

Forum: Practical Perspectives

A design process to define public challenges addressing SDGs

Hugo Medeiros ^{1 2}

George Augusto Valença Santos ³

Bruno Nunes Guedes ⁴

Katarina Santiago ⁴

Kellyton Brito ³

¹ Secretaria de Planejamento e Gestão de Pernambuco, Recife / PE – Brazil

² Universidade Federal de Pernambuco, Recife / PE – Brazil

³ Universidade Federal Rural de Pernambuco, Recife / PE – Brazil

⁴ Secretaria de Ciência, Tecnologia e Inovação de Pernambuco, Recife / PE – Brazil

How might we define local innovation challenges that are user-centered but also address strategic goals, such as the Sustainable Development Goals (SDGs)? We propose a design process that introduces a relevant contribution to the practices of the Mission-oriented Innovation Policies (MIPs) field as it goes from Grand Societal Challenges (GSCs) to local innovation challenges, which are more relevant to local needs and capabilities of solution. The main goal of the design process is to go from a GSC, such as “access to health” and one of its missions, like “reducing chronic Non-Communicable Diseases (NCD),” to a more able-to-solve innovation challenge, passing by its mission, and different problems and aspects. Snowball sampling methods allow us to find and mobilize electable subjects and design thinking techniques to process problem mapping, election, and clustering, as well as create challenge statements. It was possible to translate GSC to the local reality while reducing contestation and complexity and producing a problem-grouped map with prioritization and three problem statements (challenges) with open phrasing and solution criteria to foster the users’ desired outcomes.

Keywords: process; challenges; SDG; design thinking; mission-oriented innovation policies.

Um processo de design para definir desafios públicos envolvendo os ODS


Como podemos definir os desafios locais de inovação que são centrados no usuário, mas também abordam objetivos estratégicos, como os Objetivos de Desenvolvimento Sustentável (ODS)? Propomos um processo de design que apresenta uma contribuição relevante para as práticas no campo das políticas de inovação orientadas para a missão (em inglês, *Mission-oriented Innovation Policies* – MIPs), uma vez que vai dos grandes desafios societais (em inglês, *Grand Societal Challenges* – GSCs) aos desafios locais de inovação, que são mais relevantes para as necessidades locais e capacidades de solução. O principal objetivo do processo de desenho é passar de um GSC, como o “acesso à saúde” e uma de suas missões, como “reduzir as Doenças

DOI: <https://doi.org/10.1590/0034-761220230008x>

Article received on January 05, 2023 and accepted on May 12, 2023.

[Original version]


Editor-in-chief:

Alketa Peci (Fundação Getulio Vargas, Rio de Janeiro / RJ – Brazil) 

Associate editor:


Mauricio Dussauge Laguna (Centro de Investigación y Docencia Económicas, Ciudad de México – México) 

Reviewers:

Pedro Carlos Resende Junior (Universidade de Brasília, Brasília / DF – Brazil; Centro Universitário IESB, Brasília / DF – Brazil) 

Two of the reviewers did not authorize the disclosure of their identities.

Peer review report: the peer review report is available at this [URL](#).

ISSN: 1982-3134 

Crônicas Não Transmissíveis (DCNT)”, para um desafio de inovação mais capaz de resolver, passando pela sua missão, diferentes problemas e aspectos. Os métodos de amostragem bola de neve nos permitem encontrar e mobilizar assuntos elegíveis e técnicas de *design thinking* para processar o mapeamento de problemas, eleição e agrupamento; e criar declarações de desafio. Foi possível traduzir o GSC para a realidade local, reduzindo a contestação e a complexidade, e produzindo um mapa agrupado de problemas com priorização e três declarações de problemas (desafios) com formulação aberta e critérios de solução para promover os resultados desejados pelos usuários.

Palavras-chave: processo; desafios; ODS; pensamento de design; políticas de inovação orientadas para a missão.

Un proceso de diseño para definir los desafíos públicos relacionados con los ODS

¿Cómo podemos definir desafíos locales de innovación local que estén centrados en el usuario pero que también aborden objetivos estratégicos, como los Objetivos de Desarrollo Sostenible (ODS)? Proponemos un proceso de diseño que introduce una contribución relevante a las prácticas en el campo de las políticas de innovación orientadas por misión (en inglés, *Mission-oriented Innovation Policies* – MIPs), ya que va desde los grandes desafíos sociales (en inglés, *Grand Societal Challenges* – GSCs), comenzando con los ODS, hasta los desafíos locales de innovación, que son más relevantes para necesidades locales y capacidades de solución. El objetivo principal del proceso de diseño es ir desde un GSC, como “acceso a la salud” y una de sus misiones, como “reducir las Enfermedades Crónicas No Transmisibles (ECNT)”, a un desafío de innovación más concreto, pasando por la misión, y por diferentes problemas y aspectos. Los métodos de muestreo de bola de nieve nos permiten encontrar y movilizar sujetos elegibles, y técnicas de *design thinking*, procesar el mapeo, la elección y la agrupación de problemas; y crear declaraciones de desafío. Fue posible traducir GSC a la realidad local, al mismo tiempo que se reducía la contestación y la complejidad, y se producía un plano agrupado de problemas con priorización, y tres declaraciones de problemas (desafíos) con redacción abierta y criterios de solución para promover los resultados deseados por los usuarios.

Palabras clave: proceso; desafíos; ODS; pensamiento de diseño; políticas de innovación orientadas a la misión.

ACKNOWLEDGMENTS

This research was carried out with the support of the Usina Pernambucana de Inovação (USINA).

1. INTRODUCTION

How might we define local innovation challenges that are user centred but also address strategic goals, such as the Sustainable Development Goals (SDGs)? We believe that the answer to the question is directly related to the capabilities of public institutions to develop strategic goals (or missions) for public innovation policies to achieve and coherently define local innovation challenges from Grand Societal Challenges (GSC)¹.

Understanding that the target problems for public institutions cannot be handled with a single solution nor have definitive answers, *Mission-oriented Innovation Policies* (MIPs)² perspective proposes not only a shift from “technology-led missions” (supply) to “societal challenge-led mission” (demand), but also a change in the way public challenges are comprehended (Janssen, Torrens, Wesseling, & Wanzenböck, 2021; Mazzucato 2018; Miedzinski, Mazzucato, & Ekins, 2019; Wanzenböck, Wesseling, Frenken, Hekkert, & Weber, 2020).

¹ Can be also referred as Grand Social Challenge, Wicked Issue, or Grand Challenge.

² Can be also referred as MOIP.

Since GSC are ambivalent and have emergent components that may only reveal themselves later, innovation needs to be addressed throughout a learning cycle of creating and testing different solutions (Rizardi & Metello, 2022), keeping focus on strategic goals, or “missions”, that together will address the GSC (Miedzinski et al., 2019). The fact that MIP concentrates efforts on how to (i) formulate and design innovation policies, and (ii) select and plan missions and projects shows limitations on how to put mission-oriented innovation policies to work (Roth, Wittmann, Hufnagl, & Lindner, 2022), i.e., make the movement from GSC to more able-to-solve and user centered local innovation challenges (Brown, 2020; Wanzenböck et al., 2020).

Considering this, we offer a design process that contributes to the practice of MIP as it goes from GSC, starting with SDGs, to innovation challenges more relevant to local needs and capabilities of solution, by combining MIP and the design thinking perspective of user centered innovation challenges (Brown, 2020), developing a multilevel approach that uses snowball sampling methods to find electable subjects from organizations that work with SDGs or that deal with social problems; and common design techniques to map, elect and group problems, and create challenge statements.

2. LITERATURE REVIEW

The notion of MIP is facing a “re-emerging interest” (Wanzenböck et al., 2020, p. 475) with the reuse of its perspective in different countries and the recent production of technical guides or policy papers, like the Observatory of Public Sector Innovation (OPSI)³, the Mission-Oriented Innovation Policies Online Toolkit⁴, the Innovation Facets Methodology⁵ ⁶, the UCL policy briefs published by the Institute for Innovation and Public Purpose (IIPP), or the Brazilian case, the Centro de Gestão e Estudos Estratégicos (CGEE) (Mazzucato & Penna, 2016). There is also an extensive discussion on scientific papers: Albala, Holloway, Austin, and Kattel (2021), Larrue (2021), Leadbeater (2018), Mazzucato and Dibb (2019), Mazzucato and Macfarlane (2019), and Miedzinski et al. (2019) on technical discussion; Janssen et al. (2021), and Robinson and Mazzucato (2019), on definitions and classification; Mazzucato (2018) and Mazzucato, Kattel, and Ryan-Collins (2020), prescriptions and toolkits; Wanzenböck et al. (2020), on problem-solution space; and, in Brazilian context, Lucena (2022), on the analysis of a specific innovation policy.

These studies show two relevant limitations: the drill-down from missions to problems and from them to local innovation challenges, and the lack of user centered perspective. The first aspect is a persistent concern when grand strategies need to be placed locally, as detailed by Herrera (2019), or by Leavesley, Trundle, and Oke (2022). The second is also recurrent due to the presence of an innovation perspective that is more connected to broad projects than to contextual and user centered challenges.

³ Retrieved from <https://oecd-opsi.org/>

⁴ Retrieved from <https://stip.oecd.org/MIP/the-overall-methodological-framework>

⁵ Retrieved from <https://oecd-opsi.org/pet/>

⁶ Retrieved from <https://oecd-opsi.org/wp-content/uploads/2021/10/OECD-Innovation-Facets-Brief-Mission-Oriented-Innovation-2021.pdf>

The innovative aspect of this paper is offering a design process that contextualizes GSC with local problems and defines problems in a user centered and open perspective (Brown, 2020; Dyer, Ding, & Sun, 2013; Guimarães, Carício, & Oliveira, 2017).

3. RESEARCH METHOD

According to Tripp (2005), action research is a methodology that tries to answer the question: “how might I/we improve this practice?” (Tripp, 2005, p. 15), by building a cycle of plan, act, describe and evaluate steps. Our practice in need of improvement was the definition of innovation challenges, which we felt was focused on finding innovation challenges that were locally relevant and user centered, lacking the connection with grand challenges.

One example is the process to define innovation challenges on call for proposals to *Edital FACEPE N° 21/2021*⁷: organization team selected the main themes based on Pernambuco Strategy; representatives of public and private institutions were asked to submit challenges related to the themes; a small committee selected the better challenges. This resulted in absence of a clear mission, disconnection with grand challenges, and narrow participation of users.

In face of these limitations, we built a plan of studying literature on MIP to create a new practice for challenge definition. Upon studying MIP, we found out that there was no “recipe” to be implemented, since, as stated on section 1 and 2, literature was focused on mission projects. Hence, we decided to produce a “practical action research” (Tripp, 2005, p. 13), in which the researchers craft a new solution to a practice, having a specific goal and question in mind. Our question was “How might we define local innovation challenges that are user centered but also address strategic goals, such as the Sustainable Development Goals?” and our goal was to go GSC to more able-to-solve innovation challenges, passing by missions and its different problems and aspects, in attention to the criteria of large user participation, preferably in synchronous activities.

To better describe and evaluate, we kept notes of every encounter that happened on five cycles (one per GSC) of 3 hours hands-on activities, in which we tried to go from GSC to 3 challenge statements with solution criteria. We applied different design techniques (Brown, 2020) (cf. Section 4), with a mature design process on iteration three of five.

In 2022, the organization team selected five GSC and declared mission statements using the road mapping framework (Miedzinski et al., 2019) and evaluating criteria for MIPs (Mazzucato, 2018; Mazzucato & Dibb, 2019; Mazzucato & Macfarlane, 2019; Mazzucato & Penna, 2016). Following these two approaches, we associated GSC with SDGs, e.g., SDG 3 – “Good Health and Well-being” became the GSC on the design process to frame Health local innovation challenges. As the GSC is a big picture with many possible frames, we selected one locally relevant mission, e.g., “reducing chronic noncommunicable diseases.”

Between May 4th and June 2nd, we conducted the five workshops for the social inequalities call for proposals from the Foundation for the Support of Science and Technology of the State of Pernambuco (Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco – FACEPE). The GSC raised were: Poverty (SDG 1 and SDG 2), Access to Health (SDG 3), Equitable Education (SDG 4), Gender Equality (SDG 5), Sustainability (SDG 12, SDG 13, SDG 14, and SDG 15).

⁷ Retrieved from https://www.facepe.br/wp-content/uploads/2021/10/Edital_FACEPE_21-2021-Pro-Startups-Operação1.pdf

Before starting the workshops, as organizers, we *selected participants* based on a set of criteria through the snowball sampling technique (Biernacki & Waldorf, 1981). Those participants acted as hubs by indicating other people that fit the criteria, forming a network of contacts. This strategy enables workshop organizers to identify critical stakeholders, who could be neglected or simply not be easy to map and invite, because they are related to a rare phenomenon or do not want to join a study for specific reasons (Dragan & Isaic-Maniu, 2013). Such “active search” engages a rich population, although this may cause limitations in terms of generalizability, i.e., the selection of participants is based on invitations instead of a random sampling (Lopes, Rodrigues, & Sichieri, 1996). We used time criteria to stop the search for new participants: all indications should be made up to 7 days before the workshop.

The study reported here considered two eligibility criteria: (i) act as state, municipal or federal public servant and (ii) be involved with the public policy and the population affected by its GSC. During the workshop, the challenge team used Google Jam board, and the organization team facilitated and registered the complementary information on a google docs. After the workshop, the organization team performed a debriefing reunion in which they debated the pros and cons of that iteration and built improvements for the next cycle. The activities are summarized below.

BOX 1 **SUMMARY OF ACTIVITIES**

GSC	Day	# of participants	Notes
Sustainability	May 4th	8	The mission was too generic: Pernambuco sustainable and inclusive.
Poverty	May 17 ^h	8	The mission was validated with the challenge team, resulting in a better statement: Adequate Nutrition.
Education	May 18 th	10	The mission was again validated with the challenge team.
Health	May 25 th	10	The workshop happened digitally.
Gender	June 2 nd	11	No relevant notes.

Source: Elaborated by the authors.

In sum, we observed that our practice for challenge definition had no connection with GSC; posed the question “How might we define local innovation challenges that are user centered but also address strategic goals, such as the Sustainable Development Goals?”; built a plan, act, describe, evaluate cycle with 5 iteration; proposed a starting set of practice combining snowball sampling and user centered design technique, in a process of 2 main phases and 8 activities; evolved this starting set from iteration to iteration, resulting in the design process described in section 4.

4. A DESIGN PROCESS TO DEFINE PUBLIC CHALLENGES ADDRESSING SDGS

4.1 Description

The process starts in phase 1, **Problem Framing** (Figure 1), when the organizers *present the institution and the methodology to participants* (Activity 1), explaining the GSC that will guide the participants in future activities. Then, they *organize participants in teams* (Activity 2) that must *identify specific problems of the mission* (Activity 3), using the rule “one problem per card”. At this moment, they must consider two aspects (Wedell-Wedellsborg, 2021):

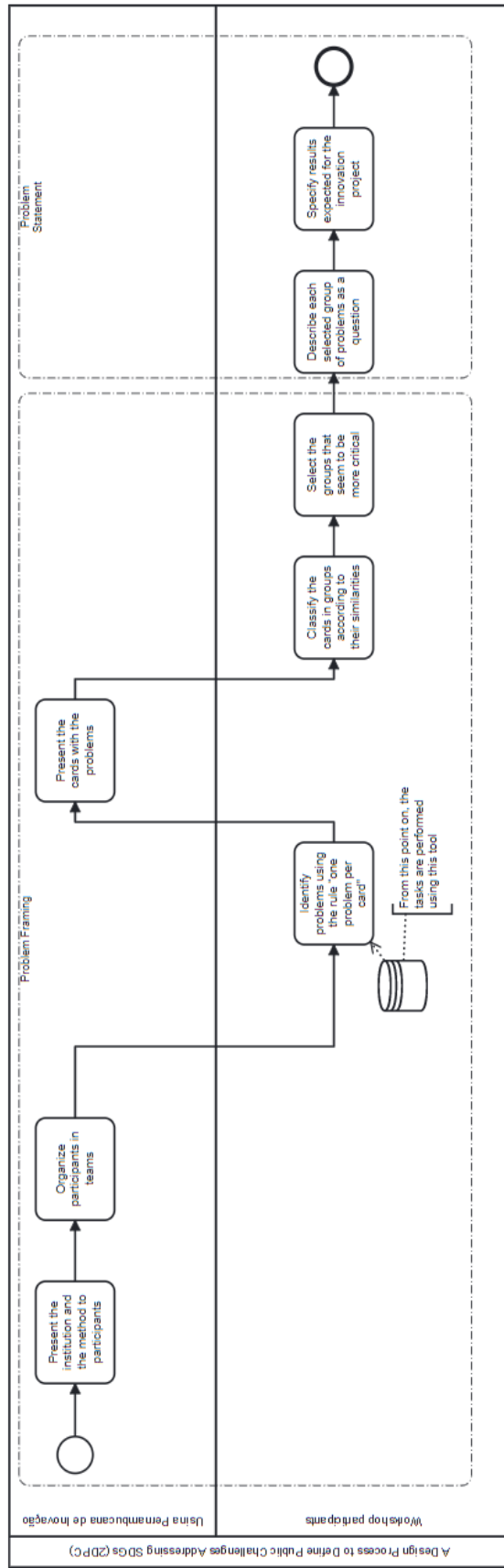
- Difficulties or barriers – when we try to accomplish this mission, what may go wrong? When do we stop? What hampers our activity?
- Pains – once we get involved with the big challenge/mission, what bothers us? What is our pain? What takes our energy?

After that, organizers *present the cards with the problems* (Activity 4) and inspire participants to use the Affinity Diagram to classify *the cards in groups according to similarities among them* (Activity 5). This avoids repetition, identifies information saturation (Guimarães, Carício, & Oliveira, 2017; Pernice, 2018), and reduces contestation and complexity (Wanzenböck et al., 2020). In the following step, participants must *select the groups of problems that seem to be more critical* (Activity 6), using dot votes to distribute on cards that they perceive as more relevant. The top-3 most voted sets are taken to the next phase, when they are processed to finally become local innovation challenges (Gibbons, 2019; Guimarães, Carício, Oliveira, 2017).

Once they start Phase 2, **Problem Statement**, each group of participants need to describe one of the selected groups of problems as a question in the form “*How Might We?*” (HWE), a technique adopted by Brown (2020) to guarantee that a problem statement is able-to-solve and is open enough to allow the design of new solutions.

In addition to HWE, participants use “*desired outcome*” (Dyer et al., 2013) to *specify expected results*, representing the success of the innovation solution in terms of two drivers: requirements (what is essential for the solution to resolve the challenge) and experience (characteristics the solution must have to be useful and attractive). At that time, the problem is not only framed in an open and positive way, but also is connected to success criteria that promote the achievement of a desired outcome.

FIGURE 1 THE PROCESS



Source: Elaborated by the authors.

4.2 Results

Here, we describe the results related to the GSC “Access to Health” (SDG 3 – “Good Health and Well-being”), whose mission was “reducing chronic Non-Communicable Diseases (NCDs)” (Activity 1). The institutions that addressed this challenge were:

- Pernambuco State Health Secretariat (SES);
- Pernambuco State Planning and Management Secretariat (SEPLAG), represented by its Center of Results-based management in Health (NGR-SES);
- Recife Municipal Government;
- Serra Talhada Municipal Government;
- Cardiovascular Health Center of Pernambuco (PROCAPE); and
- Federal University of Pernambuco Clinical Hospital (HC).

The institutions were divided in groups according to: (i) direct or indirect relation to the Health System, (ii) jurisdiction of the institution – state, federal or municipal, and (iii) type of institution – Academy or Government; in a way that every group had approximately the same number of members, and a wide representation (Activity 2).

As presented in Figure 2, during the first part of the workshop, 10 participants (1 from PROCAPE, 3 from HC and 2 from each of the other institutions) identified 34 problems (Activities 3 and 4). These problems were grouped into 6 sets (Activity 5):

- Access to health services,
- Prevention;
- Communication and Information;
- Diseases;
- Data and Information; and
- Assistance.

FIGURE 2 PROBLEMS RELATED TO THE SDG 3, ACCORDING TO PARTICIPANTS



Source: Elaborated by the authors.

Then, participants undertook a prioritization process to select three groups they considered as the most relevant (Activity 6): Data and Information (9 votes), Assistance (6 votes) and Prevention (6 votes) were considered the top-3 groups to address. Finally, they translated each prioritized group as a question (Activity 7), which was associated with a set of desired outcomes (Activity 8). Figure 3 details the final questions (here named as “challenges”) with the requirements that guide the future innovation project that would address each of them.

FIGURE 3 CHALLENGES IN THE FORM OF QUESTIONS WITH REQUIREMENTS FOR THE FUTURE INNOVATION PROJECT



Source: Elaborated by the authors.

5. CONCLUSION

The literature on MIP has provided important directions: guides to go from GSC to Mission, and then to Mission Projects (Mazzucato, 2018; Mazzucato et al., 2020; Miedzinski et al., 2019); discussion on background, concepts, typology and premises to identify MIP (Janssen et al., 2021; Robinson & Mazzucato, 2019); pathways to deal with inherent aspects of wicked problems, such as contestation, complexity, and uncertainty (Wanzenböck et al., 2020). These contributions are often described for national level and have the premise of broad public policies that are connected to Mission Projects, like “autonomous ocean stations to remove plastic pollution” (Mazzucato, 2018; Mazzucato et al., 2020). Yet they are not effective to define local/subnational public challenges, create user centered challenges.

Our design process was able to contribute with these two points. By using snowball sampling (Biernacki & Waldorf, 1981; Dragan & Isaic-Maniu, 2013; Lopes et al., 1996), and different techniques from design thinking (Brown, 2020; Dyer et al., 2013; Guimarães et al., 2017), it was possible to translate GSC to local reality (Herrera, 2019; Leavesley et al., 2022), while reducing contestation and complexity (Wanzenböck et al., 2020), and producing a problem grouped map with prioritization, and problem statements (challenges) with open phrasing and solution criteria to promote the users’ desired outcomes.

Our main **contribution** is a design process that can be replicated in different local contexts, contributing both to translate SDGs to local realities and guide other public processes to create local

innovation challenges. Although we only described the health GSC design process, we were able to execute it on other four GSC⁸.

In terms of **threats to validity**, our snowball sampling may face issues in terms of external validity. Despite the lack of generalization, this strategy is effective in engaging people that could not be reached otherwise. The design thinking steps also bring a focused view on the topics addressed, reducing internal bias using information clustering and information saturation. Also, there is a limitation concerning the absence of quantification since we did not use surveys to evaluate the process. Without this evaluation, the bias of the researcher increases because we conducted the workshops and the documenting process. However, our premise of mapping *some* local innovation challenges that are relevant to users is fulfilled. We must highlight that the call for proposals to *Edital FACEPE N° 28/2022*⁹ was a very requested instrument with at least one application for each challenge (60 in total), which reinforces the relevance of the resultant analysis. Another limitation lies in the literature: the guides, reports and papers are all very recent and incipient, with a considerable endogeneity.

For **future works**, we intend to listen to the applicants of the call for proposals to *Edital FACEPE N° 28/2022*. In addition, we plan to collect insights from the participants of the workshops, producing quantitative evaluation on the reaction of both groups.

⁸ Retrieved from https://www.facepe.br/wp-content/uploads/2022/08/Edital_FACEPE_28-2022-Apoio-a-Projetos-de-Pesquisa-para-o-Enfrentamento-de-Desigualdades-Sociais.pdf

⁹ Retrieved from <https://www.facepe.br/a-analise-da-etapa-i-enquadramento-do-edital-282022-apoio-a-pesquisa-para-o-enfrentamento-de-desigualdades-sociais-foi-concluida/>

REFERENCES

- Albala, S., Holloway, C., Austin, V., & Kattel, R. (2021). *New economics of assistive technology: a call for a missions approach* (IIPP WP 2021/04). London, UK: UCL Institute for Innovation and Public Purpose. Retrieved from <https://www.ucl.ac.uk/bartlett/public-purpose/wp2021-04>
- Biernacki, P., & Waldorf, D. (1981). Snowball sampling: problems and techniques of chain referral sampling. *Sociological Methods & Research*, 10(2), 141-163. Retrieved from <https://doi.org/10.1177/004912418101000205>
- Brown, T. (2020). *Design thinking: uma metodologia poderosa para decretar o fim das velhas ideias*. Rio de Janeiro, RJ: Elsevier.
- Dragan, I. M., & Isaic-Maniu, A. (2013). Snowball sampling completion. *Journal of Studies in Social Sciences*, 5(2), 160-177. Retrieved from <https://core.ac.uk/download/pdf/229607586.pdf>
- Dyer, S. W., Ding, B., & Sun, J. (2013, January 23). The innovator's secret weapon. *Kearney*. Retrieved from <https://www.es.kearney.com/operations-performance-transformation/article/-/insights/the-innovator-s-secret-weapon>
- Gibbons, S. (2019, July 07). Dot voting: a simple decision-making and prioritizing technique. *Nielsen Norman Group*. Retrieved from <https://www.nngroup.com/articles/dot-voting/>
- Guimarães, P. B. V., Carício, M. R., & Oliveira, A. C. S. (2017). *Inovação no setor público com estratégias de design thinking* (Série Inovação no Setor Público, Vol. 1). Salvador, BA: Ed. Motres. Retrieved from <https://sigaa.ufrn.br/sigaa/verProducao?idProducao=7579315&key=b6966636f4dbb70a4033b0790a09fd24>
- Herrera, V. (2019, June). Reconciling global aspirations and local realities: challenges facing the sustainable development goals for water and sanitation. *World Development*, 118, 106-117. Retrieved from <https://doi.org/10.1016/j.worlddev.2019.02.009>
- Janssen, M. J., Torrens, J., Wesseling, J. H., & Wanzenböck, I. (2021). The promises and premises of mission-oriented innovation policy – a reflection and ways forward. *Science and Public Policy*, 48(3), 438-444. Retrieved from <https://doi.org/10.1093/scipol/scaa072>
- Larrue, P. (2021). *The design and implementation of mission-oriented innovation policies: a new systemic policy approach to address societal challenges* (ECD Science, Technology and Industry Policy Papers, n. 100). Paris, France: OECD Publishing. Retrieved from <https://doi.org/10.1787/23074957>
- Leadbeater, C. (2018). *Movements with missions make markets* (IIPP WP 2018-07). London, UK: UCL Institute for Innovation and Public Purpose. Retrieved from <https://www.ucl.ac.uk/bartlett/public-purpose/wp2018-07>
- Leavesley, A., Trundle, A., & Oke, C. (2022). Cities and the SDGs: realities and possibilities of local engagement in global frameworks. *Ambio*, 51(6), 1416-1432. Retrieved from <https://doi.org/10.1007/s13280-022-01714-2>
- Lopes, C. S., Rodrigues, L. C., & Sichieri, R. (1996, December). The lack of selection bias in a snowball sampled case-control study on drug abuse. *International Journal of Epidemiology*, 25(6), 1267-1270. Retrieved from <https://doi.org/10.1093/ije/25.6.1267>
- Lucena, R. M. (2022). Missão em países em desenvolvimento: o caso brasileiro pelo recorte do plano inova empresa. *Revista de Administração, Sociedade e Inovação*, 8(3), 68-86. Retrieved from <https://doi.org/10.20401/rasi.8.3.670>
- Mazzucato, M. (2018, October). Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change*, 27(5), 803-815. Retrieved from <https://doi.org/10.1093/icc/dty034>
- Mazzucato, M., & Dibb, G. (2019). *Missions: a beginner's guide* (IIPP PB 09). London, UK: UCL Institute for Innovation and Public Purpose. Retrieved from https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp_policy_brief_09_missions_a_beginners_guide.pdf
- Mazzucato, M., Kattel, R., & Ryan-Collins, J. (2020). Challenge-driven innovation policy: towards a new policy toolkit. *Journal of Industry, Competition and Trade*, 20, 421-437. Retrieved from <https://doi.org/10.1007/s10842-019-00329-w>
- Mazzucato, M., & Macfarlane, L. (2019). *A mission-oriented framework for the Scottish national*

- investment bank* (IIPP WP 2019-02). London, UK: UCL Institute for Innovation and Public Purpose. Retrieved from <https://www.ucl.ac.uk/bartlett/publicpurpose/wp2019-02>
- Mazzucato, M., & Penna, C. (2016). *The Brazilian innovation system: a mission-oriented policy proposal. Sumário executivo*. Brasília, DF: Centro de Gestão e Estudos Estratégicos. Retrieved from https://www.cgee.org.br/documents/10195/1774546/Sistema_Brasileiro_de_Inovacao-Mazzucato_Penna-Sumario_Executivo.pdf
- Miedzinski, M., Mazzucato, M., & Ekins, P. (2019). *A framework for mission-oriented innovation policy roadmapping for the SDGs: the case of plastic-free oceans* (IIPP WP 2019-03). London, UK: UCL Institute for Innovation and Public Purpose. Retrieved from https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/a_framework_for_mission-oriented_policy_roadmapping_for_the_sdgs_final.pdf
- Pernice, K. (2018, February 18). Affinity diagramming for collaboratively sorting UX findings and design ideas. *Nielsen Norman Group*. Retrieved from <https://www.nngroup.com/articles/affinity-diagram/>
- Rizardi, B., & Metello, D. (2022). *Design sistêmico: abraçando a complexidade no setor público*. Brasília, DF: Enap.
- Robinson, D. K. R., & Mazzucato, M. (2019, May). The evolution of mission-oriented policies: exploring changing market creating policies in the US and European space sector. *Research Policy*, 48(4), 936-948. Retrieved from <https://doi.org/10.1016/j.respol.2018.10.005>
- Roth, F., Wittmann, F., Hufnagl, M., & Lindner, R. (2022). *Putting mission-oriented innovation policies to work: a case study of the German high-tech strategy 2025* (Fraunhofer ISI Discussion Papers, Innovation Systems and Policy Analysis, n. 75). Karlsruhe, Germany: Fraunhofer ISI. Retrieved from <http://hdl.handle.net/10419/262141>
- Steinman, D., Murphy, L., & Mehta, N. (2017). *Customer success: como as empresas inovadoras descobriram que a melhor forma de aumentar a receita é garantir o sucesso dos clientes*. São Paulo, SP: Autêntica Business.
- Tripp, D. (2005). Action Research: a methodological introduction. *Research and Education*, 31(3), 443-466. Retrieved from <https://doi.org/10.1590/S1517-97022005000300009>
- Wanzenböck, I., Wesseling, J. H., Frenken, K., Hekkert, M. P., & Weber, M. K. (2020). A framework for mission-oriented innovation policy: alternative pathways through the problem-solution space. *Science and Public Policy*, 47(4), 474-489. Retrieved from <https://doi.org/10.1093/scipol/scaa027>
- Wedell-Wedellsborg, T. (2021). *Qual é o seu problema? Para resolver seus problemas mais difíceis, mude os problemas que você resolve*. São José dos Campos, SP: Benvirá.

Hugo Medeiros

<https://orcid.org/0000-0001-6249-0920>

Ph.D. in Education from the Federal University of Pernambuco (UFPE); Government Planning Manager at the Secretariat for Planning and Management (SEPLAG-PE); Collaborating Professor at the Federal University of Pernambuco (PPGCP/UFPE). E-mail: hugoavmedeiros@gmail.com

George Augusto Valença Santos

<https://orcid.org/0000-0001-9375-5354>

Ph.D. in Computer Science from the Federal University of Pernambuco (UFPE); Adjunct Professor IV of the Department of Computing at the Federal Rural University of Pernambuco (UFRPE).
E-mail: george.valenca@ufrpe.br

Bruno Nunes Guedes

<https://orcid.org/0000-0001-8417-5307>

Ph.D. in Economics from the Federal University of Pernambuco (UFPE); Assistant Professor at the University of Pernambuco (UPE). E-mail: bruno.guedes@upe.br

Katarina Santiago

<https://orcid.org/0000-0001-8634-8013>

Ph.D. in Production Engineering from the Federal University of Pernambuco (UFPE); Government Planning Manager at the Secretariat for Planning and Management (SEPLAG-PE).
E-mail: katarinasantiago.secti@gmail.com

Kellyton Brito

<https://orcid.org/0000-0002-6883-8657>

Ph.D. in Computer Science from the Federal University of Pernambuco (UFPE); Adjunct Professor at the Department of Computing at the Federal Rural University of Pernambuco (UFRPE); Coordinator of the Laboratory of Innovation in Digital Government. E-mail: kellyton.brito@ufrpe.br

AUTHORS' CONTRIBUTION

Hugo Medeiros: Conceptualization (Equal); Investigation (Equal); Methodology (Equal); Supervision (Equal); Writing - original draft (Equal); Writing - review & editing (Equal).

George Augusto Valença Santos: Conceptualization (Equal); Investigation (Equal); Methodology (Equal); Supervision (Equal); Writing - original draft (Equal); Writing - review & editing (Equal).

Bruno Nunes Guedes: Investigation (Equal); Writing - original draft (Equal).

Katarina Santiago: Investigation (Equal); Writing - original draft (Equal).

Kellyton Brito: Investigation (Equal); Writing - original draft (Equal).