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**Exploring the Impact of Utilizing a Digital Creativity Support Tool
(CST) to Enhance Creativity in Business Models' Design**

An Empirical Investigation within the Context of Social Enterprises

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Abstract

This thesis investigates the impact of the digital Creativity Support Tool (CST) BOB on enhancing creativity in social enterprise business model design. Using an exploratory methodology with qualitative and quantitative components, a questionnaire collected data from participants, which were divided into an experimental group (using BOB) and a control group. Their task was to innovate or create a social enterprise business model, evaluated for creativity by expert assessors.

The results showed a moderate positive correlation between CST usage and higher creativity evaluations, indicating the tool's potential in fostering creativity. In addition, a significant negative correlation was found between scepticism towards AI and creativity ratings, underlining the importance of a positive and open attitude towards technology for the production, through digital tools, of more creative work.

Despite the coefficients of the multivariate linear regression not meeting conventional statistical significance threshold of 0.05 likely due to a small sample size, these findings can still provide valuable insights. The positive correlation, which should be further investigated by future research, still suggests that CSTs might benefit social enterprises striving for innovative and sustainable business models, and some collateral discoveries related to the usage of BOB by people with higher age highlight the importance of the interface design of these tools.

Future studies could expand sample sizes, explore different CSTs, and delve deeper into the relationship between age, skepticism towards technology and creativity.

In summary, this thesis highlights the potential of digital CSTs like BOB to enhance creativity in social enterprise business model design, emphasizing the role of personal attitude towards technology and innovation. It opens avenues for further research and practical applications in this evolving field.

Keywords

Business Model, Creativity, Social Enterprise, CST, AI, Digital

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Introduction

The global economy must embark on an extensive and all-encompassing shift toward sustainability to address the social and environmental challenges confronting humanity. The Paris Agreements and the SDGs offer a blueprint for advancing sustainability, and the business sector is already taking steps in the correct direction.

A good example are social enterprises: businesses that have specific social objectives that go hand in hand with making a profit as a company. They usually focus on one key social cause, such as international poverty, employment for disadvantaged groups, or climate change. Their values are built into how they work as a company and are intrinsic parts of their branding and marketing. Impact, in one form or another, is part of their DNA (World Economic Forum, 2021).

Social enterprises play a vital role in ensuring a sustainable economy. They can help transform society and the economy by exploring alternative business models and inspiring sustainable and inclusive practices. Social economy actors have emerged in sectors where the mainstream economy was traditionally dominant. They also unlock new sectors by identifying economic opportunities in niche sectors, demonstrating the sector's economic potential, and helping to structure this sector of activity (OECD, 2020). To ensure the sustainable presence of these companies into the market over the long term, it is imperative to address the technical challenges they encounter. These challenges encompass financial sustainability, the delivery of high-quality services or products, and the availability of a skilled workforce. One potential solution lies in the application of innovative and effective business models that empower entrepreneurs to address societal issues in novel ways, detaching themselves from the solutions provided by the mainstream economy. Consequently, the significance of creativity and the overall quality of the creative process which bring to unique and innovative solutions cannot be overstated.

Although their implementation in the context of Business Models is far from being mainstream, the application of Creativity Support Tools (CSTs) to boost creativity is already diffused in the creative industry, representing a valid option to help social entrepreneurs producing more creative models.

However, a noticeable gap exists in the actual literature concerning the evaluation of the efficacy of such tools in facilitating the creative design of business models for social enterprises.

Hence, the primary objective of this thesis is to investigate and shed light on the effectiveness of employing a CST, specifically BOB, in enhancing creativity during the development of business models for social enterprises.

Literature review

This section provides a comprehensive overview of the literature pertaining to the primary topics explored in this research, to guide the reader in the exploration of this thesis.

The initial part comprehends a theoretical foundation on Social Enterprises, which are the context of this research. Starting with a broad overview of the concept, the focus gradually shifts towards the challenges that social entrepreneurs might face while running their company; as a solution to solve these issues, the creation of a valid business model is proposed, subsequently defining the characteristics of a BM for Social Enterprises.

Another crucial aspect of this research is the concept of creativity, which can be an important driver in the creation of an innovative and robust Business Model, which is competitive in the complex market where SEs are immersed: a clear definition of this term is essential for its proper understanding and measurement. Therefore, an attempt is made to answer the question: What is creativity?

However, understanding creativity alone is insufficient. It is equally important to comprehend the process through which the human brain generates a creative idea, referred to as the creative process. In this context, the creative idea corresponds to the Business Model (BM), necessitating a more in-depth discussion on the specific process behind BM ideation.

Finally, since a useful practice to improve creativity can be the usage of Creativity Support Tools (CSTs), the last paragraph introduces the concept of CST, category to which also the tool used in this study, BOB, belongs.

The discussion then narrows to focus on digital CSTs (being the type of tool used in this experiment), providing examples from state-of-the-art tools currently available on the market. The potential applications of Artificial Intelligence, a technology that has recently gained significant attention, are also explored to elucidate the broad possibilities offered by CSTs.

Social enterprises

The dwindling of the welfare state has been a significant catalyst in pushing the expansion and evolution of the social economy. However, other elements such as transformations in local economies, the marginalization of certain vulnerable groups, and a gradual shift from traditional notions of civil society organizations towards more dynamic, issue-oriented entities have also played a part in revitalizing the sector. Organizations within the social economy have stepped in to fill the voids left by the market and state, demonstrating innovation, adaptability, and responsiveness to local needs when given the opportunity and environment to reach their full potential (Noya & Clarence, 2007).

Social enterprises indeed represent a valuable asset to fight the inequalities emerging from mainstream economy, but they have to face challenges which can be difficult to overcome, and to accomplish this goal social entrepreneur can delve from the traditional business theory some fundamental concepts which proved their efficacy in sustaining complex organizations. Since the issues they face can be different from the ones usually encountered from normal companies, they need to adapt and re-elaborate these tools in an innovative and creative way.

These topics will be discussed in the following chapters, starting with a definition of what a social enterprise is.

What is a social enterprise?

The concept of “social enterprise” belongs to the macro-category of the third sector: it can be considered as the residual from the public and the private sector, composed by value driven organisation and mainly reinvest their profit for social, environmental, or cultural scopes. Some examples are voluntary and community organisations, charities, social enterprises, cooperatives and mutuals. (National Audit Office (NAO), 2009). Moreover, organizations belonging to this sector should be institutionally separate from the government, voluntary and organized, feature which distinguishes them from entities belonging to the fourth sector (Salamon & Anheier, 1997).

A social enterprise it's neither a co-operative nor a non-profit organization: it's something in the middle.

The idea of social enterprise initially met a positive response in the US in the 1990s, although it remained a quite vague concept, mainly describing market-driven economic

endeavours aimed at achieving a social objective (Defourny & Nyssens, Defining social enterprise, 2006).

In Europe, while in the beginning there was a separate development of this type of organization in the different countries (due to the strong cultural, political and economic difference between countries), which varied according to the differences between legislations, a common model started to emerge and a group of researchers noticed it, deciding to start a research work, which later on gave birth to the EMES European Research Network (Defourny, Introduction: from third sector to social enterprise, 2001). According to the EMES Network, social enterprises are organizations that are established by a group of citizens with the explicit objective of benefiting the community. Such enterprises have limits on the material interests of capital investors, and they highly value their autonomy and economic risk-taking, which is related to their ongoing socio-economic activities.

EMES definition uses two main criteria to classify social enterprises: economic and social. These criteria must not be intended as prescriptive for an organization to qualify as a social enterprise. They serve more as a description of an “ideal type”.

Four criteria have been identified for the economic and entrepreneurial dimension:

- a) Engaged in ongoing production and sale of goods and/or services: social enterprises don't normally conduct advocacy activities, instead they focus more on goods production or services provision
- b) Maintaining a high degree of autonomy: social enterprises are not managed (neither directly nor indirectly) by public authorities, while they may depend on public subsidies
- c) Undertaking significant economic risk
- d) Providing a minimum amount of paid work

For the social dimension, the proposed criteria are five:

- a) Having an explicit goal to benefit the community (or a specific group of people)
- b) The initiative is launched by a group of citizens (who share a need or aim)
- c) Decision-making power does not rely on capital ownership
- d) A participatory nature, involving all activity-affected parties
- e) Limited profit distribution: the category of social enterprises, in addition to including companies characterized by a total restriction on profit distribution, also

includes companies that make limited profit distribution, although not making profit maximization the focus of their activity.

The diffusion of social enterprises is a phenomenon which in continuous growth, also to face the global issues which are related to environmental changes, lack of resources, poverty and other issues addressed by SDGs¹. According to a study conducted by Social Enterprise UK (2022), all over the globe there are approximately 11 million businesses which, independently from their legal form, could be considered social enterprises. Also according to this study, these organizations would turn over billions of pounds per year. The growing interest in social enterprises and social innovation can be attributed to the shrinking public sector and the challenges faced by traditional, profitable business models. Many see social innovation as an untapped opportunity for commercial organizations due to its perceived added value (Phillips, Ghodabian, O'Regan, & James, 2014).

Challenges social enterprises face in developing innovative business models

Social enterprises face enormous challenges: they must convey compelling business ideas that can attract funding and gain government approval, all while competing with other organizations for resources and support. Social entrepreneurs struggle with remote collaboration, acquiring and integrating new technologies, promoting awareness of their mission, and recruiting qualified staff with the skills they need (Sivathanu, 2013).

Also, according to a study conducted on Taiwanese social enterprises by Wu, Wu, & Wu, (2018), the main challenges which SE face involve products and services, human resources and financial resources.

- a) Products and services: typically, non-profit organizations (NPOs) do not possess adequate expertise in enhancing production and marketing channels. Additionally, since they haven't identified a specific market segment to distinguish their products from others, they struggle to market their products effectively, which has a detrimental impact on their profitability. Therefore, it is essential to adopt a comprehensive approach that involves planning and executing strategies related to product development, customer service, pricing, sales promotion, and

¹ United Nations - Department of Economic and Social Affairs . (2023). The 17 Goals. Retrieved from United Nations: <https://sdgs.un.org/goals#history>

distribution to achieve the desired objectives for both the organization and its stakeholders (Kotler, 1979).

- b) Human Resources: disadvantaged employees require work adjustments that impact SE operations, since they are often in unfavorable condition (mentally, physically, or socially speaking). SE founders lack business skills, being often unfamiliar with business managing. Lower pay hinders recruiting skilled managers, forcing SEs to train existing staff. Hence, addressing staff development is key to SE progress.
- c) Financial Resources: a crucial aspect of entrepreneurship for business owners is not just creativity, but rather the ability to market their innovative ideas. However, non-profit organizations (NPOs) often face difficulties in converting their creative ideas into marketable products due to their limited resources. This challenge is particularly daunting for small-scale social enterprises (SEs) that lack the collateral necessary for securing high-risk loans from banks, which are usually unwilling to take on such risks. Social enterprises can overcome resource constraints, which they will potentially face in the beginning of their activity, by using a multi-channel approach, attracting professionals through a compelling mission and vision, and utilizing free community resources to reduce overhead costs. Furthermore, SEs should acquire societal support by having people identify with the organization's beliefs, which can increase willingness to purchase services or products, as well as to become donors or volunteers (DESA, 2007).

All these factors must be carefully considered by a social entrepreneur who wants to create or innovate an effective and sustainable social enterprise's business model.

To address some of these issues, a fundamental driver of success can be the implementation of an appropriate and effective Business Model.

A well-structured BM can be a valuable way to improve the products and services offer of the social enterprise, helping social enterprises to identify their target market, differentiate their value proposition, and optimize their pricing and distribution strategies, enhancing their competitiveness and profitability in the market (Armstrong & Saartje Grobbelaar, 2023).

Being able to offer a reliable and creative Business Model can also to improve the attractiveness of the company for Human resources, attracting and retaining talented staff

by aligning its social mission and financial goals and providing incentives and opportunities for learning and development (Jbara & Darnton, 2019).

Finally, for the financial area, a good model can help social enterprises to diversify their revenue streams, by exploring various sources of income, such as grants, donations, fees, sales, or investments. This can reduce their dependence on external funding and increase their financial sustainability.

In the next chapter, the structure of a business model for social enterprises will be analysed, to highlight which are the most important components for the generation of a well-suited solution.

Business Model in Social Enterprises

The business models of social ventures are essentially a description of how these ventures navigate the tensions between their social and business goals at a systemic level. To be successful, social ventures require an effective business model that can ensure both financial sustainability and desirable social impact. (Margiono, Zolin, & Chang, A typology of social venture business model configurations, 2018).

Business modelling is a valuable tool for creating value that encompasses all aspects of the business, from processing and design to customer acquisition, sales, product distribution, and service delivery: the literature also suggests that developing a new business model can involve creating a new product or innovating a process. The concept of a business model involves not just the creation of value but also the generation of revenue and costs, comprising a series of activities that, through the collaboration of processes and technologies, result in profit (Munna, 2021).

According to Shafer, Smith, & Linder (2005), a business model is a depiction of a company's fundamental logic and strategic decisions for generating and retaining value within a value network. The authors, after conducting a literature review, individuate four main components: Strategic Choices (Value Proposition, Branding, Mission, ...), Value Network (Suppliers, Customer Information, Customer Relationship, ...), Value Creation (Assets and Activities) and Value Capture (Cost, Financial Aspects, Profit).

Social entrepreneurship merges the ingenuity of conventional entrepreneurship with a purpose of effecting social change. It provides valuable insights that can inspire the development of business strategies and organizational structures that are both socially responsible and sustainable.

As suggested by Qastharin (2015), Osterwalder's Business Model Canvas is inadequate for fully capturing the business model of a social enterprise. To gain a comprehensive understanding of how a social enterprise creates, delivers, and captures value, additional building blocks are necessary, namely the Mission and Impact & Measurements blocks. The Mission block outlines the social enterprise's purpose for existing, including the problem it aims to solve, the target customer, the approach taken, and the intended impact. This block serves as a guiding principle for the enterprise.

The Impact and Measurements block describes the benefits that the social enterprise offers to its customers and includes indicators of success and progress for the enterprise. These measurements help to track the social enterprise's impact and ensure that it is achieving its intended social goals.

Mair, Battilan, & Cardenas (2012), conducted a study on a sample of 200 Social Entrepreneurial Organizations (SEOs), and identified three main elements which compose a social entrepreneurial model: the specific area of concern or issue domain that the social enterprise aims to address, the target groups it seeks to engage with to achieve its goals, and the range of activities it undertakes in pursuit of its mission.

Another important aspect which has to be considered when discussing about social enterprises, is their characteristics of being often a conjunction between public and private perspectives: even though social enterprises prioritize social missions over business objectives and profit maximization, they adhere to private ownership principles and distribute limited profits, if any, to private owners. Each perspective influences their business models in different ways. Public funding constrains profitability by restricting how social enterprises configure their business models. It demands intensive social value creation and impact, compelling social enterprises to select value propositions, activities, resources and partnerships that maximize benefits for beneficiaries, not financial returns. Profit motives are secondary. In contrast, private funding encourages profit potential by legitimizing business model choices that could also generate profits for owners. Social enterprises can develop market value propositions and more commercial partnerships under private control. Public perspectives, emphasizing social missions, non-profit distribution, public funding and strong public controls, steer social enterprises towards prioritizing social impact over financial sustainability in their business models. Private perspectives, focusing on ownership, limited profit distribution and private funding/controls, introduce market pressures and incentives for diverse, dual business

models that balance social and financial value. Successful social enterprises navigate this tension through innovative business model design. They pursue social missions passionately in some dimensions (e.g. value propositions, partnerships) while ensuring profitability in other dimensions (e.g. resources, channels). They distribute limited profits to private owners without compromising non-profit principles in how they develop and deliver value propositions. They tap into multiple funding sources and navigate diverse controls in a targeted way, strengthening rather than compromising their dual identity and double bottom line as both social enterprises and market players. The conjunction of public and private perspectives, though seemingly contradictory, enables social enterprises to achieve more versatile and resilient business models. By blending public value optimization with private value capture, social enterprises can sustain long-term commitment to complex social problems through business models that are robust yet responsive. They illustrate how public and private forces can be mutually reinforcing rather than inherently competing in innovative organizations (Margiono, Zolin, & Chang, A typology of social venture business model configurations, 2018).

Neessen, Voinea, & Dobber (2021) suggested four key components for the composition of the business model of social enterprises, each of them composed by several sub-components:

- a) Mission: the mission, i.e. the central purpose of the organization, is composed by the “scope of the mission” and “strategy choices” sub-components.
- b) Internal Architecture: within this key component, the sub-components analyzed by the author were: “legal structure”, “stimulating resources”, “inhibiting resources” and “type of activities”.
- c) Market: withing this component, the sub-components analyzed by the author were: “customer population”, “network” and “target group”.
- d) Financial Management: Social enterprises incur costs that relate either to running the internal organization (e.g., rent and insurance) or fulfilling their social mission (e.g., training programs, funding social programs and projects). Their revenues stem from commercial activities, subsidies and donations.

Santos, Pache, & Christoph (2015), by plotting the dimensions of whether clients equal beneficiaries or differ, and whether value spillovers happen automatically or are contingent on additional interventions, derived a typology of four social business hybrid models:

- a) Market hybrids generate social impact through commercial activities and automatic value spillovers. They design market-based approaches that naturally spillover benefits without additional interventions. They face lower risks of mission drift but more challenges achieving financial sustainability through innovative low-cost models.
- b) Blending hybrids achieve impact by blending commercial offerings with dedicated social programs and interventions. They require changes in behavior or practice for impact, exposing them to higher risks of mission drift and greater financial difficulties due to costs of required interventions. They need focused governance and performance management to balance viability and mission.
- c) Bridging hybrids provide value to both paying clients and beneficiaries who have different characteristics and needs. They must develop integrated business models serving both, with risks of prioritizing the needs of commercially successful clients. They require nuanced management, adaptable staff, and balanced metrics to serve diverse constituencies while mitigating threats to mission and sustainability.
- d) Coupling hybrids serve distinct client and beneficiary groups, with impact depending on social interventions beyond their commercial activities. Value spillovers are contingent and benefits require dedication of resources separate from client-facing operations. They face the greatest management challenges, risks of mission drift, and struggles achieving financial sustainability due to costs of interventions. Sophisticated governance and performance management are essential to balancing viability and mission across diverse and potentially competing demands.

Role of creativity in the construction of a valuable business model

Now that the structure of a Business Model in the context of social enterprises have been outlined, it's important to discuss the relevance of the role covered by creativity in the generation of a valuable business model (particularly in the context of social enterprises, since the environment in which they operate requires thinking out of the box and diverge from the solutions offered by the mainstream economy) and how this can help social entrepreneurs in generating a high-quality model.

Creativity is essential for developing a successful business model as it enables entrepreneurs to innovate, differentiate, solve problems, adapt, engage customers, and gain a competitive advantage (Mets, 2012).

Follows the more detailed explanation of how it can fulfil this role for each category: (1) Idea Generation: creativity allows entrepreneurs to come up with innovative and unique ideas for their business models. It enables them to think outside the box and identify new opportunities in the market. (2) Differentiation: creativity helps businesses to differentiate themselves from competitors by offering unique products, services, or experiences. A creative business model can set a company apart and attract customers who are looking for something new and exciting. (3) Problem Solving: creativity allows entrepreneurs to find creative solutions to challenges and problems that arise in the business environment. It enables them to think critically and come up with innovative approaches to overcome obstacles. (4) Adaptability: creativity helps businesses to adapt and evolve their business models in response to changing market conditions. It allows them to identify new trends and opportunities and adjust their strategies accordingly. (5) Customer Engagement: creativity in business models can enhance customer engagement and create a memorable experience for customers. Creative approaches to marketing, branding, and customer service can attract and retain customers. (6) Competitive Advantage: a creative business model can provide a competitive advantage by offering something unique and valuable to customers. It can help businesses to stand out in a crowded market and attract a loyal customer base.

Finally, creativity is particularly relevant in the context of Social Enterprises: these organizations must explore alternative solutions, fighting the paradigms created by mainstream economy.

In the following chapter, creativity will be further deep dived, by giving a definition and describing the process which, involving creativity, brings to the generation of Business Models ideas.

What is creativity?

Creativity is based on two main characteristics: originality and effectiveness. (Runco & Jaeger, 2012). An idea, to be creative, must be original: it must be novel, something that didn't previously exist, at least not in the same form (Stein, 1953).

It must be effective as well: everything which is generated randomly can be original but having no value or utility (Runco & Jaeger, 2012). This concept is particularly important in the economic field, where the concept of value gains even more importance. An idea that stands out from the mass can have an important positive effect on sales (El-Murad & Jaafar, 2004).

According to Unsworth (2001), creativity can be of four different types, according to a distribution on two dimensions: problem type (which can be divided in open and closed, depending if the solving method is already known; in this case it's closed) and driver for engagement (the reason why the individual engages with the problem, which can be external or internal). The four emerging types are: expected creativity (open problem-external driver), responsive creativity (closed problem-external driver), contributory creativity (closed problem-internal driver) and proactive creativity (open problem-internal driver).

Another interesting aspect of creativity is brought up by Balkin (1990), who states that creative people are the ones who are able to create connections which are not apparent. These connections already exist, but creative people are able to bring them to light.

Creativity has a fundamental role also in organizations since it enables innovation. For companies, creative ideas must have practical utility and address a gap in production, marketing, or administration. Organizational creativity involves individuals working together in a complex social system to create valuable and useful new products, services, ideas, procedures, or processes (Parjanen, 2012).

The creative process

The creative process, which has been object of psychology studies on creativity during the last century, can be defined as the series of mental and physical steps that result in the development of a unique and adaptable product or solution (Lubart T. I., 2000).

Wallas (1926) firstly theorized and formalized the four stages of the creative process, which he identified in:

- a) Preparation: an initial problem analysis, in which it is defined and set up.
- b) Incubation: in this phase, no conscious mental work is done but many associations and idea combinations occur, until a promising idea is found by the unconscious mind.

- c) Illumination: a sudden enlightenment happens, and the promising idea reaches conscious awareness.
- d) Verification: the final phase, which is conscious, consists of assessing, perfecting, and developing of the idea.

This type of compartmentalized division has been criticized later on by other researchers, which is defined as a more dynamic process, a constantly evolving combination of processes that occur simultaneously and repeatedly throughout the work (Endhoven & Edgar Vinacke, 2010).

According to Guilford (1950), in the creative process a great relevance is assumed by the so called subprocesses: some examples could be divergent thinking, preparation and information encoding and the process of forgetting (Lubart T. I., 2000).

The creative process can be described also in the organizational context: Amabile (1988) proposes a model that outlines how an organization can gather and utilize resources to develop a product, process, service, or internal administrative system. The motivation to innovate component holds the executive controlling function, and is typically the driving force behind initiating the innovation process within the organization. As previously indicated by the author, there is a clear interdependence between the processes of individual creativity and organizational innovation. The five stages that Amabile identifies are: (1) Setting the agenda; (2) Setting the stage; (3) Producing the ideas; (4) Testing and implementing the ideas; (5) Outcome assessment.

Basadur (1990) represents organizational creativity as a continuous and circular process, composed by eight steps which are developed across three stages. The three main stages described are: (1) Problem finding, (2) Problem solving and (3) Solution implementation. The first one is composed by (1.1) Problem finding (1.2) Fact finding and (1.3) Problem definition; the second one is composed by (2.1) Idea finding and (2.2) Evaluate & select; the last stage is composed by (3.1) Plan, (3.2) Acceptance “sell” idea and (3.3) Action.

The process behind Business Model Ideation

Every day, without realizing it, individuals in the business world engage in the practice of design. This involves creating organizations, strategies, business models, processes, and projects, and requires consideration of a multitude of factors, including competition, technology, legal regulations, and others. Moreover, this must be done in unfamiliar and unexplored territory more frequently. Designers are constantly engaged in an

unwavering quest to determine the optimal approach for bringing about innovation, exploring uncharted territory, and achieving functionality. Their role involves pushing the boundaries of conventional thinking, generating novel alternatives, and ultimately, delivering value to end-users. This necessitates the capacity to envision concepts that are presently non-existent (Österwalder & Pigneur, 2010).

It's clear that creativity (i.e., generating an idea which is both original and useful) has a fundamental role in the creation of a successful business: coming up with a fresh business model necessitates foresight and ample knowledge about customers, rivals, and suppliers. It may also involve a significant implicit aspect. While an entrepreneur may have an intuitive sense of a novel model, they may not be able to completely rationalize and express it, necessitating experimentation and learning. Additionally, it's critical to comprehend the evolving situation that affects customers, society, and the business's cost structure, as previously noted (Teece, 2010).

Osterwalder & Pigneur (2010) described six design techniques which can be used to design an innovative business model: visual thinking, prototyping, customer insights, ideation, storytelling and scenarios.

In 2012, Trimi & Berbegal-Mirabent identified four emerging creative business model practices:

- a) Open Business Models: companies can take a new approach to innovation by generating innovative ideas and collaborating with or transferring them to another entity for commercialization. To achieve optimal innovation outcomes, businesses should broaden their approach by seeking and leveraging external ideas, as well as allowing unused in-house technologies to move outside for other companies to use. (Chesbrough, 2007).
- b) Business Model Generation Canvas: initially designed by Österwalder & Pigneur (2010), this canvas is composed by nine blocks, each of them representing a pillar of the business: (1) customer segments, (2) value proposition, (3) channels, (4) customer relationships, (5) revenue streams, (6) key resources, (7) key activities, (8) key partnerships, and (9) cost structure.
- c) Customer Development Model: instead of applying the traditional product developing method (i.e., spending time and effort to internally develop a product without showing it to the customers until the launch), companies may decide to implement an iterative process which involves the analysis of customers' reaction

to the product introduction, developed in four stages: (1) Customer discovery, (2) Customer validation, (3) Customer creation and (4) Company building (Trimi & Berbegal-Mirabent, 2012).

- d) The Lean Philosophy: by adopting the principles of the Lean Startup, one can avoid making detailed plans that rely heavily on assumptions. Instead, a continuous process of Build-Measure-Learn feedback loop allows for frequent adjustments in direction. This way, we can assess when it's necessary to make a significant change, referred to as a "pivot," or to continue on the same course. Once the business has established momentum, the Lean Startup methodology provides techniques for efficiently expanding and accelerating growth. This type of approach is ideal in a fast-changing environment, since it allows for sudden course changes (Ries, 2011).

Creativity Support Tools

Now that the role of creativity as a validity driver for business models have been clarified, and the creative process behind business model generation has been defined, the next logical step to proceed with is how creativity can be enhanced: a possible answer, sustained by their success on the market, can be found in the adoption of CSTs.

Based on the research conducted by Frich, MacDonald Vermeulen, Remy, Biskjaer, & Dalsgaard (2019), in which they investigated the actual framework of digital CSTs utilized for research (143 tools from 1999 to 2018), we can state that the academic world is interested in the topic of CSTs. However, it is very fragmented and, as Shneiderman already stated in a workshop in 2005², much work remains to be done to develop a respected academic discipline with validated results. However, an indication that CSTs could prove to be a valuable support is also their presence on the market (both in the form of digital and analogue tools).

Thus, the attempt to use a CST to enhance creativity in the creation of BM can be considered a rational choice. Consequently, in the following paragraphs, a generic definition of CST (as far as it is allowed from the actual state of the research) will be provided. Since the tool used in this research is digital, the characteristics of digital CSTs specifically will be explored, with a brief focus on the possibilities offered by the adoption

² Shneiderman, B., Fischer, G., Czerwinski, M., Myers, B., & Resnick, M. (2005). Creativity Support Tools. Washington: National Science Foundation

of AI in these tools, to raise awareness on the potential which the implementation of emerging technologies can have on the development of more and more powerful CSTs. Creativity Support Tools (CSTs) aim to increase creativity in more people more frequently, allowing them to successfully handle a broader range of challenges and even cross domains. While some tasks, like performing calculations or searching databases, may be routine, other tasks, like finding associations, correlations, or opportunities, call for creative leaps. These tools can be used in many different fields: they can be used by scientists, doctors, as well as artists and lawyers (Shneiderman, Creativity support tools, 2002).

There is no unanimity in the literature if CST which are developed as software are labeled only as CSS, hence in this thesis the term acronym CST will be used also to describe CSS. CST could be developed in the form of software or information system: there are different types of Creativity Support Systems (CSS), which are defined as “class of information systems encompassing diverse types of IS that share the purpose of enhancing creativity” (Voigt & Niehaves, 2012). Each of the existing systems fulfils a certain function, supporting creativity with different approaches.

According to Lubart (2005), this type of human-computer interaction can be classified in four main categories, which the author name as:

- a) *Nanny*: The process of creating something innovative often involves extended periods of work, during which uncertainty, vagueness, and a lack of persistence can cause individuals to discontinue the creative process. There is a possibility that computers can foster creativity by observing the work process and aiding the individual who may potentially generate creative output. These kinds of systems are known as Idea Management System (Gabriel, Monticolo, M., & Bourgault, 2016).
- b) *Pen-pal*: expressing one’s ideas is an essential aspect of creativity. This is true for creators who engage with the audience, who evaluate, interpret, and ultimately incorporate new works into domain-specific knowledge bases. Strictly speaking, in this case, the system doesn’t boost creativity directly, but it’s still essential for its development, since communication and coordination between actors are fundamental components in a creative process (Nemiro, 2004). These kinds of systems are known as Single Display Groupware (SDG), Computer-Supported

Cooperation Work (CSCW) or Group Support Systems (GSS) (Gabriel, Monticolo, M., & Bourgault, 2016).

- c) *Coach*: as numerous cognitive processes are likely to contribute to creative thinking, it is highly probable that an individual may not possess expertise in all of them and may not even realize the utility of certain modes of thinking for a given task. Therefore, a computer can serve as an expert system with knowledge of techniques relevant to creativity and aid the user in maximizing their potential. The computer can furnish information in various formats regarding how individuals can generate innovative ideas, which can act as analogues to catalyse the creative process (Lubart T. , 2005). According to Gabriel, Monticolo, M., & Bourgault (2016), these systems are the Computer Assisted Creativity (CAC) and Creative Support Tools (CST), which are the object of our analysis.
- d) *Colleague*: in this scenario, the human-computer interchange involves a partnership, with computer can show creativity and even introduce new solutions and ideas in a conversation with humans (Lubart T. , 2005). These types of systems involve the use of AI to develop a human-like actor (Gabriel, Monticolo, M., & Bourgault, 2016).

Anyway, a univocal definition of CST has not been identified by researchers, making this one a possible point to clarify (Remy, MacDonald Vermeulen, Frich, Mose Biskjaer, & Dalsgaard, 2020).

Digital CSTs development

The tool used in this thesis, BOB, belongs to a specific category of CSTs: the digital ones. It is web-based and can be accessed through the link to its URL; once in the website, the user will be presented with some questions, that will help BOB frame and define the type of social enterprise to which the user is referring, so as to provide appropriate responses.

Digital technologies are becoming increasingly integral to various aspects of daily life, particularly in creative pursuits. It could be young children utilizing his smartphone's apps to express their creativity through imaginative drawings or professionals such as record producers, photographers, architects, and designers: everyone depends on digital tools to complete their creative endeavors (Frich, MacDonald Vermeulen, Remy, Biskjaer, & Dalsgaard, 2019).

This is one of the reasons why computing professionals are increasingly focusing on the creation of tools that support creativity, allowing users to engage in exploration, discovery, imagination, innovation, composition, and collaboration. The involvement of human-computer interaction researchers is crucial in the development, execution, and assessment of the next wave of creativity support tools (Shneiderman, *Creativity Support Tools: A Grand Challenge for HCI Researchers*, 2008).

The authors present their findings from their literature review of 143 papers on Creativity Support Tools (CSTs) in Human-Computer Interaction (HCI) research. They report their findings in three tiers, focusing on the tools themselves, the research on the tools, and the trends and tendencies of this research.

Shneiderman³ discusses design principles for creativity support tools. He emphasizes the importance of excellent interfaces and rich domain-specific features to facilitate creativity. The principles include supporting exploratory search through improved search services, enabling collaboration with communication systems and trust-building mechanisms, providing rich history-keeping for users to track their progress and modifications, and designing tools with low thresholds for beginners, high ceilings for experts, and wide functionality. The author also mentions the benefits of structured and free-form thinking and the use of multilayer interface designs to cater to different user needs and expertise levels.

Moreover, he offers some examples of CSTs and examples of products, which are reported below, in Table 3.

³ Shneiderman, B. (2007, December). Creativity support tools: accelerating discovery and innovation. *Communication of the ACM*, Volume 50, Issue 12, pp. 20-32.

Table 1 – Classes of CSTs and relative examples

Creativity support tools classes	Examples
Information visualization tools	Spotfire, SAS JMP, DataDesk, ManyEyes, Digg
Concept mapping	Inspiration, MindMapper, MindManager, Axon
Specialized visualization tools: gene expression analysis	GeneSpring, DNASTAR
Specialized visualization tools: GIS	Google Maps, ArcInfo
Mathematical manipulation	MatLab, Mathematica
Engineering, architectural, industrial, product design	Autocad Inventor, DataCAD, SolidWorks
Simulation	SPICE, Tierra
New media development environments	Max/MSP, Pd, processing
Animation and interaction	Flash, FLEX, OpenLaszlo
Music	Cinescore, Cakewalk Sonar
Video editing	Premier, Final Cut Pro, Lightworks, iMovie, Windows MovieMaker

In the study conducted by Frich et al., they found that the vast majority of CSTs in their sample were intended for use on digital devices, with most intended for use on a laptop or personal computer. They also found that most CSTs were low complexity, meaning they contained one or two features or accomplished one or two specific tasks. The majority of CSTs in their sample were high-fidelity prototypes, meaning they existed as functioning implementations but were not yet available as stable releases.

The authors also analyzed the part of the creative process supported by the CSTs in their sample. They found that idea generation or ideation was the most commonly supported process, followed by implementation or realization of the creative outcome. Evaluation or critique of ideas or concepts was the third most commonly supported process.

In terms of target audience, the authors found that when specified, many of the CSTs were geared towards experts, followed by novices. They also found that most CSTs were currently unavailable or inaccessible to the public.

The authors conclude this section by discussing possible trends and developments in CST research over the past twenty years. They note that clear trends are difficult to distinguish in much of their data, but they do identify three trends that stand out: a decrease in high-complexity CSTs over time, an increase in low-complexity CSTs since 2007, and an increase in the number of CSTs intended for novice users since 2011.

AI applications in CSTs

Artificial Intelligence is a topic which recently generated a lot of discussion (both in academic and non-academic environments): describing how AI might be implemented in these kinds of tools can help to understand how new disruptive technologies can lead to the generation of tools with completely disrupted functionality, whose effectiveness can be greatly increased over previous versions, and thus how such a world can be constantly evolving.

As a result of recent advances in artificial intelligence and machine learning, CSTs now have more autonomy, allowing them to carry out duties on the user's behalf and taking on an agency-driven mindset. New kinds of interaction have developed as a consequence. It is inevitable that as cutting-edge technologies, like AI, are incorporated into CSTs within the academic community, these advancements will ultimately become commercial products, adding to the complexity of the field.

CSTs that utilize learning algorithms are designed to be trained on data, and this category encompasses a wide range of machine learning (ML) algorithms. The creators of CSTs often utilize them to propose innovative ideas, artifacts, and information. Considering the current trajectory of AI development, it is probable that the human-computer interaction (HCI) community will increasingly employ learning algorithms in the future. By utilizing such algorithms, CSTs can achieve greater autonomy, allowing them to make creative decisions on behalf of their users (Chung, He, & Adar, 2021).

The aforementioned authors, according to the literature review that they conducted, found these systems distributed among producing and execution assistance process roles: the former implies that CSTs' interactions were more human-like, while the latter are designed to allow a broader user control. These design choices are intended to protect the user's sense of agency and ownership, while also utilizing the CST's generative capabilities.

According to Amabile (2019), still no existing organizational creativity theories address artificial intelligence issues, and further research is needed.

Earnshaw, Guedj, Dam, & Vince (2001) described a model of creativity which is composed by four phases:

- a) Collect: learn from previous works stored in digital libraries, as well as from other online resources such as the web.
- b) Relate: at various stages of the creative process, consulting with peers and mentors for guidance and feedback.
- c) Create: exploring, composing, discovering, and evaluating potential solutions.
- d) Explore: disseminate their results and contribute to digital libraries, the web, and other repositories of knowledge.

As it's possible to derive from the description of AI itself, which is "an intelligent entity which can recreate human actions", this technology is the ideal tool to directly execute each of these stages, or alternatively offering support to humans who are undertaking this process.

The concept of AI Creativity pertains to the capacity for humans and artificial intelligence to collaborate and generate together by leveraging their respective strengths to accomplish greater things. AI serves as a supplement to human intelligence, pooling insights from all of humanity's accomplishments to enable collaboration across geographical and temporal barriers. By supporting us throughout the creative process, AI enhances accessibility and inclusivity, rendering creativity more accessible and equitable than ever before (Wu, et al., 2021).

Jeon, Jin, Shih, & Han (2021) tried to elucidate the function of AI in promoting creativity by utilizing a theoretical framework, illustrated through a case study of an AI-driven CST tool in the realm of fashion design. Their CST is called FashionQ, and helps fashion designers to develop their convergent and divergent thinking, as well as their blending cognitive process, by analyzing data through deep learning techniques used to detect fashion attributes, cluster styles and forecast popularity. Their experiment's results were promising, with users that recognised the CST's creativity boosting potential.

Another example is Rico, a CST created to assist designers in the development of UI for mobile application, by analyzing the characteristics of more than 72 thousands UI screens (Deka, et al., 2017).

Context

The aim of this section is to provide to the reader an empirical framework where social enterprises and CSTs can be collocated. For social enterprises particularly, it's important to clarify how the national borders where it is located influence its structure: this is why the legal framework becomes important and varies across countries; different perspectives, from the specific to the generic (starting from Italy, expanding the radius to Europe and finally giving a Global point of view) are examined. Moreover, for the sake of the easiness of comprehension, a comparison between the Italian and the European perspectives is given.

Regarding the CSTs, a market analysis has been conducted to equip the reader with an interesting view of which are the main players of the actual market, also by building a classification matrix based on the different steps of the creative process covered by each tool to give a more objective comparison and understand better which are the different types of CSTs. This can help to validate empirically the relevance of CSTs on the market and their successful implementation in boosting creativity in different contexts and industries.

Social enterprises: a Global, European, and Italian perspective

Social enterprises are present on a global scale, with a number which is around 11 million companies all over the world (British Council, 2022).

Of course, there are dissimilarities across countries: social enterprises, for their nature, solve social problems, which can be different among different states.

In the European Union, for instance, the European Commission seeks to establish a supportive financial, administrative, and legal framework for these businesses, allowing them to compete on an equal basis with other enterprises within the same industry. For over a decade, the European Economic and Social Committee (EESC) has played an active role in advancing the European social enterprise and social economy agenda, advocating for the expansion and enhancement of social enterprises as a fundamental component of the European social model.

Narrowing down to single countries, for example Italy, the complexity increases, showing how faceted this environment can be: there at least four distinct "families" (social innovation startups, social economy organizations, non-profit organizations with an entrepreneurial approach and market focus, and the legally established "social

cooperatives"), and there are even differences across the Italian territory, between North, Centre and South (Benadusi, et al., 2018).

The next paragraphs' goal is to shed light on this complicated context.

Global perspective

The Global Entrepreneurship Monitor (GEM) conducted the largest comparative study of social entrepreneurship in 2015, based on interviews with over 167,000 adults in 58 economies. The report presents both broad and narrow measures of social entrepreneurship activity. The broad measure includes individuals starting or leading any activity, organization, or initiative with a social, environmental, or community objective, while the narrow measure is more restrictive and focuses on organizations that prioritize social and environmental value over financial value and operate in the market by producing goods and services.

The findings of the report reveal that the prevalence rate of broad social entrepreneurial activity among nascent entrepreneurs in the start-up phase (SEA-SU-BRD) across all 58 GEM economies is 3.2%, with a range from 0.3% in South Korea to 10.1% in Peru, while the narrow measure has an average rate of 1.1% for nascent entrepreneurs and 1.2% for currently operating social entrepreneurial activity. These rates are lower than start-up commercial entrepreneurship, which is on a global average of 7.6%, ranging between 13.7% in Vietnam to 22.2% in Peru.

About half of the social entrepreneurs put substantial effort into measuring the social and environmental impact of their activities, and five in every ten reinvest profits towards social goals. The gender gap in social entrepreneurship is smaller than commercial entrepreneurship, with men and women equally involved, except in the MENA region where female representation is high in both types of entrepreneurships.

The report also shows that social entrepreneurship is often associated with young change-makers, with a higher representation of nascent social entrepreneurs than commercial entrepreneurs in the Middle East and North Africa, sub-Saharan Africa, and Western Europe. Social entrepreneurs' education levels differ substantially across regions, with sub-Saharan Africa having less-educated entrepreneurs compared to the US and Australia, where 62% of social entrepreneurs are highly educated.

Social entrepreneurs tend to use personal funds, but government funding, family, and banks are also important sources of funding. The average rate of own investment varies

more widely, going from an estimated 60% in Southern and Eastern Asia and MENA to roughly 30% in sub-Saharan Africa.

Overall, social entrepreneurs tend to be optimistic in terms of growth aspirations, with fairly mixed patterns of size, use of volunteers, and job expectations across the globe. The report shows that social entrepreneurs are visible to the wider population, with an average of 32% of adults aware of enterprises that aim to solve social problems, although there appears to be a mismatch between visibility and reported activity in some economies.

According to a report by the British Council (2022), social enterprises have a global history and roots in charity, co-operative and wider business communities. The report suggests that there are potentially around 11 million social enterprises around the world. Social enterprises take a wide variety of legal forms and have diverse objectives: working to improve a particular community or for a wide range of beneficiaries. They balance social and financial imperatives and take steps to measure their social impact.

Social enterprises are often young and small businesses, founded in the last few years.

In comparison to business more widely intended, they are more often creating more jobs for women, led by young people and much more likely to be led by women. They work across all sectors of the economy, all around the world: from agriculture to arts, culture, and heritage and from education to food, health, and manufacturing.

The report also suggests that, over the last decade, social enterprises are increasingly supported by emerging government policies and strategies, while still suffering from gaps in the policy landscape or policy lag. They are increasingly supported by a diverse ecosystem of policymakers, enablers and capacity builders, networks, platforms and facilitators, funders and financiers, and education institutions.

Social enterprises are often significantly influenced by external factors such as the Covid crisis in recent times or periods of economic instability. The report also highlights that social enterprises sometimes share common experiences and situations with those in other countries which we might expect, based on their shared or similar history, culture, or geography. Although social enterprises cannot be broadly characterized by their geographic region, they may share some similar experiences or features across wider regions or across countries that share some similarities, perhaps in size or economic context. For example, between Turkey and Pakistan, India and Indonesia or Philippines for example, or across sub-Saharan Africa. Social enterprises indeed share similar

experiences across contexts which are perhaps less predictable, such as between Jamaica and Sri Lanka, or between Greece and Kyrgyzstan or Viet Nam, for instance.

Social enterprises can face somewhat unpredictable barriers such as accessing investors in Hong Kong and Turkey despite their relatively well-developed financial sectors. Social enterprises are indeed sometimes thriving in the most challenging conditions. There is cause for optimism among social enterprise, sometimes particularly in areas with significant numbers of economically disadvantaged people such as India, Bangladesh, sub-Saharan Africa. Social enterprises may share very particular features in some countries such as a focus on disability or on franchising as a growth strategy.

European and Italian perspectives in comparison

In Table 2, in order to help the reader to have a clearer comparison between the two circumstances, some key features of both sides will be analyzed. The analyzed points are:

1. Number of SEs: within the EU, social economy enterprises account for 10% of all businesses, totaling 2.8 million. These enterprises provide employment for roughly 13.6 million individuals, which is approximately 6.2% of the EU's total workforce. Furthermore, in addition to the paid workforce, social economy enterprises engage 5.5 million full-time equivalent volunteers (European Commission, 2023). According to a report conducted by ISTAT (the national statistics institute) in 2019, the number of Social Enterprises in Italy was 16,388⁴.
2. Economic impact: social economy account for 8% of the EU GDP (Interreg Europe, 2021), which in 2021 was € 14.5 trillion (European Union, 2023): hence, the social economy accounts for € 1.16 trillion. In Italy, the revenue of SEs, according to data retrieved from a report made in 2011 and one made in 2013, was € 28.641 billion (Borzaga, Poledrini, & Galera, Social Enterprise in Italy: Typology, Diffusion and Characteristics, 2017).
3. Social impact: in the EU, social enterprises contribute to various areas, including employment, social cohesion, regional and rural development, environmental protection, consumer protection, agricultural development, development of third countries, and social security (European Commission, 2023). In Italy, the main sectors (in which, for instance, 83.2% of SEs in the form of associations operate)

⁴ ISTAT. (2021, October 15). Struttura e profili del settore non profit. ISTAT.

where SEs have a social impact are culture, sports and recreation, education and research, social services, healthcare (Borzaga, Poledrini, & Galera, *Social Enterprise in Italy: Typology, Diffusion and Characteristics*, 2017).

4. Legal framework: The legal forms available for social enterprises vary depending on the country. Some countries have specific legal forms designed for social enterprises, while in others, traditional forms such as associations, cooperatives, and non-profit organizations are used but may present difficulties. Social enterprises can be classified into six groups based on their legal status and activities. The first two groups refer to social enterprises with ad hoc legal forms for conducting general interest or work integration activities. The third and fourth groups refer to social enterprises with legal status for diverse activities or work integration specifically. The fifth group includes social enterprises with public benefit status, which is not exclusively for social enterprises. The sixth group includes social enterprises using legal forms also used by non-social enterprise organizations. In Italy, there are two types of social cooperatives recognized under the law 381/1991: A-type social cooperatives, which provide social, health, and educational services, and B-type social cooperatives, which focus on work integration. Additionally, there are different legal forms available for social enterprises with a specific status recognized under laws 155/2006 and 106/2016 (Borzaga, et al., 2020). According to the first law (Parlamento Italiano, 2006) establishes the legal form of the "social cooperative", providing them with certain benefits and obligations (tax exemptions, access to funding, and regulatory protections) as well as setting specific requirements, such as a minimum number of members and rules for profit distribution. The law 106/2016 (Parlamento Italiano, 2016) defines social enterprises as businesses that operate with a primary objective of pursuing a social or environmental mission, rather than just profit. The law provides social enterprises with legal recognition and establishes specific legal forms for them, including the "social enterprise" and the "benefit corporation."

Table 2 - Comparison between European and Italian perspectives

	European Union	Italy
Number of SEs	2.8 million	16.388
Economic impact	€ 14 500 billion	€ 28.64 billion
Social impact	Various areas: employment, social cohesion, regional and rural development, environmental protection, consumer protection, agricultural development, development of third countries, and social security	Main sectors: culture, sports and recreation, education and research, social services, healthcare.
Legal framework	<p>Can be categorized in six main groups:</p> <ul style="list-style-type: none"> • In the first two groups, ad hoc legal forms for conducting general interest or work integration activities • In the third and fourth group, legal status for diverse activities or work integration specifically • In the fifth group, social enterprises with public benefit status, which is not exclusively for social enterprises • In the sixth group, social enterprises using legal forms also used by non-social enterprise organizations 	<p>Law 381/1991:</p> <ul style="list-style-type: none"> • A-type: social cooperatives, which provide social, health, and educational services • B-type: social cooperatives, which focus on work integration <p>Law 155/2006: social cooperative</p> <ul style="list-style-type: none"> • Law 106/2016: defines social enterprises as businesses that operate with a primary objective of pursuing a social or environmental mission

CSTs' market analysis

Supporting and giving empirical evidence of the successful implementation of CSTs, on the market it's possible to find a big variety of Creativity Support Tools, since they can be adapted and used in different industries and domains, and they cover different steps of a creative process. To perform a comprehensive classification of the various tools which will be analysed, the design framework proposed by Wang & Nickerson (2017) will be used to build a matrix which indicates which aspects and components each tool assists. This framework is illustrated in Table 3.

Table 3- Framework for Designing Individual Creativity Support Systems⁵

Aspects	Components	Features supporting the Component
Motivation	Motivational priming	Affective priming Achievement priming
Creative Process	Process completeness	Modules to support each step in a complete creative process. The steps are: 1. Problem finding 2. Information finding 3. Idea finding 4. Solution finding
	Process control	Allowing process planning, Allowing iteration and selection of steps
Divergent thinking	Stimuli	Providing different levels of stimuli, Providing stimuli dynamically
	Long term memory	External long term memory (for example, knowledge base and case library); Facilitating search
	Working memory	Supporting association, Visualization, Random combination
	Creativity techniques	Facilitating the use of creativity techniques, Computational creativity techniques
Convergent thinking	Comprehension	Labelling, classification, simulation
	Decision	Criteria based comparison, Decision support

⁵ Wang, K., & Nickerson, J. V. (2017). A literature review on individual creativity support systems. *Computer in Human Behavior*, 139-151.

The first aspect, Motivation, refers to the feature which support task motivation, since the quality of generated ideas is positively influenced by the use of positive affective computational priming (Lewis, Dontcheva, & Gerber, 2011).

The framework's second component pertains to facilitating a methodical creative process. According to stage theories, creative support systems should ideally aid in all stages of the creative process. Apart from enabling a comprehensive creative process, a creativity support system should grant users authority over the process. The system should not only permit users to pre-plan the process but also exhibit progress throughout and enable reflection, iteration, and selection of steps.

The third framework aspect is fostering divergent thinking, crucial for originality. In order to support it, these features can be included in a CST:

1. Providing diverse stimuli as search cues, either in one category or across various categories.
2. Offering an easily searchable external long-term memory.
3. Aiding working memory functions like temporary storage, combination, association, and information processing.
4. Promoting divergent thinking using intuitive or analytical creative techniques.

Lastly, an individual creativity support system should facilitate convergent thinking by aiding candidate selection comprehension and decision-making. This involves labeling, clustering, categorizing items, generating evaluation criteria, and evaluating and selecting items based on those criteria.

Some examples of popular tools and software available on the market were analyzed in Matrix 1, where the names of each single tool is combined with the main creativity theories' categories identified in the framework of Wang & Nickerson (2017).

The market research mainly focused on Individual CSTs, excluding the ones which had communication between team members as a key component, and also focusing on those which are applicable in a context similar to the one where the software used in the experimental part of this thesis will be used (i.e. boosting creativity in the creation of a business model).

By the market research conducted, it's possible to identify four main categories of individual CSTs:

- Automatic Strategic Planning: these tools, such as Liveplan or Strategizer Innovation Software, are able to frame, thanks to the interaction with the user

(through the formulation of scripted targeted questions) the situation in which the entrepreneur is operating and suggesting (or guiding) the user through the identification of the most suitable Business Model for his company or startup. Moreover, they also support the planning and forecasting process. Hence, as can be seen in the matrix, they intervene from the problem finding (or information finding in Liveplan case) phase to the solution finding phase, since they help retrieving information on the existing business models options, as well as process control since they include the possibility to use business management informatic systems. From the divergent thinking category long term memory and working memory are included, since these types of tools can furnish the user knowledge about business models, as well as offering visualization design tools. Finally, they support both comprehension and decision, since they allow for classification, simulation, and criteria-based comparison.

- AI chatbot: a chatbot is a common example of an AI system that simulates intelligent conversation with humans through text or voice. It utilizes Natural Language Processing to understand human language input and responds accordingly. In addition to conversing, a chatbot can perform useful tasks. The chatbot's ability to interpret human language input is based on the information it has been programmed with (Khanna, et al., 2015). In the ChatGPT example, it supports almost all the components of the framework, being able to provide useful answers to a wide range of questions and completing a lot of different tasks: for instance, it can suggest a business model, but also help in the research or comprehension of a certain topic (for long term memory), random combination (working memory), but also improve and support decision making. Creativity techniques were not included since, at least in ChatGPT case, it could provide you with some suggestions on which creativity techniques to use, but they would not be incorporated in the software.
- Business Intelligence: the term "Business intelligence" describes the methods and software employed for scrutinizing business data, transforming it into valuable insights, and facilitating informed decision-making throughout an organization. Often referred to as a decision support system (DSS), a BI system evaluates both present and past data, presenting its findings in comprehensible formats such as

reports, dashboards, graphs, charts, and maps that can be disseminated across the enterprise (SAP, 2023).

- **Mind Mapping:** mind mapping is a technique that connects essential ideas using images, lines, and links. The process involves linking central concepts to other ideas via lines, which are then linked to other associated concepts. Although similar to concept mapping and spider diagrams, mind mapping differs as it involves constructing a hierarchy of ideas rather than random associations. The concept of "radiant thinking" is employed in mind mapping, whereby thoughts emanate from a single idea, typically represented by an image. Branches extend from and return to the central idea in a continuous flow (Emerald Publishing, 2023). This type of tools mainly supports the working memory, allowing the user to make new associations and visualize ideas.
- **Design tools/Canvas:** design tools are software and hardware products that help designers create and communicate their work: the Design kit proposed by Ideo includes a set of hardware tools and methods which can support almost all the phases of the framework, excluding long-term memory since it doesn't offer any knowledge base or library (IDEO, 2023). A famous example of a design tool is the Business Model Canvas, which is a strategic management template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's or product's value proposition, infrastructure, customers, and finances. (Österwalder & Pigneur, 2010)
- **Search tools:** this last category includes tools which can be used to support the creation of a knowledge base and the information finding process. Some of them, such as Ebizmba and Mindtools, can be more field-specific, while Google Scholar allows to conduct a research across many disciplines and consulting different types of sources: theses, books, articles, as well as abstracts and court opinions, which are provided by academic publishers, professional societies, online repositories, universities and various websites (Google, 2023).

			Aut. Strat. Planning	AI chatbot	Business intelligence					
			BOB	Strategyzer Innovation Software	Liveplan	Chatgpt	Mixpanel	Power BI	Adobe Workfront	Planview
Motivation										
Creative Process	Process completeness	Problem finding								
		Information finding								
		Idea finding								
		Solution finding								
	Process control									
Divergent thinking	Stimuli									
	Long term memory									
	Working memory									
	Creativity techniques									
Convergent thinking	Comprehension									
	Decision									

			Mind Mapping				Design tools/Canvas			Search tools		
			BOB	Mindmeister	Xmind	The brain	Ideo Design Kit - Methods	Lean Canvas	BMC	Ebizmba	Google Scholar	Mindtools
Motivation												
Creative Process	Process completeness	Problem finding										
		Information finding										
		Idea finding										
		Solution finding										
	Process control											
Divergent thinking	Stimuli											
	Long term memory											
	Working memory											
	Creativity techniques											
Convergent thinking	Comprehension											
	Decision											

Figure 1 - CSTs Market classification matrix

Empirical strategy

The empirical methodology employed in this master's thesis is designed to investigate and evaluate the impact of Creativity Support Tools (CST) on the generation of creative business model ideas for social enterprises. The central hypothesis guiding this research is as follows: participants who utilize the Creativity Support Tool, specifically BOB, will produce more innovative and creative business model ideas compared to those who are exposed to traditional presentations and examples. To test this hypothesis, the study employs an experimental design that includes two distinct groups: the experimental group, consisting of participants who utilize BOB, and the control group, comprised of individuals who are provided with traditional presentations and examples, accessible via an online Google Drive folder.

The participants were retrieved mainly using convenience sampling (e.g., data collected based on availability)⁶.

Ideally, the research would have involved a pool of social entrepreneurs or individuals closely connected to the realm of social enterprises. However, due to constraints related to participant availability, it became imperative to provide all participants with a common knowledge base. To accomplish this, a website was created using *Wix*, an HTML5 and mobile web development platform through the use of drag and drop online tools. The initial section of this website contained essential theoretical knowledge pertaining to the topics necessary for the successful completion of the task by participants, including definitions of Business Models, Social Enterprises, and relative examples.

The empirical methodology is developed as a hybrid between qualitative and quantitative techniques, in order to exploit the synergies deriving from their combination (O'Cathain, Murphy, & Nicholl, 2010).

Qualitative: participants were administered a questionnaire in which the first section determined their group assignment, whether they were in the experimental or control group. Based on the assignation, they were redirected to BOB or to the Google Drive folder containing the presentations. Subsequently, participants were asked to propose or create a business model, as per their group assignment. Qualitative methodology, usually characterized by open questions, allows to elucidate the intricacies and in human conduct

⁶ Tenny, S., M. Brannan, J., & Brannan, G. D. (2023). Qualitative Study. Treasure Island: PubMed.

that resist straightforward quantification⁷, making possible to evaluate a complex characteristic as creativity.

Quantitative: in this phase, which is typically concerned with the measurement of phenomenon in terms of quantity⁸, the participants responded to a series of scaled questions ranging from 1 to 7. These questions were designed to measure variables that would later serve as control variables during the data analysis phase. These variables included skepticism towards AI, self-evaluation of creativity, self-evaluation of task execution, familiarity with the concepts presented, as well as demographic information such as age and gender.

Data collected from both the qualitative and quantitative phases were meticulously recorded in an Excel spreadsheet. Subsequently, the data was imported into RStudio for in-depth analysis, comparing the results in the evaluation of creativity of the business models (conducted by two experts) between the two groups. The main statistical methodology applied is Multivariate Linear Regression.

Hypothesis

H1: Participants who use Creativity Support Tools (CSTs) will generate more creative business model ideas for a social enterprise compared to those who receive traditional presentations and examples.

The hypothesis (H1) proposes that the utilization of the chosen Creativity Support Tool (CST) will have a positive impact on the generation of creative business model ideas for social enterprises. This hypothesis suggests that participants who engage with the CST will demonstrate higher levels of creativity compared to participants who do not have access to the tool.

The CST facilitates the creative process by prompting participants to consider various aspects of the social enterprise. Through a series of carefully crafted questions, participants are encouraged to explore the nature of the social enterprise, including its target beneficiaries, customers, and overall mission. By engaging in this process, participants are challenged to think critically and expansively about the unique characteristics and challenges of social entrepreneurship.

⁷ Ibid

⁸ Patel, M., & Patel, N. (2019). Exploring Research Methodology: Review Article. *International Journal of Research and Review*, 48-55

In addition to the structured questioning, the CST provides participants with a general business model description that aligns with the specific type of social enterprise they are working on. This description serves as a starting point and framework for participants to build upon, offering them a clear direction and structure for their creative thinking.

The inclusion of related case studies further enhances the participants' understanding of practical applications and successful implementations of similar business models in real-world social enterprises.

By comparing the outcomes of participants who use the CST with those who do not, it is possible to assess the effectiveness of the tool in fostering creativity and generating more diverse and innovative business model ideas. The hypothesis suggests that the combination of structured questioning, general business model descriptions, and related case studies provided by the CST will enhance participants' ability to think creatively and develop unique business models that address the specific needs and challenges of social enterprises.

Overall, the hypothesis highlights the potential of the CST as a valuable resource in the creative process of business model generation for social enterprises. By guiding participants through a systematic exploration of key aspects and providing them with relevant frameworks and examples, the CST aims to inspire fresh thinking, encourage innovative approaches, and contribute to the advancement of social entrepreneurship.

Participant Selection

Study participants will be selected using a multifaceted approach to ensure a diverse and representative sample. Filtering results on business networking sites like LinkedIn to find people who identify as social entrepreneurs in their profiles will be part of the participant selection process. With this strategy, the goal was to specifically find participants with a history of involvement and interest in social entrepreneurship.

In addition to LinkedIn, a convenience sampling method will be utilized to gather participants from personal networks and university groups. This approach allows for a broader range of participants, including individuals with varying degrees of familiarity and experience with social entrepreneurship, as well as different educational levels and academic background (both business and non-business students will participate in the study).

The combination of targeted recruitment through LinkedIn and convenience sampling from personal networks and university groups will provide a diverse pool of participants with varying backgrounds, perspectives, and levels of social entrepreneurship experience. This diversity is essential to capture a comprehensive understanding of the impact of self-identity and self-verification on business model ideation for social enterprises.

Participants selected through this process will be invited to participate in the study and provided with detailed instructions on the research objectives, procedures, and ethical considerations. Confidentiality and data protection will be ensured throughout the study, and participants will have the option to withdraw their participation at any time without penalty.

By employing this participant selection strategy, the study aims to gather a diverse sample of individuals with a range of social entrepreneurship backgrounds and experiences, contributing to a comprehensive analysis of the relationship between self-identity, self-verification, and business model ideation for social enterprises.

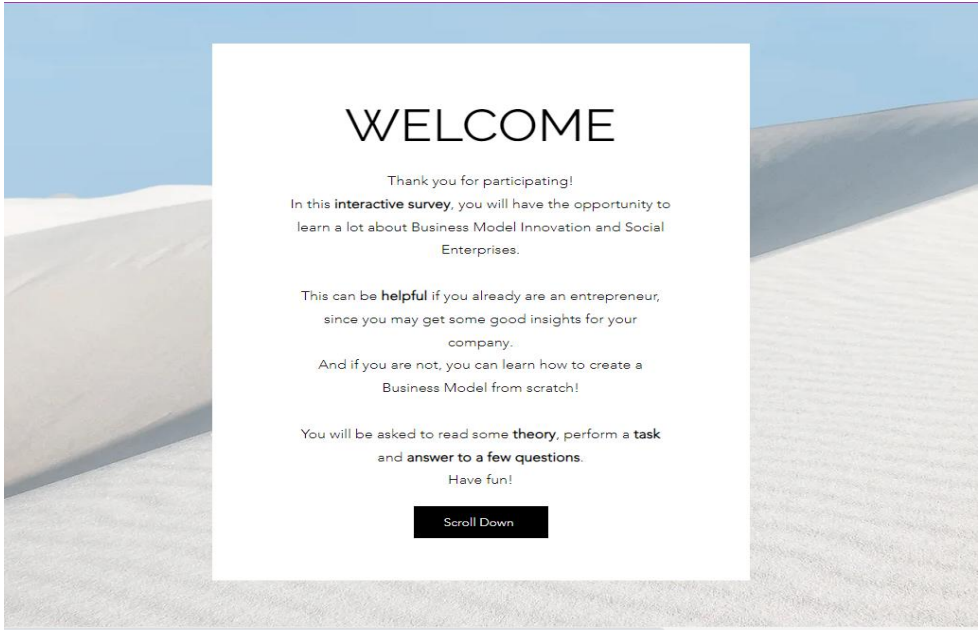
Task Design

The task will be conducted through an interactive website that has been specifically created for this study, which consists of several sections designed to guide participants through the research process and facilitate the development of their business model ideas for social enterprises. The last section of the website includes the Google Form which contains the survey with the actual questions. This form will be analyzed more in detail in another paragraph.

In Table 4, the sections of the website will be discussed and shown one by one.

Table 4 – Website Description


Section Name	Description
Welcome section	<p>The introduction to the questionnaire is a thoughtful and engaging approach to welcoming participants to the study: it represents a basic starting point and thanks the participants for their invaluable participation. This aims to outline the main benefit brought from the completion of this survey to the participant, which is the opportunity to explore and learn the complex issues of business model innovation and social entrepreneurship. The introduction specifically emphasizes the participatory nature of the survey and is intended for both experienced entrepreneurs seeking new insights for their business, as well as ordinary people who are interested in the matter.</p> <p>The opportunities to gain practical information and innovative ideas for established entrepreneurs and to learn how to create a business model from scratch for newcomers emphasize the versatility of research. The interactive design, which includes reading theoretical materials, completing tasks, and answering questions, encourages active participation and ensures a comprehensive study of the subject, as well as giving a common knowledge base to all the participants.</p> <p>In addition, the use of friendly and informal language culminates in an encouraging phrase: "Have fun!" fosters an enthusiastic and positive environment with the aim of evoking the enthusiasm and active participation of participants. The introduction sets the tone for a lively and enjoyable survey experience, ultimately enriching the quality of the responses and, in the context of this thesis, helping and motivating the users to give an important contribution to the world of business model innovation and social entrepreneurship.</p>

	
<p>Theoretical Summary Business Model and Social Enterprise</p>	<p>From this point on the website, the aim will be to create a common theoretical background for all the participants: this part explains the basic concepts of business models and social enterprises.</p> <p>This section begins by acknowledging the importance of contextual details that participants should familiarize themselves with before proceeding; a short but informative explanation assures participants that the time spent reading this material will be useful not only for future assignments, but also for their overall understanding. The site aptly defines a business model as a simple plan that describes how a company generates revenue by providing valuable products or services to customers. This concise definition captures the essence of the business model and emphasizes its importance as a foundation for successful businesses. In addition, the section introduces the concept of social enterprise and explains its unique characteristics: a company that combines a for-profit social mission with the goal of creating a positive impact. Combining the duty to generate income with influencing society, social enterprises are an example of an innovative approach to responding to social challenges. Understanding the basics of business models and social enterprises will provide participants with the necessary knowledge to engage in research engagements and promote</p>

wider awareness of innovative business practices with social goals. Through its concise and informative presentation, this section of the website ensures that participants are well prepared for the tasks ahead and encourages a deeper understanding of the dynamic interplay between profit and social impact in business model innovation and social entrepreneurship. By establishing this theoretical foundation, the site sets the stage for an enriching and meaningful research experience in which participants can explore and contribute to the development of knowledge in this emerging field.


But first... some theory

- Before we begin, there are some **contextual details** that you need to learn. They only take **few minutes** to read, but they are helpful for the upcoming task and also useful in general!
- Later on, you will be asked to get your hands dirty and **propose your own Business Model innovation**. Don't worry, it's nothing difficult, but you will need a bit of theory, so **make sure you're prepared!**



Business Model

A business model is a simple plan that explains how a company makes money by providing something valuable to customers.



Social enterprise

A social enterprise is a business that combines profit-making with a social mission to create positive impact. It aims to make a difference while generating revenue.

Theoretical Summary | Business Model main components

The second part of the theoretical summary focuses on identifying the main components of the business model, with special emphasis on those related to social enterprises. Not all the components of the classic Business Model Canvas were included, since the aim of this theoretical summary is to guarantee clarity on essential concepts, and some building blocks would be out of scope, since they are not fundamental to complete the task of writing a business model that will be introduced later on in the questionnaire.

The section begins by introducing the term "target customers", explaining that these are different groups of people or organizations that

the company wants to serve and satisfy their specific needs. This element lays the foundation for understanding the customer-centric approach of social enterprises.

The "mission" component has been highlighted as a crucial aspect for social enterprises, as it describes the purpose of the company, including the core problem it is trying to solve, the approach it will take, and the intended impact. This strategic element acts as a guiding principle and roadmap for the company's activities and initiatives, providing a clear direction for the company's social goals.

A "value proposition" is presented as a defining characteristic of a business model that encompasses the unique value or benefit that a company offers to its customers. In the context of social enterprises, this value proposition is adapted to address pain points, fulfil desires, and create positive social impact by connecting business goals with social needs.

The "income streams" component is essential to explain how to sustain financially the operation of a social enterprise. It describes the different ways a company generates revenue through direct sales, subscriptions, licenses, or other sources of revenue. This section reinforces the idea that financial sustainability is critical to achieving long-term social impact.

An addition which is not represented in the canonical version of the BMC is the introduction of the building block "Beneficiaries", which identifies the main beneficiaries of social enterprises. These beneficiaries include individuals or entities that directly benefit from the company's initiatives, products, or services. Recognizing the importance of beneficiaries, the business model is more adaptable to creating positive social change.

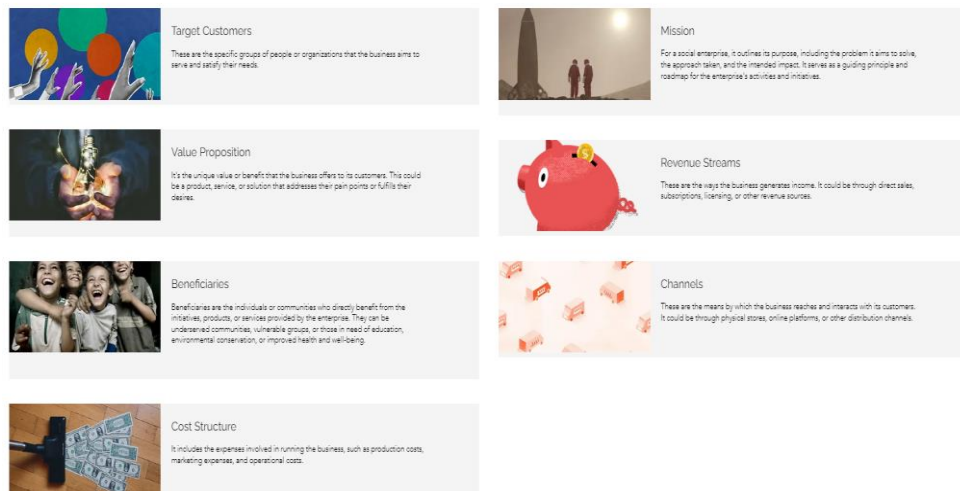
The "Channels" element describes the means by which a social enterprise reaches and communicates with target customers and beneficiaries. This component emphasizes the importance of effective

communication and engagement strategies, whether through physical stores, online platforms, or other distribution channels.

Finally, a "cost structure" is highlighted to cover the various costs associated with running a social enterprise. This component draws attention to the need for effective financial management to ensure the sustainable growth and continued positive social impact of the organization.

By providing a simplified yet comprehensive overview of these key components, the site provides readers with a clear understanding of the essential building blocks of a social enterprise business model. This knowledge provides a basis for further research on business model innovation in the context of social enterprises and allows participants to contribute to the following tasks and discussions. Integrating beneficiaries and emphasizing financial sustainability, the website's approach aptly reflects the unique characteristics and aspects of social enterprises, ultimately contributing to a better understanding of the complex relationship between business and social impact.




Business Model for Social Enterprises | Some Components



The third part of the theoretical overview part presents three examples of successful social enterprises that provide valuable insights into their unique business models.

<p>Theoretical Summary Business Models Examples</p>	<p>The first one, Made in Carcere, represents an Italian social enterprise focused on empowering female prisoners. By training and promoting the production of handicrafts, the company creates opportunities for work and personal development, which promotes the integration of (mainly) female prisoners into society. The value proposition focuses on making high-quality craft products sold through various channels, with key partners being prisons, support organizations and retail stores. Turnover consists of direct sales of handicrafts and receiving donations or grants.</p> <p>Another example, "Fairtrade International", works according to a business model that aims to improve the lives of farmers and workers in developing countries. For consumers who prefer ethical and sustainable products, Fairtrade International guarantees fair prices, workers' rights, and environmental standards for its certified products. Their revenue stream includes certification fees, licenses, and partnerships, while their cost structure includes certification processes, manufacturer support, marketing, and advocacy. Partnerships with brands, retailers and labelling of certified products are ways to reach customers.</p> <p>Finally, Ben and Jerry's is an example of a social enterprise that targets ice cream enthusiasts while emphasizing social and environmental responsibility. Their value proposition is to offer high quality, unique ice cream flavours made with fair trade ingredients and support various social causes. Revenue is generated from ice cream sales, merchandise, and partnerships. Their cost structure includes sourcing ingredients, manufacturing, marketing, and contributing to social initiatives. The company effectively reaches customers through bucket shops, supermarkets, and online sales.</p> <p>These examples function as a source of inspiration and practical reference for participants in the following tasks related to business model innovation (or ideation) in social enterprise context.</p>
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	<h2 style="text-align: center;">Some examples</h2> <p style="text-align: center;">Here are some examples of successful Business Models of Social Enterprises</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Made in Carcere</p> <p>Made in Carcere is an Italian social enterprise involving women prisoners. Through training and the production of handicraft products, the company offers job and personal development opportunities to female inmates, promoting their reintegration into society. The value proposition is to create high-quality handicraft products that are sold through physical and online channels. Prisons, support organisations and retail shops are key partners. To generate revenue, Made in Carcere sells the handicraft products directly and receives donations or subsidies.</p> </div> <div style="text-align: center;">  <p>Fairtrade International</p> <p>Fairtrade International operates with a business model that aims to improve the lives of farmers and workers in developing countries. They target consumers who value ethical and sustainable products. Their value proposition is to ensure fair prices, labor rights, and environmental standards for certified products. Fairtrade International generates revenue through certification fees, licensing, and partnerships. Their cost structure includes certification processes, support services for producers, marketing, and advocacy efforts. They reach customers through partnerships with brands, retailers, and labeling of certified products.</p> </div> <div style="text-align: center;">  <p>Ben & Jerry's</p> <p>Ben & Jerry's business model targets ice cream enthusiasts while embracing social and environmental responsibility. Their value proposition is to offer high-quality, unique ice cream flavors made with fair trade ingredients and supporting social causes. Ben & Jerry's generates revenue through the sales of ice cream products, merchandise, and partnerships. Their cost structure includes ingredients sourcing, production, marketing, and contributions to social initiatives. They reach customers through their scoop shops, supermarkets, and online sales.</p> </div> </div>
<p>Theoretical Summary Social Enterprise</p>	<p>This section is the final theoretical reference that provides an overview of the concept and meaning of social enterprises.</p> <p>The purpose of this part is to introduce participants to the main characteristics and objectives of social enterprises, which are related to the creation of positive social or environmental effects and the generation of income. The description begins by emphasizing that social enterprises are businesses that focus on financial sustainability as well as improving society or the environment. These organizations respond to social challenges by adopting innovative business strategies and practices, demonstrating their commitment to solving pressing social and environmental problems. In addition, it emphasizes that social enterprises prioritize reinvesting their profits back into their social mission and prioritize positive change rather than simply maximizing shareholder returns. This unique approach separates social enterprises from traditional for-profit enterprises and emphasizes their</p>

	<p>commitment to promoting social and environmental well-being.</p> <p style="text-align: center;">Social enterprise</p> <div style="display: flex; justify-content: space-around;"> <div style="background-color: #f0f0f0; padding: 10px; width: 45%;">  <p>A social enterprise is a business with a focus on creating positive social or environmental impact while still generating revenue.</p> </div> <div style="background-color: #f0f0f0; padding: 10px; width: 45%;">  <p>These organizations address societal challenges through innovative business strategies and practices.</p> </div> </div> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;">  <p>Social enterprises reinvest their profits back into their social mission, prioritizing positive change over maximizing shareholder profits.</p> </div>
<p>Random Number Generator</p>	<p>The following section is the last one before the questionnaire. It contains a random number generator which consists of a button that, when pressed, generates a random number between 1 and 100.</p> <p>The purpose of this random number generator is to assign users to either an experimental group or a control group in your study. When the button is pressed and a random number is received, the user is prompted to enter that number in response to the first question on the Google form. The next assignment is based on whether the generated number is even or odd. If the number generated is even, the user is assigned to the experimental group. The experimental group uses the Creativity Support Tool (CST) as part of the study. Conversely, if the generated number is odd, the user is assigned to the control group. The control group does not have access to CST and performs creative tasks without additional support tools, only a few documents containing the same case studies that CST provided as output, but all combined into one document. This random number generator section ensures random assignment of participants to experimental and control groups, minimizing potential biases and increasing the validity of study results in evaluating the</p>

	<p>effectiveness of CST as a creative support tool.</p> <p>Let's get started</p> <p>First of all, generate a random number by clicking on this button</p> <p>↓</p> <p>Generate Random Number</p> <p>●</p> <p>Scroll Down</p> <p>to proceed with the survey</p>
<p>Google Form</p>	<p>The final section includes the Google Form, which composition will be discussed in a dedicated paragraph.</p>

BOB: CST's description

This tool, which was developed and kindly made available for this research thanks to a collaboration between Bayes Business School (formerly Cass) and Ca' Foscari, particularly from the members of the team which worked on the development of BOB, both from Bayes Business School (Neil Maiden, Charles Baden-Fuller, Alessandro Giudici and Stefan Haefliger) and Ca' Foscari sides (Francesco Rullani and Ilaria Querci).

It is based on an algorithm with If-Then-Else architecture and can be considered as a creativity support tool since it supports, as indicated in *Figure 1*:

1. Information finding: this tool allows to assist the user in the research of the Business Model theory.
2. Idea finding: this tool may allow the user to make new mental connections and associations by exposing him to new knowledge, or a new combination of knowledge.
3. Solution finding: by giving a targeted and personalized answer according to the characteristics of the SE of the user, as well as some case studies, the algorithm may bring up a feasible solution for the business.
4. Long term memory: it fosters the development of long-term memory since this tool includes a knowledge database as well as a search facilitation engine.

5. Comprehension: the business models and case studies are already labeled and classified in the algorithm.

The flowchart output (*Figure 2* gives a visual representation of the algorithm behind BOB: the rectangular shapes indicate an action or process (which could be both a single step or an entire process); the oval shapes are the start/end symbols; the parallelograms represent an input or output (i.e. some data is entering or leaving the system); the diamonds represent a decision point, and the lines attached to them represent different decisions.

In the next section, a description of the user interface together with the theoretical background behind it will be provided.

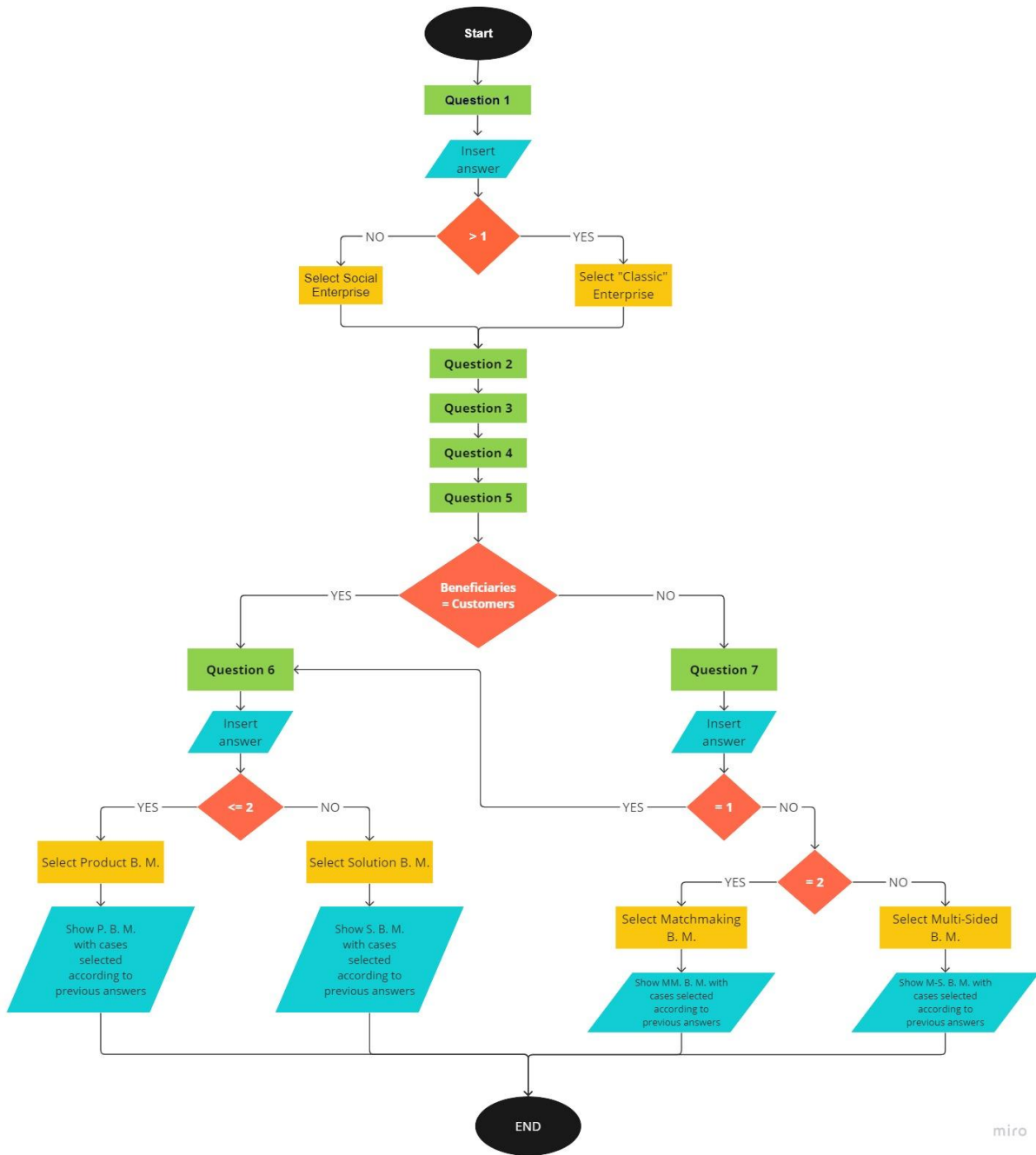


Figure 2 - BOB algorithm flowchart

miro

BOB: a step-by-step analysis

Since the tool utilized in the experiment is a sub-component of a bigger system, which also aids for-profit enterprises, it only focuses on Social Enterprises.

It's mainly based on the theory described in the Business Model Project, which team is led by Professor Baden-Fuller Charles⁹.

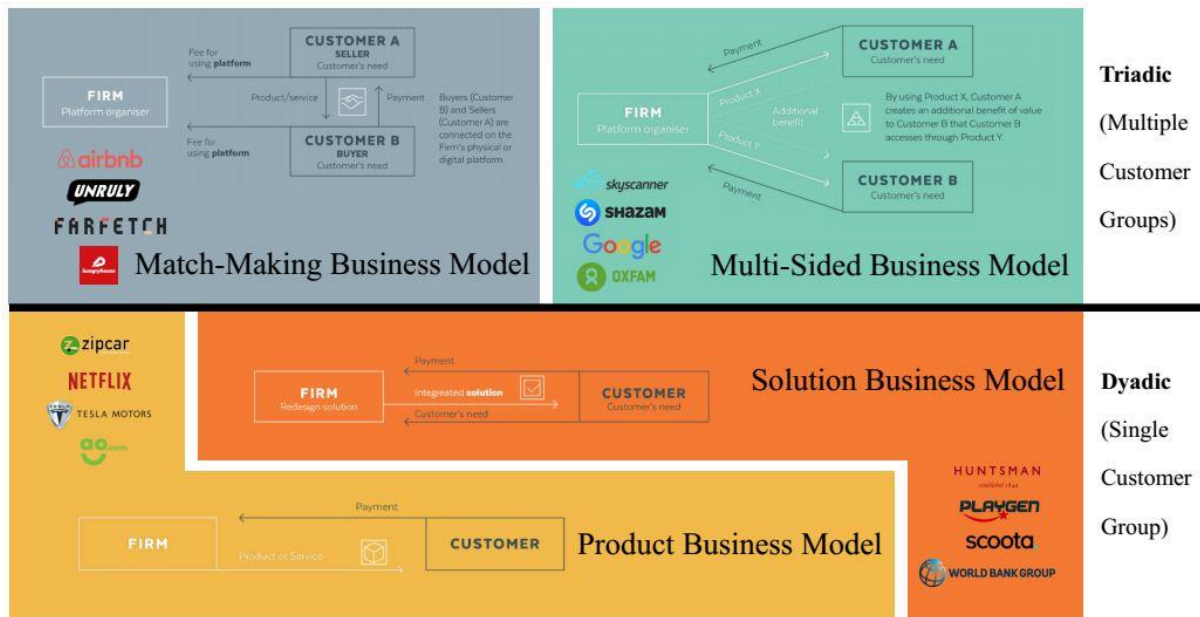
This theory individuates four main categories of Business Model:

1. **Product Model:** the company creates and offers a product or standardized service to customers, with the aim of providing a valuable solution that meets their needs. The value proposition which is offered is transactional, with the aim of providing a product or standardized service which customers can buy.
2. **Solution Model:** the company interacts with customers to discuss their challenges and offers a comprehensive solution. The type of value proposition is relational: focused on building relationships and creating customized solutions for each individual customer.
3. **Matchmaking Model:** the company operates an online or physical marketplace that connects buyers and sellers. Their value proposition is transactional: centered around enabling transactions and facilitating exchanges.
4. **Multi-Sided Model:** the company offers a variety of products or services to distinct customer segments. Their value proposition is multi-sided, with one group of customers receiving supplementary benefits from transactions conducted by the other group.

The first two models are characterized by a dyadic relationship (with a single customer group), while the other two are characterized by a triadic relationship (with multiple customer groups). In *Figure 3*, some examples of companies which adopt these models are provided.

⁹ Baden-Fuller, C. (2023). Prof. Baden-Fuller Charles. Retrieved from Baden-fuller: <http://www.baden-fuller.com/>

Figure 3 - BM Zoo examples¹⁰



Questions 2, 3 and 4 are just used to determine which case studies are more appropriate to be given as an output of the interaction with the software, according to the characteristics (sector, business domain and main beneficiaries). The answers don't influence the selection of the business model type.

¹⁰ Baden-Fuller, C. (2023). Prof. Baden-Fuller Charles. Retrieved from Baden-fuller: <http://www.baden-fuller.com/>

Step 1 – Question 1

Figure 4 - Question 1

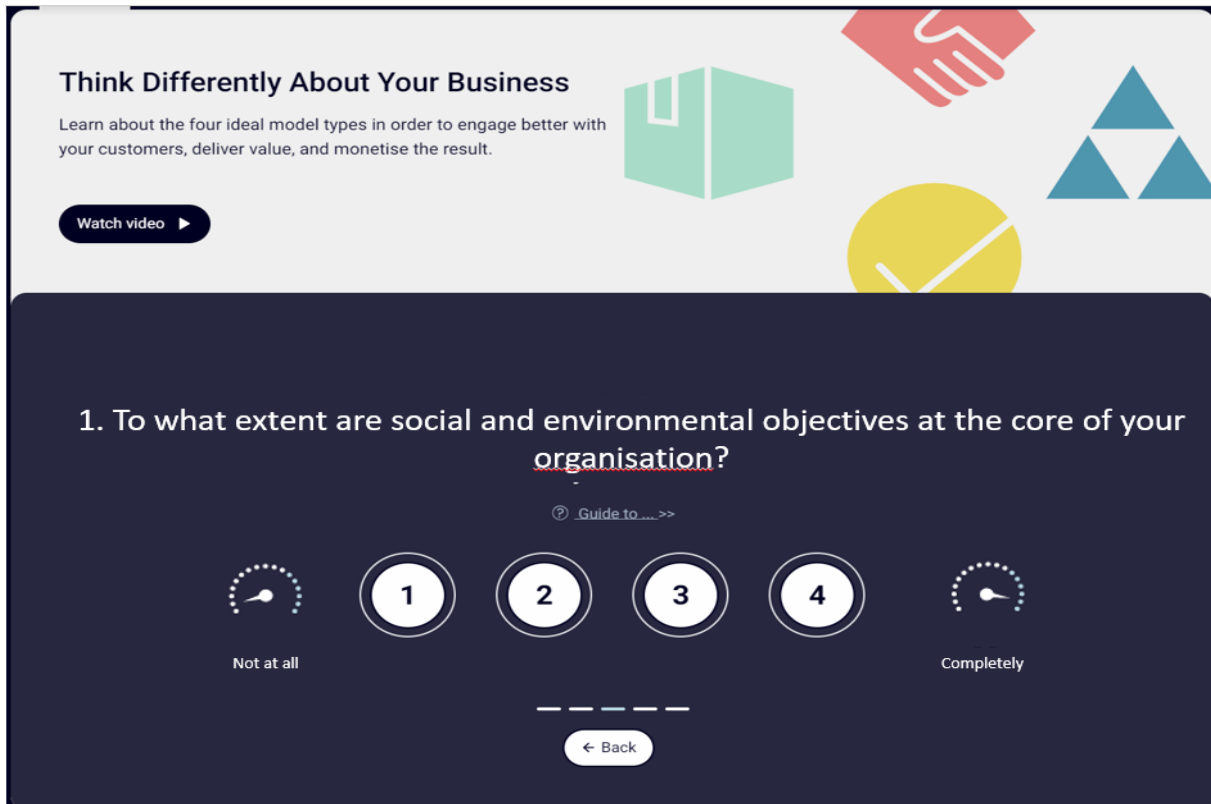
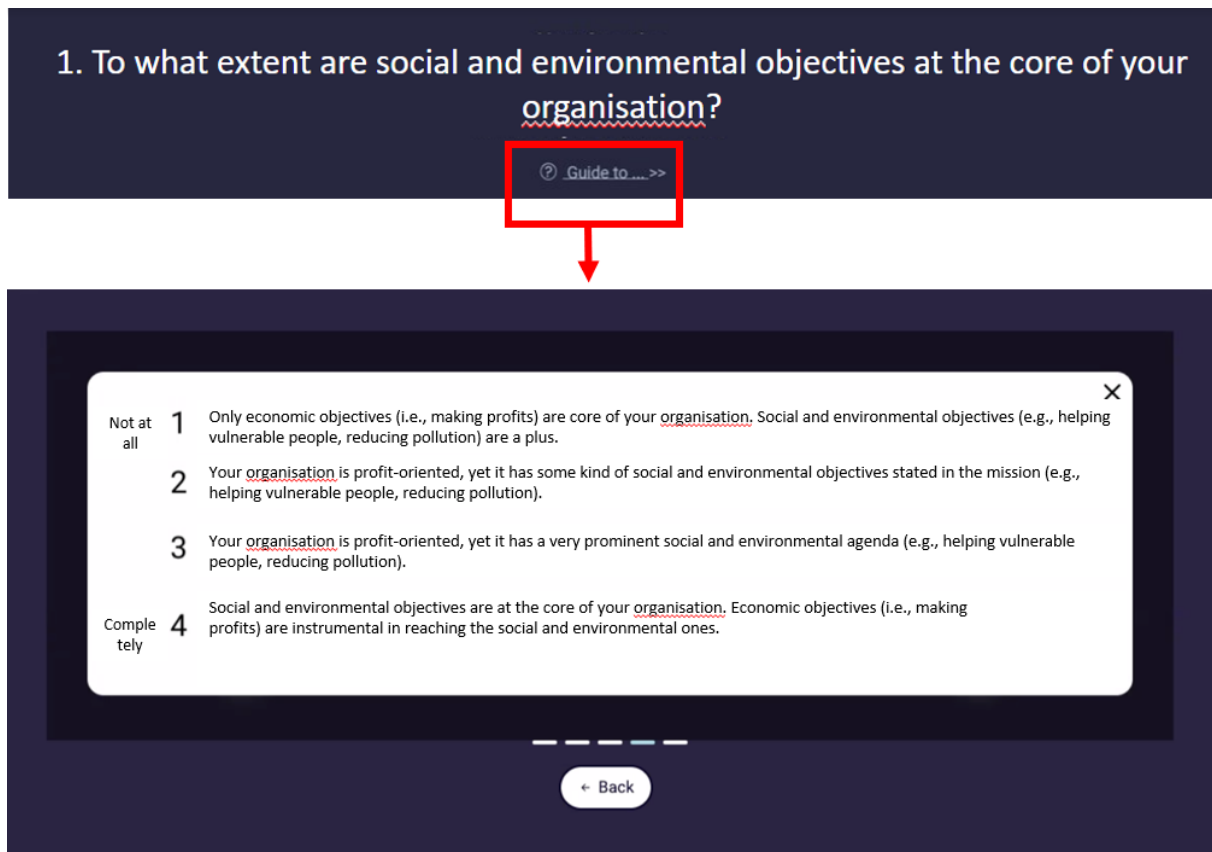


Figure 4 is a graphical representation of how BOB would look like, particularly this page refers to the first question. According to Kolk and Lenfant (2016), Battilana and Lee (2014), and Yunus et al. (2010) we can use and adapt the classification represented in Figure 1 in the paper by Kolk and Lenfant (2016) and the vertical dimension in the matrix in Figure 1 in Yunus et al. (2010) and at the end of p. 408 in the paper by Battilana and Lee (2014).

Based on these findings, we can conclude that organizations can be positioned along a continuum based on the extent to which social and environmental factors are central to their business. On one end of the spectrum, there are organizations such as charities and non-profits that solely focus on social and environmental factors. On the other end, there are traditional for-profit businesses that prioritize financial factors. Social enterprises, however, occupy a middle ground on this continuum as they consider both social/environmental and financial factors equally important.

The purpose of the initial question is to determine whether the user's organization aligns with the social enterprise section of BOB.

Figure 5 - Explanation of Question 1



By clicking on *Guide to*, the user will get an explanation of each point, as showed in Figure 5.

Step 2 – Question 2

Figure 6 - Question 2

Think Differently About Your Business

Learn about the four ideal model types in order to engage better with your customers, deliver value, and monetise the result.

[Watch video ▶](#)

2. Please select the sector that best describes your business

Education and Skills Development

Agriculture, Hospitality, and Food

Health and Social Care

Creative Industry

Retail

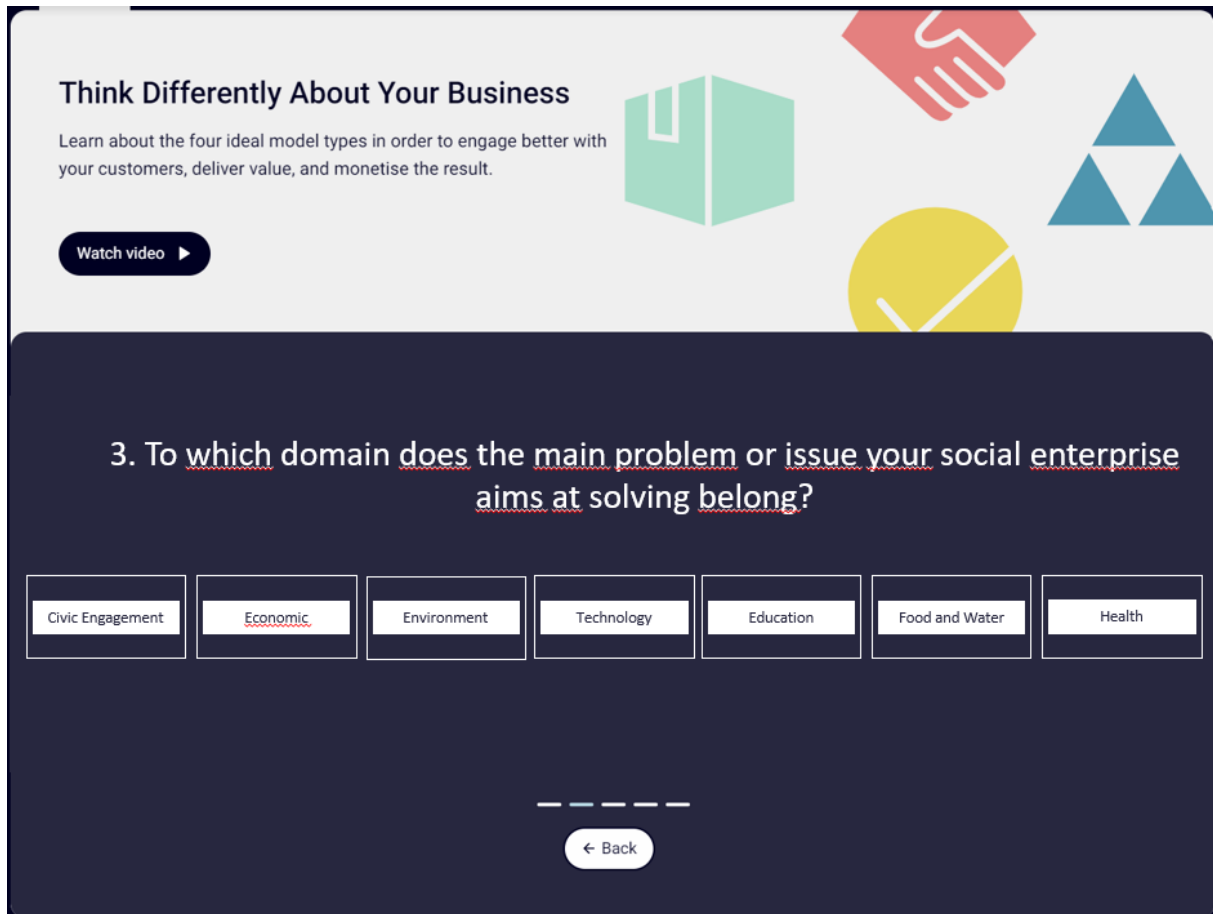
Other

[← Back](#)

In this question, the user will be asked to select the sector that best described his business: in this way, the algorithm will start to select only the case studies which are interesting for the user. These sectors were retrieved from a report conducted by Social Enterprise UK (2021). After this question, the user will be shown question number 3.

Step 3 – Question 3

Figure 7 - Question 3



In this question, the user will be asked to identify the domain to which the main problem or issue that his social enterprise aims at solving belongs. According to the content analysis conducted by Mair, Battilan, & Cardenas (2012), the main categories of issue domains addressed by Social Enterprises are the ones showed in *Figure 7*. As for Question 2, also in this case the user will be shown Question 4.

Step 4 – Question 4

Figure 8 - Question 4

Home Discover Your Business Model

Think Differently About Your Business

Learn about the four ideal model types in order to engage better with your customers, deliver value, and monetise the result.

Watch video ▶

4. Who are the **MAIN** beneficiaries of your social enterprise?

(If your social enterprise has more than one group of beneficiaries, you can select more than one option)

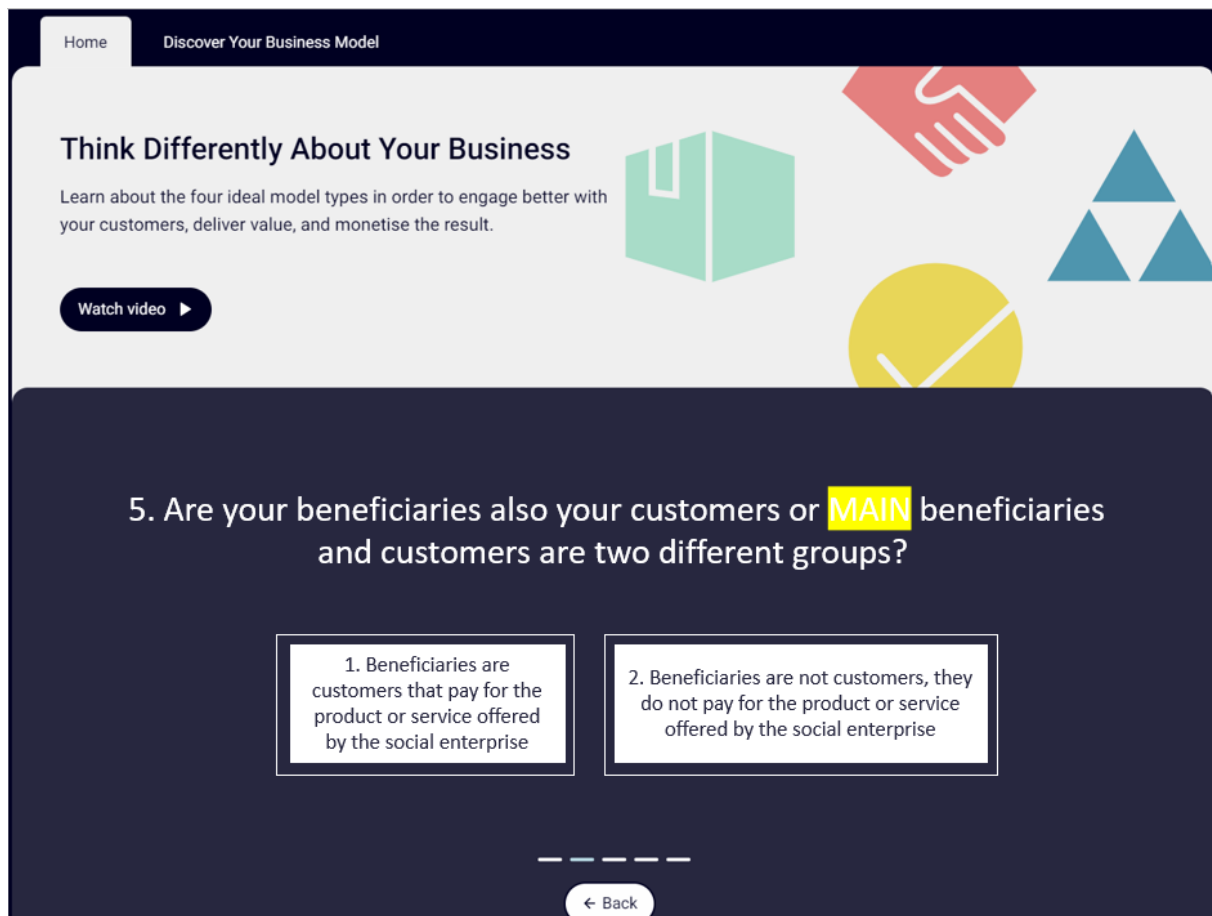
- Communities
- Civil Society Organizations
(e.g., NGO, nonprofit, voluntary, local organizations)
- Children and Students
- People with Vulnerabilities or Victim of Discrimination (e.g., disabled, poor, women)
- Workers
(e.g., farmers, teachers)

← Back Next →

In this question, the user is asked to indicate the main beneficiaries of the Social Enterprise, with the possibility to select multiple answers. Again, according to the analysis conducted by Mair, Battilan, & Cardenas (2012), the main categories of target constituencies are the ones shown as possible answers in *Question 4*. After answering this question, the user will be shown *Question 5*.

Step 5 – Question 5

Figure 9 - Question 5

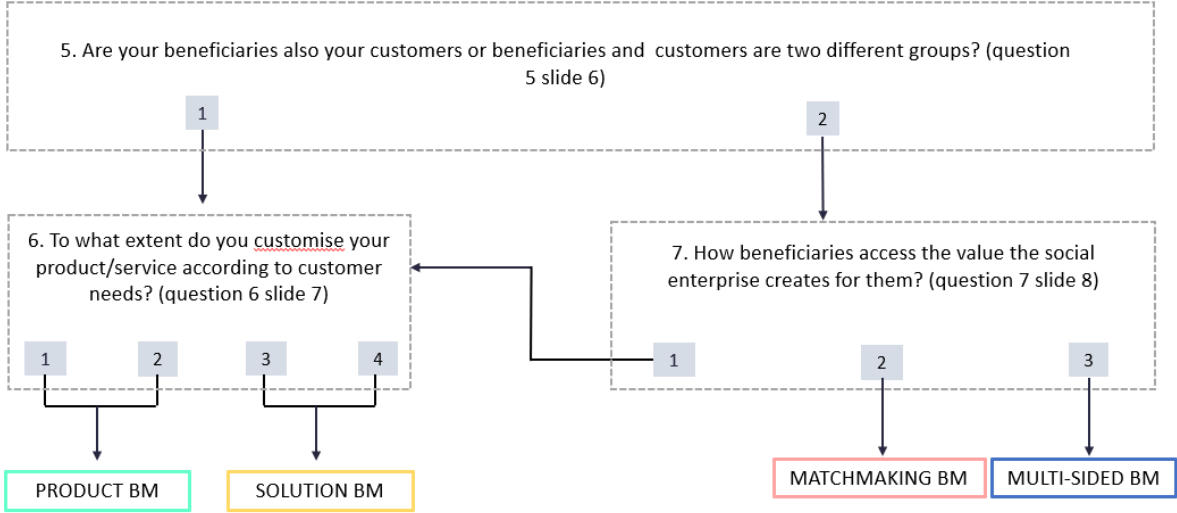


As shown in *Figure 9*, the fifth question asks whether customers and beneficiaries belong to the same group (i.e., whether the beneficiaries of the SE are also its customers or beneficiaries and customers are two separate groups). Indeed, according to Santos, Pache, & Christoph (2015), SEs can be categorized in two main groups: SEs in which clients and beneficiaries are part of the same group (for example, Base Of the Pyramid (BOP) initiatives, which could help low-income segment of population to access basic services) and SEs in which clients differ from beneficiaries (for example, a business model that offers job matching services for individuals with disabilities). In this case, clients are defined as the ones who financially support the product or service while beneficiaries are the ones who receive its advantages in line with the social objective.

This type of classification reflects the one which emerges in the BMZoo theory, where the Business Models are categorized in two groups: triadic (Multi-sided and Matchmaking, with multiple customer groups) and dyadic (Product and Solution, with a single customer

group). The main difference between the SE and BMZoo concepts lies in the fact that, in the case of beneficiaries different from clients, two cases may emerge: (1) one stakeholder from the offer side, or (2) two or more stakeholders from the offer side. For example, in the case of a company where beneficiaries are internal to the organization (they are employees of the organization itself) while clients and beneficiaries differ, hence we should have two or more groups of stakeholders, the group of stakeholders from the offer side is still one, hence, according to the BMZoo logic, it will be the case of a Product or Solution business model (see *Figure 2* and *Figure 10*).

Figure 10 - Question 5 decision tree



If the user selects the first answer, he or she will be redirected to Question 6. If he will select the second answer, he or she will be redirected to Question 7. If in Question 7 the user selects the first answer, he or she will be redirected to Question 6.

Step 6.1 – Question 6

Figure 11 - Question 6

Home Discover Your Business Model

Think Differently About Your Business

Learn about the four ideal model types in order to engage better with your customers, deliver value, and monetise the result.

Watch video ▶

6. To what extent do you customise your product/service according to customer needs?

None 1 2 3 4 Fully

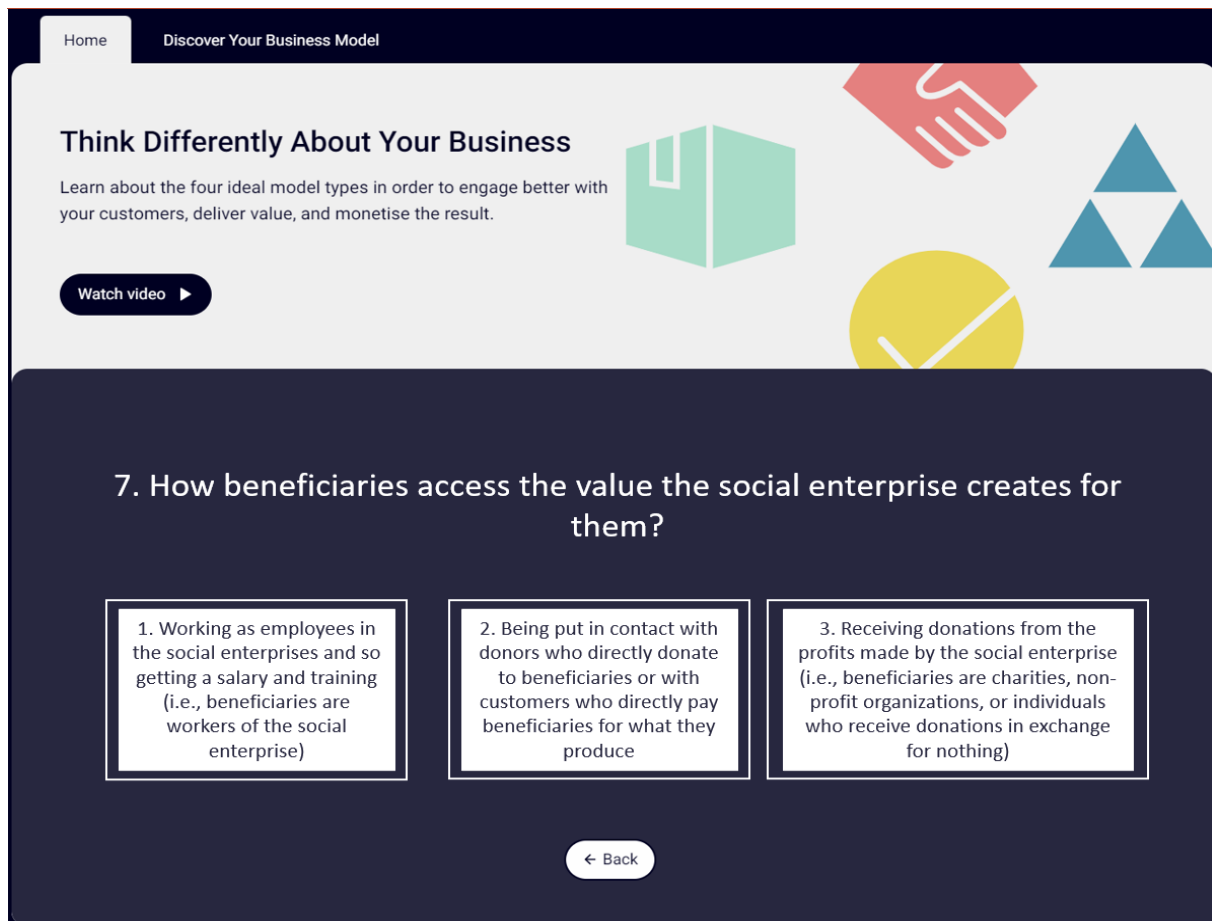
← Back

If users have chosen the first answer in Question 5, they will be shown Question 6. As shown in *Figure 11*, the sixth question asks what is the extent to which the offered product/service is customized according to customer needs. According to the website of the professor Baden-Fuller (2023), who is leading the team working on the BMZoo project, the extent to which the product/service is customized determines whether the the Business Model is of Product (standardized) or Solution (customized) type.

If the customer answers 1 or 2, he or she will be redirected to the Product BM result. If he/she answers 3 or 4, he will be redirected to the Solution BM result (see *Figure 10*).

Step 6.2 – Question 7

Figure 12 - Question 7



If the user has chosen the second answer to Question 5, he/she will be redirected to Question 7, skipping Question 6 (see *Figure 10* and *Figure 2*). As shown in *Figure 12*, Question 7 asks the user to assess how beneficiaries access the value the SE creates for them, choosing between three options: if the user selects the first answer (beneficiaries are internal to the SE), he/she will be redirected to Question 6; if the user selects the second answer (SE as a matchmaking platform), he/she will be redirected to the Matchmaking BM result; if the user selects the third answer (beneficiaries receive donations from the profits made by the SE), he/she will be redirected to the Multi-Sided BM result.

Step 7.1 – Product Business Model result

BOB Home > Business Model

Start again

Product Business Model

A dyadic transactional relationship where your good or service can be designed and delivered without prior interactions with the customer.

Watch video Add to list

FIRM → Product/Service → **CUSTOMER** ← Payment

This pathway requires

Selling products or services is the oldest and most common form of business model.

Case Studies for B2C include Ford motor cars; McDonald's hamburgers, and for B2B companies include electric motors for consumer durables. This pathway requires:

- Identifying potential customers
- Identifying how to capture awareness and create demand
- Identifying mechanisms of monetization - that include unit price, freemium, razor blade discounts for quantity
- There are many ways the firm can be structured that include: hierarchical-integrated or unbundled-networked among partners of suppliers and channels.

Scalability - Greater volumes typically reduce costs.

Profitability - When the firm achieves scale and there are high entry barriers.

Risk - Copycat products, especially those with lower costs.

This page is one of the four possible final outputs that the user will receive from BOB (see *Figure 2*). Particularly, it gives a general description of what a Product Business Model is, as well as differentiating between the two possible scenarios of (1) Beneficiaries = Customers and (2) Beneficiaries ≠ Customers. It also includes some case studies as an example of SEs which successfully used this type of Business Model.

Step 7.2 – Solutions Business Model

The screenshot shows the BOB (Business Model Canvas) interface. At the top left, the BOB logo is displayed. The navigation path is 'Home > Business Model'. A 'Start again' button is visible. The main heading is 'Solutions Business Model'. Below the heading, a definition states: 'A dyadic relationship where your physical good or service can only be designed and delivered after prior interactions with the customer.' To the right, a diagram illustrates the relationship between a 'FIRM REDESIGN SOLUTION' and a 'CUSTOMER NEED'. An arrow labeled 'Integrated solution' with a checkmark points from the firm to the customer. A return arrow labeled 'Payment' points from the customer to the firm. A bottom arrow labeled 'Customer need' points from the customer back to the firm. Below the diagram are two buttons: 'Watch video' and 'Add to list'. The main content area describes the pathway requirements, defining it as a dyadic relationship where the organization engages with a customer about a problem and provides an integrated solution. It compares this to product pathways and lists requirements such as identifying customers, building trust, tailoring delivery, value-based charging, and customer engagement. It also notes challenges in scalability, high profitability, and the risk of upfront investments.

Start again

Solutions Business Model

A dyadic relationship where your physical good or service can only be designed and delivered after prior interactions with the customer.

Watch video **Add to list**

This pathway requires

A dyadic relationship where the Organisation engages with a Customer about a problem that the Customer faces, and provides an integrated solution to that problem. The value proposition is relational.

Compared with the product pathway, the solutions pathway requires much greater customer engagement by the Organisation with its Customer. The Customer has to trust the Organisation to deliver the product-service that is typically key to the Customer's business (B2B) or enjoyment (B2C).

In B2B markets, users of airplane engines, machine tools or computers are provided services on a solutions basis such as 'power by the hour', 'machine time as a service' and 'software as a solution'. In B2C markets, services such as a haircut or an interactive premium priced online video game are solutions. In government markets, we see solutions being offered in some Private Finance Initiative (PFI) contracts. The boundary line between Solutions and Products is sometimes a matter of degree – not absolute. This pathway requires:

- Identifying potential customers
- Creating a high level of trust with those customers, that allows identification of unmet needs
- Tailoring the product or service delivery to fulfil those needs in the context of the customer
- Charging mechanisms are almost always value based rather than cost based
- Customer engagement is rarely outsourced; in contrast there are many possible supply arrangements including outsourcing for the component products or services.

Scalability - Difficult: greater volumes often lead to higher unit costs.

Profitability - Typically excellent among selected customers.

Risk - Developing relationship with a customer and tailor-made solutions require upfront investments in time, money, and relationship building.

This page is one of the four possible final outputs that the user will receive from BOB (see *Figure 2*). Particularly, it gives a general description of what a Solutions Business Model is, as well as differentiating between the two possible scenarios of (1) Beneficiaries = Customers and (2) Beneficiaries \neq Customers. It also includes some case studies as an example of SEs which successfully used this type of Business Model.

Step 7.3 – Matchmaking Business Model

BOB Home > Business Model

Start again

Matchmaking Business Model

You identify two or more customer groups and bring them together in your marketplace.

Watch video Add to list

Buyer (Customer B) and Sellers (Customer A) are connected on the Firm's physical or digital platform.

This pathway requires

A multi-party arrangement (triadic) where an Organisation identifies two (or more) different customer groups A and B; and brings them together on the Organisation's digital or physical marketplace.

The value proposition of the Organisation is transactional, and lies in the matchmaking between A and B via this new marketplace. Trade was one of the first activities of mankind; but making a business from running a marketplace has only recently become widespread. This pathway requires:

- Identifying potential buyers AND potential sellers; AND making them arrive at the same time to the marketplace (a double challenge)
- Creating high level of trust with these each of these two groups – that they can fulfil needs by trading on the digital or physical marketplace organized by the Firm
- Charging mechanisms are almost always a fee based on actual trade
- Construction of the marketplace and the mechanisms of customer engagement are rarely outsourced

Successful C2C exemplars include: Airbnb who identified people's homes as an asset to be rented out, created trust among renters and those who do the renting, and created sufficient value to be able to collect significant fees for its service. Stock markets are well known B2B platforms that started in the physical space and are now almost exclusively digital. In many cases creativity about what is to be traded is the key to success. Failure rates are very high for this business model – designing the offer and building the trust takes time and effort.

Scalability - Typically high.

Profitability - Margins are typically small – profits rely on volume.

Risk - Entry from copycats and envelopment from multisided business models. This model also requires that customer groups A and B are entrepreneurs.

This page is one of the four possible final outputs that the user will receive from BOB (see Figure 2). Particularly, it gives a general description of what a Matchmaking Business Model is, as well as including some case studies as an example of SEs which successfully used this type of Business Model.

Step 7.4 – Multi-Sided Business Model

BOB Home > Business Model

Start again

Multi-sided Business Model

You identify two or more different customer groups; and after interacting with each you design and deliver your goods or services in a manner that connects the two parties.

Watch video Add to list

This pathway requires

A multi-party arrangement (triadic) where an Organisation identifies two different customer groups A and B; and delivers to each group a (different) product, service or solution.

However, there is an additional requirement: B must get additional benefits from A's usage that is orchestrated by the Organisation. The value proposition is multi-dimensional: the Organisation delivers independent benefits to each of A and B; and it orchestrates additional value between A and B (externalities).

The oldest multi-sided business model is the charity for the poor – donors give money to provide services for others and receive benefits from their consumption. This pathway requires that:

- The Organisation has to identify and provide a product or service that is of use to customer group A.
- This product or service also has to generate a positive externality (benefit) to another group of customers B.
- The Organisation has to persuade B that it should pay money for the costs of supplying A, perhaps in exchange of an additional service.
- The positive externality created by the exchange between A and B may be orchestrated by actors who lie outside of the boundary of the Organisation. Some firms develop a special reputation in a market serving a group of customers B that generates possibilities of additional income from reselling some of the knowledge gained in this activity to a wholly separate group of customers A. And in this process, generating positive interactions between A and B. (This is the case of Ferrari Formula One – that resells the technology developed on the race track to other car companies in the form of best in class components.)

Failure rates are very high for this business model – but when successful, profits are larger than product equivalent – e.g. Google

Scalability - Many organisations start with developing a service for one customer group A that is provided for free but that is perceived as very valuable, and only when this customer group becomes really large does the firm look for another group of customers B to join and provide the revenues. (This is the Facebook story).

Profitability - Potential to be very high, if network effects are strong and there are low ongoing costs of facilitating positive externalities that result from exchange between Customer groups A and B.

Risk - Potentially quite high: the organisation is ultimately ceding control of the value proposition behind the exchange between customer groups A and B, because this model requires that customers are entrepreneurs and that customer group A will continue to have something of value to customer group B.

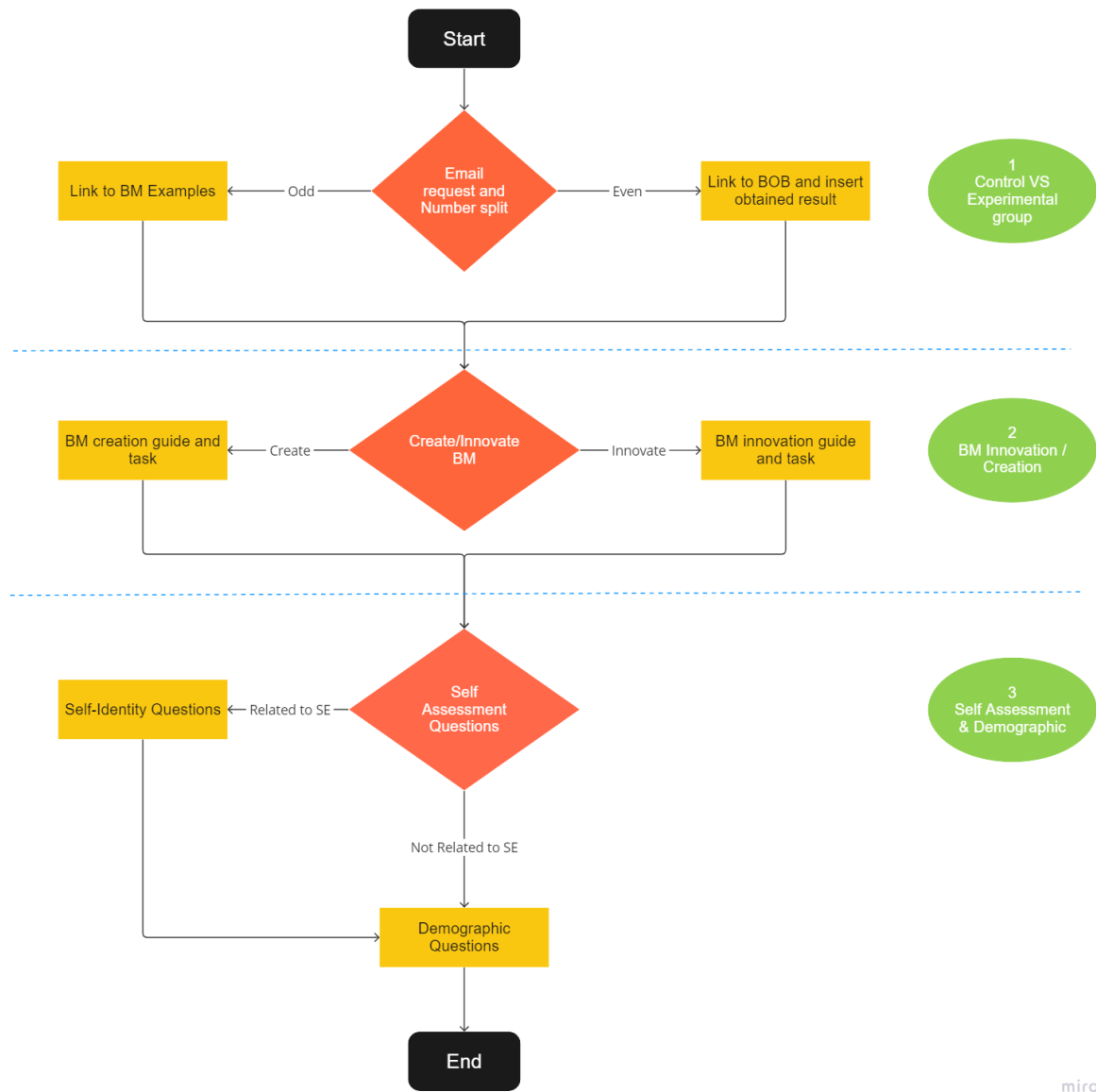
This page is one of the four possible final outputs that the user will receive from BOB (see Figure 2). Particularly, it gives a general description of what a Multi-Sided Business Model is, as well as including some case studies as an example of SEs which successfully used this type of Business Model.

Survey Design

Figure 13 gives a graphical representation of the flow that the questionnaire follows.

In the next paragraph, each one of the three sections in which the graph of Figure 13 is split will be presented and discussed.

Figure 13 - Questionnaire Flow Chart



Survey Design – Control vs Experimental Group

Sezione 1 di 9

Questionnaire

Your e-mail will only be used for the purpose of this thesis.
By clicking on "Next" you accept the terms of the [Privacy Policy](#).

Email *

Indirizzo email valido

Questo modulo raccoglie gli indirizzi email. [Modifica impostazioni](#)

Is your number even (divisible by 2) or odd? *

Even

Odd

Figure 14 – Random split

As shown in *Figure 14*, in this question the user will be asked to enter his e-mail address, which can be used to uniquely identify participants, and possibly to contact them later. Also, the participant will be asked to specify whether the number obtained from the random number generator was even or odd, so that he will be randomly assigned to the control group or to the experimental group.

An example of Social Enterprise

You will be asked to answer some questions regarding your social enterprise:

- If you are a social entrepreneur, just describe yours;
- If you are not a social entrepreneur, but you have in mind a social enterprise, you can describe that;
- If you do not identify with any of the above answers, below you can find an **example of a social enterprise** that you can take as a reference.

Made in Carcere is an Italian social enterprise involving **women prisoners**.

Through training and the production of **handicraft products**, the company offers job and personal development opportunities to female inmates, promoting their **reintegration into society**.

The value proposition is to create high-quality handicraft products that are sold through **physical and online channels**. Prisons, support organisations and retail shops are key partners.

To generate revenue, Made in Carcere sells the handicraft products directly and receives donations or subsidies.

In this way, the company creates social value through employment and reintegration of female prisoners, following a **sustainable and ethical model**.

This is the **link to their website**: <https://www.madeincarcere.it/>

This online platform will help you to generate your Business Model. *

Click [HERE](#) and complete the process.

Which result did you get?

- Product Business Model
- Solution Business Model
- Matchmaking Business Model
- Multi Sided Business Model

Figure 15 - Experimental Group

As shown in Figure 15, the participant who got an even number, will be considered as part of the experimental group, and redirected to this section, in which he will get an introduction of what the task will be as well as an example of an Italian social enterprise (Made in Carcere). Subsequently, he will get the link to BOB and, in order to ensure that he completed the exercise proposed in the platform and move on in the questionnaire, he will be asked to indicate what result he obtained after completing BOB.

Social Enterprises' Business Models examples



To help you completing this task, we will give you **some examples of Business Models**.

Feel free to read them and get inspired!

By clicking on [this link](#), you will enter a Google Drive folder containing:

- four PowerPoint presentations with one example for each Business Model category
- a Word document which includes more cases

You can keep the Drive folder open in another window.

Whenever you want, you can click next.



Figure 16 - Control Group

If, on the contrary, he got an odd number, he will be provided with a link to a Google Drive folder, where he can find a Word file containing examples of business models (the same ones that BOB gives as output at the end and slides summarizing four business models, one for each category (Match-Making, Product, Solution and Multi-Sided)).

Survey Design – Business Model Innovation / Creation

Sezione 4 di 9

Titolo della sezione (facoltativo) ✕ ⋮

Descrizione (facoltativa)

Now it's your turn!

Descrizione (facoltativa)

What do you prefer? *

I want to create my own business model

I want to innovate the business model of a social enterprise which already exists

Dopo la sezione 4 Continua alla sezione successiva ▼

Figure 17 - Innovate / Create

In *Figure 17*, the user will be presented with two options: 1) Create their own Business Model from scratch, or 2) Innovate an existing Business Model. This choice aims to make the task as easy as possible for the participant. The research's objective is to evaluate the increase in creativity resulting from using a CST (Creative Support Tool) in the Business Model generation process. This increase can also be measured in the case where the user chooses to innovate an existing Business Model.

I want to create my own business model



Here we are, it's time for you to create the business model for your own company.

Here is a generic guide you can refer to in case you need some guidance or inspiration.

You don't necessarily have to strictly follow it: rather intend it as a reference, which you can read to get inspired.

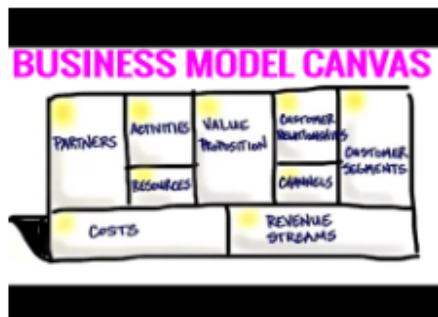
Think about the **people and communities your social enterprise wants to help**: focus on the individuals who face unique challenges and needs, such as underserved populations or marginalized groups. By understanding the specific problems they face, you will be able to develop a targeted business model.

Reflect on the **products, services or solutions you can offer** to make a positive impact on their lives. Be innovative and creative to develop unique offerings that directly address their needs. By offering solutions not readily available in traditional markets, your social enterprise can make a big difference.

Effectively **reach your audience and beneficiaries**, using a communication strategy tailored to their preferences and accessibility. Use different channels to engage with them, such as social media, community events and partnerships. By continuously and actively adapting your approach, you will strengthen your connection with the people you want to help.

Financially supporting a business and social mission is very important for long-term sustainability. Explore different sources such as product sales, service fees, donations, grants or partnerships so that your business can make an impact and remain financially viable.

If you want, you can watch this video which will provide you an easy explanation on how to create your own Business Model Canvas.



Please write a short description (about 10 lines) of your business model: remember, if you have doubts about how to do this, you can consult the previous guide. *

You could start with "My social enterprise aims to solve this problem..."

Testo risposta lunga

.....

In case the user will choose to create his business model, he will be redirected to the question shown in Figure 18, in which a brief and simple guide on how to create a business model in its simplest and essential components will be presented, in order to minimize the disorientation perceived by the user (including: beneficiaries, product/solution offered, channel, revenue streams).

Also, the user will be provided with a link to a YouTube video containing an easy explanation on how to build a business model.

Finally, the participant will be asked to complete the main task of the questionnaire, which is creating his own business model.

I want to innovate an existing Business Model ✕ ⋮

Here we are, it's time for you to innovate a Business Model.

- If you **already know a Social Enterprise** (whether you work for it, just know it or even if you are the owner) you can propose a way to innovate its Business Model
- If you **don't know it**, we will provide you with an example, and you can propose an innovation

Example - Made in Carcere

Made in Carcere is an Italian social enterprise involving **women prisoners**.

Through training and the production of **handicraft products**, the company offers job and personal development opportunities to female inmates, **promoting their reintegration into society**.

The value proposition is to create high-quality handicraft products that are sold through **physical and online channels**.

Prisons, support organisations and retail shops are key partners.

To generate revenue, Made in Carcere sells the handicraft products directly and receives donations or subsidies.

In this way, the company creates social value through employment and reintegration of female prisoners, following a **sustainable and ethical model**.

This is the link to their website: <https://www.madeincarcere.it/>

Here is a generic guide you can refer to in case you need some guidance or inspiration.

You don't necessarily have to strictly follow it: rather intend it as a reference, which you can read to get inspired.

Start with **focusing on making a bigger and more sustainable impact** on the social or environmental problem your social enterprise wants to solve. Consider how you can expand your reach and influence to create more meaningful and lasting change.

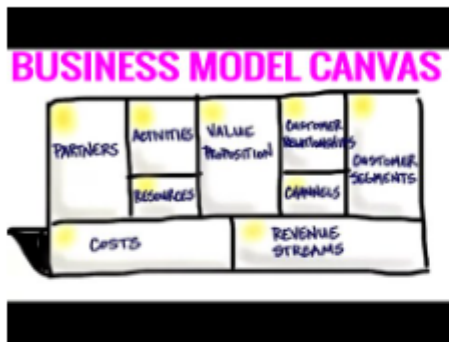
Use new technologies and innovations to enhance your social mission, exploiting them as a tool to improve efficiency, reach and impact. Find out how digital solutions, data analytics or sustainable practices can optimize your operations and strengthen social impact.

Assess whether the needs and wants of the people you serve have changed. By constantly listening and learning from the community you serve, you can effectively adapt your offering to their changing needs. You can increase your effectiveness by identifying new organizations or people you can work with. Working with like-minded partners can increase your reach, resources and expertise, allowing you to achieve greater results together.

Ensure the financial sustainability of your social enterprise without compromising your social goals. **Find different sources of income**, research an effective investment or develop a social enterprise business model that matches your mission. Balancing financial viability and social goals is the key to long-term success. **By developing robust monitoring and evaluation systems** that track your results and evaluate your social performance, you can effectively measure and evaluate your impact to understand if you are having an impact. Use information to inform your decisions and continuously improve your performance.

Remember to **make sure your innovations align with your values** and have no unintended negative effects. Regularly assess the social and environmental impacts of your activities. Commit to your mission and make decisions that align with your organization's core values.

If you want, you can watch this video which will provide you an easy explanation of how to create your own Business Model Canvas.



Please write a short description (about 10 lines) of your business model: remember, if you have doubts about how to do this, you can consult the previous guide. *

You could start with "My social enterprise aims to solve this problem..."

Testo risposta lunga

Dopo la sezione 6 Continua alla sezione successiva

Figure 19 - BM Innovation

Otherwise, if the user decides to innovate an existing business model, he will be redirected to this question, which is composed by the following sections:

1. An initial statement, aimed at guiding the user through the resolution of the exercise by proposing two different approaches (he can choose to innovate a social enterprise that he already knows or the proposed one, Made in Carcere)
2. The social enterprise which can be used as an example if the user doesn't already know one, Made in Carcere
3. A generic guide, like the one proposed in the BM Creation section, which aims to motivate and drive the user through the innovation process, which includes the same video proposed in the previous section
4. The main task of the questionnaire, which is proposing a possible innovation for an existing social enterprise's business model.

Survey Design – Self Assessment & Demographic

In this last section, the user will be asked to evaluate on a scale from 1 to 7 his agreement with the following statements, which will be used to compare the self-perceived condition with the actual results.

These scales have been retrieved and adapted from other studies.

The screenshot displays a survey interface with the following elements:

- Section Header:** "Sezione 7 di 9" (Section 7 of 9) in a blue box.
- Section Title:** "Self assessment questions" with a close icon (X) and a menu icon (three dots).
- Section Description:** "Descrizione (facoltativa)" (Optional description).
- Question 1:** "I think my business model idea is an innovation *". The scale ranges from 1 (Strongly Disagree) to 7 (Strongly Agree).
- Question 2:** "My imagination was fostered during the creation of the Business Model *". The scale ranges from 1 (Strongly Disagree) to 7 (Strongly Agree).
- Question 3:** "My curiosity was triggered by the creation of the Business Model *". The scale ranges from 1 (Strongly Disagree) to 7 (Strongly Agree).
- Question 4:** "I created the Business Model in a creative way *". The scale ranges from 1 (Strongly Disagree) to 7 (Strongly Agree).

Each question is followed by a 7-point Likert scale with radio buttons for each point. The labels "Strongly Disagree" and "Strongly Agree" are positioned at the ends of the scales.

Figure 20 - Creativity as self-perception

These statements were elaborated from the article written by Eppler, Hoffmann, & Bresciani (2011), which proposed the questions in the following form: “I think our business model idea is an innovation”; “My imagination was fostered during the group work”; “My curiosity was triggered by the task” and “We solved the task in a creative way.” In the article, these statements were used to evaluate the creation of a sustainable business model.

The figure displays three separate Likert scale items, each within a light gray rounded rectangular box. Each item consists of a statement followed by a seven-point scale from 1 to 7, with 'Strongly Disagree' at the left end and 'Strongly Agree' at the right end. The scale points are represented by empty circles.

- Item 1:** Statement: "I know how to elaborate a business model *". Scale: 1 (Strongly Disagree) to 7 (Strongly Agree).
- Item 2:** Statement: "I am confident in my ability to understand and develop a business model *". Scale: 1 (Strongly Disagree) to 7 (Strongly Agree).
- Item 3:** Statement: "I believe I am capable of operating and creating a business model, even if I haven't done it before *". Scale: 1 (Strongly Disagree) to 7 (Strongly Agree).

Figure 21 - Self-efficacy in task execution

To evaluate the self-efficacy in the task execution, the user will be asked to indicate his agreement level with the statements shown in Figure 21, which have been retrieved from the article written by Mani & Chouk (2017), the aim of which was to gain a deeper insight into the factors that cause consumer resistance towards smart and connected products (specifically, smartwatches). In their original form, these questions were: “I know how to use the smartwatch”; “I am confident in my ability to understand the use the smartwatch”; “I think I am able to operate the smartwatch although I’ve never used it before”. They have been adapted by changing the subject of the sentence from “smartwatch” to “business model”.

I am skeptical towards AI softwares *

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

I do not think AI softwares will be successful *

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

I doubt that AI softwares can actually do what their programmers promise *

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

Figure 22- Skepticism towards AI

As a control variable, the skepticism towards AI was measured, adapting the statements used in the article written by Mani & Chouk¹¹, which, in the original form, referred to IoT (since the aim of the article was to measure consumer resistance to innovation in services).

Your relationship with Social Entrepreneurship is... *

I'm a Social Entrepreneur

I work in a Social Enterprise

I collaborate with Social Enterprise(s)

None of the previous answers

Figure 23 - Relationship with SE

¹¹ Mani, Z., & Chouk, I. (2018). Consumer Resistance to Innovation in Services: Challenges and Barriers in the Internet of Things Era. *Journal of Product Innovation Management*, 780-807.

In order to analyse how much the fact of having a direct relationship with a Social Enterprise (whether the subject is a social entrepreneur, or just an employee or collaborator) influences the creativity degree of the output produced by the participant, the latter will be asked to state, if existing, the nature of the relationship with the SE.

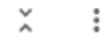
The image shows a digital questionnaire interface. At the top left, there is a blue tab labeled "Sezione 8 di 9". Below this, there are two input fields: "Titolo della sezione (facoltativo)" and "Descrizione (facoltativa)", each with a close icon and a menu icon to its right. The main content consists of three vertically stacked items, each with a statement and a 7-point Likert scale. The first item is "I am very passionate about social entrepreneurship *", the second is "I identify myself as a social entrepreneur *", and the third is "Social entrepreneurship is one of my main interests *". Each item has a scale from 1 to 7, with "Strongly Disagree" at the left end and "Strongly Agree" at the right end. Each scale point is represented by an empty radio button.

Figure 24 - Self-Identity assessment

If he states that this relationship exists, then he will be redirected to the section shown in Figure 24. The statements in this section aim at assessing self-identity of the participant, to which degree he identifies as a social entrepreneur or is passionate about social entrepreneurship. They have been adapted from the article of Paolacci & Puntoni (2018), where, in their original form, have been used to demonstrate that, when consumers strongly identify with a specific social category, they might resist automated features if

these features obstruct the association of identity-relevant consumption outcomes with themselves (in the article specific scenario, the users identified themselves as drivers). If the user selects “None of the previous answers” in the question of Figure 23, he will be directly redirected to the last section.

Demographic questions



Descrizione (facoltativa)

What's your gender? *

- Male
- Female
- Prefer not to say

How old are you? *

Testo risposta breve

What's your current occupation? *

Testo risposta breve

Were you already familiar with the concept of Social Enterprise?



Scelta multipla

- Yes
- No
- Aggiungi opzione o [aggiungi "Altro"](#)



Obbligatorio



Were you already familiar with the concept of Business Model? *

- Yes
- No

Figure 25 - Demographic Questions

Finally, in *Figure 25*, the user will be asked some demographic questions, aimed at collecting his: gender, age, current occupation and whether he was already familiar with the concepts of Social Enterprise and Business Model.

Data Collection

For the data collection, the participants were retrieved from different sources, which allowed for a larger variety in the composition of the pool, but at the same time it might have posed a threat to the reliability of the results, since the quality of the response is strictly related to the cultural background of the respondent, as well as his commitment to the task.

The data is primary, and the collection method is the one described in the previous paragraph: the answers were subsequently saved in a dedicated Excel file, which was loaded on RStudio to conduct the analysis.

The sampling method used is Convenience sampling, which involves selecting participants who are easily accessible or readily available, often from personal connections, locations like hospitals, or online platforms. However, this method introduces various drawbacks. Firstly, its outcomes cannot be generalized beyond the participants in the study, limiting its applicability to a wider population. Additionally, convenience sampling doesn't allow researchers to determine sampling error or the precision of data in relation to the target population. This compromises the confidence in the representativeness of the sample. The inability to establish causation and the potential for motivation bias, particularly in qualitative research, further weaken the method. Moreover, convenience sampling may result in limited cases or poor participation rates, influencing the reliability of case-based clinical studies. In survey-based research, non-participant error is a concern, as an unbalanced representation of information might lead to biased conclusions (Stratton, 2021).

A positive side of this method is the lower cost, as well as being simpler and quicker: it can adequately serve the purpose of formulating hypotheses and establishing objectives for application in more stringent research investigations.

The data obtained from the questionnaire were utilized to construct the variables employed in the subsequent data analysis procedures. These are the variables in object:

groups: this variable indicates whether the participant belongs to the experimental group (using BOB, *groups* = 1) or to the control group (using the Google Drive folder, *groups* = 0).

creativity_eval: this variable was initially composed of four items (Originality, Feasibility, Elaboration, Flexibility). These items were assigned with a value from 1 to 5 by two experts, and the variable is the average of these values. After calculating the Cronbach's Alpha, it emerged that the variable would have greater internal consistency by dropping feasibility or flexibility. I've decided to drop flexibility, since feasibility is more in line with the scope of the research: The proposed BMs are in a preliminary stage, characterized as drafts. Within this context, the assessment of model flexibility emerges as a pivotal parameter. However, it is my perspective that a comprehensive evaluation of flexibility demands a certain level of intricacy and profound insight, which the provided responses currently lack.

creativity_SA: this variable measures the self-assessed creativity of the participant, and is the average of the answers to the questions using the questions in *Figure 20*

taskexec_SE: this variable measures the self-efficacy in task execution, and is the average of the answers to the questions using the questions in *Figure 21*

AI_skept: this variable measures the skepticism toward Artificial Intelligence, and is the average of the answers to the questions using the questions in *Figure 22*

collab_SE: this variable is used to determine whether or not the respondent collaborates with social enterprises, and is the average of the answers to the questions using the questions in *Figure 24*

gender: this variable is used to indicate the gender of the respondents (0 = Male, 1 = Female)

age: this variable is used to indicate the age of the respondents

familiarity: this variable is used to measure the familiarity of the respondents with the concepts of Business Model and Social Enterprise. It's the average of the answers to the last two questions in *Figure 25*

The Self Identification as a Social Entrepreneur variable has not been considered since the respondents who identified as such were significantly low in number: only three positive answers have been collected.

The data was collected in the period between 23rd July 2023 and 25th August 2023.

Some answers to the questions in *Figure 18* and *Figure 19* were discarded, since they didn't meet the minimum requirements to be evaluated (e.g., the answer provided was not a Business Model or was too general).

The greatest difficulty in collecting responses lay in the difficulty of the survey and the consequent low propensity to complete it.

These variables were used to build a Multivariate Regression Model (using the statistical tool RStudio) to understand how the dependent variable (*creativity_eval*) is influenced by the independent variables (*groups*, *creativity_SA*, *taskexec_SE*, *AI_skept*, *collab_SE*, *familiarity*).

Data Analysis

For the data analysis, the statistical tool RStudio has been used. More in detail, the following are the packages (collection of R functions, data, and compiled code, organized in a specific manner, and designed to add certain features) which have been installed: *readr*, *ggplot2*, *readxl*, *psych*, *summarytools*, *gridExtra*, *dplyr*, *corrplot*, *car*, *leaps*, *stargazer*, *lmtest*, *sandwich*.

The number of total observations is 23.

In the figure below, it's possible to observe the descriptive statistics of the most relevant variables in the dataset.

```

> summary(BMSdata$groups)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  1.0000  0.5217 1.0000  1.0000
> summary(BMSdata$creativity_eval)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 1.500  2.719  3.000  3.139  3.906  4.500
> summary(BMSdata$creativity_SA)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 2.250  4.000  5.500  5.054  6.125  6.750
> summary(BMSdata$taskexec_SE)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 1.000  3.292  4.667  4.170  5.167  6.000
> summary(BMSdata$AI_skept)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 1.000  1.500  2.333  2.580  3.500  6.000
> summary(BMSdata$collab_SE)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  0.0000  0.1739  0.0000  1.0000
> summary(BMSdata$gender)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  0.0000  0.3043  1.0000  1.0000
> summary(BMSdata$age)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 22.00  23.50  24.00  34.61  42.00  68.00
> summary(BMSdata$familiarity)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  0.5000  0.5217  1.0000  1.0000

```

Figure 26 - Descriptive statistics

The *groups* variable indicates whether the participant belongs to the experimental group (using BOB, groups = 1) or to the control group (using the Google Drive folder, groups = 0). The median (the middle number in a sorted data set) and mean values of this variable suggest that there are more participants in the control group than in the experimental group.

The *creativity_eval* variable measures the creativity of the proposed Business Models (BMs) as evaluated by two experts. The median and mean values of this variable suggest that the BMs are generally evaluated as being moderately creative.

The *creativity_SA* variable measures the self-assessed creativity of the participants. The median and mean values of this variable suggest that participants generally rate their own creativity as being above average.

The *taskexec_SE* variable measures the self-efficacy of participants in task execution. The median and mean values of this variable suggest that participants generally have moderate to high levels of self-efficacy in task execution.

The *AI_skept* variable measures the skepticism of participants towards Artificial Intelligence. The median and mean values of this variable suggest that participants are generally not very skeptical towards AI.

The *collab_SE* variable measures whether or not participants collaborate with social enterprises. The median and mean values of this variable suggest that most participants do not collaborate with social enterprises.

The *gender* variable indicates the gender of the participants, with 0 representing male and 1 representing female. The median and mean values of this variable suggest that there are more male participants than female participants in the dataset.

The *age* variable indicates the age of the participants, with a wide range from 22 to 68 and a mean age of 34.

The *familiarity* variable measures the familiarity of participants with the concepts of Business Model and Social Enterprise. The median and mean values of this variable suggest that participants are generally moderately familiar with these concepts.

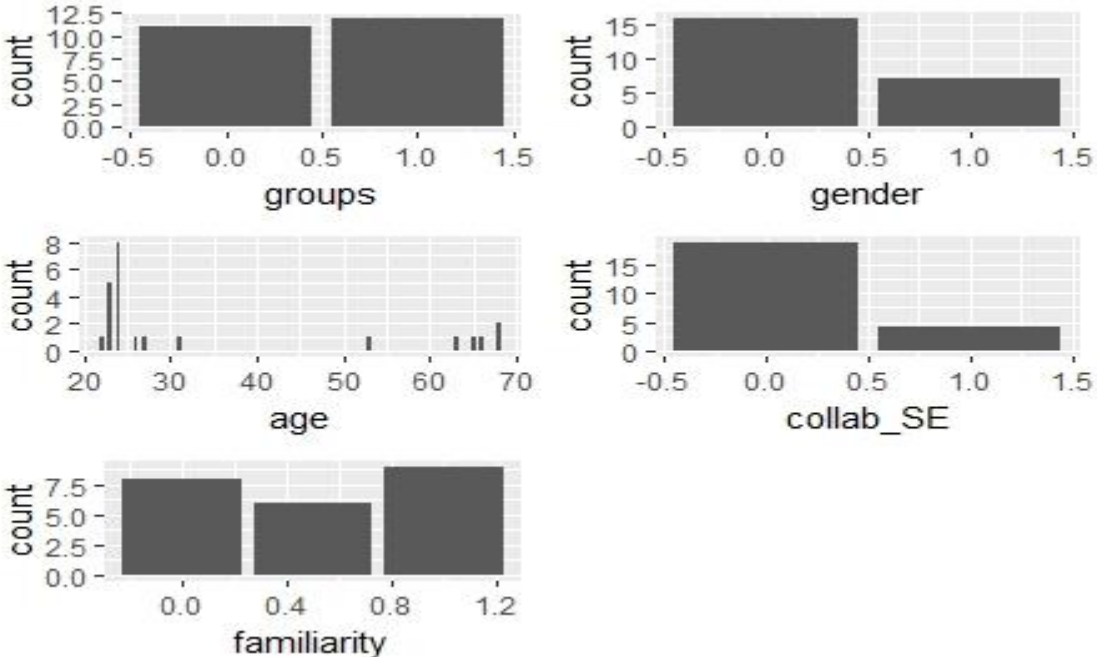


Figure 27 – Univariate Distribution Histograms

Figure 27 gives a graphical representation, using histograms, of the univariate distribution of the variables: in other words, it represents the distribution of values within a single variable. According to these results, the variable *groups* indicates that there are 11 participants in the control group (0) and 12 participants in the experimental group (1). This suggests a fairly balanced distribution between the two groups.

The variable *gender* indicates that there are 16 male participants (0) and 7 female participants (1). This indicates a higher number of male participants in the study.

The variable *collab_SE* indicates that 19 participants do not collaborate with social enterprises (0), while 4 participants do (1). This shows that a majority of the participants do not collaborate with social enterprises.

The variable *familiarity* indicates that 8 participants have a familiarity score of 0, 6 participants have a score of 0.5, and 9 participants have a score of 1. This suggests a fairly even distribution across the different levels of familiarity with the concepts of Business Model and Social Enterprise.

The variable *age* indicates that the age of the participants ranges from 22 to 68 years old. The most common ages are 23 and 24, each with 5 and 8 participants respectively. There are also several participants who are significantly older, with ages in the 50s and 60s.

The variables *creativity_eval*, *creativity_SA*, *taskexec_SE*, *AI_skept* are composed by items (i.e., it is represented by a combination of different values or categories). In order to measure the reliability of these items, the Cronbach's Alpha has been calculated for each set of them.

```
Reliability analysis
Call: alpha(x = BMSdata[, c("Originality", "elaboration", "feasibility")])

raw_alpha std.alpha G6(smc) average_r S/N ase mean sd median_r
0.54      0.57      0.73      0.31 1.3 0.18 3.3 0.74 0.48

95% confidence boundaries
      lower alpha upper
Fe1dt 0.09 0.54 0.79
Duhachek 0.20 0.54 0.89

Reliability if an item is dropped:
      raw_alpha std.alpha G6(smc) average_r S/N alpha se var.r med.r
Originality 0.64 0.65 0.48 0.48 1.88 0.14 NA 0.48
elaboration -0.31 -0.31 -0.13 -0.13 -0.24 0.54 NA -0.13
feasibility 0.73 0.73 0.57 0.57 2.67 0.11 NA 0.57

Item statistics
      n raw.r std.r r.cor r.drop mean sd
Originality 23 0.61 0.65 0.53 0.21 3.2 0.98
elaboration 23 0.92 0.93 0.91 0.79 3.1 0.93
feasibility 23 0.66 0.61 0.45 0.19 3.7 1.14
```

Figure 28 - creativity_eval items reliability analysis

Cronbach's alpha (α) serves as a reliability estimate, particularly assessing the internal consistency, of a test or scale. It finds extensive application in the fields of psychological test development and analysis. Cronbach's alpha seeks to measure how closely test items are related to one another and thus measuring the same construct. When test items are

closely related, Cronbach's alpha will be closer to 1, and when test items are not closely related to one another, Cronbach's alpha will be closer to 0 (Cortina, 1993).

As shown in *Figure 28*, from this analysis emerged that by removing the item *feasibility* from the set, the Cronbach's Alpha would increase from 0.54 to 0.73. Hence, the variable has not been used in the calculation of the *creativity_eval* variable.

Reliability analysis

Call: alpha(x = BMSdata[, c("item1CR", "item2CR", "item3CR", "item4CR")])

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	ase	mean	sd	median_r
	0.81	0.82	0.78	0.53	4.5	0.061	5.1	1.3	0.54

95% confidence boundaries

	lower	alpha	upper
Feldt	0.65	0.81	0.91
Duhachek	0.70	0.81	0.93

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha	se	var.r	med.r
item1CR	0.80	0.80	0.73	0.58	4.1	0.072	0.0019	0.57	
item2CR	0.74	0.74	0.67	0.49	2.9	0.089	0.0079	0.54	
item3CR	0.74	0.74	0.66	0.48	2.8	0.094	0.0080	0.50	
item4CR	0.78	0.79	0.72	0.56	3.8	0.074	0.0041	0.55	

Figure 29 - creativity_SA items reliability analysis

Reliability analysis

Call: alpha(x = BMSdata[, c("item1TE", "item2TE", "item3TE")])

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	ase	mean	sd	median_r
	0.9	0.9	0.87	0.76	9.3	0.037	4.2	1.5	0.73

95% confidence boundaries

	lower	alpha	upper
Feldt	0.80	0.9	0.95
Duhachek	0.83	0.9	0.97

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha	se	var.r	med.r
item1TE	0.91	0.91	0.84	0.84	10.3	0.037	NA	0.84	
item2TE	0.82	0.82	0.70	0.70	4.7	0.073	NA	0.70	
item3TE	0.84	0.84	0.73	0.73	5.3	0.067	NA	0.73	

Figure 30 - taskexec_SE items reliability analysis

Reliability analysis

Call: alpha(x = BMSdata[, c("item1SK", "item2SK", "item3SK")])

raw_alpha	std.alpha	G6(smc)	average_r	S/N	ase	mean	sd	median_r
0.78	0.79	0.72	0.55	3.7	0.081	2.6	1.3	0.51

95% confidence boundaries

	lower	alpha	upper
Feldt	0.56	0.78	0.90
Duhachek	0.62	0.78	0.94

Reliability if an item is dropped:

	raw_alpha	std.alpha	G6(smc)	average_r	S/N	alpha	se	var.r	med.r
item1SK	0.79	0.79	0.65	0.65	3.7	0.088	NA	0.65	
item2SK	0.67	0.68	0.51	0.51	2.1	0.135	NA	0.51	
item3SK	0.65	0.66	0.49	0.49	2.0	0.141	NA	0.49	

Figure 31 - AI_skept items reliability analysis

As shown in Figure 29, Figure 30, and Figure 31, indicating respectively the results of analysis conducted on the items composing the variables *creativity_SA*, *taskexec_SE*, *AI_skept* the Cronbach's Alpha in all three cases doesn't show relevant improvement if an item is dropped, hence all the items have been kept.

It is crucial to examine the presence of collinearity among variables before moving on to the modeling phase. Collinearity can create difficulties when fitting and interpreting the model. When two or more predictor variables exhibit a high degree of correlation, they fail to provide unique information to the regression model, which can result in incorrect conclusions.

To do so, a correlation matrix has been built, and the results are shown in Figure 32.

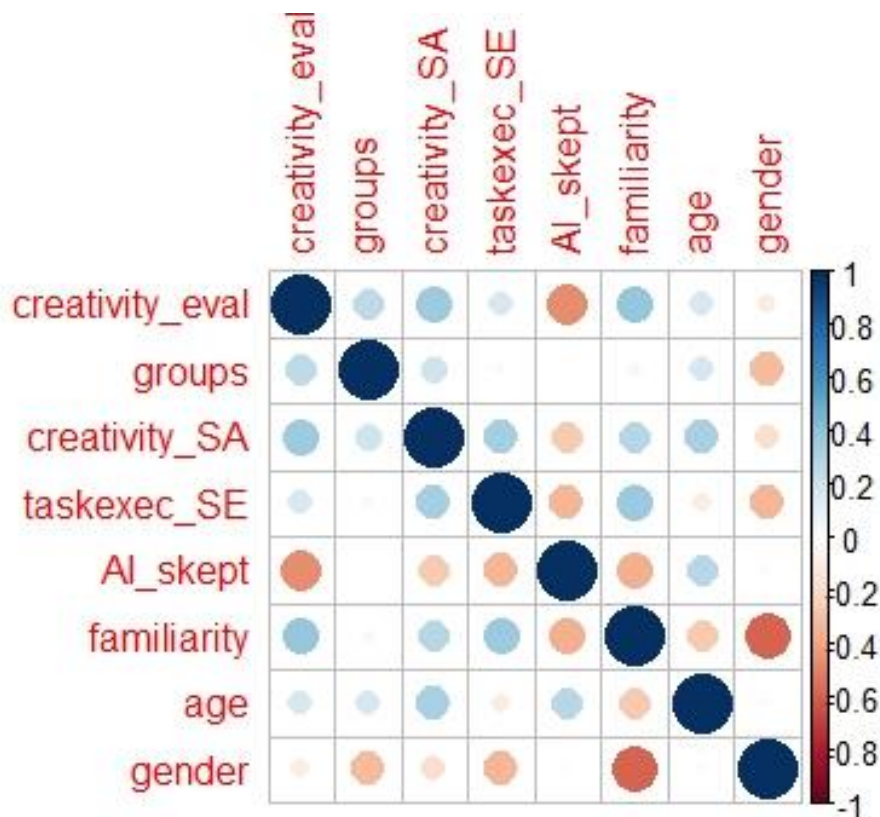


Figure 32 - Correlation Matrix

There is no evidence of collinearity between the variables since none of the correlations is excessively high (considering that correlation values range from 0 to 1).

However, it is still possible to retrieve some valuable insights from the correlation's coefficients: the variable *creativity_eval* has weak to moderate positive linear relationships with the variables *groups*, *creativity_SA*, *taskexec_SE*, *familiarity*, and *age*, with correlation coefficients of 0.2585, 0.3567, 0.1683, 0.3885, and 0.1642, respectively. On the other hand, *creativity_eval* has a moderate negative linear relationship with the variable *AI_skept*, with a correlation coefficient of -0.46156207, and a weak negative linear relationship with the variable *gender*, with a correlation coefficient of -0.10345828. These results suggest that increases in *groups*, *creativity_SA*, *taskexec_SE*, *familiarity*, and *age* are associated with increases in *creativity_eval*, while increases in *AI_skept* are associated with decreases in *creativity_eval*.

The relationship between *creativity_eval* and *gender* is less clear, as the correlation is weak and negative.

Evaluating only the correlation between variables would not allow us to draw robust and accurate conclusions. This is because correlation is simply a measure of the linear relationship between variables and does not provide a model for making predictions for

new values or for gaining a better understanding of causation. To make more informed conclusions, it is important to consider other factors and methods of analysis.

Hence, the next step is building a Multivariate Linear Regression Model: multivariate regression models seek to elucidate how the behaviour of multiple response variables can be explained by a set of predictor variables. These models expand upon the fundamental concept of linear regression, which focuses on a single response variable, to encompass numerous response variables simultaneously (Ganesh, 2010). More generally, linear regression is used to predict the value of a dependent variable using some independent variables, by studying their relationship.

To create the most accurate model, it's important to choose the correct variables, since adding more variables doesn't necessarily imply a better fit or accuracy of the model, it could indeed cause overfitting issues (an overfitted model, characterized by a regression line that adheres too closely to individual data points rather than reflecting the overall trend, may not perform well when applied to new observations).

After running the function "regsubsets" (from the package "leaps"), which allows to perform subset selection by identifying the best model that contains a given number of predictors, it was possible to select from these models the one with the highest Adjusted R-Squared, which provides insight into the extent to which a group of predictor variables can explain the variability in the dependent variable, while also considering the number of predictors incorporated into the model. A model with a higher R-Squared allows to make more accurate predictions, and generally means that predictor variables have a strong relationship with the response variable: for these reasons, it is useful in model selection.

Hence, the choice fell on the *model 3*, the one with highest Adjusted R-Squared, which is associated with a better model fit and is appropriate for the application in Multivariate regression model (since, differently from R Squared, is adjusted for the number of predictors in the model). This model includes only the variables *groups*, *taskexec_SE*, *AI_skept*, *familiarity*, *age*, *gender*.

```

> print(reg_summary)
Subset selection object
Call: regsubsets.formula(creativity_eval ~ ., BMS_subdata, nvmax = 23,
  method = "seqrep")
7 Variables (and intercept)
              Forced in Forced out
groups                FALSE      FALSE
creativity_SA         FALSE      FALSE
taskexec_SE          FALSE      FALSE
AI_skept              FALSE      FALSE
familiarity           FALSE      FALSE
age                   FALSE      FALSE
gender                FALSE      FALSE
1 subsets of each size up to 7
Selection Algorithm: 'sequential replacement'
 1 ( 1 ) groups creativity_SA taskexec_SE AI_skept familiarity age gender
 2 ( 1 ) " " " " " " " " " " " " " "
 3 ( 1 ) " " " " " " " " " " " " " "
 4 ( 1 ) "*" "*" "*" "*" "*" "*" "*" "*"
 5 ( 1 ) "*" " " " " " " " " " " "*"
 6 ( 1 ) "*" " " "*" "*" "*" "*" "*" "*"
 7 ( 1 ) "*" "*" "*" "*" "*" "*" "*" "*"

```

Figure 33 - regsubset function's output

To further investigate the results obtained applying the *regsubsets* function, in the following figure a comparison between the properties of the four models containing the variable *groups* is represented.

Dependent variable:				
creativity_eval				
	(1)	(2)	(3)	(4)
groups	0.346 (0.329)	0.502 (0.348)	0.405 (0.335)	0.398 (0.348)
creativity_SA	0.146 (0.136)		0.009 (0.143)	0.016 (0.152)
taskexec_SE	-0.031 (0.120)	-0.013 (0.124)		-0.023 (0.125)
AI_skept	-0.270* (0.135)	-0.212 (0.145)	-0.248* (0.139)	-0.255 (0.148)
familiarity		0.765 (0.521)	0.909* (0.520)	0.911 (0.536)
age			0.016 (0.011)	0.016 (0.011)
gender		0.398 (0.491)	0.449 (0.453)	0.427 (0.482)
Constant	3.045*** (0.919)	2.960*** (0.960)	2.365** (0.910)	2.456** (1.065)
Observations	23	23	23	23
R2	0.319	0.357	0.458	0.459
Adjusted R2	0.167	0.168	0.255	0.207
Residual Std. Error	0.773 (df = 18)	0.773 (df = 17)	0.732 (df = 16)	0.755 (df = 15)
F Statistic	2.105 (df = 4; 18)	1.888 (df = 5; 17)	2.253* (df = 6; 16)	1.819 (df = 7; 15)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure 34 - Comparison between the two models

While interpreting these results, the main takeaways are that in model6: (1) the Adjusted R2 is higher, which corresponds to a better explanatory power of the model (2) the F-Statistic is higher and more statistically significant, indicating respectively an overall better fit as well as proving that the regression model offers a superior fit to the data compared to a model devoid of independent variables; (3) finally, it has a slightly lower Residual Standard Error value (which is a measure of the amount of variance in the data that is not explained by the regression model).

Hence, it is possible to conclude that model 6 is the best option.

Below, the formula of the selected model:

$$\text{CreativityEval} = \beta_0 + \beta_1 \text{Groups} + \beta_2 \text{Creativity_SA} + \beta_3 \text{AI_skept} + \beta_4 \text{Familiarity} + \beta_5 \text{Age} + \beta_6 \text{Gender} + \epsilon$$

where: (1) CreativityEval represents the dependent variable creativity evaluation. (2) Groups, Creativity_SA, AI_skept, Familiarity, Age, and Gender represent the independent variables *groups*, *creativity_SA*, *AI_skept*, *familiarity*, *age*, and *gender*, respectively. (3) $\beta_0, \beta_1, \dots, \beta_6$ are the coefficients of the model representing the

intercept and slopes of the independent variables. (4) ϵ is the error term representing the unexplained variation in the dependent variable.

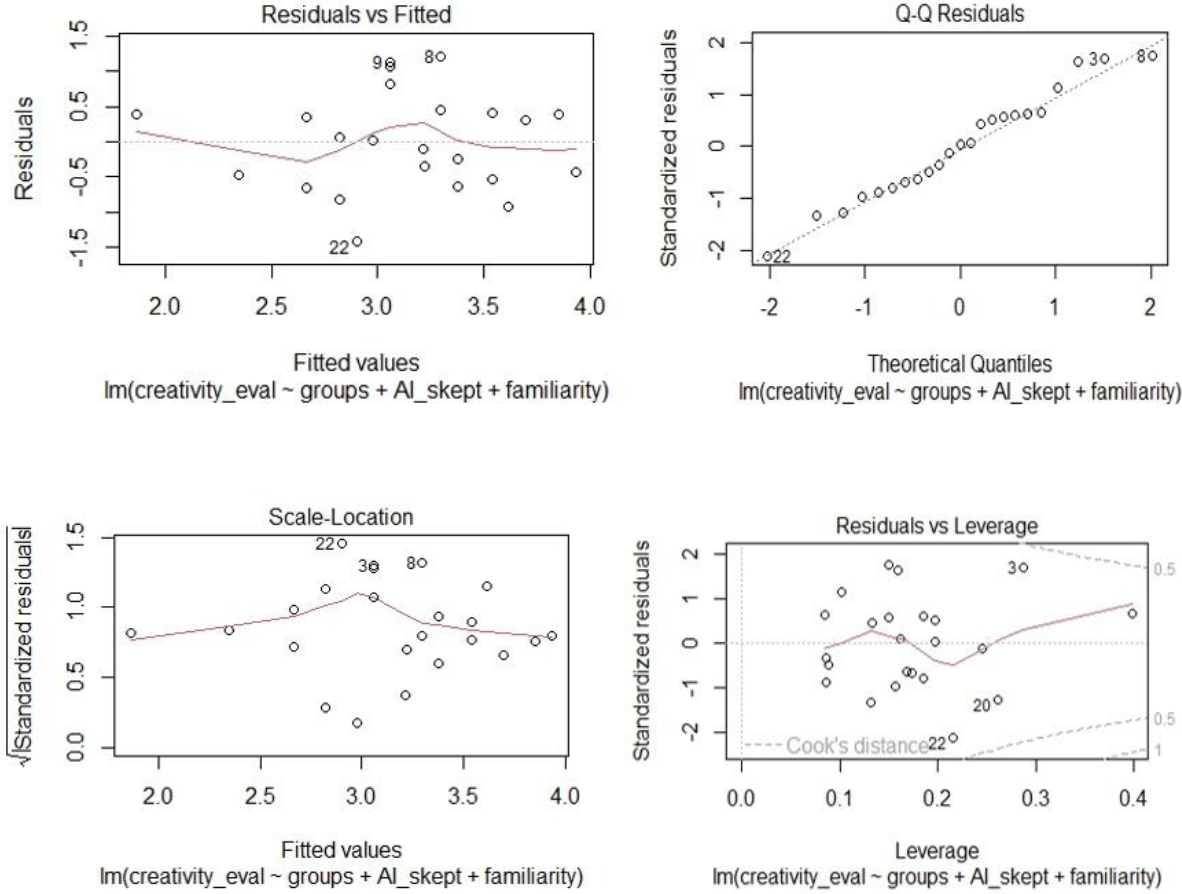


Figure 35 - Plots to check for normality

The plots represented in *Figure 35* are a graphical representation of residuals, which can be inspected to test the classical assumptions of linear regression, which are:

1. Zero mean, the error term has a mean of zero, $E(\epsilon) = 0$. The average of the differences between the observed and predicted values is zero.
2. Constant variance (homoscedasticity), the error term has a constant variance, $var(\epsilon) = \sigma^2$. The dispersion of residuals is constant across all levels of the independent variable.
3. Normality, the error term follows a normal distribution, $\epsilon \sim N(0, \sigma^2)$. This means that most of the observations have average values.
4. Uncorrelated errors, the errors are uncorrelated with each other (no correlation is detected between residuals).

The first graph, representing the relationship between residuals and fitted values, doesn't show any evident pattern (the red curve is linear), meaning that there aren't non-linearity

problems. Anyway, the graph shows a funnel shape, suggesting that the variability of the residuals is not constant across different levels of the fitted values. This can lead to incorrect standard errors and invalid t- and F-tests, which can result in erroneous conclusions. In order to solve this issue, as will be discussed in the next paragraph, heteroskedasticity-robust coefficients have been calculated.

A useful method for detecting deviations from the normal distribution in error data involves examining the Normal Q-Q plot. This plot displays a comparison between the quantiles of standardized residuals on the vertical axis and the quantiles of the Standard Normal distribution on the horizontal axis. Its purpose is to assist in evaluating whether a given set of regression errors reasonably conforms to a normal distribution. By analysing the Normal Q-Q plot in *Figure 35*, it is possible to infer that the residuals are normally distributed.

Finally, the Residuals vs Leverage plot can be used to determine how influential is a point in a regression, it can be deduced that there are no relevantly influential cases. Influential cases risk to, precisely, influence excessively the regression.

As anticipated beforehand, heteroskedasticity-robust coefficients will be implemented to satisfy the classical linearity assumptions. The new coefficients for model 6 are the ones showed in the following figure.

```
t test of coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.3647336  0.7273308  3.2512 0.005008 **
groups       0.4049211  0.3131039  1.2932 0.214286
creativity_SA 0.0086205  0.1077312  0.0800 0.937215
AI_skept    -0.2484791  0.1081199 -2.2982 0.035372 *
familiarity  0.9094269  0.3628672  2.5062 0.023379 *
age         0.0158585  0.0065654  2.4155 0.028041 *
gender      0.4491440  0.3053307  1.4710 0.160682
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Figure 36 - Heteroskedasticity-Robust Coefficients

The next section will proceed with the interpretation of the regression results, analysing the data shown in *Figures 36* (for the heteroskedasticity-robust coefficients) and *37* (for the remaining statistics: Adjusted R-squared and F-statistic).

The coefficients in a linear regression, as a generic rule, can be interpreted as follows: an increase of 1 unit in an independent variable corresponds to an increase of the dependent variable equal to 1 multiplied by the coefficient of the dependent variable. For example,

according to the coefficients indicated in *Figure 36*: if familiarity increases of 1 unit, the creativity evaluation increases of 0.9 units.

```
Call:
lm(formula = creativity_eval ~ groups + creativity_SA + AI_skept +
    familiarity + age + gender, data = BMSdata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.31483 -0.42846  0.00498  0.40077  1.28616

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.364734   0.910490   2.597  0.0195 *
groups       0.404921   0.335042   1.209  0.2444
creativity_SA 0.008621   0.142667   0.060  0.9526
AI_skept    -0.248479   0.139349  -1.783  0.0935 .
familiarity  0.909427   0.519753   1.750  0.0993 .
age         0.015859   0.010520   1.508  0.1512
gender      0.449144   0.452626   0.992  0.3358
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7317 on 16 degrees of freedom
Multiple R-squared:  0.458,    Adjusted R-squared:  0.2547
F-statistic: 2.253 on 6 and 16 DF,  p-value: 0.09098
```

Figure 37 – Model6 regression results

The coefficients discussed below are the heteroskedasticity-robust ones (*Figure 36*):

1. **Intercept:** The intercept has a coefficient of 2.36, a t-value of 3.512 and a very low p-value (0.005008), denoted by "***". This indicates that the intercept is statistically significant, suggesting that the estimated mean of "creativity_eval" when all predictor variables are zero is equal to 2.3647.
2. **groups:** the coefficient for *groups* (0.404) has a t-value of 1.2932 and a p-value of 0.214286, which is greater than the common significance level of 0.05. Although this suggests that there is no statistically significant effect of "groups" on *creativity_eval* in this model, the effect can still not be overseen (as will be discussed in the following paragraphs).
3. **creativity_SA:** The coefficient for *creativity_SA*, equal to 0.086 has a t-value of 0.08 and a p-value of 0.9372, indicating that *creativity_SA* is not statistically significant in explaining variations in *creativity_eval*. Also, the effect on the dependent variable would be small.
4. **AI_skept:** The coefficient for *AI_skept*, which is -0.248 has a t-value of -2.2982 and a p-value of 0.035372, denoted by "*". This suggests that *AI_skept* is statistically significant at the 0.05 significance level. The negative coefficient implies that higher levels of AI skepticism are associated with lower creativity evaluations,

more specifically a one-unit increase in AI-skepticism would bring to a decrease of 0.25 units in the evaluation of creativity.

5. *familiarity*: The coefficient for *familiarity*, equal to 0.909, has a t-value of 2.5062 and a p-value of 0.023379, denoted by "*". This indicates that "familiarity" is statistically significant at the 0.05 significance level. The positive coefficient suggests that higher levels of familiarity are associated with higher creativity evaluations, with a notable nearly one-to-one ratio.
6. *age*: The coefficient for *age*, equal to 0.015, has a t-value of 2.4155 and a p-value of 0.028041, denoted by "*". This means that *age* is statistically significant at the 0.05 significance level. The positive coefficient implies that older individuals tend to have higher creativity evaluations, although the magnitude of the effect is moderate (for an increase of 1 year in age, the evaluation of creativity increases of 0.0158).
7. *gender*: The coefficient for *gender*, equal to 0.449, has a t-value of 1.4710 and a p-value of 0.160682. While the p-value is greater than 0.05, it's worth noting that *gender* may not be statistically significant in explaining variations in *creativity_eval* at the conventional significance level.

The following statistics (R-squared and F-statistic) are the ones referring to the general model summary, as represented in *Figure 37*.

The Multiple R-squared value is 0.458, indicating that about 45.8% of the variability in *creativity_eval* is explained by the variables in the model.

The Adjusted R-squared value is 0.2547, which adjusts the R-squared value for the number of predictors in the model. It suggests that the model may not be a strong fit for the data, as a relatively small proportion of the variability is explained when considering the number of predictors.

The F-statistic tests the overall significance of the model. In this case, the F-statistic is 2.253 with a p-value of 0.09098. This p-value is greater than 0.05, indicating that the model as a whole is not statistically significant at the 0.05 significance level.

In summary, based on these results, it appears that *groups* (the main independent variable of interest) does not have a statistically significant impact on *creativity_eval* in this specific model. However, *familiarity* and *age* appear to be statistically significant and positively related to *creativity_eval*, *AI_skept* have a significant negative relationship with *creativity_eval*.

Another important aspect to analyze is the combined effect between the variables (in this case, the couples formed by *groups* and each one of the other independent variables), allowing for the possibility that the relationship between variables is not simply additive, meaning that the effect of the variables on the outcome isn't just a simple sum of their individual effects.

To do so, as summarized in *Figure 38*, a model for each independent variable combined with *groups* has been created. The models are structured as follows: (1) the independent variables are: the variable *groups*, the independent variable which interaction with *groups* is analyzed, and the interaction (product) between *groups* and that independent variable. (2) The dependent variable is *creativity_eval*.

By analyzing the results, it emerges that the only statistically relevant interaction is the product between *groups* and *age*. Individually, both *age* and *groups* exhibit a positive correlation with the evaluation of creativity and are statistically significant.

This suggests that: (1) the usage of BOB brings to more creative results and (2) older participants are capable of generating more creative results than younger participants. This could be attributed to their higher level of work experience, which enables them to obtain a better score in the items composing *creativity_eval* (especially feasibility and elaboration).

However, their interaction has a negative coefficient, indicating a negative relationship with *creativity_eval*. Hence, the higher age of participants may indicate less familiarity with technology and digital assets, resulting in lower creativity if using BOB. This can explain the negative relationship between the product variable *groups:age* and the dependent variable.

	creativity_eval				
	(1)	(2)	(3)	(4)	(5)
groups	2.235 (1.522)	-0.030 (0.754)	0.668 (0.535)	1.680** (0.781)	0.229 (0.447)
creativity_SA	0.311* (0.155)				
groups:creativity_SA	-0.370 (0.288)				
AI_skept		-0.352** (0.153)			
groups:AI_skept		0.173 (0.265)			
familiarity			0.938* (0.508)		
groups:familiarity			-0.513 (0.794)		
age				0.033* (0.018)	
groups:age				-0.039* (0.021)	
gender					-0.302 (0.525)
groups:gender					0.677 (0.852)
Constant	1.421* (0.783)	3.833*** (0.460)	2.446*** (0.351)	1.882*** (0.606)	3.052*** (0.354)
Observations	23	23	23	23	23
R2	0.232	0.291	0.226	0.219	0.097
Adjusted R2	0.110	0.179	0.103	0.096	-0.045
Residual Std. Error (df = 19)	0.799	0.768	0.803	0.806	0.866
F Statistic (df = 3: 19)	1.910	2.600*	1.845	1.779	0.683

Figure 38 - Interaction between Variables

Since by not including the control variables in this last analysis there is the risk of emerging spurious correlation, I've decided to conduct further analysis, building and running different models based on model 6, each one containing a different product-variable, as shown in *figure 39*.

	creativity_eval				
	(1)	(2)	(3)	(4)	(5)
groups	1.786 (1.465)	0.389 (0.887)	0.864 (0.548)	1.125 (0.863)	0.065 (0.417)
creativity_SA	0.091 (0.166)	0.008 (0.148)	0.002 (0.142)	-0.001 (0.144)	-0.001 (0.140)
AI_skept	-0.210 (0.145)	-0.250 (0.164)	-0.253* (0.139)	-0.198 (0.151)	-0.280* (0.138)
familiarity	0.946* (0.522)	0.912 (0.548)	1.308* (0.641)	0.824 (0.531)	0.793 (0.516)
age	0.016 (0.011)	0.016 (0.013)	0.015 (0.010)	0.031 (0.020)	0.021* (0.011)
gender	0.430 (0.454)	0.451 (0.477)	0.577 (0.467)	0.184 (0.541)	-0.036 (0.576)
prod_groups_creativity_SA	-0.270 (0.279)				
prod_groups_AI_skept		0.007 (0.348)			
prod_groups_familiarity			-0.798 (0.755)		
prod_groups_age				-0.023 (0.026)	
prod_groups_gender					1.043 (0.792)
Constant	1.845 (1.058)	2.373** (1.028)	2.172** (0.925)	1.951* (1.023)	2.600** (0.908)
Observations	23	23	23	23	23
R2	0.490	0.458	0.496	0.486	0.514
Adjusted R2	0.252	0.205	0.260	0.246	0.287
Residual Std. Error (df = 15)	0.733	0.756	0.729	0.736	0.715
F Statistic (df = 7; 15)	2.058	1.811	2.105	2.027	2.268*

Figure 39 - Model6 with interaction variables

In model (4), the variable representing the interaction between groups and age is not significant anymore: adding the control variables made the results more reliable, reducing the confounding. Although this can be interpreted as a lack of causation, it is important to consider the influence of having such a small sample size, as will be discussed more in depth further on.

AI_skept and *familiarity* are the variables which recur more often as significant, which is an interesting result considering the small sample size and the exploratory nature of this research.

For the latter motivations, it is reasonable to still maintain the validity of some insights which emerged during this data interpretation section, which will be discussed in the following chapter.

Discussion and Implications

The variable *groups* is not statistically significant, indicating that the use of the tool BOB may not be relevant in increasing creativity in the creation of a business model for social enterprises. However, it should be considered that the sample size was small, and the p-value of the coefficients could decrease with an increase in observed cases, as the standard deviation could decrease, and the model could become more accurate. This could still be an interesting indication of the type of tool on which companies can focus research or development: there are new disruptive technologies that could make CST more effective than the one used in this research, relatively simple and scripted, forcing the user to follow a pre-determined path (for example, generative AI that allows for much deeper interaction with the tool).

In addition, the research methodology implemented in this thesis could lay the groundwork for future, more in-depth research with a better sample. Furthermore, the positive correlation between the *groups* variable and *creativity_eval* still shows a relevant effect, which cannot be ignored as the implication could be a bridging of the technical/managerial skills gap (which, as discussed in the literature review section, is often precisely what does not allow social entrepreneurship to be lasting over time and being financially sustainable).

It cannot be ignored that in the creative industry, the implementation of these tools is already a reality, bringing an empirical confirmation to the table: Adobe Creative Cloud, a suite of tools supporting various aspects of creative professionals, is a famous example of how technology is deeply intertwined with creativity, and how it can help to improve it (although the effects on the creativity in the business field have not been extensively studied).

The familiarity variable has a high positive influence on creativity evaluation: a result easily predictable, as prior knowledge of the subjects leads to better awareness during exercise.

The age variable shows a slightly positive effect on creativity evaluation of the performed exercise: this could be related to the fact that older people who participated in this survey

had more work experience in business and were therefore able to formulate more appropriate business models.

Moreover, the negative relationship between evaluation of creativity and the variable representing the interaction between the usage of BOB and the participants' age can indicate that older people perform worse if using a digital tool, being less acquainted with technology. The lesson that companies can distill from this observation is the necessity to focus on easy-to-use and intuitive tools, designing the User Interface in a way which can be easily comprehended by all age groups.

As for the variable representing skepticism towards artificial intelligence, the statistically significant negative correlation could be due to people skeptical about artificial intelligence approaching exercise in a more biased and distrustful way, leading to less proficient execution of the exercise. Also, a similar reflection to that made earlier on the influence of age on creativity can be done: a person with high skepticism toward AI might extend this approach to the implementation of new technologies in general, thus being less accustomed to the use of digital tools, especially if they are new and never previously used. Again, for companies is essential focusing also on easiness of use of the tool, to reach the widest possible users' pool.

In conclusion, although the results regarding the influence of using BOB tool on creativity in creating a business model for social enterprises are not statistically significant, given that this research is exploratory in nature and considering all limitations as well as the fact that in practice these tools are already successful in the creative industry market, and given the importance of the practical implications for companies, this research may lay the foundation for further investigation into this topic by future researchers, who could be inspired by this methodology to explore the topic further.

Limitations

This study encompasses a range of limitations, primarily attributed to the intrinsic characteristics of the questionnaire. The survey demanded a considerable level of dedication from participants, encompassing the requirement to engage with a substantial theoretical framework and subsequently formulate a comprehensive Business Model. Furthermore, participants were tasked with responding to a series of multiple-choice questions. Regrettably, these constraints led to a limited participant pool, thereby impeding the attainment of a larger sample size that would have facilitated the

construction of a broader and more robust model, characterized by enhanced generalizability and reliability. The main limitations were that:

1. One notable concern that emerged pertains to the potential utilization of external tools by participants to augment or expedite their work processes. This encompasses the possibility of incorporating supplementary resources like ChatGPT in order to assist in the facilitation of their tasks.
2. An inherent limitation stemming from technical constraints was the unfeasibility of translating BOB into Italian. The introduction of a language transformation was hindered by the prevailing technical limitations, precluding the seamless implementation of an Italian version of the system: this might complicate the task for Italian users, creating a precondition for impartiality.
3. The involvement of participants, in part attributed to the intricacies intrinsic to the subject matter under consideration, could potentially result in suboptimal utilization of the provided resources or instances of selective disregard towards specific sections. This may lead to variations in their approach to resource engagement and information assimilation.
4. The conceptualization of the BOB tool was conceived with the intention of aiding social entrepreneurs in the improvement/innovation process for their business models. Consequently, a fundamental prerequisite for its effective utilization is that the user can be identified as a social entrepreneur. However, within the context of this questionnaire, respondents who did not possess the status of social entrepreneurs were prompted to simulate this role: this simulation introduces the potential for a diminished efficacy in tool utilization, given that it diverges from the genuine entrepreneurial perspective that the tool was designed to complement.
5. The sample size of participants is not large enough to allow the construction of a general and reliable model, since the representativity of the population can't be guaranteed.
6. The cultural background of participants exerts a substantial influence on the level of proficiency with which the assigned tasks are executed. It is relevant to recognize that the existing sample size is relatively modest, and as a result, the inherent impact of this cultural factor could be potentially magnified within such a constrained sample. However, with a more expansive sample size, the influence stemming from diverse cultural backgrounds would likely be better balanced,

thereby offering a more comprehensive and representative insight into the overall impact of these backgrounds on task quality.

7. These findings are likely applicable exclusively to Creativity Support Tools (CSTs) exhibiting a structure akin to that of BOB, which is meticulously designed to direct users in framing their respective Business Models (BMs), and as such, it precludes a wholly unconstrained and interactive engagement. This contrasts with the potential of employing generative artificial intelligence models, which can facilitate a more unconfined and interactive interaction in the BM formulation process.
8. The existence of technical constraints may have brought to the existence of design gaps of the website hosting the questionnaire, which could potentially engender user impediments, including but not limited to concerns stemming from suboptimal user experience, intuitiveness deficits, and navigation complexities.
9. Finally, the robustness of the obtained responses may exhibit a substantial dependence on the level of engagement demonstrated by individual participants. This dynamic is one that assumes particular significance within the context of larger sample sizes, wherein such influences tend to be effectively mitigated. However, it is important to recognize that due to the inherent constraints of the experimental phase, achieving an adequately substantial sample size has proven unfeasible.

Conclusions

In this empirical study, the impact of using a digital creativity support tool (CST), specifically BOB, on enhancing creativity in business model design in the context of social enterprises has been analyzed and several important conclusions can be drawn from this study.

While the variable *groups*, representing the use of the BOB tool, was not statistically significant, it still opens up a broader discussion on the relevance and effectiveness of such tools. The small sample size could have influenced these results, suggesting that larger studies might yield different outcomes.

Indeed, following the path indicated by the positive correlation between the use of BOB and the enhancement of creativity, which in our case cannot be neglected given the magnitude of the effects, the exploratory nature of the study and the empirical

confirmation, it is important that research in this area be conducted more comprehensively to confirm or not confirm the correctness of this clue.

The study also provides valuable insights for future research and development: the exploration of new disruptive technologies, such as generative artificial intelligence, could lead to more efficient and interactive CSTs, since these advanced tools could significantly influence creativity by allowing users to explore creative possibilities in a deeper and more customizable way.

The research methodology used in this study could serve as a foundation for future investigations. With larger and more diverse samples, future studies could provide a clearer picture of the relationship between CST use and creativity, specifically in business model design.

On the other hand, other statistically significant results emerged: the variable *familiarity* had a strong positive effect on creativity evaluation. This aligns with expectations, indicating that individuals with prior knowledge and experience are more likely to succeed in this exercise. Similarly, *age* had a slightly positive effect on creativity evaluation, possibly due to the greater business experience of older participants.

Although it did not show robustness in statistical significance when the control variables were also added to the regression model, the fact that the interaction between age and tool use is negatively correlated with the assessment of business model creativity, shows an interesting perspective on how a higher age leads to less appropriate tool use, which could be explained by not belonging to the category of digital natives and consequently a probable less familiarity with the digital world.

AI skepticism showed a statistically significant negative correlation with creativity ratings. This suggests that biases and mistrust towards AI (which can be extended to innovative technology in general) among skeptics may affect their ability to perform creative tasks. Another interpretation, maybe less intuitive but still interesting, can be deduced assuming that there is a correlation between being skeptical towards artificial intelligence and being skeptical towards sudden technological innovations: the more skeptical participants could in fact be less familiar with and inclined to frequent use of technological means, leading them to have less effectiveness in using digital CSTs.

Both these points underline the importance for companies to concentrate and give the right priority to the design of a user interface that is intuitive and accessible for all user groups, even those less familiar with the digital world, to avoid precluding, in the case

under examination in this thesis, the possibility for each range of users to generate creative and innovative Business Models for social enterprises and more generally to make this technology accessible to all potential customers.

In conclusion, this study provides valuable insights into the role of CSTs in promoting creativity in social entrepreneurship. Despite the lack of significant results on the impact of the BOB tool on creativity, this research lays a foundation for future investigations into this topic and gives relevant insights on collateral discoveries. Given the rapid technological advancements and the practical implications of enhancing creativity, this area warrants further exploration.

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