

HOW TO BE SUCCESSFUL IN THE SUSTAINABILITY AGE? Thoughts on business model innovation in socio-technical contexts

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Resumo

The essay purpose is to describe how (BMI) proposition in the seminal six key issues contributes to the process of innovation and sociotechnical transformation, emphasizing implementation and evaluation of these new additions through the lenses of the Theory of Technical Transition (TTT), including its operationalization by Multi-Level Perspective (MLP) composed by three main heuristics: niche-innovations, sociotechnical regimes, and socio-technical landscape. The MLP anticipates that aligning these 3 levels when combined allows for radical innovations, cooperating with the mainstream. The results show the interdependence relationships between the constructs that compose it: value creation, value proposition, value delivery, value capture and value network, initial and maturity, in this sense TTT enables the MLP that maintains with great dexterity and ease strategic decisions tactics and practices – necessary for successful BMI. This study becomes useful, especially considering the context of the health crisis originated by COVID-19, which requires new and urgent solutions through innovation by new business models.

Palavras Chave

socio-technical transitions, BMI, MLP

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INTRODUCTION

Innovation in business models can be beneficial to organizations, it allows them to obtain a competitive advantage by generating future value and making it difficult for model changes to be easily replicated by competitors. However, business model innovation is not simple, as what is being changed is not just a product or process, but a set of activities that are part of the business core (Amit & Zott, 2012). In addition to the challenges that are associated with innovating, it is also important to understand how business models can impact society, as discussed by Biggi & Giuliani (2021), the consequences of innovation can extend outside organizations, affecting, for example, the social and environmental spheres.

To overcome the negative consequences that innovation can have, it is necessary to consider the company's economic performance and sustainable innovation together, so they can contribute to sustainable development. Business models should take a look at these issues not just as a matter of responsibility to their stakeholders, but because, as Boons (2012) argues, innovation for sustainable development demands radical change, and it is in business model innovation that this potential for systemic change lies.

However, for companies to be able to contribute to sustainable development, it is necessary to consider that their business models are inserted in socio-technical regimes and can play different roles, contributing to the continuation of the current regime or to helping in the transition to another regime (Bidmon & Knab, 2018). Considering that sustainable development is currently an important agenda in society, it is essential to promote discussions on the relationship between business models and sociotechnical transitions. Although there are studies that have started to address this issue, they are still recent and few, such as Bidmon & Knab, 2018 and Wesseling, 2020.

To contribute to this discussion that is still in its early stages, we aim to discuss how business models can carry out innovations in socio-technical contexts and may even impact these contexts. To do this, first, we carried out a literature review of studies that address separately and together with the concepts of business model innovation and sociotechnical transitions. Then we rely on work about sociotechnical transitions presented by Geels & Schot (2007) and the six key questions about business model innovation provided by Amit & Zott (2012) to propose a framework that hints at elements that companies need to take into account for successful implementation and evaluation of innovation in business models in sociotechnical contexts. Finally, we propose a research agenda that could help scholars identify new avenues to explore. We expect to bring theoretical and managerial implications by proposing a framework that could help companies take an active role in internal and external sustainable development.

BUSINESS MODEL INNOVATION AND SUSTAINABILITY

Innovation in organizations can occur in different ways, such as by-product or by process, for example. But there is one type of innovation that can bring major long-term benefits to firms: business model innovation (Amit & Zott, 2012). The high level of competition – often driven by new competitors and technology – increasingly requires companies to adjust their

business models to cope with dynamic market conditions, because of that, companies need to address these concerns through Business Model Innovation - BMI (Keiningham et al., 2020).

A business model refers to a system of connected activities that impacts the way a company's business is done. Its execution requires interaction with different stakeholders to meet identified market needs (Amit & Zott, 2012; Chesbrough, 2010). Business models are related to three main dimensions: value creation, value proposition, and value capture (Clauss, 2017). Osterwalder & Yves (2009) explains these three components: 1) value proposition – specifically, the value components under the control of the company –, which could be a product or service; 2) value creation, which is the experience of the product or service by the customer; 3) revenue/resource flow, also known as "value capture" representing how the company obtains benefits – monetary or not –, in other words but similar ways of thinking. From this, we understand that it is not enough to just consider how to generate value for the chain and customers, it is also necessary to capture those values back through revenue.

In addition to these three values, Rezazadeh & Carvalho (2021) suggest that managers should also take into account the value network and the value delivery. In the value, the network is the need for the company not to limit itself to internal processes, but also to open up to external possibilities for innovation, where it must depend on the development and management of partnerships to bring maximum value to the BM. Meanwhile, value delivery is fundamentally about the relationship the company establishes with its clients and the ways to deliver what it aims to offer them (Rezazadeh & Carvalho, 2021).

Furthermore, Keiningham et al. (2020) say that the goal of BMI is to increase revenue by improving the value of products or services and/or the delivery of these offerings to customers. As such, the success of the BMI is often dependent on the evaluation of the customer experience resulting from the effort, which in this article we have expanded to the experience of the entire social techno context involved, including the multilevel ones (Geels, 2011).

As we can see, despite the challenges of achieving BMI, it assumes a big role in companies, allowing them to explore new opportunities in existing markets and can even identify new markets. Beyond that, other advantages identified by Amit & Zott (2012): the possibility of creating new market opportunities, the difficulty of imitation or replication by competitors, the proposition of deep questions and analysis of all the organization operations, higher sustainable performance (Amit & Zott, 2012).

However, even though the literature has mainly presented the positive aspects of business model innovation, we also need to consider the dark sides of innovation. Biggi & Giuliani (2021) conducted a literature review to investigate the noxious impacts of innovation, identifying the consequences in and outside organizations - on the workplace and employees, and in the social, economic, and environmental spheres. Therefore, when we talk about innovation, in addition to economic performance, we also need to consider its consequences for stakeholders and the environment.

This is something that consumers expect from companies, as they consider that the focus must go beyond revenue and include the interests of society. Such concern increased with COVID-19, as identified by Westbrook & Angus (2021) when presenting the major consumption trends. Before the pandemic, people already showed concerns associated with sustainability, in particular, in environmental issues (e.g.: climate change, pollutants), and during the pandemic, social issues gained prominence (e.g.: support to employees and local communities) (Westbrook & Angus, 2021). In the face of that, organizations must approach the sustainability agenda from a broad perspective, not limiting themselves to considering only environmental issues.

So, while innovation may lead to negative consequences, it also has the potential to contribute to sustainable development, especially when it comes to business model innovation, as it can promote systemic changes (Boons, 2012). For the changes to be possible, it is necessary to understand the dynamics between the business model and the context in which it is embedded, for this reason, in the following sections we will present some concepts associated with sociotechnical transitions and the relation with BMI.

TECHINICAL TRANSITION THEORY AND REALTED CONCEPTS

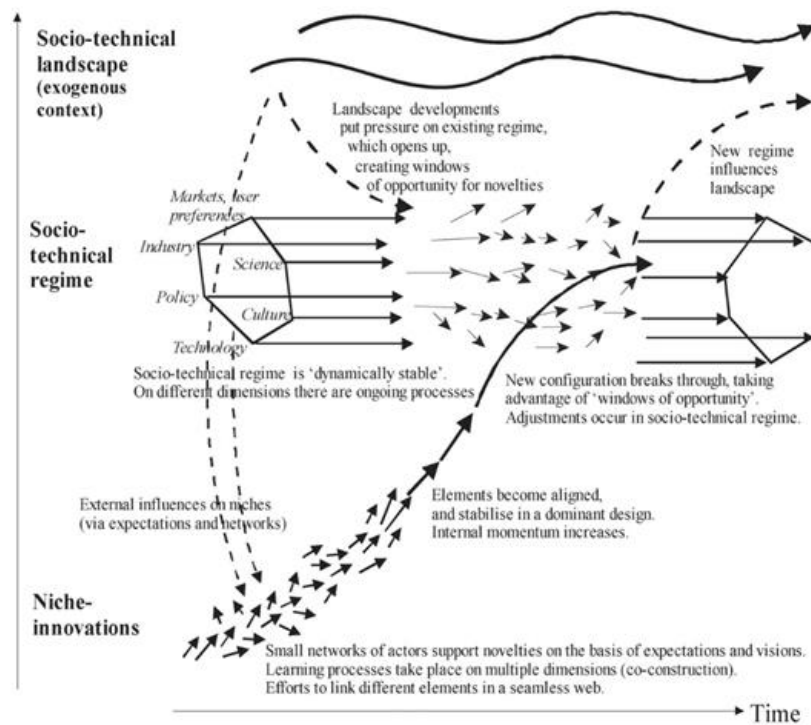
Technological Transitions (TT) are defined as major technological transformations in the way society functions and are fulfilled in different areas such as health, food, transportation, etc. Not only involve technological changes, but also in elements such as user practices, regulation, industrial networks, infrastructure, and symbolic significance (Rogge, Pfluger & Geels, 2020).

The Socio-technical regime is the number of actors that share cognitive routine among scientists, policymakers, users, and interested groups to develop the subject. Technological niches are involved with the niche market segments, which brings radical novelties that are developed by small networks outside the market and main actors. The Socio-technical landscape is beyond regime and niche structures and is related to the external environment. Such a changing level normally takes decades to be placed (Geels, 2002; Geels & Schot, 2007).

Geels and Schot (2007) brought us a new path to deal with a large conceptual term that emerged by transitions and systems by that time (Van de Poel, 2003; Geels, 2002; Geels, 2005) through a multi-level perspective (MLP). The MLP is formed by three main heuristics: Niche-innovations, sociotechnical regimes, and socio-technical landscape (Rip & Kemp, 1998; Geels, 2002). The MLP preconized that the alignment of these 3 levels when combined allows radical innovations that will compete with the mainstream. Figure 1 shows the MLP and how the three levels act among each other.

It is important to mention that the passage from niche innovations to the regime is a cumulative process, in other words, in the case of using business models as an innovation, that is the issue of our study, we are going to show how it has been developed in typical cumulative events and how was the innovation path till current days.

Figure 1 – MLP | Multi-level perspectives (Socio-technical Transition Model)



Source: Adapted from Geels 2002.

The MLP talks about patterns and describes it as a “process type theory which explains outcomes as the result of temporal sequences of events, timing, and conjunctions of event-chains. Situated groups make moves, undertake actions and react to each other”, (Geels & Schot, 2007). Yet, MLP can be modified by detailing specific paths shown in Table 1, that combines answers from some criticisms made to the theory and adapted by authors (Geels & Schot, 2007) responding to local and global analysis, as such:

Table 1 – MLP and Pathways

Transition Pathways - Actors and (inter)actions			
Transformation pathway	Actors	Type of (inter)actions	Keywords
Transformation	Regime actors and outside groups (social movements)	Outsiders voice criticism. Incumbent actors adjust regime rules (goals, guiding principles, search heuristics).	Outside pressure, institutional power struggles, negotiations, adjustment of regime rules.
Technological substitution	Incumbent firms versus new firms	Newcomers develop novelties, which compete with regime technologies	Market competition and the power struggle between old and new firms.
Reconfiguration	Regime actors and suppliers	Regime actors adopt component innovations, developed by new suppliers. Competition between old and new.	Cumulative component changes, because of economic and functional reasons. Followed by new combinations, changing interpretations, and new practices.

De-alignment and re-alignment	New niche actors	Changes in deep structures create strong pressure on the regime. Incumbents lose faith and legitimacy. Followed by the emergence of multiple novelties. New entrants compete for resources, attention, and legitimacy. Eventually, one novelty wins, leading to the re-stabilization of the regime.	Erosion and collapse, multiple novelties, prolonged uncertainty, and changing interpretations, new winner, and re-stabilization.
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Source: Geels & Schot, 2007.

When revising the literature, Sustainability Transitions experiments (SNM) mentioned it is a TT evolution, and it is related to an engaged and social constructivist position, which are aligned to new technologies and practices to re-design social and material scenarios

Bidmon & Knab (2018) claim that trigger technology-emphasized transitions can only provide a function to society when incorporated into a sociotechnical system, however, only sociotechnical approaches to transition research focusing on the role of technological innovation have been found.

The SNM literature is close to the TT background and talks about the benefits that could be generated by technologies developed in R&D labs, and failures in being embraced by the market due to regular socio-technical regime (Geels, 2002; Sengers et al., 2019), though. Nevertheless, SNM worked in innovative technical niches that can influence the regimes and find a way to convert them into market niches and overcome structural barriers.

SNM concept emphasizes three processes that are key to the protection of experimentation: shielding (a process that holds off the selection pressures actively or passively), nurturing (a process that supports the development of path-breaking innovation), and empowering (a process that makes niche innovations competitive regimes) and it is a likely path for low carbon technologies, such as biorefineries, as an example (Sengers et al., 2019).

Sengers (2019) brings contributions for research avenues that are related to green solutions since it mentions contributions like how incumbents could participate in experiments and participate in industry evolution and push development for local communities, creating social commitment for society. Such a concept would fit with the latent themes such as green society, health, and food verticals foundations since it may allow experiments from university labs with breakthrough technologies with the support of government and incumbents to shape sustainable transitions.

Sociotechnical transitions in all applications is a multilevel perspective (MLP), it provides a useful lens through which to consider. From insights to evolutionary economics, sociology of technology, and innovation, the MLP supports the analysis of the dynamics of the long-term system, supports co-evolution of technology and society, moving one sociotechnical system to another and other (Geels, 2002, 2005, Elzenet et al., 2004, Geels & Schot, 2007, Kemp, 1998).

BUSINESS MODEL INNOVATIONS IN THE CONTEXT OF SOCIO-TECHINICAL TRANSFORMATIONS

According to Geels (2007), Socio-Technical Transitions are multilevel approaches to sustainable innovation business transition: 1) resignification of the macroeconomic context, 2) an industrial revolution adapted to social demands and 3) sustainable development. The transformation to a new economic model can be addressed not only through proper coordination and cooperation between government institutions and international organizations

but also through cooperation between business entities and their stakeholders. The transition from sustainability as such can be presented graphically as a multilevel structure (Geels, 2007)

In the multilevel framework, the transition is defined as the change from one socio-technical regime to another (Schot, 2007). What we have found in the literature related to this, is that, in this perspective, sustainable innovation business as a sustainability transition process has reached an unprecedented scale. Business entities gradually move away from the business as a usual operating model, seeking new business models by introducing the idea of corporate sustainability through business model innovation (Seyfang & Longhurst, 2013).

The flow of symptoms and crisis problems in the economic, environmental, social, and political spheres has gained momentum with the explosion of the latest global financial crisis. The deeper effect was the acceleration of fundamental systemic changes that – due to its strong opposition to the existing system resulting in rapid generation of aggravated imbalance – naturally tend to the transition of sustainability (Loorbach & Huffenreuter, 2013).

Given this context, we must identify the roles that business models can play for systemic transformations in society (Kummitha, 2019). To do this, it is important to recognize that the relationship between organizations and society is not unidirectional, but instead bi-directional. Business can also benefit from transformations in society, which is evidenced in the work of Kummitha (2019), in which he argues that entrepreneurship contributes to the development of smart cities as they offer new opportunities for exploitation and exploration by opening up the possibility for organizations to propose innovative technologies for smart cities and by enabling data to be collected once the technology is implemented, allowing new opportunities to be identified that can influence a company's business models.

In line with this, the work of Van Waes et al. (2018) on bike-sharing business models, in which they propose that there is a co-evolutionary process between business models and the context in which they are embedded, being necessary to consider endogenous factors (e.g., company resources and processes) and exogenous factors (e.g., industry norms and structure) to a business model and how this affects the return on investments. These dynamics occur differently depending on the business model configuration, influencing their potential in upscaling, and modifying incumbent regimes (Van Waes et al. 2018).

A functional business model is often not an ideal business model it is evident the need for BMI to often be driven by changes in the external environment or context of a company (Keiningham et al. 2020) understood as a framework for co-creation of value occurring through the integration of resources between a network of actors guided by institutions and institutional arrangements, not being considered (only) an environmental factor

Instead, actors (companies, consumers, public agencies) and their actions are seen as part of the context. Changes in one of these actors can create a ripple effect throughout the ecosystem that makes up the context for future interactions (Edvardsson et al., 2018). Context dynamics promote innovation in many sectors and emphasize that innovating is not simply making new production units, but rather the design and creation of new markets, contexts, and meanings (Edvardsson et al., 2018; Mele et al. 2017; Keiningham et al. 2020).

Specifically about the potential of business models to modify current regimes, Bidmon & Knab (2018), based on the multi-level perspective on sociotechnical transitions by Geels & Schot (2007), propose that business models can play three types of roles: 1) as part of the socio-technical regime, ensuring the stability of the current regime, but, at the same time, creating barriers for transitions to other regimes; 2) as intermediate between technological niche and socio-technical regime, acting as facilitators of transitions by stabilizing technological innovation processes; 3) as non-technological niche innovation, acting as drivers of transitions, and can emerge independently of technologies. Particularly, these three roles are interesting for

the discussion on how to implement business model innovations that can contribute to changes in society, as we shall see in the next section.

IMPLEMENTING AND EVALUATING BMI AS A DRIVER FOR SOCIO-TECHNICAL TRANSFORMATIONS

For the implementation of business model innovations, Rezazadeh & Carvalho (2021) argue about the importance of managers understanding the interdependence relations among the building blocks that compose the BM: value creation, value proposition, value delivery, value capture, and value network. Focusing on only one of these elements, without considering the impacts on the others and in the totality can lead to implementation failures (Rezazadeh & Carvalho, 2021).

Adding to what companies should consider for promoting BMI, Amit & Zott (2012) propose a pathway with 6 key questions: 1) What market needs will be met by the new business model? 2) What new activities are needed to meet these needs?; 3) How do the necessary activities interconnect in new ways?; 4) Who should carry out each of the activities that are part of the business model? The company itself? A partner? The client? Which arrangements guarantee the proposed structure? 5) How is value created with the new business model for each of the participants?; 6) Which revenue model fits with the company's new business model. Definition of forms of remuneration and appropriation of rights of co-creation and execution? These questions are important because they allow managers to see companies playing an active role and not a passive one in the middle of the interconnected context where they are situated.

These activities relate in part to planning and predicting how BMI will result and, although helpful, may not be enough to achieve success in its implementation. Companies also need to be prepared to deal with the process of trial and error for achieving success (Chesbrough, 2010). It is as well necessary to overcome certain obstacles, such as cognitive barriers, which may be related to not knowing which model is best for the company (Amit & Zott, 2012) or even if it is known what the most appropriate BM is, there is still resistance to move away from the prevailing model (Chesbrough, 2010).

So far, we have seen that promoting business model innovations is not trivial, because even if companies have resources at their disposal to promote change, the maximum value that BMI can generate will not be achieved if they do not know how to use it, as Chesbrough (2010) emphasizes “companies need to develop the capability to innovate their business models, as well as their ideas and technologies”. All this should also be taken into consideration when talking about BMI's role in promoting change in society

In business models, an inherent characteristic and potential for transitions is their plurality of functions. As we have seen previously, some barriers undermine the possibility of companies bringing societal change, and this is what happens in business models that perform the function of industry recipes. The BMs are part of the socio-technical regime, in which there is a dominant logic, and the established rules are reinforced by those who are part of the regime. This implicates that to promote innovations it would be necessary to overcome both organizational and regime barriers (Bidmon & Knab, 2018)

When the function of business models centers on the commercialization of technological innovations, existing or new companies play the role of intermediaries between the technological niche and the sociotechnical regime. BMs then contribute to sociotechnical transitions: by contributing to the company's learning process; facilitating the articulation between vision and expectation about these technologies; and developing social networks by

connecting the technological innovations with agents external to the company (Bidmon & Knab, 2018).

BMs can still play the role of non-technological niche innovation, with the potential to contribute to societal change by reaching a higher level of stabilization than new technologies. The learning process, the social networks and the articulation between vision and expectation must achieve a higher level of maturity, making it possible to reach more actors and promote cognitive changes. (Bidmon & Knab, 2018).

Considering these possible roles that business models can play in socio-technical contexts, we propose an integrated framework for BMI implementation and evaluation (see Figure 2) which combines both STT and BMI constructs and offers possibilities for future studies, since there is still scarce research that integrates these two theories. The framework points out aspects that companies need to address, such: environment analysis, action plan and execution for changing the current BM, and the evaluation to see if the BMI was well implemented.

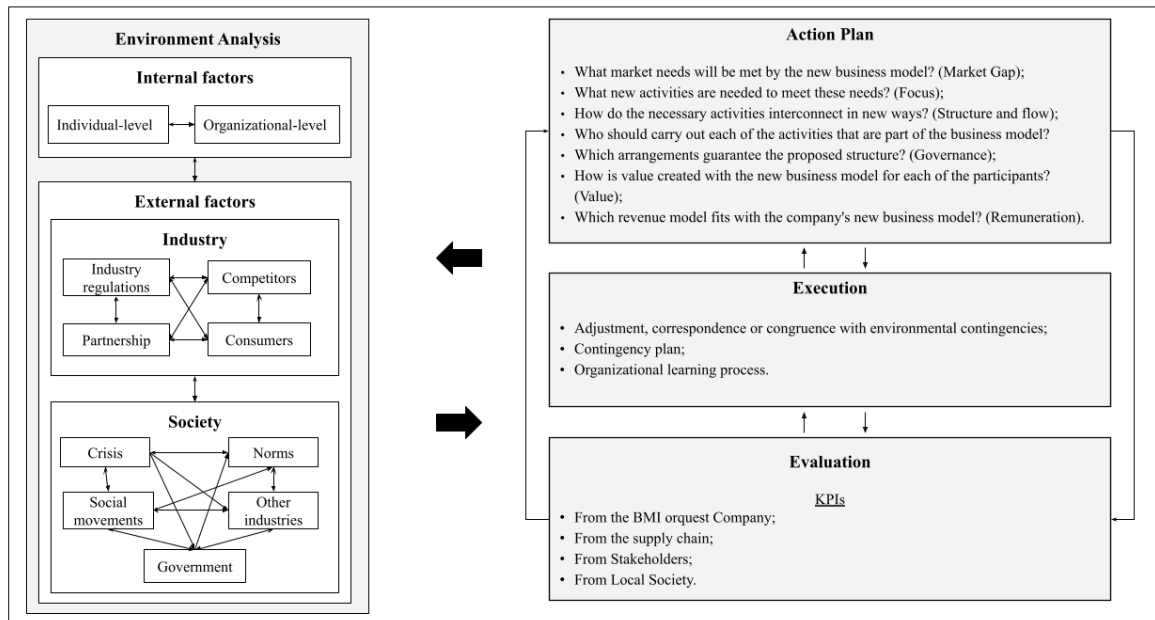
As Bidmon & Knab (2018) have argued, BM can help or obstruct transitions, which may vary according to internal (e.g.: at individual-level the cognitive barriers and organizational-level the maturity of the learning process) and external factors (e.g.: government and consumers) and the interactions between them. For this reason, we suggest that companies that aim to promote BMI do an environmental analysis that takes into account these factors as they may re-configure BM on incumbent companies.

Considering that companies must have a robust structure to maximize the value of the business model innovation (Rezazadeh & Carvalho, 2021), after this analysis of the environment in which the organization is embedded is made, we expect this information to be considered in the action plan, the managers ask themselves the key-questions proposed by Amit & Zott (2012), which are related to what and how these identified needs will be attended and who will be responsible for it. The idea is to provide a framework for managers and scholars to identify paths to rethink business and not lose competitiveness in front of innovations brought by market niches and macro levels forces and may take business advantage from it.

We decide not to use the regular order of Geels's (2007) multi-level approach, instead, use the levels according to the incumbent felt effects and transformation pathway (table 1) from STT related to external factors, as described in the framework. Such figure intends to describe the relationship between both theories, whereas the initial point is the consideration of current strategies impacted by STT and association with an action plan to be taken based on environmental analysis – internal (actioned by STT and new entrants) and external factors (which will drive the most adequate action plan to fit adaptations towards the innovations caused by STT).

Moreover, recognizing the dynamism of organizations in sociotechnical contexts, the framework indicates that BMI implementation and evaluation is not a linear process, rather, it presents interactivity between actions and the need to constantly rely on environmental analysis to better adjust the identified needs.

Figure 2 – BMI Implementation and Evaluation Framework



Source: Adapted by Authors.

Underlying this framework are our three main propositions:

- **Constant analysis of the environment** - for a successful implementation of business model innovations for sustainable development is necessary to consider constantly the sociotechnical context in which the company is embedded, because the context is subject to recurrent changes given the influences that the external and internal factors exert on each other (Van Waes et al., 2018; Kummitha, 2019);
- **Be aware of contingencies** - since the implementation of business model innovations involves a process of trial and error (Chesbrough, 2010), companies must have a robust organizational learning process not only to turn failures into learning opportunities but also for the companies to challenge the prevailing assumptions in the industry (Bidmon & Knab, 2018). It is important to develop a contingency plan to deal with potential risks arising from aligning the company's strategic orientation with the sociotechnical transition context, as different BMs may find it easier or more difficult to promote change depending on which one of three levels of MLP they are located (Geels, 2002; Geels, 2005; Bidmon & Knab, 2018);
- **Beyond company performance** - as we are talking about a perspective that places the company within an interconnected context (Van Waes et al., 2018; Kummitha, 2019, Geels, 2002; Geels, 2005) to evaluate whether the business model was well implemented, it is necessary to consider indicators that are not limited to the company's performance, but also consider the stakeholders and impacts on the local community, such as economic, social, and environmental impacts. For this, we suggested that companies use objective indicators (e.g., the company's employment generation rate) and subjective indicators (e.g., community perceptions).

Thus, when looking at the interconnection between business model innovation and socio-technical transitions, we can see while STT focuses on the actors' role in structural change, BMI focuses on the actors themselves, and bringing these perspectives together can

help identify how the change in business structure can stem from the broader socio-technical system and can ultimately lead to changes at a structural level.

Final Considerations and Agenda for Future Studies

This study has brought the main considerations of the literature on Business Model Innovation including the success factors of BMI, that are not simple, the changes go beyond the product or the process, there is a framework of activities that are part of this radical innovation, far beyond the wall of organizations and their service chain. It is important to understand how business models can impact and be impacted by society.

To overcome the negative consequences that BMI may have, it is necessary to consider the economic performance and consistency of the long-term model, in addition to its initial acceptance and maturity, in this sense the study contributed to the sustainable development of innovation considering that they are inserted in socio-technical regimes and can perform different functions, contributing to the continuity of the current regime or to help in the transition to another regime.

Our framework is not intended to propose a formula for business model innovations in the context of sociotechnical transitions, because this will vary according to several aspects, such as regime rules. This framework intends to highlight that, although more difficult for some companies than others, it is possible to play an active role in promoting sustainable changes internally and externally. We hope it can be useful for companies to keep in mind the aspects they should consider.

The discussion we promoted about the relationship between the business model's innovation and socio-technical transitions is complex, as it does not only involve the organizational level but a multiplicity of stakeholders from outside the organization. Therefore, there are still many research possibilities, especially considering the context of the health crisis originated by COVID-19. Considering this, we suggest some questions be investigated in future research:

- With the COVID-19 pandemics, how many other businesses have been forced to innovate their models and will potentially need to keep up with sociotechnical trends for survival?
- The agility of social techno transitions will certainly require that business models remain in continuous innovations, so: Would this be a new normal of organizations?
- How are social techno transitions impacted by the development of innovative business models in your ecosystem?
- Would it be possible to innovate in the business model not aligned with all the multilevel agents of these recurring social techno transitions?
- How does a company increase opportunities to develop the right business model for every social transition?

We have identified that previous studies on BMI and socio-technical contexts have focused mainly on systematic reviews of bibliography and case studies, so for future research, there are opportunities for studies that apply other methodologies and contexts, as only were founded and exclusively related to environmental sustainability contexts. Additionally, exploratory possibilities by surveys, connected to other experiences and contexts, are deeply available.

As a final thought, innovation in business models is important, but only if we can make it effective. And, to be able to make it effective is not only under a technical agenda.

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