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Using Artificial Intelligence (AI) Generative Technologies For Business Model Design with IDEATe Process: A Speculative Viewpoint

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Abstract:

Purpose: Artificial Intelligence (AI) and the more recent generative technologies are disrupting many activities related to strategy and operations within organizations. Business model design is no exception.

We define business model design as an iterative process involving a combination of creativity, decisions, and tests, consisting in envisioning and creating a business model (for a brand-new activity) or a new business model (for an existing activity), to change an existing situation into a preferred one.

In this paper, we discuss the potential impact of generative technologies on the business model design process, highlighting the opportunities and challenges that these technologies present and suggesting some methods for using generative technologies for business model design.

Design/Methodology/Approach: We build on knowledge about business model design and on documentation from forums, social networks, and media about generative technologies. We also used generative AI platforms to test dozens of prompts related to business model design.

Findings: We propose the IDEATe process for business model design and identify six major changes in the process or the outcome of business model design that generative technologies can trigger. We also discuss blind spots and risks associated with the use of generative technologies for business model design. Finally, we advance some functions of generative technologies that may support this process.

Originality/Value: Instead of focusing on how generative technologies could change business models, we investigate how these technologies could impact the design of business models. We make propositions to use these technologies properly for business model design.

Keywords: Business Model – Business Model Design – Generative Technologies – AI – Artificial Intelligence – ChatGPT – Business Model Innovation

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Introduction

Generative technologies are types of technologies that rely on vast amounts of data sets collected and analyzed thanks to Artificial Intelligence (hereafter, AI) to produce content (text, images, video, or other kinds of media) in response to user inputs (called prompts) (Jovanović and Campbell, 2022). Popular applications of generative technologies include creating new data, improving existing algorithms, or writing syntheses and analyses.

Generative technologies are viewed as game changers in most fields. In early 2023, Bill Gates analyzed AI's significance and potential future impact in an interview with Forbes (Conrad, 2023). He categorized AI as the fourth major advancement in digital technology, following the personal computer, the graphics interface, and the internet, respectively. Gates also noted that generative AI has become, in less than a year, as important as the three previous milestones.

In recent months, media have widely covered generative technologies' actual and potential impact on business models (BM hereafter), relying on numerous tests and business cases, showing deep transformations in various domains such as customer relationships, data acquisition, or operations. For instance, generative technologies are currently affecting different functions of blockchain systems, such as smart contract development, security improvement, and data analytics, among others. The focus of media and research has mainly been on how these generative technologies are expected to transform BM in a particular industry or in general (McKinsey Global Institute, 2018). The impact of generative technologies on the design of BM has been overlooked.

This paper aims to fill this gap by exploring how generative technologies may change BM design. Here, we are not concerned with how generative technologies may change business models *per se*.

We define business model design as an iterative process involving a combination of creativity and decisions, consisting in envisioning and creating a business model (for a brand-new activity) or a new business model (for an existing activity), to change an existing situation into a preferred one. Indeed, BM design enables entrepreneurs and managers to conceive the value architecture of a new organization or to set a new BM when the project is to transform the value creation and value capture processes of an existing organization.

Over the last two decades, researchers and consultants alike have proposed frameworks and tools to facilitate BM design (see, for instance, BM Canvas -Osterwalder and Pigneur, 2010-, RCOV framework -Demil and Lecocq, 2010, BM Navigator – Gassmann et al., 2020). These frameworks aim to support managers and entrepreneurs in improving their ability to design BMs. They provide a set of concepts (such as 'value proposition' or 'revenue model') to create a common language and eventually yield a visual thinking tool (as is the case with the BM Canvas) to describe BM components in a simple way. These frameworks may propose a list of existing configurations (i.e. business models) that can be adopted by organizations (e.g., the BM Navigator), or a specification of the types of relationships that may be created between the main components of the BM (e.g., the RCOV framework). Nowadays, some managers and entrepreneurs know how to use these frameworks, whether by their own mean or supported by consultants organizing workshops dedicated to BM design. However, the impact of various technologies on the process and outcome of BM design has received no or minimal attention.

To contribute to this research area, we build on the literature, on our knowledge and experience on BM design, on documentation from forums, social networks, and media about generative technologies, in particular, ChatGPT (whereas as a standalone or as integrated with Bing), Bard and Midjourney. We have also tested dozens of prompts related to BM design and innovation to feed our reflection. However, ChatGPT or other generative AI technologies have not been used to write this paper.

The incredibly rapid evolution of generative technologies makes our endeavor highly speculative. But, as researchers, it will be fascinating for us to observe

how things have truly progressed in a few years' time and compare the situation with this speculative essay written in 2023.

The next section describes the new landscape induced by generative technologies for BM in general. Then, we advance the IDEATe process for BM design and describe how generative technologies may impact the various stages of this BM design process. Afterward, we discuss the weaknesses and risks associated with generative technologies for BM design (at least in the short term). Finally, we propose types of potential tools and frameworks based on generative technologies that could be developed in the next few months or years to support BM design.

The new Landscape for the Design of Business Models

Generative technologies as massive game changers

While AI has been around for a while in the business environment, 2022 has yield a major change in the visibility of and accessibility of its capabilities. Indeed, the term "generative technologies" has been coined to acknowledge that AI has become more than just a technology that facilitates data collection and analysis. With the launch of Chat GPT in 2022, most people have realized that AI can also contribute to creating various contents, from stories to pictures. Generative technologies are the next stage in software, pushing collaboration between humans and machines one step further. Indeed, what is sometimes labelled "generative AI" does not fully account for what we currently observe. Indeed, AI constitutes the basis of the current phenomenon. But there are also tons of applications allowing to deploy AI models for a specific purpose. We use the label "generative technologies" to refer to these AI-based software made to create and generate content.

As a consequence, these generative technologies may lead to change drastically how knowledge is conceived, created, structured, and shared (see, for instance, McKinsey, 2018). For example, various debates have appeared on the future of the World Wide Web and it is often assumed that the Web will move from a "read-write-stock" approach to a really "generative Internet" as anticipated by Zittrain in 2006.

ChatGPT, Bard, or Midjourney are today the most visible applications, but in a few months thousands of software solutions have appeared, proposing cheap and high-quality AI models to generate images, videos, lines of code, texts, voice, music, or any combination of these outputs. Some of these applications are based on proprietary AI models, while others are proposed in open source, allowing for the generation of numerous derivative products (Demil and Lecocq, 2006), i.e., generative technologies applied to various contexts and goals.

The most emblematic of these generative technologies is most certainly GPT-4, the fourth major generation of the Generative Pre-trained Transformer language model (following ChatGPT), created by Open AI. GPT is a natural language processing model. It allows human-machine natural interaction through conversations based on prompts established by the user.

GPT appears as a massive game-changer in itself, enabling two billion of knowledge workers and students to increase their efficiency or to operate tasks they were not able to do. GPT may help build marketing campaigns, write books, make presentations, propose first drafts or improve human-generated ones, etc. Observers mention that various sectors will be impacted by this software, particularly finance, health, or education in the first stage (see, for instance, Hulick, 2023). Generative technologies are not only impacting efficiency and productivity (McKinsey and Company, 2023) but also quality (Dell'Acqua et al., 2023). They can also enable new BMs based on real-time optimization (e.g., automatically changing product ranges or prices on a website), on personalized products or services (e.g., allowing customers to design their products easily), or on rapid prototyping and rapid design, for instance (with the risk of observing "fast fashion" logic in numerous industries).

However, beyond such impacts of generative technologies on BMs, it is probably worth wondering what the impact of these technologies on the design of business models could be.

Business Model design with the IDEATe process

We define BM as a system for value creation and value capture embedded in an ecosystem. BM encompasses an organization that deploys and coordinates resources to generate activities producing value propositions and capturing value (Demil and Lecocq, 2010).

BM design is an iterative process that consists in envisioning and creating a business model (understood as an instance in real life). It aims at specifying how an organization creates value (solving problems for stakeholders) and captures value (solving problems for the organization itself). This process is mostly conceptual, while it may include the creation and manipulation of various artifacts. It can be deployed in the case of a brand-new business activity, for instance, when entrepreneurs are designing a BM for their start-up. It can also be deployed in the case of an existing company that intends to change its current BM (what Massa and Tucci (2021) label 'business model reconfiguration').

However, we contend that not all new and/or incumbent organizations design their prospect BM. For instance, Seb, a worldwide leader in kitchen appliances, has led the evolution of its BM without a design process (Demil and Lecocq, 2015). Indeed, the progressive transformation of Seb's BM has been operated through the creation of various emerging artifacts (new products, new roles for staff in the organization, new partnerships…) embodying a new BM. The goal of senior executives was clearly to change the BM of the company but they decide to develop and test local initiatives (in business units and in functional services) and to progressively connect these initiatives to finalize the emergence of a new BM. The same probably holds true for some new ventures, as we can observe entrepreneurs who end up with a BM without any formal BM design. Thus, BM design is not the only way for an organization to have a BM or change its existing BM.

According to Amit and Zott (2015: 332), BM design "*involves the conceptualization of a boundary-spanning activity system that includes the mechanisms that connect these interdependent activities and the identification of the party that carries out each of the activities within the system.*" This conceptualization requires exploring alternative sets of choices and consequences concerning the activities included in a BM and their relationships (Casadesus-Masanell and Ricart, 2010). Indeed, there is a consensus on the discovery-driven nature of BM and on the need to explore and test (at least conceptually) multiple alternatives (see, for instance, McGrath, 2010; Massa et al., 2017).

However, the design activity itself is not fully apprehended in the BM literature (Osterwalder and Pigneur, 2012). Most of the time, designing a BM means using a framework that managers reflect on. For almost twenty years, dedicated methods and frameworks have been used to lead or facilitate BM design. Methods include storytelling, visual thinking, or Lean Start-Up, for instance. Frameworks encompass, for example, Business Model Canvas (Osterwalder and Pigneur, 2010), RCOV framework (Demil and Lecocq, 2010), or Activity System Perspective (Zott and Amit, 2010). These frameworks are used through applications or in live workshops using paper boards, posters, and post-it.

To reflect on the BM design activity itself, we have used two sources of inspiration. The first is the design discipline itself as used in the innovation management literature, and the second is the literature on BM innovation processes and BM design.

Generally speaking, the design discipline aims to design solutions (often in the form of artifacts) to solve problems (Brown, 2008). It offers methodological principles such as the design thinking process, aiming at identifying problems, proposing and testing solutions by successive iterations. According to different sources[1], various stages are proposed. Although these methods can inspire a manager or an entrepreneur in the search of a BM, the BM design may differ from the general approach of design thinking on at least three dimensions. First, BM design does not

[1] See for instance the 3-stages proposed by Tim Brown (2008), the 5-stages proposed by the Hasso Plattner Institute of Design at Stanford (the d.school) (https://dschool.stanford.edu) or the 4-stages proposed by Esther Han (2022) (https://online.hbs.edu/blog/post/design-thinking-examples).

result rapidly in material artifacts that are confronted with reality. It is essentially conceptual. Second, the concept of BM is not exclusively a user-centric concept as suggested in the design thinking process (see the 'empathize stage' proposed in some design thinking models). Thinking about the ecosystem or the mechanisms connecting activities, for example, are central to BM design. Third, the goal of design thinking consists above all in proposing product or service innovations while BM design is more holistic (Demil et al., 2015).

Another source of inspiration can be drawn from the BM innovation process literature which also proposes several stages of new BM development. These stages strongly echo the design thinking stages. For example, the 4-I model (Frankenberger et al., 2013) considers Initiation, Ideation, Integration, and Implementation as the four main stages of the BM innovation process. In a review of 20 studies on BM innovation processes, Wirtz and Daiser (2018) find that most of them share similar stages (Analysis, Ideation, Integration and Implementation) with the design thinking approach. Eventually, they propose seven stages to innovate a BM: Analysis, Ideation, Feasibility, Prototyping, Decision-making, Implementation, and Sustainability. Each stage of this process is itself constituted by several activities. However, as Wirtz and Daiser recognize, the studies under review display a high variance according to the more or less fine-grained approach adopted (e.g., some studies propose three stages while other identify ten stages).

Although processes described in literatures on design thinking and BM innovation can be a good source of inspiration, we contend that a good process for BM design should present some specific characteristics.

First, BM design should have clear conceptual boundaries. Thus, we exclude from it the definition of the purpose pursued by entrepreneur or manager. Indeed, this "Purpose" appears as an upstream process to BM design (See Figure 1). This purpose concerns for example the for-profit or non-profit orientation of the organization and the social or environmental role of the organization. In our view, BM design process does not include neither the downstream Implementation process (See Figure 1). Indeed, the BM design process is above all conceptual, articulating concepts in the form of a visual model or a narrative for example. BM testing can be operated in real conditions, at least partially. However, we contend that fully running the real BM is associated with the Implementation process and does not belong anymore to the BM design process. Sure, we recognize that Implementation may still lead to evolution of the BM as indicated in Figure 1.

Second, we contend that at the core of the BM design process lies several stages of BM conception. However, some stages of the BM design do not refer to the conception of the BM itself. The design process of BM requires stages related to gathering data or to defining the issues that the designed BM must solve – stages that are not conception of BM *per se*. As a consequence, the BM design process should include more than just the conception of a BM.

Third, instead of considering that some stages only consist in divergence of ideas (very often evoked in the 'ideation' stage) while others consist in convergence of ideas (in the 'prototyping' stage, for instance), we consider that each stage encompasses both convergence and divergence processes. (See Figure 1). We contend that, to be effective, the BM design process should allow each of the stages to articulate convergent and divergent phases, successively opening and narrowing ideas and discussions. The divergent phases consist in producing multiple ideas. The convergent phases consist in fine-tuning ideas, restricting and selecting, leading to choices. Thus, each stage incorporates creativity and decisions.

The preceding developments have led us to conceive the IDEATe five-stage process for BM design and the main activities associated to each stage (see Table 1). In our view, these different stages do not constitute a linear sequence and should be considered as part of an iterative process (Amit and Zott, 2021). Iterations may occur between each stage and the overall cycle may be repeated several times. Implementing the BM may result in a new cycle of BM design and may ultimately lead to a reconsideration of the very purpose of the BM.

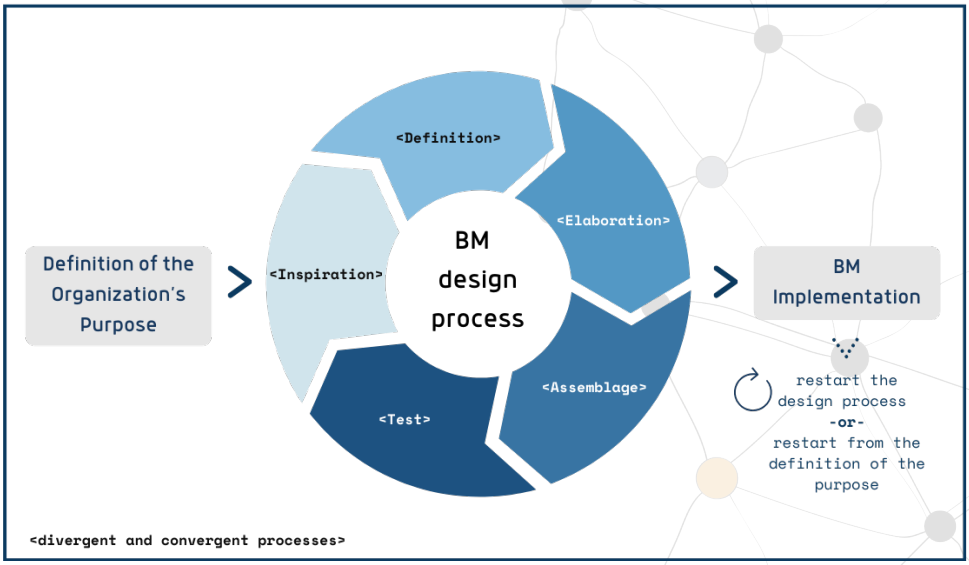

Figure 1: The IDEATe process for business model design

Table 1.

STAGES	EXAMPLES OF ACTIVITIES
Inspiration *Collect and make sense of data*	• Gather and analyze data on the general environment of the organization (actors, competitors, regulations, technologies…), identifying macro and micro tendencies. • Obtain insights from "customers". • Search on existing business models (within or outside industry) and their ecosystem.
Definition *Explore and frame issues*	• Specify one or several issues that the designed BM will try to solve for stakeholders (value creation problems). • Specify one or several issues that the designed BM will try to solve for the organization itself (value capture problems).
Elaboration *Experiment and select elements*	• Conceive main elements encompassed in the BM: - Resources - Internal and external organization - Value propositions
Assemblage *Relate and integrate elements into a BM*	• Conceive loops connecting elements into a single BM, searching for performance through virtuous circles and considering externalities of the BM. • Prototype the complete BM and the enacted ecosystem
Test *Challenge and validate the BM*	• Identify risks and threats of the envisioned BM and conceive eventual BM modifications. • Get feedback from stakeholders of the enacted ecosystem and conceive eventual BM modifications. • Evaluate consistency between the designed BM and the purpose of the organization. In case of inconsistency, start a new IDEATe process.

Table 1: Stages and main activities in the IDEATe process

Finally, designing a new BM involves a combination of creativity, decisions, and iterations. Generative technologies can intervene at various stages of the described process. Moreover, BM design may require multiple rounds of ideation, testing, and refinement before it may be upscaled. Thus, generative technologies may be used several times during the whole process.

How Could Generative Technologies Change Business Model Design?

We envisage six ways generative technologies may change either the process or the outcome of BM design.

Major change 1: Producing and analyzing data supporting BM design (Inspiration, Definition and Test stages)

Designing a BM requires data collection and data analysis, particularly during stages of Inspiration and Test. Because they rely on massive aggregated amounts of existing knowledge to create new, structured content, generative technologies can be used to produce market studies at an incredible speed and at a very low cost. These data do not only help to create a broad understanding of the environment but also to understand the issues encountered by stakeholders. Similarly, generative technologies can generate structured data on diverse types of resources (financial, human, technological, etc.) that would feed the BM design process and outcome. This is what the American start-up *Plus* offers with its service "Plus AI": based on a business name or an industry, *Plus AI* creates slides of a market research presentation.

Major change 2: Generating ideas – a lot of ideas (Elaboration and Assemblage stages)

Generative technologies can produce tremendous amounts of ideas at a speed that no human brain can match. They also make these ideas available to everyone, including people with little knowledge of management or strategy.

When it comes to BM design, ideas may concern either the various components of the BM, or the interdependencies between these components through loops (Casadesus and Ricart , 2010). For instance, when considering the RCOV model (Demil and Lecocq, 2010), generative technologies can provide ideas about the nature of the Resources and Competencies (RC), the Organization (O), or the Value proposition (V) to be included in the designed BM. They can also provide ideas about the interconnections of these three components to maximize value creation and value capture.

Consider the case of an entrepreneur engaging in a dialogue with GPT via Bing to create an airline company. A first prompt could be: "I want to create an airline company. What kind of business model should I implement?". The software comes with five general propositions: full-service carrier, low-cost carrier, hybrid carrier, charter carrier, and regional carrier, as identified by IATA (International Air Transport Association). Opening a dialogue asking for more innovative BM, generative technology comes soon with a set of new options, such as sustainable or subscription-based BM.

Major change 3: Conceiving a "zooming design" of BM (Elaboration and Assemblage stages)

Not only may generative technologies give insights into the components and interconnections within a BM, but they can also assist entrepreneurs and managers in navigating back and forth between the macro level (general design) and micro level (specific element) of a BM, improving consistency between Elaboration and Assemblage and allowing to move back and forth between those stages.

Consider the previous case of designing the BM of an airline company. GPT would return various types of BM (macro-level) from which the entrepreneur could choose to continue the discussion. After choosing a general BM, the entrepreneur may then ask, for instance, which types of planes should be used to launch the company, and then ask increasingly specific questions about the configurations of the plane or of the seats, the number of staff required on board, etc. The entrepreneur could thus progressively align the different components with each other, and with the general design of the BM. Therefore, generative technologies could help zoom in and zoom out from architecture to details during

the BM design, favoring the alignment between the components within and across the levels of the BM. This is a fundamental change in the process of BM design, as it takes advantages from different design methods. Indeed, this "zooming design" allows to combine within the same design process a systematic approach (adapted in the case of high complexity) as suggested by Pahl and Beitz (1996), and an agile approach (adapted in the case of high uncertainty). In other words, with such a process, sequential rigorous design (see, for instance, the V-model) meets agility, facilitating virtual prototyping of the BM.

Major change 4: Pushing analogical reasoning forward (Elaboration stage)

Analogical reasoning refers to the "*application of structured knowledge from a familiar domain to a novel domain*" (Martins et al., 2015, p. 106). In the case of BM, it involves identifying characteristics of a given BM observed in a sector to elaborate another BM, potentially in another industry. Analogical reasoning plays a crucial role in human thinking, as it is powerful for making sense of unfamiliar experiences and acting accordingly. For instance, entrepreneurs can draw from BM archetypes as guides for developing new business models or adapting existing ones (Bocken et al., 2014). Therefore, analogical reasoning may contribute to transposing successful BM designs from one company, or even one industry to another (Gassmann et al., 2020). In this view, Mikhalkina and Cabantous (2015) mention that iconic BM (such as Ryan Air, Nespresso, or Uber) are identified and partially imitated by entrepreneurs in the same or in other sectors. Analogical line of reasoning may also assist managers identify illustrations or arguments that support changes they want to bring to their own BM and may help them communicate in their company.

For instance, when asked "how the business model of La Compagnie (a French airline offering an all-business class service on transatlantic route) could be adapted to create a sustainable carrier?", generative technology software mentions the main characteristics of La Compagnie BM (offering a niche service, reduce costs and increase efficiency, offering competitive fares and generate loyalty) before using analogy for proposing choices for a sustainable BM. For instance, it suggests using choices for sustainability (such as alternative fuels or electric aircraft) to generate loyalty.

Finally, analogical reasoning is key for artificial intelligence (Hall, 1989), and by extension for generative technologies, both because these technologies rely on it to create new content and because they are very good at identifying analogies across gigantic sets of data (Prade and Richard, 2015). Thus, generative technologies can help managers (1) identifying similarities with other contexts and (2) making sense of these similarities to leverage innovation in their BM.

Major change 5: Strengthening a reflexive analysis of BM design (Test stage)

Because they permit entrepreneurs and managers to engage in a conversation, and because of their ability to analyze and deal with incredible amount of data, generative technologies can help users identify the pros and cons of a given BM design and identify the associated risks.

As an example, users can prompt generative technologies with different types of scenarios to stress test and evaluate the robustness of a BM when faced with potential future uncertainties (Haaker et al., 2017). Managers can ask generative technologies to evaluate the performance of each component of their BM, or the resilience of the interconnections therein, under relevant trends (i.e., stress factors) – trends that they may have identified themselves thanks to their experience and knowledge (Spaniol et al., 2019), or together with generative technologies. The variety of generative AI platforms makes it possible to visualize the results of these stress tests as text, pictures, tables, graphics, or even audio or video. This provides several bases for reflection and analysis and facilitates their sharing with other stakeholders to further open discussion and reflection on a designed BM.

Major change 6: Blurring the boundaries between BM design and BM implementation (Test stage and Implementation)

The speed at which generative technologies enable the design of new BMs is unprecedented. It tends to blur the boundary between the distinct processes of BM design and BM implementation, especially in the

case of digital businesses where innovations can be tested immediately after they were developed.

This boundary becomes even thinner as generative technologies can serve simultaneously to refine and challenge a designed BM and contribute to BM implementation *per se*. For instance, several independent artists and crafters who sell on the online marketplace Etsy.com have used generative technologies to redesign their BM and adjust their value proposition. They started selling AI-generated digital products, such as coloring books, stickers, mugs, and T-Shirts (Tiffany, 2023), relying on Etsy's policy that considers that using generative technologies involves some level of creativity, hence allowing such moves. Therefore, generative technologies eventually enable adaptive BM by bringing the "rapid prototyping" paradigm to BM innovation itself (Rayna and Striukova, 2016).

Moreover, whatever the BM, generative technologies may be used to continue change in a test-and-learn process, even after implementing the BM. Indeed, in the case where a given BM does not fully deliver the expected performance, generative technologies can help identify potential change to create more congruent and positive reinforcing loops or eventually pivot the BM. In this case, the BM design itself is ongoing, and it becomes difficult to separate the design from the implementation processes, both being part of a single process of BM evolution (Demil and Lecocq, 2010).

Blind Spots and Risks Associated with Generative Technologies for Business Model Design

Blind spots of generative technologies in business model design

Generative technologies may contribute a lot to the design of BM. However, we may also identify some dimensions of business model design where generative technologies may fail to contribute.

First, designing a BM is not only a matter of organizing resources and activities within the company and beyond its boundaries (at the ecosystem level). It is also a matter of purpose. Indeed, before designing a BM, an entrepreneur or a manager must clarify what the purpose of the organization is. As mentioned by Ranjatoelina (2018), there is a strategic intent behind each business model, whether the organization is a non-governmental organization or a for-profit company, a family business or a multinational corporation. This purpose, which is probably the most important dimension to impulse BM design process, should be clearly stated in the prompts during the dialogue with AI.

Second, generative technologies may be used in Elaboration and Assemblage stages to identify several elements composing the BM, and eventually several potential BMs for a given business. Once they have been proposed by the generative technology, the user must decide which one to explore and deepen. The user will have to decide which one (if any) is the 'good' BM for the organization. Indeed, with their current capabilities, generative technologies may not be able to really integrate the role of intuition and the identification of entrepreneurial opportunities.

Third, interacting with generative technologies properly often requires one to be familiar with various notions. For instance, designing a BM entail articulating numerous concepts from innovation, production, strategy, marketing, finance, or supply chain management. Moreover, in the case of analogical thinking, it is necessary to have heard about details of iconic or less known businesses. Thus, one may wonder if the support from generative technologies for BM design does not suppose a deep knowledge on BM... Indeed, these technologies may help a novice entrepreneur to develop the first draft of a BM, but they will probably need to acquire knowledge to refine their BM.

These three blind spots for BM design with generative technologies are merely examples. However, the territory of tasks that generative technologies can do is expanding very rapidly. For instance, a few months ago, organizing the dialogue with AI necessitated specific skills and capabilities. This has changed recently, as prompt repertories, prompt marketplace or even generative technologies dedicated to helping on making good prompts are now available.

Risks associated with the use of generative technologies for business model design

Several risks can be identified when using generative technologies for the process of BM design. These risks may reduce the effectiveness or the degree of innovation of the process.

First, current generative technologies build on existing data, current products or services, and actual business models. This may reduce the ability to proceed to very abstractive and speculative elaboration of BM. Moreover, in some cases, we may observe that a generative technology may be trained or have access to a relatively reduced set of data, creating biases in the proposed output related to the designed BM. Consequently, the set of propositions offered by the generative technology can be quite limited.

Second, submitted to the same kind of demands, generative technologies may end up being not creative and simply imitative, sometimes without "being aware" of it. Users of these technologies may finally not even know anymore where an idea or a BM comes from. Indeed, in the current situation, generative technologies appear to produce output for which there is no real copyright and no real copyleft either. There is no plagiarism, but there is no originality either. Currently, we contend generative technologies operate in a no man's land from the imitation-differentiation point of view. This situation opens huge opportunities for research but creates huge uncertainty for practice. Indeed, entrepreneurs may have difficulties to evaluate the originality of propositions made by generative technologies, whereas it is not the case when entrepreneurs are exploring and sensing their ecosystem themselves.

Third, using generative technologies to test and improve a given BM supposes to feed them with data. The software may then be able to use it to help competitors in their own projects when they use the generative technology. As a consequence, we may see entrepreneurs and managers avoiding supplying data to generative technologies, or even providing false information or trivial data.

Fourth, with technologies allowing to generate detailed BM in a few minutes, entrepreneurs may be tempted to quickly design a new BM rather than implementing or pursuing the improvement of a BM previously designed. Indeed, following what can be considered as a Penelope syndrome, entrepreneurs may be permanently redesigning their BM, without even implementing them.

The four examples of risks mentioned here may lead to affect 'parallel play'. McDonald and Eisenhardt (2020) have borrowed this wording from the child development literature and propose that most successful entrepreneurs designing a BM are engaged in such a process.

Parallel play occurs when *"they (1) borrow from peers and focus on established substitutes for their services or products, (2) test assumptions, then commit to a broad business model template, and (3) pause before elaborating the activity system"* (McDonald and Eisenhardt, 2020, p.1). As noted by the authors, while they mostly play alone, preschoolers engaged in parallel play look at what their peers are doing, and eventually imitate them or pick up their toys. These children may pause before continuing to learn about their environment.

McDonald and Eisenhardt (2020) note that parallel play is an effective method to design a BM in nascent markets. However, given the risks identified above, we contend that using generative technologies may lead to less and less parallel play. Indeed, entrepreneurs may spend less time searching for their own way, trying to learn from others. They may simply dialogue with generative technologies, reaching isomorphic BM.

On the other hand, we also consider that, if properly used, generative technologies may reinforce, and not weaken, parallel play – for instance, through the use of these technologies to build from other industries and learn from other cases. Thus, entrepreneurs and managers could use forms of "parallel play prompting" with generative technologies (e.g., "What can I learn from case X?"; "How can I apply case X recipes for my business?").

Some Functions of Generative Technologies Supporting BM Design

Identifying and classifying generative technologies that may support BM design is not easy, because of their constantly evolving quantity and nature. For instance, as of October 22nd, 2023, Futurepedia.io, a website that presents itself as "the largest AI tools directory, updated daily", proposes 5,338 generative tools – up from 925 on February 2nd, 2023. The same day, prompting "I want to design the business model of my company" on this website returns 92 results (up from 26 results returned on July 4th, 2023).

Thus, the emergence of generative technologies could provide new frameworks and tools or new functions to support firms in developing and improving their business models. We list three of them below:

- AI-assisted BM ideation systems: they could leverage AI to propose ideas related to BM. Moreover, by incorporating data on customer needs, or more generally on the ecosystem, these platforms could provide customized recommendations to companies expecting to develop innovative business models. Such systems could be based on typologies or taxonomies of BM.
- AI-assisted BM simulations: these generative technologies could allow companies to simulate the performance of different BM under different scenarios established by the user or by the generative technologies itself. These include AI-generated stress tests. This enables firms to better understand the risks and opportunities associated with different BM and make more informed decisions. Moreover, data on real cases of various BM around the world may allow to anticipate the performance of a designed BM.
- AI-assisted decision support systems: these systems are developed to provide decision-makers with customized recommendations based on real-time data or previous preferences of the user. This is, to some extent, how Shein, the famous Chinese fast-fashion online retailer, adapts to social media trends in real time (Plé and Yacoub, 2022). These decision support systems allow firms to make more informed and data-driven decisions, increasing their chances of success. Such decision support systems may even offer real-time visualization of suggested BM – a visualization that is crucial to facilitate the dialogue between different stakeholders (Täuscher and Abdelkafi, 2017).

Conclusion

Business model design is a disciplined creative process for which generative technologies may be very useful. Indeed, their capabilities enable to leverage, connect, and reorganize pre-existing knowledge. Consequently, they may produce almost systematic and eventually unexpected data and ideas at the various stages of the BM design process. However, the usefulness of these technologies for the design of BM heavily depends on prompt engineering, that is, the art of questioning and interacting with generative technologies to get effective results. It requires individuals to be more and more specific when formulating the successive iterations of their requests without losing sight of the coherence between the various components and the interdependencies within the BM. Thus, while generative technologies may be a good starting point for quite unexperienced entrepreneurs, these interactions require a good base of managerial and conceptual understanding. For instance, Martins et al. (2015, p. 108) note that the success of analogical reasoning depends on "*developing substantive understanding of the architecture of the analog's activity systems as well as of the strategic problems to be solved in the context of the target business model.*" Consequently, using generative technologies for designing BMs require new skills and reflexivity to be fully exploited. We must also remind that performance does not solely originate from the BM design process but also from the implementation of the BM.

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