualize it (e.g. Davidsson, 2015). Entrepreneurship is essentially a journey, yet the process orientation in entrepreneurship research has been surprisingly absent (McMullen and Dimov, 2013). So far, attempts to explain such a process have relied on chronological accounts, narratives and event-based journeys that articulate how actions, social interactions, and learning (Dimov, 2007) occur from idea to market. In the current conceptualization, the market operates as the single interacting agent that gives feedback to the entrepreneur regarding whether the idea at hand will work or not. By introducing entrepreneurial synchronicity within social-ecological systems we address the absence of time and timing in SE scholarship in connection to its two main points of reference (i.e. nature and society). Surprisingly, SE scholars to date have largely overlooked timing and venture

rhythms despite being essential to better understanding how social organizations function (Ancona et al., 2001).

Let us articulate some final reflections by momentarily bridging arts and entrepreneurship. Artistic endeavors, represented as a piece of composed music or an artistic performance, are similar to entrepreneurial endeavors; they share the same critical, forward-thinking orientation and involve deep engagement in a creative, iterative process (Dimov, 2007) that enables building something from nothing (Baker and Nelson, 2005) in the face of uncertainty (McMullen and Shepherd, 2006). In the life of an aspiring singer, the quality of the performance and eventual success depend not only on the merits of her voice but also on her ability to synchronize the tune and the lyrics with the sound patterns of the bass and the drum. Jazz singers may need to slow down or hurry up because the arrangement of musical sounds proposed by the drummer and the bass player is normally non-systemic and asymmetric. All entrepreneurs are just like jazz singers, some of them more skillful than others, unfortunately, we have overlooked the role of rhythmic patterns. Society and nature, as in a jazz ensemble bass and drum, set the rhythm and it is up to the entrepreneur and the singer to follow the rhythmic patterns and play a harmonic or an awful out-of-tune song. Yet, entrepreneurship scholarship seems to still believe that selling records depends only on the singer and her audience.

As rhythms and synchronicity are at the heart of music, in this paper we argue that SE can be better understood by a formal recognition of the role of social-ecological embeddedness and synchronicity as ventures bridge socio-cultural, institutional and biophysical contexts. Numerous scholars and practitioners have begun to challenge our collective thinking unfolding around food systems and consumption, money and investment which encourages aligning industrial and natural cycles and slowing the pace of production and consumption. These alternative socio-economic frameworks emerging mostly as a result of the actions of, and facilitated by, sustainable ventures, such as slow economy (Pietrykowski, 2004) and the circular economy (George et al., 2015), could be better explained through social-ecological embeddedness and synchronicity. The notions we put forward can help advance both theory and practice and support the transition of aspiring sustainable entrepreneurs from linear reasoning (feedback loops considered) to one that is social-ecological embedded and synchronized with both social and biophysical rhythms.

Appendix A. Examples of publicly-available sources and data collected

Document	Source
Native Panama Tree Species Propagation Guide	https://static.squarespace.com/static/4feb48eec4aa85ee63f67a52/526485d9e4b0250aaefa896b/526485dae4b0250aaefa8b8c/1364777606017/STRI-Guia-Propagacion–120-Especias-Nativas-Panama.pdf
Panama project encourages farmers to create sustainable tropical ecosystems	https://www.theguardian.com/environment/2015/may/05/panama-planting-empowerment-project-deforestation-logging-replanting
Planting Empowerment Blog	http://www.plantingempowerment.com/blog
Good Business: Making Private Investments Work for Tropical Forests	https://static.squarespace.com/static/4feb48eec4aa85ee63f67a52/526485d9e4b0250aaefa896b/526485dbe4b0250aaefa8bea/1359725595607/ETFRN-News–54-web.pdf
Guide to investing in locally controlled forestry	https://static.squarespace.com/static/4feb48eec4aa85ee63f67a52/526485d9e4b0250aaefa896b/526485dbe4b0250aaefa8beb/1359725596493/ILCF-Guide-web.pdf
Wood for Good	http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/wood-for-good.pdf
Equitable Forestry Model	http://www.plantingempowerment.com/approach/ https://www.youtube.com/watch? v=IXPP-nsRmDg
UNDP Biodiversity Report	https://static.squarespace.com/static/4feb48eec4aa85ee63f67a52/526485dae4b0250aaefa8a64/526485dae4b0250aaefa8a6c/1305000960173/Planting-Empowerment-UNDP-Biodiversity-Report.pdf (p.151)
Video interview PE Leasing Partner	1 https://www.youtube.com/watch? v=H83LB_TPCK8 2 https://www.youtube.com/watch? v=4lhiUsoodW4
Plantain nursery	1 https://www.youtube.com/watch? v=FPxzpUCpiIU 2 https://www.youtube.com/watch? v=4Zp2pjJuXn8 3 https://www.youtube.com/watch? v=rr0_0mHu-fM
Replanting the Rain Forest in Panama	https://www.youtube.com/watch? v=XEZfH-IgTlo

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