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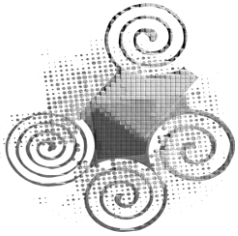

PROGRAM ASSESSMENT IN INNOVATION ECOSYSTEMS

AVALIAÇÃO DE PROGRAMAS EM ECOSSISTEMAS DE INOVAÇÃO

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Abstract

The objective of this study is to analyze how different typologies and evaluation approaches relate to assessment requirements of a program inserted in an innovation ecosystem. Methodology involved interviews with 21 stakeholders and a documentary survey. Although the nature of the program suggests greater alignment with developmental evaluation and a subjectivist approach, the results also imply assessment demands based on the objectivist approach. Conclusions highlight the relevance of stakeholders' demand for defining evaluation guidelines, and indicate that programs inserted in collaborative networks receive a diversity of demands that require multiple typologies and approaches.

Keywords: Program assessment. Evaluation approach. Evaluation typology. Innovation ecosystem. Business Verticals Program.

Resumo

O objetivo deste estudo é analisar como as diferentes tipologias e abordagens avaliativas se relacionam às demandas por avaliação de um programa inserido em um ecossistema de inovação. A metodologia envolveu entrevistas com 21 stakeholders e levantamento documental. Apesar da natureza do programa sugerir maior alinhamento à avaliação desenvolvimental e abordagem subjetivista, os resultados sugerem também demandas por avaliação apoiadas na abordagem objetivista. As conclusões destacam a importância da demanda dos stakeholders para a definição das diretrizes da avaliação e sugerem que programas inseridos em redes colaborativas tendem a uma diversidade de demandas que requer tipologias e abordagens múltiplas.

Palavras-chave: Avaliação de programas. Abordagem avaliativa. Tipologia avaliativa. Ecossistema de inovação. Programa Verticais de Negócios.

Introduction

As of the 19th century, modern organizations are those based on the principles of Weberian bureaucracy, and depend on the application of rational means to achieve specific results (Clegg, Kornberger & Pitsis, 2011). In this perspective, they need control mechanisms, where information is an essential unit of the organizational process (Ramos, 1983).

Assessment is part of the context of bureaucratic control. Its objective is to determine the value, merit, or significance of an appraised object, by answering significant evaluation questions. Rossi, Lipsey and Freeman (2004) characterize it as a political and managerial activity, source of information for decision-making and resource application. Its role varies according to the way and purpose of use of this information (Worthen, Sanders & Fitzpatrick, 2004; Patton, 2008; Scriven, 2018). When arguing that evaluation translates into a process of judging the value of a program, Scriven (2018) observes that it may have merit, that is, be intrinsically good, but with no value for a particular individual, organization or context. The notion of value brings up the idea that assessment should be useful (King & Alkin, 2016; Scriven, 2018).

Evaluation approaches stem from several theoretical currents, from objectivist to subjectivist perspectives, which guide their practical developments (Worthen et al., 2004). Therefore, the delimitation of an appropriate evaluation plan relates directly to the understanding of which evaluation approaches will the intervention be based on. Approaches that emphasize use originate from two currents: performance measurement and knowledge production with the purpose of use.

From the first current, concepts related to the evaluation of results have evolved, and the possibility of using evaluation information to improve the assessed processes was identified. From this current, Scriven's two classic typologies (1967) were born: formative (linked to form) and summative (related to results) assessments, both guided by a more objectivist and utilitarian perspective of evaluation, which assumes a high degree of predictability and control. They assume that results, objectives, strategies and processes can be determined in advance, that change is a linear process, and that stakeholders' expectations remain stable (Eyoang & Oakden, 2016).

The second current sees knowledge production as an assessment product, and distinguishes between knowledge for action (instrumental use), knowledge for understanding (conceptual use), and knowledge to justify actions and decisions (symbolic use) (King & Alkin, 2016). In a context where organizations increasingly deal with emerging objectives and results, adaptive processes and non-linear change theories, developmental assessment arose. It rests on a more constructivist perspective of evaluation, bringing with it the use of the assessment process, in addition to the use of results. It includes the process of evaluation questioning and gathering information, to provide feedbacks that will support a developmental decision-making process, correcting the course of actions along its journey. The concern is that in a dynamic environment the evaluation process may be unable to provide useful and timely information, so that assessment can achieve its objectives as a learning tool (Patton, 2006), thus allowing the intervention to constantly adapt, so that it keeps providing results (Patton, 2011).

Regarding the theoretical field on program assessment, King and Alkin (2018) consider that a unifying and comprehensive theory, or competing theories, have not developed yet, as is common in traditional fields of social sciences. They agree that evaluation scholars have progressed in creative and influential models and approaches for conducting program evaluations. However, a substantial volume of empirical studies that show evaluation approaches at work did not follow these advances. For these authors, the field lacks research for supporting the continuous development of theories, based on processes with empirical and theoretical rigor.

There is this gap in programs inserted in environments oriented to innovation, where the complexity, uncertainty and instability are present, which Patton (2011) pointed out as justification for the

developmental approach. The collaborative nature of the innovation process, explained by neo-Schumpeterian authors (Lundvall, 2007; Freeman, 1995; Nelson, 1993), and the growing emphasis on user's centrality (Von Hippel, 1988), require the implementation of the iterative process proposed by Kline and Rosenberg (2015). This was strengthened in recent approaches to decision-making and complex problems' solution (Lages et al., 2020), and seems to be the most appropriate evaluation approach for programs inserted in innovation ecosystems. However, when looking for articles that discuss the topic in this kind of environment, we see that it is a recent theoretical field that has grown in recent years, but is still incipient. Neither is there a body of empirical evidence that shows that developmental assessment is the most suitable for innovation-oriented programs, nor papers that widely discuss how different evaluation theories and approaches fit the characteristics of this type of program. In addition, Teixeira et al. (2019) highlight the need to advance the understanding of how actions in ecosystems and innovation habitats affect companies, entrepreneurs, and other stakeholders, with emphasis on the programs developed in these environments.

The present study addresses this context, and its object are the assessment demands of the 'Business Verticals' Program of Santa Catarina Technology Association (ACATE). The state of Santa Catarina is considered one of the most prominent technological hubs in the country (Endeavor, 2015), and ACATE is one of the main articulators of this technology and innovation ecosystem. The Business Verticals program aims to promote cooperation among entrepreneurs that wish to develop their businesses and the market where they operate, through innovative associativism (ACATE, 2016). Although it has been active since 2009, comprises 13 different sectors represented by their respective verticals, and involves 376 companies (ACATE, 2018), its stakeholders do not have evaluation information as a reference to support the development of future actions, among other uses that assessment results could provide to managers. The analysis of managerial documents of the program, as well as of previous studies, such as Bitarello's (2014), highlights the existence of a managerial gap related to the absence of monitoring and evaluation mechanisms. The delimitation of a potentially useful assessment model requires (1) understanding the intended use of evaluation information and, therefore, the evaluation demands of the program; and (2) understanding which evaluation approaches are best suited to this demand (Wholey, Hatry, & Newcomer, 2004; Brunner, Craig, & Watson, 2019).

Therefore, the purpose of this paper is "to analyze how the characteristics of different typologies and evaluation approaches relate to the assessment demands of ACATE Business Verticals program". For the definition of typologies and evaluation approaches, we assumed as reference the classifications of Patton (2011) and Worthen et al. (2004). In this perspective, based on Scriven's (1967) seminal work, the summative and formative evaluations form an objectivist approach, and the developmental evaluation, a subjectivist approach.

We expect that the systematization of findings may contribute to a field of knowledge that lacks empirical evidence, in the terms discussed above. From a managerial point of view, we expect it to serve as a reference for the design of assessment plans oriented by typologies and approaches suitable to the characteristics and demands of the program studied, to other ACATE programs, and to programs of other institutions inserted in innovation ecosystems.

We organized this article as follows: after this Introduction, it follows with a brief theoretical review on innovation as a collaborative process, and on evaluation concepts and approaches. Next, it presents the methodological procedures adopted; in the sequence, section 4 presents and analyzes results, beginning with an explanation of the Business Verticals Program in the context of Santa Catarina Innovation Ecosystem, followed by result discussion. It ends with the final remarks.

Theoretical Framework

Innovation as a collaborative process: concepts associated to the study object's context

In the knowledge economy, learning process is the driver of innovation (Lundvall, 2009). This understanding boosted the rise of innovation models with system attributes that transcended the limits associated with linear models (Stokes, 2005).

The consolidation of the concept of 'national innovation systems' is supported by this perspective. They comprise a set of institutional actors that, together, influence the innovative performance of companies, regions, and countries (Lundvall, 2007; Freeman, 1995; Nelson, 1993). Based on the notion that environments where there is an exchange of tacit knowledge can improve learning processes, Ashein and Gertler (2007) discuss the role of the geographical dimension of innovation systems, by explaining the relevance of physical proximity.

The term 'innovation ecosystems' is part of this context. In Wessner's (2007) perspective, they are made up of a set of individuals, communities, material resources, standards, policies and organizations, which, through universities, government, research institutes, laboratories, small and large companies and the financial markets of a given region, work together to allow for knowledge flows, driving technological development and innovation for the market. Similarly, Isenberg (2010) mentions the components of an innovation ecosystem: articulation of the government and leaders; availability of financial capital; qualified human resources; cooperation networks; and support institutions. Jackson (2011) complements that the innovation ecosystem, by acting as a source of knowledge creation, added value, and an economy's wealth, fosters economic development through these actors' interrelationship.

In this sense, an innovation ecosystem stimulates and supports business growth and promotes regional development, but this is only possible by fostering appropriate interactions within the network (Trzeciak, Teixeira, Matos & Varvakis, 2018). Interactions within the ecosystem and support to innovation are directly linked to actions carried out by the various innovation habitats that comprise it. Habitats have different types, and the most common are technology parks, innovation centers, incubators, accelerators, and networks of companies.

Menegazzo, Dalmazio, Ehlers, Catapan, and Teixeira (2016), when studying the performance of technology parks, a type of habitat quite common in the national scenario, observe that this and other habitats carry out actions towards entrepreneurship, through different mechanisms associated with services, physical infrastructure, convenience, and programs. In general, entrepreneurs find in these environments subsidy, qualification and training programs, internationalization of companies, besides programs aimed at the formation of collaboration networks and others focused on approximation and interaction with the community.

ACATE's 'Business Verticals' program reflects this context, being a support program for entrepreneurs, with the purpose of developing collaboration networks. Amal, Carvalho, Hoffmann and Mais (2010) address the role of networks, and show evidence of their importance in searching for innovation strategies. Haris and Wheeler (2005) discuss the relationships established in the networks and show the effect of personal networks on a company's strategy, overcoming the view that relationships have more restricted functions, such as to complement missing information on the market and access channels. Mineiro, Souza, Antunes and Castro (2019) still highlight, based on a case study in a network of technology-based companies, that companies see participation in networks as a means to achieve competitive advantages. The convergence of objectives among the actors, especially in networks with players from the same field of activity, participation time, and the strengthening and greater representation of the network, due to its interaction with other local agents, are perceived by participants as the network's main growth factors.

These are concepts that permeate the context of our study object, and can influence the needs of the Business Verticals Program regarding evaluation, theoretically supported by the following section.

Assessment: concepts and approaches

In the social field, evaluation research has spread in the 20th century (Rossi, Lipsey & Freeman, 2004). The traditional view considered it an activity of interest to social researchers (evaluators). Through its evolution, some evaluators began to question the separation between the act of collecting information, which was traditionally theirs, and the act of making judgments, whose competence was of those who requested the collection, or 'users' of the evaluation. By including the consumers' perspective, assessment results are useful for a much larger number of stakeholders. The process is currently a political and managerial activity (Rossi et al., 2004; Serapioni, 2016).

In general, the assessment process seeks to determine the merit, relevance, and value of objects, and evaluations are its products (Scriven, 2018). Regarding the assessment of social programs and policies, Serapioni (2016) mentions a consensus among scholars on the fundamentals of the evaluation process. Three elements bring together several definitions: 1) Assessment seeks to make value judgments on the practiced action; 2) It is a systematic process, with procedural rigor; 3) It is a tool that will support decision-making (Serapioni, 2016).

Assessment is a learning strategy valid for the different actors involved with its object, which aims to improve knowledge on the object and the way action is developed. Based on an objective and systematic process, it also enables better management and a basis for decision-making (Kellogg Foundation, 1998; Wholey et al., 2004). It is the most formal way to evaluate the work and send feedback. The evaluation process can involve analysis of relevance, performance, efficiency, or activities' impact, according to its purposes (Ubels, Acquaye-Baddoo, & Fowler, 2010).

The philosophical and ideological dimensions, methodological preferences, and authors' practical options have contributed to the dissemination of different evaluation approaches over the years. Worthen et al. (2004) highlight approaches based on objectivist and subjectivist epistemologies. The first suggests that assessment information should be "scientifically objective" and independent of the evaluator, and replicated by others, with similar results. As for subjectivism, emphasis is more on the evaluator's experience than on the scientific method. Thus, evaluation is valid if the training and qualification are relevant, as well as evaluators' clarity of perceptions.

Between objectivity and subjectivity, authors present several evaluation approaches. Considering the principle of value attribution, Worthen et al. (2004) identify the utilitarian and intuitionist-pluralist approaches to evaluation. The utilitarian seeks to determine value by estimating the global impact of the intervention on those affected, approaching the objectivist epistemology. The intuitionist-pluralist approach assumes that value depends on the impact on those individually affected, which is closer to subjectivism.

Serapioni (2016), based on Stame's typology (2001), mentions three main approaches that guide assessment models: positivist-experimental; quality pragmatist; and constructivist. The former is more objectivist, and the latter more subjectivist. The author also quotes the existence of mixed and pluralist models.

In another proposal, Alkin (2004) brings together the different currents, divided in three main pillars: valuation, methods, and use, which are the approaches suggested by several authors of the field. Thus, some put as a central issue the perspective of assigning value to the variables evaluated, while others emphasize the assessment methods; and there are currents that address the use of evaluation as a central factor in their models.

With regard to typologies, Worthen et al. (2004), according to the seminal work by Scriven (1967), divide the assessment elements in just two types: formative and summative. Formative evaluation provides evaluation information, especially to the program team, for making decisions regarding its form. Its focus is on gathering information to improve the intervention. The summative assessment, in turn, provides program decision-makers and consumers with evidence for judging the value or merit of the program, based on pre-established criteria.

For Preskill and Russ-Eft (2005), formative assessment aims to improve the intervention, focusing on its execution. Summative evaluation defines the merit or value of the object, in order to assess it. The authors also present a third typology, called Developmental Assessment.

According to Patton (2006), and Patton, McKegg and Wehipeihana (2015), developmental assessment focuses on adaptive development, that is, it aims to foster changes in a program once its context has changed, its clients have changed, learning has led to a significant change, or an alternative and creative way to deal with the problem that originated the intervention has arisen. This process assumes information gathering from evaluation questions, in order to provide feedback and support to a developmental decision process.

The idea behind developmental assessment is that there is no single fixed assessment model, it will be constantly adapting. There is no linearity in the program, unlike the previous typologies, where intervention planning stipulates the impacts to achieve. The purpose of this type is to provide information to support innovative and adaptive development in complex and dynamic environments. The developmental typology brings to this type of environment the possibility to carry out the assessment process in a way that is appropriate to its constantly changing context (Guijt, Kusters, Lont & Visser, 2012). In this evaluation, together with the program team, the evaluator designs and tests alternatives in a process of continuous improvement, adaptation and intentional long-term change (Preskill & Russ-Eft, 2005; Patton, 2006).

Both ratings clearly emphasize the perspective of evaluation use, pointing their primary purposes. In general, we can assume that the formative/summative proposal relates more to objectivist approaches, while developmental assessment is closely related to a more subjective and constructivist proposition. Considering the existence of increasingly dynamic environments, the developmental type evaluation can be seen as an evolution of the assessment process. According to Patton (2011), the objects submitted to evaluation are dynamic and changeable along the course of the process, which must be adapted to them in order to extract better results.

As stated above, as a procedural practice, assessment requires fulfilling a series of orderly activities. Regarding the practical design of evaluation models, there is, initially, a need to look at the object and its context, in order to understand what the starting point of the assessment is, and where it should attain. To that end, Wholey et al. (2004) propose a process called evaluability assessment, showing a way to help evaluators identify assessment models potentially useful to the context, analyze them, and design the solution for adoption. Brunner et al.'s contribution (2019) complements this perspective, by suggesting checking if the intervention is sufficiently mature and developed for the implementation of the evaluation process, and for using the evaluation results.

Hence, we adopted the concept of evaluability assessment, presented by Wholey et al. (2004), as the basis for the research design, described in the following section.

Methodology

The research had an exploratory and qualitative nature, and consisted of a case study. We collected primary data at two different times, which sought to: 1) identify the formal program guidelines, and how

stakeholders understand them; and 2) figure out the program's demand for assessment, based on their perception.

We carried out the first stage of the research through a documentary survey and semi-structured interviews. We examined ACATE's most recent publications: Technology and Innovation in Santa Catarina: ACATE 30 years (2016); ACATE Tech Report (2016); ACATE Observatory (2018); Annual Activity Report 2017 (2018), in addition to the Business Verticals Internal Regulation, updated in 2019. We conducted interviews with representatives of the following categories: (1) founders (view of program's pioneers); (2) ACATE directors (current institutional view); (3) Verticals' directors (view of program participants); (4) executive team (view of the program's management team). We interviewed one of the program founders; two members of the association's board of directors; the director of one Vertical and representative of the participating entrepreneurs; and two members of the program management team, who are employees hired by the association, totaling six interviews.

For the second collection, we defined a new sample, with the main program stakeholders identified in the previous round. The program currently has 13 verticals: Agribusiness, Construtech, Connectivity and Cloud, Education, Energy, Fintech, Games, Governance and Sustainability, IoT (Internet of Things), Manufacturing, Health, Security, and Retail. For this study, we chose four priority Verticals, covering groups with distinct levels of maturity, indicated by the program's team based on another program's assessment updated in December 2018. To evaluate these maturity levels the team analyses how the verticals are evolving in five areas: Group's Visibility, Relationship with the Market, Knowledge Exchange, Involvement with the Ecosystem, and Internal Governance and Sustainability. The decision for taking verticals with different levels of maturity aimed to build a reference on the groups at different times, and to verify the influence of group's maturity on the assessment proposal.

In increasing order of maturity, the selected Verticals were Construtech (technology for construction); Fintech (technology for the financial sector); Manufacturing; and Health. In addition to interviewing members from these four groups, we interviewed members of ACATE's board of directors and a representative of the program's management team, appointed as stakeholders in the initial data collection.

The second stage sample totaled 15 respondents, thus composed of: three representatives of each group (one director plus two participating entrepreneurs), who took part in the program and were selected by the criterion of high frequency at meetings, an indicator used for measuring a company's engagement in the program. In addition, two representatives of the association's board and one representative of the program's management team.

Data collection and analysis for this second stage took as reference a structured analysis model based on Worthen et al. (2004) and Patton (2011), regarding the Summative, Formative and Developmental typologies, and on Patton (2011), for the analysis dimensions. Thus, we asked interviewees on their perceptions of the objectives and intentions of using the evaluation; methodological guidelines, in particular, which questions to answer; and assumptions for evaluation development and use of the information collected. We carried out data analysis in the light of the aforementioned analysis model, which correlates the above typologies to the dimensions: purpose of the assessment (objectives and intended uses); methodological guidelines; and assumptions for implementing the evaluation.

Table 1 summarizes the research's methodological design.

Table 1

Methodological design

Stages	Purpose	Data collection	Interviewees	Analysis
Stage 1	Identify the formal program guidelines, and how stakeholders understand them	Documentary survey and Semi-structured interviews with 6 stakeholders	1 of program's founders 2 ACATE's board directors 2 Program's team members 1 Vertical's director	Content analysis based on the theorical framework
Stage 2	Figure out the program's demand for assessment, based on stakeholders perception	Semi-structured interviews with 15 stakeholders	12 program's participants (3 from each Vertical selected) 2 ACATE's board directors 1 Program's team member	Content analysis based on the analysis typologies: Summative, Formative and Developmental, and on analysis dimensions: (1) purpose of the assessment; (2) methodological guidelines; (3) assumptions for evaluation development and for the usage of the information collected

Result analysis and discussion

ACATE Business Verticals' Program and Santa Catarina Innovation Ecosystem contexts

This section summarizes the results of the first stage of the research, and explains the "Business Verticals" Program within ACATE and the innovation ecosystem where it operates.

In its history, ACATE has invested in strengthening the "innovative associativism", which seeks interaction and synergy among entrepreneurs, fostering an environment conducive to collaboration and generation of new businesses (ACATE, 2016). In the area of Strategic Programs, the association promotes entrepreneurship and innovation initiatives, aiming to strengthen the innovation ecosystem where it operates (ACATE, 2018). In 2009, it created the Business Verticals program, which gathers groups of companies that operate in different and complementary markets. Its main objective is to promote interaction among entrepreneurs through collaborations that result in businesses. In general, partners and directors of the technology companies associated to ACATE, who represent their firms, participate in each Vertical (according to their segment), and voluntarily contribute to the development of collective actions that will benefit all companies.

According to the program's Internal Regulations, Business Verticals aim to "develop and foster the growth of the associated companies, thus strengthening the various market segments based on technology". As purposes, Verticals expect to increase cooperation among companies and business creation; foster organizational learning; strengthen ACATE's and participating companies' branding (ACATE, 2019).

Information collected in the association documents presents the program as a promoter of interorganizational networks development, through cooperation and collaboration in groups of companies, for learning and business creation, as seen in Jackson (2011) and Trzeciak et al. (2018) for innovation ecosystems.

There was alignment among interviewees, regarding the strategic basis (guidelines) of the program and its stakeholders. As for the guidelines, for them the program aims to strengthen the participating companies, the entity itself, and the environment where it operates, based on sharing and cooperation among them. We noticed the importance of relationships to complement market information and access

channels, for example, and of personal networks established through the program (Harris & Wheeler, 2005). As a result, interviewees understand that the program seeks, among other things: business growth; strengthening of associativism; more visibility to those involved; and knowledge generation and expansion. The guidelines perceived by interviewees are thus similar to those formalized in the Internal Regulation of the Business Verticals program (2019), and refer to attributes for the promotion of the innovation ecosystem, as taught by Wessner (2007).

Demand for assessment in the Business Verticals program, in the light of different approaches and typologies

Analysis regarding the Assessment Purpose

According to Patton (2011), the evaluation purpose combines the objectives of producing information and its proposed use. Asked about the assessment objectives, all actors interviewed indicated the need to understand the results and returns that the program brings to its stakeholders, or even if the results meet the purpose of the program.

Respondents who are entrepreneurs that participate in the Verticals associate these objectives to the process of continuous improvement of the program. They mention the need to understand what can improve, and how to do it. These findings show a summative and formative proposal for evaluation, from entrepreneurs' perspective, according to Patton's (2011) proposition. The summative typology focuses on the judgment of merit or value of the evaluated object, based on its results, and formative evaluation provides inputs for checking the intervention effectiveness, seeking to understand the cause-effect relationship, and enabling the implementation of subsequent improvements.

According to entrepreneurs that take part in the program, assessment must rely on both typologies, which are complementary for achieving the expected results. It intends to understand the cause-effect relationship of the activities undertaken and their effects, enabling analysis of value or merit and proposals for improvement. There is a strong demand for a process based on an objective approach.

Yet, respondents that represent the program's management team and ACATE's board refer to objectives directly linked to summative and developmental assessments. Their speech suggests that developmental-type assessment could assist the program in gathering information to support development and continuous adaptations, in dynamic and constantly changing conditions and environments, as is the case with innovation ecosystems (Patton, 2011).

Correlating the intended objectives with the intentions of using the information, in the view of entrepreneurs participating in the Verticals, the demand for information on the results and returns of the program has the specific purposes of accountability (respond to expectations) and decision-making. These purposes align directly with summative assessment, with a very objective character. In the social context, summative assessment has a strong relationship with accountability, since it is necessary to provide feedback and accountability to those that supported and invested in the program (Rossi et al., 2004).

Thus, as it is a program where the main beneficiaries are also those who develop activities, by investing time and money for its success, there is a need for value judgments on the perspective 'investment versus return'. The analysis of this information allows the company to make individual decisions about whether or not to remain in the program. In the case of ACATE's board, the use of information focuses on checking the achievement of the program's objectives, bureaucratic control, and subsidies for decision-making.

The summative assessment regarding the focus of information use shows that, from the information produced, decision-makers and consumers can make judgments on the program's value or merit, for determining its continuity (Worthen et al., 2004). Therefore, regarding the objectives and uses of

evaluation in the Business Verticals program, there is a clear demand for summative evaluation, linked to the need for accountability and decision-making on the program's directions in the general context, and for participants' individual decisions. Thus, there are distinct focus of evaluation, due to the different roles of each actor in the program.

To understand how and what to improve in the program, pointed out by entrepreneurs participating in the Verticals, information from the evaluation is relevant and should be used to make improvements and provide higher value to participants. Formative assessment emphasizes the use of evaluation for improvement purposes, as it aims to provide information to guide the implementation of changes that will enable a better performance of the program (Rossi et al., 2004). Thus, the perspective of use falls into this type.

One of the interviewees, an entrepreneur that participates in a Vertical, reinforces the need to seek information that allows for improvements. He also addresses that improvements are the basis for the program's continuity, given their impact on results. This view confirms the understanding that formative assessment tends to support the preparation of the program for a summative assessment (Worthen et al., 2004; Patton, 2011).

However, only the representatives of the newest Verticals, classified by the program itself as less mature, highlighted the need for information to improve the way (mainly methods and processes) intervention takes place. Meanwhile, other participants put focus on the use of information to foster program's development, within the environment where it operates, without much emphasis on how to perform tasks. This suggests that the groups' maturity gain changes the proposed use of the evaluation and its perceived value. Hence, the focus of the assessment can still be distinct, due to the maturity of groups and entrepreneurs, regarding the context and experience with the program.

Resuming the assessment objectives, there were demands focused on understanding the alignment and expectations of participants with the program's objectives and activities, and its behavior towards the environment where it operates. The expected use of this information is for promoting changes in the program to make it evolve and add more value to the participants and the market. Also noteworthy is the possibility of using the information resulting from the evaluation process to identify and analyze new products and services for the organizations involved and for the market. These perceptions were brought by the Verticals considered more mature, as well as by ACATE's management team and board.

With regard to the alignment and evolution of the program, considering the next steps, there is support for developmental assessment, which seeks to foster changes by changing the context, allowing the correction and redirection of the program for its continuous development (Patton et al., 2015). It also considers the alignment between those that understand the moment and the search for alternatives that lead to the necessary improvements (Preskill & Russ-Eft, 2005; Patton, 2006).

Thus, with regard to the perspective of using the information produced by the evaluation, there are demands based on the three assessment typologies. These occurs due to the maturity of the groups and interviewees regarding the context of the program, and the different roles they play.

In the general context, the demands for understanding the results in order to make a judgment of value, meeting the objectives and continuity of the program, were evident. In addition, the understanding of how the program develops, in order to make improvements, characterizes typical demands of a very objective approach. Still, there is a concern about the program meeting the associates' expectations and evolving within its context by adapting when necessary. This suggests a more constructivist and subjective perspective.

Table 2 summarizes the demands brought by each group regarding the purpose of the evaluation according to each typology.

Table 2

Purpose of the evaluation x Typology

Group/ Approach	Formative	Summative	Developmental
Construtech Vertical	Understand if the work model is adequate and what could be improved to optimize tasks and redirect activities.	Verify if the program/vertical is delivering results and achieving its goal, allowing merit judgement and improvements.	
Fintech Vertical	Understand what could be improved and how, to promote continuous improvement.	Understand which results were generated to participants and be able to show these results to external public, proving the program's value and continuity necessity.	Understand the alignment between the vertical model and participants expectations, to adjust the vertical focus.
Manufacture Vertical	Understand what actions could be optimized to support improvements.	Understand what the program's results and overall impacts to companies are, to judge program's performance and to be able to improve.	Understand how and why results are being generated to align expectations and create an analytical base. This base will allow stakeholders to plan new actions to attend expectations.
Health Vertical	Understand the program' model e be able to improve it.	Understand which results are being generated to stakeholders, to provide accountability and to judge the activities', the vertical's, and the whole program's merit. These data will also help to make decisions and manage the program.	Understand the verticals' peculiarities and the program's dynamism, seeking to measure innovation and to support the discovery of new products/services for involved organizations and the market.
Program's team			Verify program's impact to the innovation ecosystem and understand how the companies and the verticals are evolving in order to develop and improve the program.
ACATE's board		Understand what the program's results are and verify if these results are helping the program to achieve its goals, to be able to control and manage activities.	Understand if the program's purpose meets the associates'/participants' body expectations (this body is constantly changing), and understand how the program is working to correct and improve actions according to associates' expectations.

In view of the above, the analysis by groups of respondents identified different purpose perspectives regarding the view of program's participants, the view on Verticals individually, and the view on all groups. Hence, evaluation demand in Business Verticals, according to the process purpose, consists of different levels: 1) Participants' level, with the entrepreneurs or partners who actively participate in any Vertical; 2) Verticals' level, which considers the set of activities and attributes of each group; and 3) Program's level, with the perspective of all participants and groups that, as a whole, make up one of

ACATE's strategic programs. The presence of different levels indicates that the stakeholders have different interests on the evaluation, which is, in most of the cases, due to their own roles in the program.

Table 3 summarizes the demands discussed above showing the correlation between the assessment purpose, through the set of objectives and uses (Patton, 2011), brought by the interviewed groups, at each level.

Table 3

Assessment levels x Purpose

Level	Assessment objectives	Uses of Assessment
Program (institutional)	Understand if the program is achieving results and which are they Understand if the program achieves its purpose, and if the purpose serves the associates Understand how the Vertical reacts to its context and affects the innovation ecosystem. Understand what can be improved	Control and direct the program, by correcting and improving its actions, aligned to associates and market demands Develop and make the program evolve.
Verticals (Groups)	*All Verticals:* Understand what results the Vertical creates for its participants, and if the results achieve the program's objectives Check what can be improved *Construtech and Fintech Verticals (Lower maturity):* Understand if the working model is appropriate. Understand the alignment between the Vertical's proposal and participants' expectations *Manufacture and Health Verticals (Higher maturity):* Understand how results are generated and why Understand the particularities of each Vertical, and the program dynamism Check what can be adapted	*Construtech and Fintech Verticals (Lower maturity):* Show the results and highlight the value of the program. To foster improvements and foster improvements and redirections *Manufacture and Health Verticals (Higher maturity):* Show the results and highlight the value of the program, aligning the participants' expectations. To direct Vertical's movements from its environment, fostering its adaptation and changes
Participants	Understand if the program brings results and what are they Understand if it is worth continuing in the program	Decide to keep participating or not in the Vertical

At the Participants' level, information produced is especially useful for entrepreneurs that take part in the program. At the Verticals' level, the information is useful to participants and the management team, who work in the program operation. At the Program's level, it especially meets the demands brought by ACATE's board.

Analysis regarding Methodological Guidelines

The design of an evaluation plan requires asking questions that need answers through the assessment (Kellogg Foundation, 1998). The questions bring focus to the evaluation process, and help to explain what will be addressed, how, and why (Worthen et al., 2004).

In general, interviewees point out the need for questioning the program's value creation for participants and others involved, its sustainability, and participants' profile, engagement, and satisfaction. These demands suggest a summative evaluation (Patton, 2011). They also request answers on the groups' working model, its functioning, and the quality of the actions developed, which refer to a formative assessment. There are also questions related to the purpose and meaning of the groups in face of the

participants' expectations, their motivation, and the alignment and behavior of the Vertical regarding the environment where it operates, based on the developmental perspective.

Worthen et al. (2004) add that, in the summative perspective, the assessment must answer: "What were the results?" and "Who participated?" The purpose is to raise evidence for decision-making. On the other hand, formative assessment focuses on understanding which information is needed and when, by answering questions such as: "What has worked?", "What needs to be improved, and how?" A developmental assessment raises questions on the understanding of the context and environmental conditions, the relationship between results and progress aligned with the program's expectations and objectives, system trends, understanding innovation, and the program's success criteria, among others (Patton, 2011).

In order to relate to the perspectives of use for decision-making and accountability, the interviewed entrepreneurs raised questions in order to understand the impact, results, value added by the program and benefits to companies, which confirms the key factors for the permanence of companies in cooperation networks (Mineiro et al., 2019). In addition, the program board understands that it is necessary to question the program's sustainability, achievement of objectives, strategic vision, and impacts in general. Among the intended uses is the promotion of improvements and the program development. Once again, there is a difference in the evaluation questions made by interviewees from Verticals with different levels of maturity. Relating to the formative and developmental perspectives, groups with low maturity (Construtech and Fintech) focused on questions on the justification of existence, understanding of participants' interest, and working methods, suggesting an attempt to validate their existence, relevance, and even their potential. Verticals with higher maturity (Manufacturing and Health) made questions on continuity, sustainability, quality of actions, and use of information for the purpose of adapting and developing the program in a dynamic and innovative environment.

An evaluation plan assumes the elaboration of questions that need answers, which, in turn, depend on the assessment purpose (Kellogg Foundation, 1998; NSF, 2002). Thus, the differences in the assessment questions pointed by the Verticals are important with regard to the evaluation focus and practical developments in each group. It should be examined the possibility and feasibility of having different evaluation processes for each Vertical, according to their maturity, and what would be potential alternatives. King and Alkin (2018) and Brunner et al. (2019) observe that analyzing evaluation's feasibility, regarding the process practice and the program maturity, is a key factor to ensure its usefulness.

The vision of the program's board and its management team concludes the analysis on the evaluation questions, by relating inquiries of a formative and developmental nature, in addition to those based on a summative evaluation. As for the formative look, there are questions on cause-effect relationships: "How can we improve?"; "Which promoted actions benefit the Verticals most?"; "How is the program management?" In the developmental perspective, we seek to know, among other questions: "How are market segments behaving?"; "How has the Vertical reacted to the economy?" and "How much is the program aligned with the market?" The focus of the evaluation questions, based on the various typologies, follows the conclusions regarding the assessment purpose.

Table 4 summarizes evaluation questions brought by Verticals with lower maturity levels, Verticals with higher maturity levels, and Program's team and ACATE's board directors, from their perspectives on the purpose of the evaluation (objectives and use) and typologies.

Table 4

Evaluation Questions x Typology

Groups/ Approaches	Objectives	Use	Questions
Less Mature Verticals – Purpose demands especially aligned to formative and summative typologies	Understand what results the for participants, and if the results achieve the program's objectives Check what can be improved Understand if it is worth continuing in the program Understand if the working model is appropriate. Understand the alignment between the Vertical's proposal and participants' expectations	Show the results and highlight the value of the program. To foster improvements and foster improvements and redirections	"How can we improve?" "Is the work model adequate?" "Why the vertical exists? What should be the group main goal?" "Are the participants satisfied?" "What are the main results?" "Are the participants benefiting from the program?"
Higher maturity Verticals – Purpose demands especially aligned to summative and developmental typologies	Understand what results the for participants, and if the results achieve the program's objectives Understand if it is worth continuing in the program Check what can be improved Understand how results are generated and why Understand the particularities of each Vertical, and the program dynamism Check what can be adapted	Show the results and highlight the value of the program, aligning the participants' expectations. To direct Vertical's movements from its environment, fostering its adaptation and changes	"What are the main results?" "Are the participants benefiting from the program?" "Which promoted actions benefit the verticals most?" "Is the program achieving its goals?" "Is the relationship "effort versus return" worthy to participants?" "How can we improve?"; "How are market segments behaving?" "What could be adapted?" "Which innovations are being generated?" "How much is the program aligned with the market?"
Program's team and ACATE's board – Purpose demands especially aligned to developmental typology	Understand if the program is achieving results and which are they Understand if the program achieves its purpose, and if the purpose serves the associates Understand how the Vertical reacts to its context and affects the innovation ecosystem. Understand what can be improved	Control and direct the program, by correcting and improving its actions, aligned to associates and market demands Develop and make the program evolve.	"What results the program brings?" "How is our relationship with associates?" "How can we improve?" "Which promoted actions benefit the Verticals most?" "How is the program management?" "How are market segments behaving?" "How has the Vertical reacted to the economy?" "How much is the program aligned with the market?" "How much is ACATE contributing to associates' and the Market development?" "Is the program sustainable?" "What is the program's maturity?"

Analysis regarding the assumptions for implementation

Regarding the assumptions for the implementation and use of assessment information, respondents showed very similar perceptions. Essentially, through an objective approach, there is a demand for available resources for evaluation, qualification of the evaluators, and clarity of the analysis method. In addition, all of them argued that program participants should engage in the evaluation process, since they are the providers of the main information to be collected and analyzed, which points to a more

constructivist approach. Thus, even though some groups did not show great alignment to developmental typology regarding the purpose of the evaluation and questions to be answered, considering the implementation process it is clear that they expect this process to be hold under a constructivist approach, which is directly aligned to the developmental typology as posited by Patton (2011).

Regarding the key conditions and factors for the collection and use of information, Patton (2011) states that summative assessment assumes a well-defined and clear assessment model, procedural rigor, reliable data, commitment to decision-making, etc. Hence, the demand approaches this typology.

The developmental assessment, in turn, states that evaluators must be able to adapt the evaluation plan according to the context and its dynamism, without the need for such a well-defined model. Among the key conditions for use, there is the ability of evaluators and participants to act in partnership, in an agile manner, considering multiple data and information, and with tolerance and openness to what emerges, seeking development (Patton, 2011). Thus, the analysis on assumptions for the implementation and use of assessment also converges to the developmental evaluation, reflecting the operation environment of the program.

According to Patton's (2011) comparative model on Summative, Formative and Developmental typologies, purpose demands on one typology should be followed by questions to be answered aligned to this same typology and hence followed by assumptions for implementation on that typology. However, the demands brought by stakeholders regarding the implementation process slightly diverged from this linear pattern, what suggests this process might depend not only on the purpose and methodology demands but also on different criteria, such as the operation environment of the program.

Final Remarks

This article aimed to analyze how the characteristics of different assessment typologies and approaches relate to the evaluation demands of ACATE's Business Verticals Program. We expected to find out which approaches and typologies best meet the program needs, given that the design of an appropriate evaluation plan directly depends on the understanding of assessment approaches that will support the intervention (Rossi et al., 2004). For the definition of typologies and evaluation approaches, it was assumed as reference the classifications of Patton (2011) and Worthen et al. (2004). Based on Scriven's (1967) seminal work, the summative and formative evaluations form an objectivist approach, and the developmental evaluation, described by Patton (2011), a subjectivist approach.

The study was conducted through 2 stages. The first one was developed through a documentary survey and semi-structured interviews with 6 selected stakeholders, and focused on identifying the formal program guidelines and how stakeholders understand them. The second stage sought to figure out the program's demand for assessment, based on stakeholders' perceptions, and was conducted through semi-structured interviews with 12 selected participants from four different Verticals, 2 members of ACATE's board directors and 1 representative of the program's team, totaling 15 interviewees. These four prioritized Verticals cover groups with distinct levels of maturity, according to an assessment conducted by the program team, updated in December 2018. The decision for taking verticals with different levels of maturity aimed to build a reference on the groups at different times, and to verify the influence of group's maturity on the assessment proposal.

The first stage of the research revealed that the Business Verticals Program has as focus the strengthening of companies associated to ACATE. As it articulates and seeks interrelationship among different actors in the innovation ecosystem, the program is seen by its stakeholders as a promoter of this strengthening (Isenberg, 2010; Wessner, 2007; Jackson, 2011; Trzeciak et al., 2018). This suggests that developmental evaluation of the program would be more suitable, according to Patton (2011).

However, the demands for evaluation revealed in the second stage vary according to the role played by the research subjects and the maturity of groups and actors in relation to the program context, thus incorporating both objectivist and constructivist characteristics and covering aspects of the three types of evaluation.

In view of the assessment objectives, entrepreneurs participating in the program suggest that the evaluation must be especially objective, based on complementary summative and formative processes. Yet, the speech of the program management team and ACATE's board suggests that, in addition to the summative perspective, developmental assessment could assist the program, supporting its development and continuous adaptations within the innovation ecosystem where it operates. Regarding the relevance and use of the information produced by the assessment, the demands correlate with the objectives, and rest on the three typologies. Thus, with regard to the analysis dimension "purpose", the evaluation objectives are distinct due to the different roles of each actor in the program, and to the groups' maturity gain. We divided the demand in three different levels: Participant; Group; Program. These, in turn, differ in terms of the proposed use of the evaluation and its perceived value, based on different types of assessment. Results related to the analysis dimensions "methodological guidelines", which focused on the evaluation questions, and "assumptions for implementation and use of the evaluation", converge to those achieved for the dimension "purpose".

In summary, research results suggest complementarity between the objectivist and subjectivist approaches, by pointing out demands that refer to the three types of evaluation. Although the nature of the Business Verticals program suggests greater alignment with the developmental assessment and subjectivist approach, favorable in dynamic contexts such as innovation environments, the diversity that characterizes its stakeholders creates different demands for evaluation. The identified demands also interact with the attributes of summative and formative evaluation, of objectivist approach.

Hence, the paper confirms the importance of demand analysis for the design of evaluation models useful and feasible in the context, according to Wholey et al. (2004) and Brunner et al. (2019). In this specific case, results suggest that programs inserted in collaborative networks, such as innovation ecosystems, tend to a diversity of demands that require multiple typologies and approaches.

This conclusion rests on the perspective that support programs for entrepreneurship and innovation are integral part of ecosystems, and have their characteristics, among them the presence of a multiplicity of actors that represent different institutional and political spheres. Programs carried out in this type of context correspond to interventions with shared objectives, although operated by different organizations. Thus, when considering all program stakeholders as interested in the evaluation, we tend to identify many actors, who bring with them the need to create and use information for substantially different purposes.

In addition, the assessment of a program inserted in an innovation ecosystem tends to be more complex and based on multiple approaches and typologies, the more diverse is the set of stakeholders participating in the network involved with the program, and the more complex is the ecosystem's web itself. In order to guide the practice of designing assessment plans in these contexts and limit their range, a potential path then emerges, through a previous analysis of the intervention's stakeholders and their representative spheres within the ecosystem, which further confirms Wholey et al.'s (2004) proposal regarding the creation of programs' evaluation models useful to the context.

This article sought to contribute to the formation of a body of empirical evidence that will allow advances in the understanding of how different theories in the field of assessment are suited to projects in different contexts. In this particular case, we organized evidence related not only to a context focused on innovation, but also characterized as a collaborative network. Thus, from a managerial point of view, research findings can constitute an initial reference for designing evaluation plans appropriate to the attributes and demands of other programs inserted in innovation ecosystems.

The study contributes to the advancement of discussions on program evaluation in innovation ecosystems and habitats, and on how to develop them for producing information on what was done in these environments, their impact, and value added.

However, we limited the research to the analysis of relationships between assessment approaches and typologies, and to the demand of a program inserted in an innovation ecosystem. In order to foster advance in the field, we need complementary studies that address the other stages in the building of evaluation models for innovation environments, focused on the feasibility of implementing models based on multiple assessment approaches.

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