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The use of digital data analytics in the performance of advertising campaigns: the effect of absorptive capacity

Silvia Spagnol Simi dos Santos[1]
Carlos Eduardo Carvalho[2]

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Abstract

Purpose – This study focuses on how the interplay between an advertising firm's absorptive capacity (ACAP) and the use of big data/social media analytics contributes to the performance of advertising campaigns.

Theoretical framework – This study extends the theory of the resource and knowledge based views, and that of dynamic capabilities, exploring absorptive capacity in a new context – the advertising industry and the performance of campaigns in Brazil. The influence of the use of external knowledge of big data analytics and social media analytics on the performance of cross-media advertising campaigns in the search for competitive advantage is analyzed.

Design/methodology/approach – This study uses structural equation modeling in a sample of 335 advertising agencies (335 questionnaires in all regions of Brazil).

Findings – We find that social media analysis led to better performance of advertising campaigns, unlike big data analytics, which was not significant

Practical & social implications of research – Questions are raised by highlighting the integrative nature of absorptive capacity and how its components (acquisition, assimilation, transformation, and exploitation) relate to the performance of advertising campaigns.

Originality/value – The application of a model to advertising firms is presented, which differs from other industries in its operationalization, pointing out critical theoretical and practical implications.

Keywords: Big data analytics, social media analytics, advertising campaign performance, absorptive capacity.

1. *University of West Santa Catarina, Area of Social Sciences, Joaçaba, SC, Brazil*
2. *PhD in Administration and Tourism, University of West Santa Catarina, Chapecó, Brazil.*

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1 Introduction

In the digital transformation, we are experiencing technological solutions through the transformation of digital advertising, a significant change in marketing initiatives (Mokoena et al., 2021). Social media sites have brought dynamism to communication and marketing processes regarding the dissemination of campaigns and the measurement of their results. Each medium has a specific way of measuring results. Technologies in digital media enable real-time measurements and measuring results based on performance will ensure that digital channels attract a fair share of media spending (Fulgoni & Lipsman, 2014). The competitive and turbulent advertising landscape intensifies the curious relationships between analytics information and the performance of advertising campaigns (PAC).

Capturing knowledge from clients and consumers is essential for generating insights in advertising agencies. However, the absorptive capacity (ACAP) lens will be the consolidated basis of this investigation, both in the context of using digital data analysis and external knowledge to acquire it, and in the context of the impact of assimilating, transforming, and using data from the digital environment during the process of ideation of communicative strategies to gain competitive advantage, in this case superior performance in advertising campaigns.

The most used form of data analysis in advertising agencies is social media analytics, but there is a trend toward using big data analytics (Schultz et al., 2018; Zimand-Sheiner & Earon, 2019). Therefore, it was decided to include both constructs in the model. Thus, this study aims to investigate the relationships between the use of big data analytics (BDA), social media analytics (SMA), advertising campaign performance (PAC), and PAC in the context of advertising agencies. The main theoretical framework is the resource-based view (RBV) of ACAP. It provides a relevant perspective to explain the dimensions of knowledge use (Zahra & George 2002; Lane et al., 2006; Todorova & Durisin, 2007) in advertising agencies.

After Cohen and Levinthal (1990) and, later, Zahra and George (2002), several investigations tested variables and models of absorptive capacity (Lane et al., 2006; Todorova & Durisin, 2007; Armstrong & Lengnick-Hall, 2013; Flatten et al., 2011; Forés & Camisón, 2015) in order to arrive at an adequate model, but such studies are inconclusive. It should be added that there are no specific studies with models or variables of the advertising environment based on big data analytics data. Therefore, in line with the models of Flatten et al. (2011) and Armstrong and Lengnick-Hall (2013), based on Zahra and George (2002), we propose to use the absorptive capacity model in the Brazilian advertising environment.

ACAP has been evidenced in several studies in the area of administration, however, a distinct field of empirical investigation is envisioned, but which is affected by the turbulence of technology, since it is understood that advertising agencies have undergone a variety of restructuring of people and processes over the last decade, and this change is not expected to cease at any point, as this profession is constantly changing with new media, formats and metrics of new applications and social networks that are emerging exponentially.

Analyzing the contribution of ACAP in the performance of advertising campaigns in emerging countries such as Brazil requires an adequate theoretical definition and understanding of the specific elements of ACAP in advertising agencies, in the current context in which BDA data are valuable sources of knowledge in market studies. Lam et al. (2016, p. 13) define big data absorptive capacity as "[...] routines by which a company acquires, assimilates, transforms and applies big data knowledge to create a dynamic marketing capability [...]." The authors state that ACAP "[...] is driven by the ability to combine and integrate big data and data knowledge at the small enterprise and frontline employee levels" (Lam et al., 2016, p. 13). Thus, agencies are seen as a rich field for investigations, as their product is insight, in other words, using BDA data to create valuable insights for their clients seems to be the central objective of Brazilian advertising agencies today.

Few empirical studies have addressed ACAP in advertising agencies, with the existing one investigating the function of account planning as a mechanism of absorptive capacity in advertising agencies (Parker et al., 2018).

ACAP's relationship with advertising has been scarcely studied, but it is possible to find studies that relate social capital, organizational learning, and knowledge transfer in cultural and creative industries (Liu, 2018); the role of complementarities in technology adoption, adapting the framework of new technologies, generating investments in R&D, human capital and advertising (Gómez & Vargas, 2012); the role of learning in value co-creation in the context of new B2B technological services in retailers that tested a new advertising service (Komulainen, 2014); the absorptive capacity of teams (Hakanen, 2014); the economic value to companies of

investing in training their employees, and company-level factors that influence how much companies benefit, including advertising (Riley et al., 2017); the role of investments in intangible capital and their complementary potential as a way to improve the productivity of companies, focusing on the three intangible resources that, according to the literature, have the greatest strategic importance: research and development (R&D), advertising, and human capital (Añón Higón et al., 2017).

In the relationship between ACAP and big data, more scientific progress is perceived, but only recently. There are studies that examine the relationship between the RBV and big data (Mazzieri & Soares, 2016); the effect of social networking sites and ACAP on the innovative performance of SMEs (Scuotto et al., 2017); the capacity of information systems and ACAP (Felipe et al., 2016); big data and knowledge transfer systems (Rothberg & Erickson, 2017); the cost of big data to manage frontline employees (Lam et al., 2016); and the use of social media, transactional memory systems (TMSs), ACAP and team knowledge creation capability (KCC) (Cao & Ali, 2018).

Wieneke and Lehrer (2016) state that some studies have applied the ACAP concept in the context of social media, such as that of Ooms et al. (2015), who examined how the use of social media in innovation processes affects socialization and coordination capabilities for ACAP; and that of Hu and Schlagwein (2013), who aimed to identify which types of external and internal social media use increase companies' ACAP and generate business benefits. Therefore, the authors investigated the micro basis of companies' ACAP deployment to generate customer insights from social media data (Wieneke & Lehrer, 2016).

The organizational environment of advertising agencies has several configurations that vary according to the needs and profile of their clients. However, the ability of an advertising agency to gain competitive advantage through the application of its knowledge in advertising campaigns may depend on its absorptive capacity, which is the ability to acquire, assimilate and apply knowledge for commercial purposes (Cohen & Levinthal, 1990; Lane et al., 2006; Zahra & George, 2002).

The search for this BDA knowledge will have to take place in the external environment, and for this it is essential to develop the ability to absorb knowledge from this environment. The ACAP of an advertising agency, like any other company that uses information, depends on absorbing the knowledge of its individual members and its team. The absorptive capacity therefore depends not only on the communication between the organization and its external environment, but also between the sectors of the agency and, in our case, the advertisers and other professionals who work in it (Cohen & Levinthal, 1990), whether in the areas of customer service, planning, media, BI, account management, among others. Thus, absorptive capacity can be considered as a fundamental disposition in the work of agency teams that act as providers of creative services, which are mainly based on the acquisition, assimilation, transformation and application of knowledge from internal and external sources (Zahra & George, 2002).

The study makes four contributions. First, we advance the research on advertising agencies' data analysis tools for the digital environment. Second, we validate three scales (BDA, SMA, and PAC) that are valuable and contribute to the theory and field of advertising practice. The third contribution concerns the operationalization of the ACAP model, which differs from the other investigated fields. Finally, we connect theories about data analysis of the digital environment, the performance of advertising campaigns, and ACAP, demonstrating their relationships.

2 Literature review

2.1 Absorptive capacity

ACAP is the theoretical lens chosen to support this investigation. It is one of the branches of the resource-based view (RBV) and a dynamic capability (DC) (Zahra & George, 2002; Jansen et al., 2005; Lane et al., 2006), which is considered critical to the survival and success of the organization in the long run, as it can strengthen, complement, and reinforce its existing knowledge base (Lawer, 2013). Given that organizational knowledge is an important asset in a company's resource base, there are clear links between ACAP, the RBV, and the DC framework, as by understanding ACAP it is possible to understand how companies create, modify, or expand their resource base through DC (Lawer, 2013).

The RBV is a well-known strategic management perspective that recommends that the actions that sustain a company's competitive arrangement require it to have very specific sets of resources, competencies, and capabilities (Penrose, 1959; Wernefelt, 1984; Barney, 1991; Peteraf, 1993). This set of routines and organizational processes by which companies acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational

capability refers to the creation and use of knowledge, which increases a company's ability to gain and sustain an advantage (Zahra & George, 2002).

Clearly, a company's ability to manage competitor threats and reconfigure itself depends on its investment activity, which in turn depends on its ability to sense an opportunity. It is imperative that entrepreneurs possess the ability to interpret, integrate, and apply external knowledge in order to systematically analyze changes in the target market and incorporate this knowledge into their processes to enhance performance (Rua & França, 2017). Thus, dynamic capabilities naturally require the creation, integration, and commercialization of a continuous flow of innovations in line with customer needs and technological opportunities (Teece et al., 1997).

DCs are considered as routines and resources (Eisenhardt & Santos, 2002). A resource refers to an asset or production input (tangible or intangible) that an organization owns, controls, or has semi-permanent access to (Helfat & Peteraf, 2003). An organizational capability refers to the ability of an organization to perform a series of tasks using organizational resources with the purpose of achieving a specific end result (Helfat & Peteraf, 2003). Both resources and capabilities can change over time (Helfat & Peteraf, 2003) and can be "operational" in the sense of a recurring activity or "dynamic" (Helfat & Peteraf, 2003). DCs build, integrate, or reconfigure organizational capabilities (Helfat & Peteraf, 2003) and include two types of routines, those used to perform individual tasks and those that coordinate individual tasks (Helfat & Peteraf, 2003). Capabilities have a life cycle in which the development of an organizational capability resides within a team (Helfat & Peteraf, 2003).

Eisenhardt and Santos (2002) suggest four types of dynamics: i) those that integrate resources; ii) those that reconfigure resources; iii) those that earn resources; and iv) those that free up resources. The earning of resources is important in this study, as they are knowledge creation routines and focus on gaining new knowledge to build new thinking and capabilities within the company. This concept is particularly important for the present study, since the process of generating insights from BDA data can be considered a knowledge creation routine, with absorptive capacity being the approach that explains how companies acquire, assimilate, transform, and apply knowledge (Zahra & George, 2002).

The contribution of ACAP to the PAC in emerging countries such as Brazil requires an adequate theoretical definition and understanding of specific elements of ACAP. Especially in advertising agencies in the current context, BDA and SMA data are valuable sources of knowledge in market studies. Lam et al. (2016, p. 02) define big data absorptive capacity "as routines by which a firm acquires, assimilates, transforms, and applies big data knowledge to create a dynamic marketing capability." ACAP is "driven by the capability of combining and integrating big data and small data knowledge at both the firm and frontline employee levels." Thus, agencies are a rich field of study, as their product is insight. In other words, using BDA to create valuable insights for their clients seems to be the central objective of Brazilian advertising agencies today.

The organizational environment of advertising agencies has several configurations that vary according to the needs and profiles of their clients. However, the ability of an advertising agency to gain a competitive advantage by applying its knowledge in advertising campaigns may depend on its ACAP. This is the ability to acquire, assimilate and apply knowledge for commercial purposes (Cohen & Levinthal, 1990; Lane et al., 2006; Zahra & George, 2002).

In addition to the conceptual model of Zahra and George (2002), Todorova and Durisin (2007) are cited, who propose substantial changes in the concepts and relationships of the model of Zahra and George (2002). The first one is the increase of the component "recognizing the value," the first original component of the conceptualization of Cohen and Levinthal (1990), with "acquisition." They understand transformation as an alternative process for assimilation, as companies transform their knowledge structures when it cannot be assimilated. In the model, there is the insertion of triggers and the activation of social integration mechanisms.

Todorova and Durisin (2007) divide absorptive capacity into "potential absorptive capacity" and "realized absorptive capacity," elaborate the theorization of the contingency factors, and propose a new contingency factor, power relations, as both appreciation and exploration of new knowledge. To capture the dynamic aspects of the phenomenon, they added new feedback links (Todorova & Durisin, 2007).

Finally, for Todorova and Durisin (2007), the ACAP model must capture the dynamics of absorptive capacity through the addition of feedback loops. Therefore, based on theoretical and methodological considerations, the authors include in the model positive feedback loops between the new externally absorbed knowledge and the antecedent of absorptive capacity - previous organizational knowledge.

Following Todorova and Durisin (2007), many empirical articles have investigated ACAP. In particular, Forés and Camisón (2015) created and validated two scales to measure the main components of the absorptive capacity construct: potential and realized absorptive capacity (PACAP and RACAP), and Flatten et al. (2011) focused on validating a measure of absorptive capacity that highlighted the multidimensionality of the construct.

The measure proposed by Flatten et al. (2011) assesses the extent to which a company engages in knowledge acquisition activities, assimilates acquired information into existing knowledge, transforms newly adapted knowledge, and commercially exploits transformed knowledge. The findings show that transformation is an integral dimension of ACAP, contrary to the position of Todorova and Durisin (2007).

2.2 Use of big data and social media analysis

Big data analytics or big data analysis (BDA) is the process of examining big data using advanced technology features such as data management, text mining, open source programming, statistical analysis, sentiment analysis, time series analysis, and others.

Social media analytics or social media analysis (SMA) collects big data specific to the feelings and content generated by social media users in their various points of contact, and is based on the development and evaluation of IT structures and tools to collect, monitor, summarize, analyze and visualize social media data, facilitating the understanding of reactions and conversations between people in online communities, extracting patterns and valuable information from these interactions and their sharing in SMS (Elgendy & Elragal, 2014).

As the design of this investigation focuses on advertising, it is understood that social media analysis is one of the relevant resources for advertisers as it examines what social media users are saying to discover patterns, useful information about users and feelings through text mining or sentiment analysis (Elgendy & Elragal, 2014). Therefore, for the operational purposes of this study, the term big data analytics is used. BDA includes the measures of big data analytics itself, data mining and social media analytics (SMA), and BDA refers to the integral parts of the construct.

The term big data has been consolidated in the digital universe since the 2000s, and in a short time it has become popular and has received emphasis in the fields of advertising and marketing (Chen & Zhou, 2017). It has risen in terms of academic research, given the combination of social media and advances, along with the shift of advertising budgets from traditional channels to online media channels, making this line of research important (Jobs et al., 2016).

There are extensive studies on big data and advertising. These articles cover analytics (Jobs et al., 2016), data mining (Liu et al., 2017), the advantages of using big data in digital advertising (Fulgoni & Lipsman, 2014), measuring online advertising (Edelman, 2014), big data of user-generated content on social media (Liu et al., 2017), user behavior data (Jun & Peng, 2013; Guo, 2018), social media analysis (Elgendy & Elragal, 2014), and social media marketing (Paquette, 2013; Alves et al., 2016).

Regarding the involvement of big data with ACAP, in a bibliometric study, Mazzieri and Soares (2016) found, after extensive analyses, that the RBV is strongly present in big data studies. These authors (2016) found several articles by RBV researchers linking big data with innovation (Grant, 1996; Barney, 1991) and theories of dynamic capabilities (Teece et al., 1997), considering that these capabilities can not only be a competitive advantage in themselves, but also increase the value of existing resources in the company, making them more rare, inimitable and daring (Mazzieri & Soares, 2016). Thus, the information from the BDA is formalized as a resource, but the ability to use this information can be seen in the context of capabilities.

For the purposes of this study, BDA is operationalized in agencies through specific tools and platforms, based on the study by Grover and Kar (2017). It is important to point out that these tools can often overlap with the KPIs mentioned in the performance of advertising campaigns, which provide campaign performance data. Therefore, the metrics are measures that serve as a basis for the constitution of an indicator, normally associated with user behavior and without a defined goal, such as visits to the site, the bounce rate, among others, since they do not present concrete data on marketing actions, but rather show the performance of the site and not of the business. The KPI, in turn, is an indicator created from metrics that aims to show the achievement of a certain result. It is more focused on measuring results. In addition to assessing organizational performance, indicators can be useful for analyzing user trends.

2.3 Performance of advertising campaigns

Social media advertising has become the focus of studies, as advertisers are using social media for advertising and marketing purposes (Gavilanes et al., 2018). At the same time, there have been extensive studies of the campaign performance of online advertising. These have addressed the creation and validation of performance measures (Clarke & Jansen, 2017), strategies to increase the size of a social network (Ballings et al., 2016), ad acceptance ratios in skippable videos (Belanche et al., 2017), the construction of automatic methods for the advertising ontology (Chen et al., 2019), and the use of temporal series models to infer the interaction dynamics between ads and search displays and performance (Kireyev et al., 2016).

In addition, they have studied the effectiveness of advertisements in digital channels, using neural networks and metrics based on neuroscience (Guixeres, et al., 2017), the return on investment in advertising (Heiens et al., 2016), advertising effectiveness on social media (Humphrey et al., 2017), advertising effectiveness on the financial performance of companies (Acar & Temiz, 2017; Muñoz-Leiva et al., 2018), planning, media selection, and performance online (Javan et al., 2018; Lee et al., 2017), and humanization advertising (Reavey et al., 2018).

Evidently, online advertising is making significant contributions to brands, and consequently, companies increasingly need online media to stay competitive. However, the effectiveness of communication will always depend on the campaign and specific advertising objectives (Belanche et al., 2017).

The digital environment offers more accurate ways to test or measure the performance of the strategies addressed in an advertising campaign, since the use of metrics and analysis of customer data allows professionals in the field to verify the effectiveness of their strategies and tactics and improve them as the campaign progresses. At the same time, selecting the most appropriate media for a given campaign is a complex and challenging process, as it must take into account issues such as investing in more economical means with higher returns. Thus, this becomes a challenge due to the variety of alternatives, the different goals of the organization, and budget constraints (Javan et al., 2018).

More and more companies depend on online media to acquire and retain consumers (Kireyev et al., 2016). In addition, advertisers, managers and marketing specialists rely on online metrics to avoid wasting efforts and money on inventory. Thus, specialists have the function of converting raw data into business insights so that managers can make decisions.

According to Ghose and Todri-Adamopoulos (2016), regarding the effectiveness of advertising, its performance was initially evaluated using simple proxies such as click-through rate (CTR). Currently, this is done through online KPI reporting. These are well-known metrics, such as return on investment (ROI), customer acquisition cost (CAC), search engine advertising (SEA), conversion rate (CR), pay Per click (PPC), among others, which are useful for comparing past performance over time and helping with optimization tactics (Rosenkrans & Myers, 2018).

Evidently, it is important for professionals to know how to work with campaigns in order to achieve performance or success, including financial performance (Acar & Temiz, 2017), a profile with more likes (Ballings et al., 2016), engagement (Paek et al., 2013), reputation (Smith & Gallicano, 2015), among others.

Farris et al. (2012) state that the internet increasingly offers valuable opportunities to enhance traditional advertising with interactive media, but some specific web metrics are necessary because they serve not only as a means of communication, but also as a direct sales channel that can provide real-time feedback on the effectiveness of advertising in generating customer interest and sales.

3 Hypothesized model

3.1 The use of big data and social media analytics and the performance of advertising campaigns

Tools and companies specializing in data processing and manipulation have emerged in the market to offer service packages that enable more powerful information mining, including big data analysis (BDA) and social media analysis (SMA).

BDA uses advanced technologies, including data management, text mining, open-source programming, statistical analysis, sentiment analysis, and time series analysis. Characterized as a scientific product and marketing discipline, BDA gathers, analyzes, and extracts the informational value of the customer's online interactions for the company (Jobs et al., 2016).

Although studies approach the online environment and advertising performance, a clear relationship between the use of BDA and the perception of PAC has been lacking in the literature. Jobs et al. (2016) and Acar and Temiz (2017) found clear empirical evidence that BDA influences economic/financial performance. Therefore, it is expected to influence the performance of advertising campaigns. Thus, the first hypotheses are proposed:

> H1a: The use of BDA information positively affects the perceived PAC at the cost level. The better the use of information from the online universe, the better the PAC in terms of investment versus result.

> H1b: The use of BDA information positively affects the perceived PAC at the exposure level. The better the use information from the online universe, the better the PAC in terms of investment versus result.

SMA is based on developing and evaluating structures and tools to collect, monitor, summarize, analyze, and visualize social media data. It facilitates the understanding of reactions and conversations among people in online communities. Extracting patterns and valuable information from these interactions and their shares in SMS is one of the relevant resources for advertisers. It investigates what social media users say to discover valuable patterns, information about users, and feelings through text mining or sentiment analysis (Elgendy & Elragal 2014).

These marketers must determine how much they will interact directly with all big data participants. As the industry matures and agreed upon key performance indicators start to crystallize, the influence of Google Analytics will be significant (Jobs et al., 2016). In this sense, hypotheses 1c and 1d of this study are proposed:

> H1c: The use of SMA information has a positive effect on the perceived PAC in terms of costs. The better the use of information from the online universe, the better the PAC in terms of investment versus result.

> H1d: The use of SMA information has a positive effect on the perceived PAC in terms of exposure. The better the use of information from the online universe, the better the PAC in terms of investment versus result.

3.2 The use of big data analytics and social media analytics and potential absorptive capacity

The capabilities of information systems improve the ACAP of technology companies, and a greater ACAP can improve organizational agility (Felipe et al., 2016). There is a clear connection between knowledge management and big data. This relationship and the lessons learned are valuable as they provide opportunities to improve performance through intangible assets (Rothberg & Erickson, 2017).

Chen and Zhou's (2017) investigation explored the perceptions and interpretations of senior professionals working in digital marketing advertising agencies or Chinese e-commerce marketing departments. They found that the future will be focused on technology, humanity, new specializations, and new professionalization. The barriers and challenges are talent, technology, structure, ideology, and politics. Evidence suggests that the application of big data in the Chinese market is complicated, dynamic, and constantly changing and evolving. In this sense, hypothesis 2a is proposed:

> H2a: The use of BDA information has a positive effect on PACAP. The greater the use of BDA, the better the PACAP.

Research has already addressed the ACAP of companies transforming SMS data into insights and using this information to create added value for customers. Wieneke and Lehrer (2016) found positive results regarding the use of SMS data to generate customer information. When it comes to data acquisition, companies must predefine the criteria to collect only relevant social media data. The amount of data generated in the digital environment increases the complexity of the analysis if there are no filters.

This sorting of information is helpful because one can define and assess the data in terms of relevance, validity, and quality, so that only valuable data is assimilated. Such data are specific resources that support acquisition and assimilation capabilities, with technological applications facilitating the process. Nevertheless, the assimilation capacity depends on employees with advanced analytical skills (Wieneke & Lehrer, 2016).

Cao and Ali's (2018) research findings reveal that using social media at work is positively correlated with the firm's transactional memory systems (TMS). In addition, using social media at work and TMS are positively related to ACAP and the team's knowledge creation capacity (KCC).

The results indicate that ACAP positively influences KCC, and both have a direct relationship with the performance of the creative team. Therefore, organizations must ensure that external knowledge is used to create new knowledge and improve the performance of the creative team.

In general, it can be concluded that the external source of knowledge is an essential method for advertising agencies. It is impossible for agencies immersed in a highly dynamic environment to develop campaigns solely with internal knowledge. Therefore, we propose hypothesis 2b:

> H2b: The use of SMA information has a positive effect on PACAP. The greater the use of SMA, the better the PACAP.

3.3 Realized absorptive capacity and the performance of advertising campaigns

The dynamic nature of the advertising environment, as well as that of any technology-related firm, requires special attention to knowledge as the dominant source of competitive advantage (Jansen et al., 2005). Previous studies have explored the dimensions of performance through the lens of ACAP, focusing on financial performance (Fuchs et al., 2016), innovative performance (Kostopoulos et al., 2011; Xie et al., 2018), new product performance (Najafi-Tavani et al., 2016), and organizational performance (Ali et al., 2016).

Regarding advertising performance, few studies are related to ACAP. Liu (2018) examined social capital, organizational learning, and knowledge transfer in the cultural and creative industries. The results indicate that organizational learning is the critical mechanism linking the relationship between social capital and knowledge transfer. The moderating view of ACAP provides evidence that qualities, such as capabilities, can lead to effective knowledge transfer and a higher level of organizational learning intention for cultural and creative purposes.

The findings confirmed the hypothesis that using social networking sites positively influences the ACAP of small and medium companies. There is a positive relationship between social media websites and ACAP, which positively affects the performance of innovative companies. It is a fact that ACAP affects performance. It remains to be established whether this occurs in the advertising environment. Therefore, based on these premises, hypothesis 3 is proposed:

> H3a: Realized ACAP positively impacts PAC at the exposure level. The higher the RACAP, the better the performance of advertising campaigns.

> H3b: Realized ACAP positively impacts PAC in terms of costs. The higher the RACAP, the better the performance of advertising campaigns.

3.4 Potential absorptive capacity and realized absorptive capacity

Several researchers have investigated the operationalization of ACAP to establish dimensions or models. What is observed is that even though the dimensions and the model do not enjoy a scientific consensus, most authors have found that PACAP influences RACAP.

Zahra and George (2002) consider PACAP as a construct that includes the acquisition and assimilation dimensions of external knowledge; RACAP includes the transformation and use dimensions. However, they did not test them empirically. Todorova and Durisin (2007) propose substantial changes in the concepts and relationships of Zahra and George's (2002) model. In other words, they claim that such a construction is ambiguous since assimilation and transformation are alternative, not subsequent, components. If transformation becomes part of PACAP, RACAP renews the component of use. Two reinforced changes are tested in this research: i) they understand transformation as an alternative process to assimilation, and ii) they divide ACAP into PACAP and RACAP (2007).

Flatten et al. (2011) provide a measure of ACAP. Their results and scale validation show that transformation is an integral dimension of ACAP, contrary to Todorova and Durisin (2007). The other three dimensions of ACAP do not capture transformation, reinforcing the distinction of transformation as a separate dimension. Empirical studies test the relationships and ACAP components with a focus on social media data (Wieneke & Lehrer, 2016) or in the context of other companies. However, the lack of consensus regarding the relationship between the dimensions of ACAP is evident.

Based on the model of Lane et al. (2006), Parker et al. (2018) examined the function of planning for advertising accounts as an ACAP mechanism. The findings showed that advertising agencies seek insights by researching, drawing on existing domain knowledge, challenging conventions, using borrowed sources, and extending the brand's core narrative (Parker et al., 2018).

Finally, the model of Zahra and George (2002), and empirical studies on ACAP (for example, Yeoh, 2009; Kostopoulos et al., 2011; Fuchs et al., 2016; Xie et al., 2018), suggest that PACAP has a positive influence on RACAP. Therefore, hypothesis 4 is proposed:

> H4: PACAP has a positive effect on RACAP in advertising agencies.

The hypotheses are represented in the preliminary structural model (Figure 1):

4 Methodology

4.1 Sample and data collection

This study was conducted in Brazil. Data were collected from 335 advertising professionals working in agencies in all five Brazilian regions (South, Southeast, Midwest, North and Northeast) in micro (16.8%), small (32.7%), medium (6.9%), or large (32.7%) agencies, and of these, 29.3% work abroad (Supplementary Material – Supplementary Data 1 – Database). The most significant respondents are advertising agencies that provide online and offline services (81.2%), followed by traditional agencies (12.5%) that do not provide digital services and outsource to online and other agencies, and digital agencies (6.3%) that only work with online media.

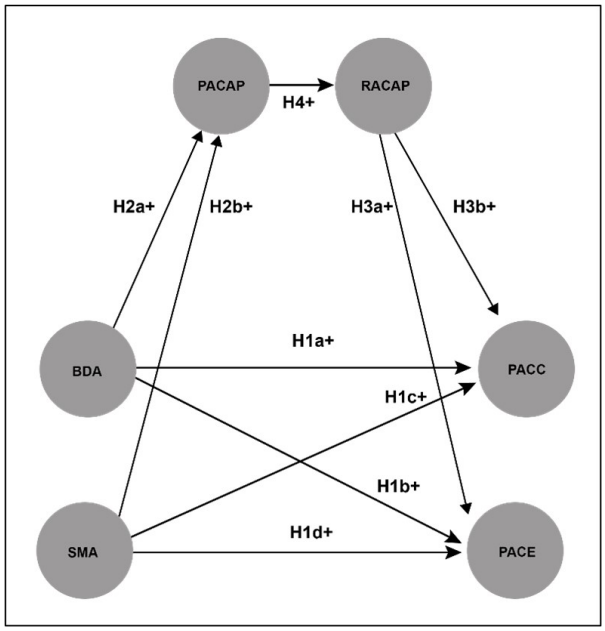

Figure 1. The conceptual model

The universe studied was that of publicists working in Brazilian advertising agencies, through the construction of a database of companies with this profile, using information already existing in associations and unions in the field, such as CENP, SINAPRO, or *Revista Meio e Mensagem*. Of the 13,311 agencies listed, contact was made and a final database of 1,874 was obtained. It was found that several of the agencies listed did not have contact information or even an email address or active social media. An exhaustive internet search was carried out through Google, Instagram and Facebook one by one.

In the end, convenience sampling, judgment, and snowball sampling, also known as the snowball technique (Malhorta, 2019), were used, especially because the questionnaire included a space for indicating professionals that the respondent could suggest to answer the questionnaire.

It is noteworthy that the contact was carried out by email with the national CENP and SINAPRO, as well as with the SINAPRO of each Brazilian state. A response was obtained from only two states, denying the request to share the research with their partners, claiming that there was a lot of research and that they could not forward it to the associated agencies.

The SINAPROs of the other states did not respond. Telephone contact was also used, but there were no people answering the phones, possibly because the collection took place during the 2020 quarantine (COVID-19).

In addition, another form of contact with professionals was via the social network LinkedIn, where professionals were contacted directly by sending invitations one by one. The same procedure was followed for all the agencies found on the social network, by clicking on the link "View all employees on LinkedIn." Only those indicated in the sample of this study were chosen, that is, account managers, media professionals, BIs, or those with some connection to social media.

The tool used for data collection was surveymonkey.com. The data collection took place between December 2019 and May 2020. The collection was carried out through an online form, without the presence or interference of the researcher at the time of collection.

The sample that makes up this research is characterized as non-probabilistic. Structural equation modeling (SEM) requires a larger sample than other multivariate techniques, so we followed Hair et al. (2009). The number of observations per variable should be maximized, with a minimum of five and at least ten observations per variable (Hair et al., 2009).

With the 335 final cases obtained in the sample of this investigation, we have nine observations per variable.

4.2 Measurement of variables

The data collection instrument was designed based on the literature and the analysis model. Research on integrated performance measurement of an advertising campaign is scarce in the literature (Jobs et al., 2016). To measure the performance of on and off advertising (cross-media), a scale from Farris et al. (2012) was used. The measure of BDA usage was based on Grover and Kar (2017). They reviewed the literature on BDA in high-impact business management journals. In addition to discussing the evolution of BDA, they postulated the types and uses of tools for BDA in order to categorize them. SMA measurement includes website analytics, reporting tools, and digital marketing integration tools based on DesignRush (2019).

The definition of Zahra and George (2002) was adopted for the ACAP construct, idealized based on the first concept of Cohen and Levinthal (1990), implemented in a scale validated by Flatten et al. (2011), in which ACAP is a CD formed of four dimensions: (i) acquisition, (ii) assimilation, (iii) transformation, and (iv) exploitation of knowledge. These dimensions generate the competitive advantage (Zahra & George, 2002), in our case, the better performance of advertising campaigns. Once the instrument had been improved, the next step was to carry out a pre-test with the aim of identifying possible problems, verifying how the instrument behaves in a real data collection situation, re-evaluating the questionnaire and obtaining an opinion on its comprehensibility and ease of response. The test was carried out with 30 advertisers from different regions of Brazil, based on an email interview. The questionnaire was considered satisfactory at this stage (Supplementary Material – Supplementary Data 2 – Questionnaire and Scales) and was applied to the proposed universe. In a Supplementary Data 3 (Supplementary Material) – variables and codes, it´s possible see the codes and correspondence of the questionnaire and database.

4.3 Control variables

Ten variables are controlled in this research. At the organizational level, and in line with empirical studies related to ACAP, company size is an excellent variable to exploit. Another essential variable to verify the impact on the dependent variables is the type of agency in which the respondents work, and the respondent could choose: a) full service agency that provides traditional and digital services; b) digital agency that focuses mainly on the digital environment, or c) traditional agency that does not provide or outsource digital services.

Another group evaluated is the location and performance of the agencies. We used the state and region in which they operate, as well as the number of states in which they operate. It was tested whether the agency operates abroad and whether it is certified by CENP (Conselho Executivo de Normas Padrão, 2018), the executive council for standard norms for Brazilian advertising activities. The last variables correspond to the respondent's experience, that is, prior knowledge, which is measured by academic background and length of experience in advertising.

ANOVA was performed to identify whether any control variable impacted the dependent variables, most of which were normal, with results above 0.05 (Hair et al., 2009). Regarding the data at the individual level, it was found that the sample was heterogeneous for the length of experience, ranging from one year to up to 58 years of experience in the advertising field. Therefore, it was decided to drop this variable.

There was significance below 0.050 (0.004) in the variable PAC1 (the points and gross audience - equivalent to a percentage point of the audience or the sum of the audiences of the programs selected in a media plan). The data for this variable were carefully analyzed in terms of N and average. Most of the respondents (N: 272) work in full-service agencies, which means that they develop campaigns for on and offline media, and the average is 5.21. Hence, this variable can affect the model but does not replace it.

5 Data analysis

5.1 The measurement model

The measurement model (confirmatory factor analysis - CFA) was conducted using SEM and LISREL. It started with the measurement model, where the validity or adequacy of the measurement model was examined. The fit indexes of the CMIN/DF, RMSEA, TLI, and CFI models were outside the recommended standards. It was decided to examine the correlations (covariance). To reduce the discrepancy, covariances were added to the items that presented the highest MI (modification index).

The accused items were: e22, e23, e24, and e25 related to ACAPT4, ACAPT3, ACAPT2, and ACAPT1, respectively, that is, all the ACAP transformation dimensions, and e26, e27, and e28 related to ACAPAp application, namely ACAPAp1, ACAPAp2, and ACAPAp3, respectively. After analyzing the theory, it was concluded that the correlated variables make sense because they belong to the same dimension.

After including the covariances, the fit indexes of the CMIN/DF, RMSEA, TLI, and CFI models are within the recommended standards, namely: (i) the value of the CMIN/DF indicator was 2.510, less than 3; (ii) the RMSEA value was 0.0617, greater than 0; (iii) the value of the TLI indicator was 0.900, and models with a good fit must have values close to 1, more significant than 0.900; (iv) and, finally, the CFI value was 0.911, therefore, more significant than 0.90. Thus, the model was considered acceptable given the fits presented. For the validity of the construct, two calculations were performed: (i) variance extracted (VE), where 0.5 or more indicate adequate convergence. On average, more error remains in the items than the variance explained by the latent factor structure imposed on the measure; and (ii) construct reliability (CR).

Discriminant validity seeks to determine whether the constructs are distinct (Hair et al., 2009) and whether the square root of the data for each construct is greater than the other correlations. The path diagram is shown in Figure 2:

The model has nine paths, of which three were not statistically significant. Note the coefficients of determination (R2), where an R2=1 indicates that the proposed model perfectly predicted the dependent variable. The values of the R2 coefficients of the model variables presented in Figure 2 are shown in Table 1 below.

According to the R2 values shown in Table 1, BDA and SMA explain 15% of advertising campaign performance in terms of exposure, 9% of advertising campaign performance in terms of cost, 12% of PACAP, and 47% of RACAP.

Table 1
Value of constructs

Constructs	Value
Advertising Campaign Performance - Exposure	0.15
Advertising Campaign Performance - Cost	0.09
Potential Absorptive Capacity	0.12
Realized Absorptive Capacity	0.47

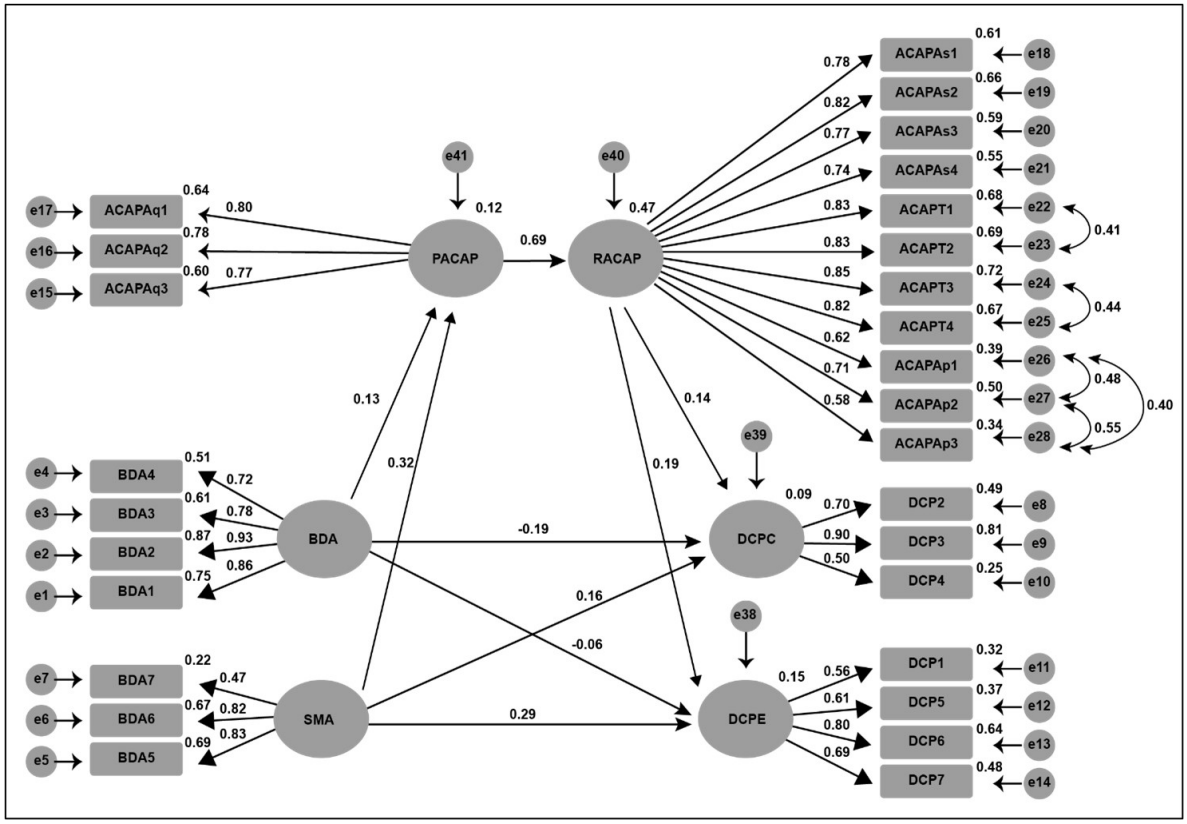

Figure 2. Standard path diagram

According to the literature and social sciences (Cohen, 1988), the value of R2=2% is classified as a small effect. R2=26% is a significant effect. Therefore, this means that the effects found in the model showed promising results.

Thus, it can be seen in Table 2 that the R2 value in the dependent variables (PACC and PACE) were 0.09 and 0.15, respectively, which means that the model explained 24% of the variation of these variables. Kline (2015) states that non-standardized regression coefficients (B) are preferred when comparing results for the same predictors. Table 2 presents the path diagram with standardized and non-standardized data to make the comparison visible. At the same time, the empirical support of the model tests is revealed.

Table 2 shows the standardized estimates of the model paths (β) and their p values (which indicate their statistical significance). P-values with ***) indicate that the path was significant at a level below 0.001. The same can be seen for the paths PACE <--SMA, PACAP<--SMA, and PACAP<--RACAP in Table 1.

The significant paths at this level were PACC <--SMA, PACAP <-- BDA, and PACC <-- RACAP. The p-values expressed in numbers greater than 0.005 indicate that the relationship is not statistically significant (NS). This is the case for the paths PACE <- BDA and PACC <- BDA.

6 Discussion

The hypothesized findings show that the use of BDA data by Brazilian advertisers does not affect the PAC in terms of costs or investments. The more advertisers use BDA, the less profit the client makes from the campaigns. Therefore, hypothesis H1a+ is rejected. There is also no empirical support that the use of the same data affects the PAC in terms of exposure, so hypothesis H1b+ is rejected.

The previous findings show that big data is used in advertising agencies (Schultz et al., 2018; Zimand-Sheiner and Earon, 2019). Despite that, in Brazil, its use is still in its infancy.

For Schultz et al. (2018), consumer media use is the next stage of media planning. This fact shows that the traditional ways of achieving good performance in advertising, through reach and frequency, for example, change when agencies have BDA. The findings of this work imply that data from BDA do not influence the PAC level because agencies have naturally optimized media design with more accurate and longitudinal data.

As for the use of SMA, there is support for both types of performance: cost and exposure. Therefore, hypotheses H1c+ and H1d+ are supported. The literature has not proposed such relationships. Therefore, the findings seem to be a contribution. After all, the literature had not shown them.

In order to analyze acquired external knowledge, ACAP was the theoretical lens that supported this investigation, and advertising activity, while dependent on knowledge, brought unique contributions to the construct. Previous studies state that there is a lack of clarity regarding the operationalization of ACAP, its dimensions, and models (Flatten et al., 2011; Forés & Camisón, 2015). This study contributes to the literature by providing empirical evidence for ACAP. It challenges the assumptions about how the construct is configured in the advertising environment, in terms of the dimensionality of ACAP.

Table 2
Model coefficients and significance

			Estimates		p value	Meaningfulness	Support
			*SV	**NSV			
H1a+ PACC	<---	BDA	-0.19	-0.114	0.007	n.s.	No
H1b+ PACE	<---	BDA	0.06	-0.022	0.377	n.s.	No
H1c+ PAC	<---	SMA	0.16	0.139	0.034	< 0.050	Yes
H1d+ PACE	<---	SMA	0.29	0.150	***	< 0.001	Yes
H2a+ PACAP	<---	BDA	0.13	0.080	0.047	< 0.050	Yes
H2b+ PACAP	<---	SMA	0.32	0.292	***	< 0.001	Yes
H3a+ PACE	<---	RACAP	0.19	0.091	0.009	< 0.010	Yes
H3b+ PACC	<---	RACAP	0.14	0.114	0.036	< 0.050	Yes
H4+ RACAP	<---	PACAP	0.69	0.805	***	< 0.001	Yes

*SV: Standardized value; **NSV: Non-standardized value; ***Significant at the level < 0.001. n.s.: not significant.

The results place external knowledge acquisition in the dimension of PACAP, providing more clarity on how advertising agencies use knowledge and absorb it into their work teams after acquisition.

Flatten et al. (2011) show that transformation is an integral component of ACAP, contrary to Todorova and Durisin (2007). The other three dimensions of ACAP do not capture the action of transformation, reinforcing the distinction of transformation as a separate dimension. The findings provide clear evidence that the acquisition dimension is separate in the context of the Brazilian advertising industry. This differs from Zahra and George (2002) and Flatten et al. (2011) and favors the interpretation previously discussed in the theorization of this paper, based on Todorova and Durisin (2007), regarding two aspects. First, in creative environments, acquisition is related to value recognition. In their model, Cohen and Levinthal (1990) proposed the recognition of the value of new external resources as a step before acquisition, that is, recognition as the first component of ACAP.

At this point, the characteristics of cognitive structures of individuals and organizations are discussed. There is evidence that without prior knowledge, organizations cannot evaluate new information and therefore do not absorb it (Todorova & Durisin, 2007). The same is true in the advertising industry, as many medium and large agencies have included in their work teams people and departments specialized in BI, which collects information from the digital environment. They already know what is valuable or not for agency work teams.

The second aspect concerns the assimilation component. Todorova and Durisin (2007) propose assimilation as an alternative component to transformation. The existing cognitive structures distinguish assimilation from transformation. This leads us to believe that ACAP is personalized according to the organizational environment, which can change or be reformulated according to the learning path (path dependence).

Even though the model assumes that assimilation is part of PACAP, empirically it makes more sense for RACAP to consider creative environments. These findings led to a model of ACAP in the Brazilian advertising industry, shown in Figure 3.

According to the model resulting from this study, assimilation is part of RACAP. This finding is consistent with the visualization of advertisers' work routines in the digital environment. Assimilation only occurs after several analyses and handling of the acquired data. This assertion is supported by the fact that the BI department is becoming more and more indispensable in large agencies. Even if the acquired data are already processed, it is usually only after the reports, comparisons, and analyses that the work teams can assimilate the information. At the same time, the transformation and exploitation of this information into creative or strategic insights is the main service offered to clients. After all, the purpose of an agency is to sell ideas.

There is empirical support for H2a+, since using BDA positively affects the potential ACAP. There is support for hypothesis H2b+. SMA data affect PACAP, suggesting that data acquisition from the external digital environment is identified and obtained by Brazilian advertising agencies. These agencies are potential sources of knowledge for clients and consumers. The theoretical background confirms that it is necessary to filter the acquired information in order to evaluate valid data. However, such filters occur in the assimilation. On the other hand, PACAP (Wieneke & Lehrer, 2016) differs in the findings of this study, as assimilation is already part of RACAP, as detailed in the previous paragraphs.

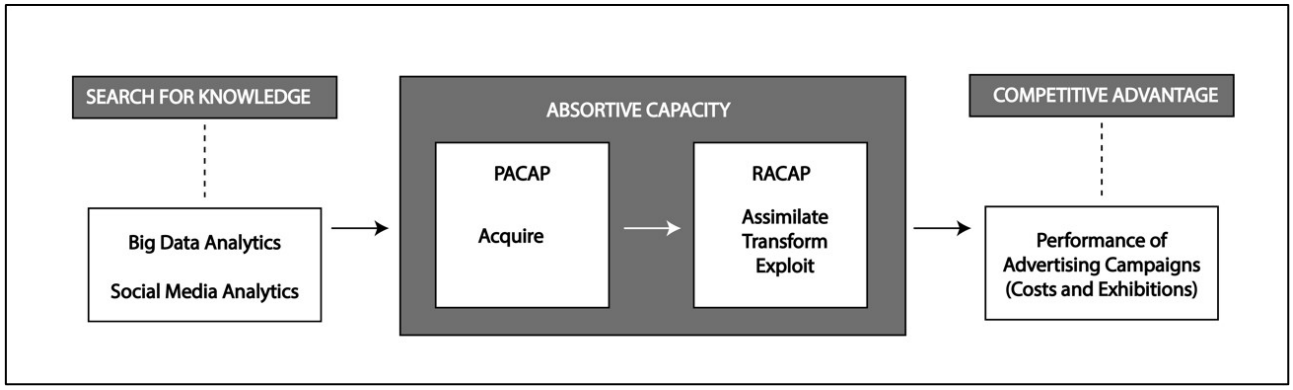

Figure 3. Advertising ACAP Model

In this sense, in Brazilian advertising agencies, the filtering of collected information occurs while the advertising professionals are using it to generate strategic creative and media insights.

Previous studies that tested RACAP with other types of performance (financial, innovative, and others) found support (for example, Yeoh, 2009; Kostopoulos et al., 2011; Fuchs et al., 2016; Yao & Chang, 2017; Xie et al., 2018). Therefore, there seems to be a consensus in the literature that RACAP generates performance. The literature includes the advertising industry, as the findings of this investigation confirm hypothesis H3a+ that RACAP affects PAC at the exposure level and hypothesis H3b+ that RACAP positively affects PAC at the cost level.

Zahra and George (2002) argue that PACAP and RACAP play a unique role in value creation. Consequently, they claim that the new conceptualization of two subsets of ACAP is essential. Thus, in H4+ we tested whether PACAP positively affects the RACAP in the Brazilian creative industry. As expected, the hypothesis was supported. Therefore, the new knowledge acquired by the agencies in their specialized sectors fully supports the work teams in the assimilation, transformation, and exploitation of knowledge (RACAP).

7 Conclusions

This investigation advances the understanding of three phenomena in particular: i) the performance of advertising campaigns; ii) the role of the use of information from big data in the context of advertising agencies; and iii) the absorptive capacity construct in the context of advertising. Adopting a quantitative design in the Brazilian context, we sought to clarify the understanding of how the process of absorptive capacity is configured in advertising agencies in order to obtain competitive advantage, formalized by the performance of advertising campaigns and anchored in the use of data from the digital environment. With regard to the research context, as mentioned, the advertising industry has been scarcely used in studies of absorptive capacity (Parker et al., 2018), which was considered curious in view of the turbulence in the sector caused by the high frequency of data and new technologies coming from the digital environment practically every day.

Such choices led to unique contributions to the field of strategy, as the study focused on the tactical factor of campaigns, focusing on advertising performance. This allowed the validation of scales and the proposal of a model of the absorptive capacity of advertising. These choices resulted in unique contributions to the field. The theoretical contributions are presented below, as well as the practical contributions, limitations, and suggestions for future studies.

7.1 Research implications

The contribution lies in understanding the dynamics of ACAP in the advertising environment. The consolidated model was tested in empirical studies by Flatten et al. (2011) and adapted to the context of advertising.

The results indicate that the process of PACAP is guided by the acquisition of knowledge, which differs from Zahra and George (2002) and Flatten et al. (2011) and other empirical investigations, for example (Ali et al., 2016; Wieneke & Lehrer, 2016; Lam et al., 2016). At the same time, the knowledge assimilation process is part of PACAP, along with the transformation and exploitation of knowledge, which is consistent with Todorova and Durisin (2007).

The acquisition of BDA and SMA by advertising agencies is independent of assimilation, as the latter occurs only with information processing. The assimilation process refers to a "firm's routines and processes that allow it to analyze, process, interpret, and understand information obtained from external sources" (Zahra & George, 2002, p. 189). Therefore, it involves good internal routines to make sense of the data from the digital environment and transform them into knowledge about the advertiser. Data mining explores large amounts of data in search of consistent patterns, such as association rules or temporal sequences, to detect systematic relationships between variables. Therefore, it is no longer part of PACAP, but part of RACAP.

The findings indicate that PACAP refers to new knowledge entering the agency (especially data from the digital environment) that has not been assimilated (Todorova & Durisin. 2007). Such knowledge needs to go through routines and processes inherent to data analysis and methodologies for developing a campaign, to be finally assimilated, transformed, and exploited by professionals in each of the specific sectors of the agency. Therefore, the ACAP process of the advertising industry differs from others that have already been empirically tested. It is claimed that the separation between PACAP and RACAP is inherent to the model. Nevertheless, the clarity of its composition depends on the type of organization.

7.2 Practical implications

Most Brazilian advertising agencies registered with CENP (Conselho Executivo de Normas Padrão, 2018) are complete agencies. That is, they incorporate online into their daily strategies and practices. This discovery contributes to managers who doubt the success of such a model (full agencies). We believe that there is no turning back for data analysis practices in the digital environment. There is no doubt that advertising processes increasingly depend on this valuable data to generate a competitive advantage. The essence of the advertising technique must prevail. That is, digital initiatives must use traditional advertising techniques in internal processes. The essence of strategic, creative, and media planning inherent in advertising activity remains intact and is essential to the success of an advertising campaign.

Agency ACAP is formalized differently from in other companies, but it occurs systematically as in any technological or research and development environment. Managers need to consider that agencies with large numbers of employees may have the potential to invest in cross-functional teams, and that decision making can add and leverage value for teams with few employees.

Therefore, it is essential to identify the relevant absorptive capacities in order to gain a competitive advantage. Entrepreneurs must analyze market changes and incorporate this knowledge to identify current and future needs, anticipate changes in demand, and pursue business opportunities (Rua, 2019).

7.3 Limitations and directions for future research

This investigation has limitations. In terms of the universe studied, the Brazilian sample was chosen. Future research could extend the investigation to other countries and correlate with these findings. As for the context, it was decided to investigate external data coming from the digital environment. Future studies could broaden the range of data. Upcoming studies should examine data from other environments such as marketing, market research, or advertiser data to compare each advertiser and the purpose of the campaign.

In terms of the proposed relationships, it is noteworthy that the BDA data did not affect the performance of advertising campaigns. Future studies could analyze whether long-term BDA will have increased usage and add media influence variables to the performance construct. Media consumption appears to be a latent path in media planning (Schultz et al., 2018).

The proposed ACAP model needs to be extended. One can consider the mediating role of ACAP in the process between the use of data from the digital environment and advertising performance, and one can also cover the history, as prior knowledge and activation trigger the mechanisms of social integration (Todorova & Durisin, 2007) inherent to the model. Understanding how different constructs and their relationships can vary and reconfigure over time can enrich future discussions. Continuing research in this turbulent advertising environment can contribute to the RBV literature.

Although the future of big data in advertising and strategy is still in the development stage, it is already evident that its use is latent in Brazilian advertising agencies. What is evident is that investing in such data and focusing on exposure and reach strategies for good campaign performance does not seem to work. While advertising managers recognize the value of BDA and SMA, they should focus on profitable media strategies and broaden their experience in how media is consumed.

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Supplementary material accompanies this paper.
Supplementary Data 1 – Database
Supplementary Data 2 – Questionnaire and Scales
Supplementary Data 3 – variables and codes
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Authors:
1. Silvia Spagnol Simi dos Santos, PhD in Administration, University of West Santa Catarina, Joaçaba, Brazil.
E-mail: silvia.simi@unoesc.edu.br
2. Carlos Eduardo Carvalho, PhD in Administration and Tourism, University of West Santa Catarina, Chapecó, Brazil.
E-mail: carlos.eduardo@unoesc.edu.br

Authors' contributions:
1st author: definition of research problem; development of hypotheses or research questions (empirical studies); development of theoretical propositions (theoretical work); definition of methodological procedures; data collection; literature review; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.
2nd author: definition of research problem; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.