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A LÓGICA ABDUTIVA INTRÍNSECA AO DESENVOLVIMENTO DE STARTUPS: AS RELAÇÕES ENTRE ABDUÇÃO E *STARTUP* ENXUTA[1]

THE ABDUTIVE LOGIC INTRINSIC TO STARTUP DEVELOPMENT: THE RELATIONSHIP BETWEEN ABDUCTION AND LEAN STARTUP

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RESUMO

O presente artigo apresenta um constructo teórico que relaciona a lógica abdutiva e o desenvolvimento de *startups*. Primeiramente proposta por Peirce (1865), a abdução apresenta uma proposta de raciocínio que busca as melhores respostas possíveis para um problema, utilizando o "e se" ao invés do "é" para responder às perguntas. *Startups* utilizam um sistema similar para se desenvolverem, através da testagem e validação de hipóteses por meio de *minimum viable product* (MVP) sendo protótipos de seus produtos ou serviços, visando obter feedback de seus usuários finais para corrigir o curso de sua organização. Dessa maneira, visou-se verificar quais são as relações entre os meios de gestão e desenvolvimento de *startups* com os modelos de lógica abdutiva; investigar e entender os modelos de desenvolvimento de *startups* e lógica abdutiva, verificando sua similaridade; descrever os processos de desenvolvimento das *startups* e do uso da lógica abdutiva; e realizar uma analogia entre os aspectos semelhantes para propor um constructo teórico para futuras pesquisas.

Palavras-chave: *Startups*. Lógica Abdutiva. Quebra de Paradigmas.

ABSTRACT

This paper presents a theoretical construct for future research that relates the abductive logic and the startups development. First proposed by Peirce (1865), abduction presents a reasoning proposal that seeks the best possible answers to a problem, using "what if" instead of "is" to answer questions. Startups use a similar system to develop themselves, by testing and validating hypotheses through minimum viable product (MVP) prototypes of their products or services, aiming to get feedback from their end users to correct the course of their organization. Thus, it was aimed to verify what are the relationships between the means of management and development of startups with the abductive logic models; to investigate and understand the

development models of startups according to abductive logic and their similarities; to describe the development processes of startups and the use of abductive logic; and to make an analogy between the similar aspects to propose a theoretical construct for future research.

Keywords: Startups. Abductive Logic. Breaking Paradigms.

INTRODUÇÃO

It's known that deductive and inductive logic in academic and professional circles, however, we do not hear much about abductive logic (MARTIN, 2010). This form of reasoning seeks to present possible answers to a given problem, instead of establishing absolute answers, whether true or false (CHIFFI; PIETARINEN, 2018). Abduction tolerates errors and failures when trying to find a best possible answer (CANKURTARAN; BEVERLAND, 2020), which increases the options that emerge through the questioning that this means generates and can open paths for the generation of future changes or innovation (GARBUIO et al., 2015).

Startups are organizations that aim for disruptive innovations in conditions of considerable uncertainty and vulnerability (WEIBLEN; CHESBROUGH, 2015). To survive in their environment, they need management methods that differ from those of traditional organizations (BLANK, 2013). This occurs precisely because of the intrinsic characteristics of startups, which generate a need to build, validate and learn from their hypotheses (RIES, 2019). They carry out their activities using prototypes of the products or services they want to put on the market and thus obtain the feedback and capital needed to survive, even if this leads to imperfect products or mistakes, i.e., the focus is on learning and correcting (AHLUWALIAA; MAHTOB; GUERREROC, 2020).

Reflecting on both concepts, the following problem arises: what are the relationships between the means of management and development of startups with the abductive logic models? To answer this problem, the following general objective is designated: to investigate and understand the development models between startups and abductive logic and possible similarities. The specific objectives are to describe the development processes of startups and the use of abductive logic and to make an analogy between similar aspects to propose a theoretical construct for future research.

To justify the choice of this problematic and the objectives, it is exposed that the abductive logic was widely spread in the field of Design Thinking (BROWN, 2008; MARTIN, 2010). This is seen as a door to innovation through hypotheses, so it should ensigns, in the same,

the proposition of the stages of development of startups, and may contribute to a better understanding of the rational process that leads to breaking paradigms and innovative management (LEAVY, 2010; DONG; LOVALLO; MOUNARATH, 2015).

This article is segmented into five topics, the first being this introduction, followed by the theoretical foundation that aims to establish the foundations for the achievement of the proposed objectives. The third topic addresses the studies found, followed by the conclusion, contributions, and suggestions for future research.

2 THEORETICAL BACKGROUNDS

This section deals with the theoretical background of this article. It is segmented into two topics: startups and abductive logic.

2.1 Startup

There is no universally accepted definition for the concept of startups (BORTOLINI, et al., 2018). Researchers classify this business model by characteristics intrinsic to the management environment and environment in which these organizations operate. Ries (2019) understands that startups are nascent organizations that focus on innovation and development of products and services for humans in an environment of extreme uncertainty and must constantly learn from mistakes and successes. For Neubert (2018) startups seek to develop innovative solutions by creating new demands or business models.

Another characteristic attributed to startups is the fact that traditional methods of business management do not apply to these organizations and may even cause more problems (BLANK, 2013). This may be related to the natural vulnerability of a startup that depends on its entrepreneurial ecosystem to survive crises (KUCKERTZ, et al., 2020). Cacciolatti et al. (2020) argue that the mortality of these organizations is linked to the use of planning and projections that prove to be frustrated, there is no room for bad calculations, startups need capital and fast learning (FIGUEIRA et al., 2017).

To avoid the mishaps of business management and obtain growth, startups, in general, go through peculiar life stages and researchers propose several nomenclatures for the life stages of startups. Gonzaga et al. (2020) compiled several understandings and researches that converge in ideas, but diverge in nomenclatures, thus presenting three stages of the life cycle of startups:

formation, validation and growth. Afrânio (2015) in turn also elucidates the divergence of the management models of startups and "traditional" organizations, arguing that the basis for the formation of the business model of a startup begins from the testing of hypotheses.

Ries (2019) addresses the need for validation through a management model for startups by segmenting it into three stages: build, measure, and learn. The goal is to keep the organization learning and avoiding false assumptions. Bocken and Snihur (2020) defend this model with three arguments: lean startup not developed for ideation; proposition of experimentation in an interactive way, mitigating uncertainty and engaging stakeholders; and the non-relation to incrementalism. Nardes and Miranda (2014) argued the effectiveness of the model for the development of innovative businesses since it allows for greater flexibility and speed.

Given the low capital, the need for fast growth and the extreme environmental uncertainty, they need fast feedback from their stakeholders (AHLUWALIAA; MAHTOB; GUERREROC, 2020). Startups should test their products and services as quickly as possible through prototypes or the minimum viable product (MVP) to obtain data to learn and correct their course in a series of trial and error (RIES, 2019). Brown (2008) explains that prototyping is developing a product or service in a simple, inexpensive and tangible way, with the purpose of getting feedback on the characteristics of an idea, whether quality or defects, as quickly as possible.

It is necessary to learn to develop a startup. Along these lines, there are those that have explored this theme, such as the learning alliances verified by Perez, Whitelock, and Florin (2013), who discussed the positive impact of the exchange of information between large organizations and startups. Gonzaga et al. (2020) confirmed a positive relationship: the more advanced the stage of development of startups, the greater their organizational learning. When analyzing startups in incubators Sullivan, Marvel, and Wolfe (2020), supported several learning activities that entrepreneurs should pursue regarding finance and consumer issues, aiming to increase the number of sales and the growth of employees. Another research on the same theme is by Cajuela and Galina (2020), who investigated interorganizational relationships for the development of absorptive capacity in startups, reaching the conclusion that the capabilities developed in accelerators and in large companies influence the increase in the competence of these organizations when acquiring, assimilating, transforming, and exploring new knowledge.

Through these studies it is possible to establish a main point for the existence of startups: they have the need to learn as quickly as possible (ALFRÂNIO, 2015; RIES, 2019), which can be interpreted through a perspective of searching for the best probable truth. Startups, organizations that seek to launch themselves into the market quickly to get feedback and thus refine their vision, product, or service, get more learning as they develop into a more feasible solution (AHLUWALIAA; MAHTOB; GUERREROC, 2020).

2.2 Abductive logic

The first to propose the concept of abductive logic was Charles Sanders Peirce, who studied the three forms of reasoning: deduction, induction and abduction (1865). Abductive logic began to be called first abductive hypothetical, then retroductive and finally abductive again (FISCHER, 2001). For Martin (2010) this type of logic results in a logical mental leap through the balance between analytical thinking through data and intuition, as well as considering this a tenacious tool of design thinkers.

Leavy (2010) argues that abductive logic combined with a management that aims to achieve practicability and feasibility ends up driving innovation in organizations. Innovative strategic decision-making is also positively influenced by abduction, as was ascertained by Dong, Lovallo, and Mounarath (2015) when researching project selection.

When discussing innovative companies with limited resources, Bicen and Johnson (2014) present the functioning of abductive logic through the premises of Design Thinking (DT) established by Martin and Brown. In DT, innovation goes through a funnel of knowledge starting with the mystery that represents the imagination phase, followed by heuristics or ideation, ending in the algorithm that implements the idea (MARTIN, 2010; BROWN, 2008). The imagination presents several variables that may exist within that mystery; the heuristics aims, through ideation, to reduce the number of variables to make the mystery more manageable; and the algorithm, implements a basic formula for the use of that previously mysterious knowledge (BICEN; JOHNSON, 2014).

These steps are driven by reasoning by abduction that searches for "what could be," as opposed to the "ought" or "is" coming from the other forms of logic. Chiffi and Pietarinen (2018, p.7), demonstrate what Peirce's model of abduction looks like through the following argument:

1. The surprising fact, C, is observed;
2. But if A were true, C would be normal; and
3. Therefore, there is reason to suspect that A is true.

The first point that should be made about this model is the fact of the existence of something unexpected or a surprise within an observed fact. The second argument states that there is a correlation between hypothesis A and fact C, where if there were truth in A, C would not be a surprise, completing with logic that A can be true.

Abduction is considered a form of rationalization for creating the future (DORST, 2011). Cankurtaran and Beverland (2020) argued that abductive logic provides one of the means for organizations to change their strategy, through naïve questioning and natural interactivity, complementing with a tolerance for error and ambiguity, balancing analytical and intuitive notions. For Garbuio et al. (2015) an abductive hypothesis starts after a series of observations with the purpose of answering a problem, however it does not seek a true logical conclusion, but a possible truth. These authors present the following example of abduction:

- (Premise) A device exists that provides mobile communication capability while allowing end users to visually attend to their environment;
- (Rule) If there were a device that was a see-through glass with the capabilities of a smartphone, then the premise would be true; and
- (Conclusion) There is a device that is a transparent eyeglass with the capabilities of a Smartphone (GARBUIO et al. 2015, p. 453).

The premise establishes a generality, like the example, there are devices that fulfill a certain purpose. The rule dictates a possible reality, which is confirmed, would make the premise true. It concludes that there is a certain device with the characteristics of the rule that made the premise true. When the word "if there were" is introduced, new strategic options are generated, because it uses an idea (premise) and establishes a rule so that the new hypothesis can be tested (GARBUIO, 2015).

3 DISCUSSIONS

Startups need to test their hypotheses as soon as possible to receive feedback from their users to make more assertive adjustments regarding their product or service (AHLUWALIAA; MAHTOB; GUERREROC, 2020). However, not being able to make use of the tools originating

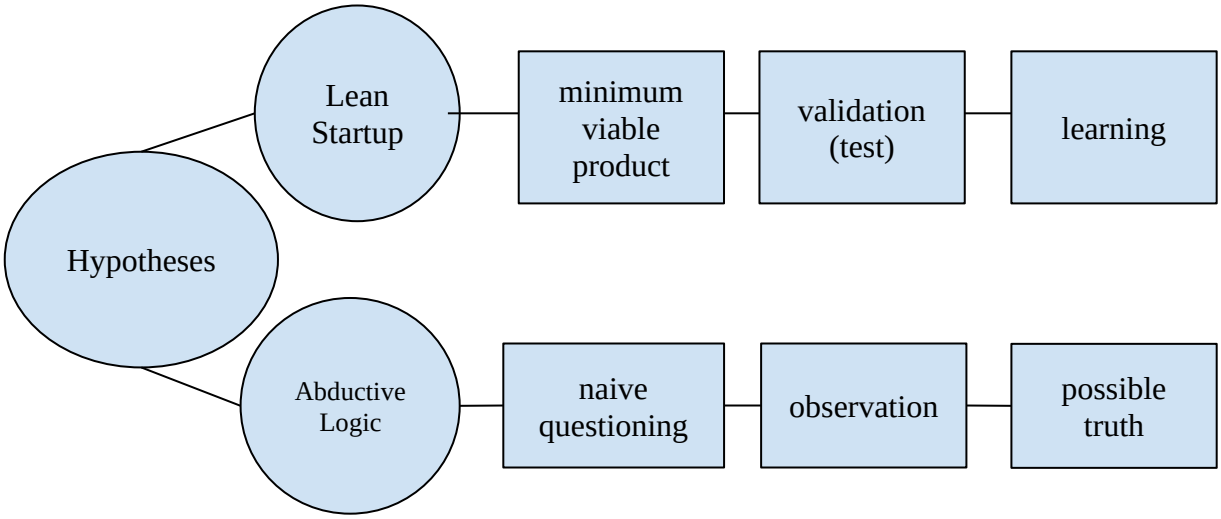
from the management of "traditional" organizations, a startup needs to seek more dynamic methods (BLANK, 2013).

The means they find to "escape" the "traditional" management environment and achieve the goal of getting feedback and learning from mistakes, startups make use of what they call minimum viable product (MVP) which is a prototype of the desired final product and test their hypotheses (AFRÂNIO, 2015). As Reis (2019) asserts, the goal of the lean startup process is to learn to mitigate the most painful mistakes, this validation is accomplished through building measuring, and learning. This occurs through an error acceptance and interactive process (BOCKEN; SNIHUR, 2020).

Similarly, abductive logic proposes the development of hypothesis reasoning, working on what may be possible (BICEN; JOHNSON, 2014). Unlike the other forms of logic, abduction does not seek an absolute answer to a problem, but rather an answer that may or may not be the truth, through a model, which like the lean startup, is participatory and accepts failure (MARTIN, 2010; CANKURTARAN; BEVERLAND, 2020). Both concepts are considered sources of innovation through their respective processes and studies (LEAVY (2010); NARDES; MIRANDA, 2014; BICEN; JOHNSON, 2014; DONG, LOVALLO, MOUNARATH, 2015; NEUBERT, 2018).

It is noted the assumption that startups as well as abductive logic start from a hypothesis, something that might be possible, be it a product, service, business model or problem (MARTIN, 2010; RIES, 2019). Figure 1 presents a figure that compares the lean startup and abductive logic models based on the research and authors listed in the theoretical foundation.

Figure 1 - Basic lean startup model and abductive logic



Source: prepared by the authors based on Peirce (1865), Martin (2010) and Ries (2019)

Startups and their founders identify a market hypothesis and thus decide to verify the hypothesis possibilities. To verify the possibilities within that hypothesis a startup is created that is conditioned to its own characteristics, these being: innovation, low capital and extreme uncertainty (AHLUWALIAA; MAHTOB; GUERREROC, 2020). In view of the natural vulnerability of startups, they need a cheap, fast and unfinished means to develop the minimum viable product (MVP) or prototype (AFRÂNIO, 2015; KUCKERTZ, et al., 2020). Through prototyping it is possible to validate the hypothesis, which will ultimately generate valuable learning, whether positive or negative for the business (PEREZ; WHITELOCK; FLORIN, 2013; GONZAGA ET AL., 2020; SULLIVAN; MARVEL; WOLFE, 2020; CAJUELA; GALINA, 2020).

Through the lens of abductive logic, reasoning begins with the hypothesis of the existence of another possibility, whether it is true or not (CHIFFI; PIETARINEN, 2018). To initiate the use of abduction, one can consider the use of frivolous questioning, abstract questions and reflections that aim to decrease the quantity of options within that hypothesis (PEIRCE, 1865; BICEN; JOHNSON, 2014). With the premises established by the initial questioning, one can follow the general rule through observation, which is the interaction part with hypothesis, in other words, observe how the phenomenon could behave with a new rule (GARBUIO et al. 2015). The result is the discovery of a possible truth, which is based on the originally established premise.

Through the comparative model (Figure 2) it becomes possible to perceive the similarity between the methods employed by startups and the abductive logic reasoning model. Thus, a construct is proposed for future research to verify the impact of abduction on the development of startups.

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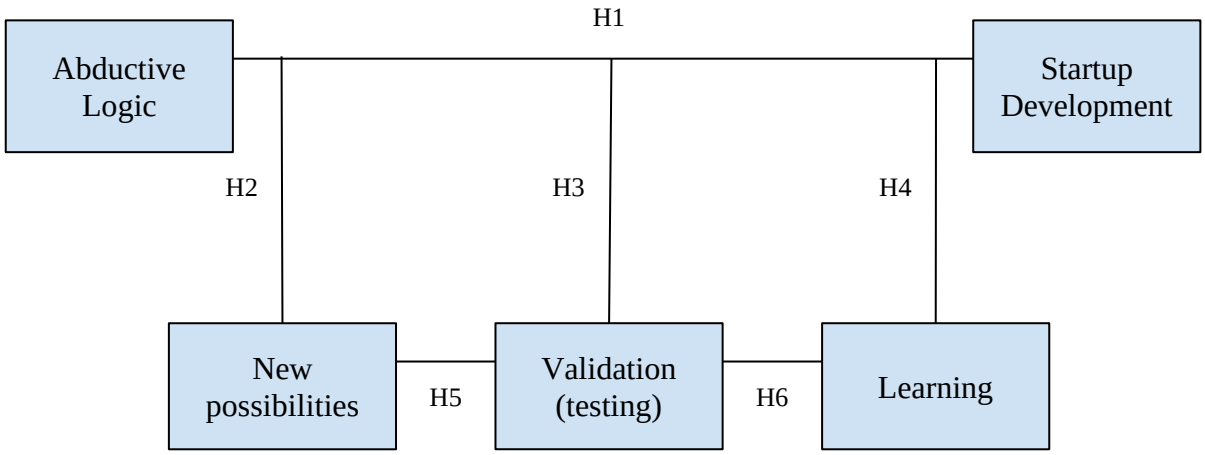
Figure 2 - proposed construct to verify the impact of abductive logic and startup development



Source: prepared by the authors based on Peirce (1865), Martin (2010) and Ries (2019)

The first hypothesis (H_1) verifies if there is a positive relationship between abductive logic and startup development; H_2 identifies if the observation of new possibilities within a hypothesis strengthen the influence of abductive logic under startups; H_3 deals with the positive relationship between the use of abduction for startup development when validating or testing new possibilities; H_4 tangents the positive influence of learning through the use of abduction for the development of a startup; H_5 investigates the positivity between the discovery of new possibilities and the amount of validations performed; and H_6 aims to verify the positivity between validation and testing with learning.

It is expected that through this construct there will be analogies between the management and development methods of startups and abductive logic. This could elucidate

the rationality behind the development of these innovative organizations, as well as understand which cognitive processes are used when facing the natural conditions of startups.

4 CONCLUSIONS AND CONTRIBUTIONS

According to the proposed objectives, it was found that startups arise through a market hypothesis that generates a need to test a possibility quickly and, for this, they use the minimum viable product (MVP), thus obtaining feedback and validation of its end users, obtaining the necessary learning to boost its development and mitigate unnecessary errors (RIES, 2019; GONZAGA et al., 2020; SULLIVAN; MARVEL; WOLFE, 2020; CAJUELA; GALINA, 2020). The abductive logic works in a similar way, given that it also arises after the verification of a hypothesis that is then filtered through the observation of the initial established premise to verify its behavior within a rule that then generates a conclusion, or a possible truth (PEIRCE, 1865; BICEN; JOHNSON, 2014; CHIFFI; PIETARINEN, 2018; GARBUIO et al. 2015).

With an analogy established between both concepts worked on in the theoretical foundation of this study, it was possible to synthesize their similarities. Figure 1 puts both side by side revealing the similarities verified through the referenced research that makes it safe to answer that: yes, startups management and abductive logic are analogous in their methods and reasoning progression.

Once the analogy was verified, it was also possible to propose a theoretical construct for future research. Through the verification of the hypotheses designated in figure 2 so that it is possible to deepen the understanding of the influence of abductive logic on the development of startups, as well as new possibilities, validation, and learning that can arise through abduction and how these relate positively to abductive logic on the development of startups and to each other.

The study is relevant to the theoretical and managerial field, firstly by proposing a theoretical construct for future research with defined hypotheses that can be complemented and improved, and by demonstrating that there is similarity between the practices of startups and abductive logic. The analogy between the two concepts studied also contributes to the management field, as there is a chance for managers to observe that there is a field of logic that can be used in their businesses and deepened in their organizations.

Finally, research is suggested through the theoretical construct designated in figure 2, aiming to deepen the understanding of abductive logic, much attributed to Design Thinking, but now directed towards the development of startups. Quantitative methods may be employed to verify the value of the hypotheses developed and their impacts on the development of startups. Qualitative studies are also encouraged through the same construct, to identify the more personal perceptions of managers regarding abductive logic.

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