Exploring the Role of Creativity in Business Analytics Use: A Business Analysts Perspective

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Abstract

Today's businesses heavily rely on Business Analytics (BA) for informed decision-making, developing and sustaining competitive advantage, and growth. For achieving these goals, organizations aspire for creativity and creative solutions. Creativity is an important source of organizational innovation, competitive advantage, and growth, yet it remains an under-researched area in the information systems (IS) discipline. Intrigued by the influential role of creativity in organizational performance, we aim to explore its role in using BA. Through a qualitative approach, we aim to establish the importance of creativity for BA use and provide a deeper understanding of users' (i.e., business analysts') perceptions of creativity in the BA use process.

Keywords: creativity, business analytics use, qualitative research, pilot study.

1. Introduction

In today's highly competitive business environment, decision-makers rely on BA to promote informed and evidence-based decisions (Seddon et al., 2017). We refer to the BA use as "*the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions*" (Davenport & Harris, 2017; Duan et al., 2020; Hindle et al., 2020; Zhang & Chen, 2020). The main components of BA use include people, processes, and technologies for transforming raw data into meaningful information (Delen & Ram, 2018; Someh et al., 2019; Wixom et al., 2013).

The use of IS is considered one of the most central topics in IS discipline (Córdoba et al., 2012; Straub & Del Giudice, 2012). It has been studied in different contexts, through various theoretical lenses and employing different models (Barki et al., 2007; Burton-Jones & Gallivan, 2007; Orlikowski, 2000), and remains an important research topic for the nature, modalities, and extents of impacts at the individual, group, and organization levels. If organizations aspire to capitalize on the use of BA, they need to understand individual users (i.e., business analysts), business and information needs (Orlikowski, 2000) and analyze how these individuals use BA to transform data into insights.

The essential purpose of BA use is to support business actions and drive decisions. Business actions are constantly challenged by and need to respond to dynamic environments characterized by highly competitive markets, changing consumer needs and habits that require creative approaches (Amabile, 1988; Woodman et al., 1993). Creativity continues to be a business imperative. Many organizations are exploring strategies to spark creativity (Dennis et al., 2014), while contemporary organizational decision-making encourages the development of creative solutions (Minas & Dennis, 2019). Creativity is the process of creating something novel or original and valuable or meaningful (Amabile, 1983; Dean et al., 2006; Lubart, 2001; Mumford, 2003). Literature views creativity as tangible or intangible; it can be a state of mind, a talent, a product, a solution, or a process, and many authors agree that it is a complex phenomenon (Ford, 1996).

Creativity, viewed as generating various ideas, searching for alternatives, and identifying business opportunities, presents an important step in problem-solving and decision-making (Perry-Smith & Mannucci, 2017; Seeber et al., 2017; Seidel et al., 2019). Furthermore, to study BA from a practice perspective and to get closer to users' understanding of BA and explore their perception of creativity in BA use, we will conduct a pilot study. In our work, we aim to answer the following research questions: (1) Do users perceive creativity when using BA? and (2) How does creativity manifest itself in BA use?

2. Creativity research in the IS discipline

Couger, Higgins, and McIntyre (1993) suggested that the phenomenon of creativity is an under-researched area in IS discipline. IS scholars (Mûller &

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Ulrich, 2013; Seidel et al., 2010) have followed this call and investigated the concept of creativity in IS discipline; they analyzed 105 papers related to the concept of creativity published in the Senior Scholars' Extended Basket of Journals and the journals on the Association for Information Systems list. The authors exposed how other disciplines (e.g., Psychology, Sociology, and Organizational Behavior studies) have dedicated entire scientific journals to the subject and its research and how little attention is devoted to the creativity concept in IS discipline. Nevertheless, they outlined the importance of creativity for IS discipline, underscored contributions on the impact of the use of creativity or group support systems on the creative performance of individuals and groups (Mûller & Ulrich, 2013; Seidel et al., 2010), and corroborated the role of creativity in the IS development (Couger et al., 1993). In the examined literature reviews, we found no topics dedicated to BA, nor creativity in BA, as the chronological evolution of the field, knowledge development, and the scientific interest to understand the phenomenon remarks last decade of research in IS discipline.

To extend the findings of presented literature reviews and to find evidence of creativity in the field of BA, we searched further for contributions in analyzing creativity. We limited our search to top-tier journals (Senior Scholars' Extended Basket of Journals in alphabetical order: European Journal of Information Systems (EJIS), Information Systems Journal (ISJ), Information Systems Research (ISR), Journal of Association for Information Systems (JAIS), Journal of Information Technology (JIT), Journal of Management Information Systems (JMIS), Journal of Strategic Information Systems (JSIS), and MIS Quarterly (MISQ)) and proceedings of renowned conferences in IS discipline (in alphabetical order: Australian Conference of Information System (ACIS), Americas Conference on Information Systems (AMCIS), European Conference on Information Systems (ECIS), Hawaii International Conference on System Sciences (HICSS), International Conference on Information Systems (ICIS) and Pacific Asia Conference on Information Systems (PACIS)), searching for the word "creativity" in the title, abstract, or keywords sections of the paper. We identified 18 relevant journal papers and 40 papers from selected conferences published from 2010 to 2021 and corroborate that creativity remains modestly analyzed in IS discipline.

Notwithstanding the evidence that creativity is a poorly researched phenomenon in IS discipline (Mûller & Ulrich, 2013; Seidel et al., 2010), its influential role is exposed in various intellectual contributions. Authors primarily analyze systems designed to stimulate, enhance and support the realization of creative outcomes, i.e., creativity support systems (Althuizen & Reichel, 2016; Althuizen & Wierenga, 2014; Minas & Dennis, 2019; Müller-Wienbergen et al., 2011; Olszak et al., 2017; Siemon et al., 2017; Wang & Nickerson, 2019), group support systems (Alnuaimi et al., 2010; Bhagwatwar et al., 2018; Jenkin et al., 2011; Redlich et al., 2018), electronic brainstorming (Dennis et al., 2014; Javadi et al., 2013), virtual worlds (Kohler et al., 2011; Lee & Chau, 2019; Roquilly, 2011; Shirish et al., 2014), and crowdsourcing platforms (Literat, 2017; Wang et al., 2013; Yu & Nickerson, 2011; Zou et al., 2014), while to the best of our knowledge, only one connected creativity and BA (Tamm et al., 2021), focusing on how the use of BA empowers the creative process.

Even though the limited number of papers on a particular topic is not so unusual in the IS discipline (Seidel et al., 2010), generally known for representing a diverse and large number of themes, there is a need to further develop knowledge about creativity in the IS discipline. Based on our search results and the rising significance of BA, we can claim that further understanding of the role of creativity in BA, especially in the BA use, could significantly contribute to the IS discipline from both scientific and practical perspectives.

3. The perception of creativity in BA use

Our pilot study aims to get closer to understanding BA use from the users' perspective. Our starting point is to endorse two propositions: first that creativity is understood *as the generation of novel and useful ideas or solutions* (Baskerville et al., 2016; Shao et al., 2021; Wang & Nickerson, 2019), and second, that is understood *as the ability to form new and meaningful combinations of available resources* (Baumgart et al., 2020; Sher et al., 2020). Drawing from these explanations, we would like to delineate the role of creativity in BA use, which in practice could be perceived, i.e., when users using BA strive to elaborate meaningful information for decision-making or search solutions for various data quality or integration challenges in BA, or when they select appropriate data visualization and its design. In the present research, we aim to confirm that we can discuss creativity in BA use and answer on posed research questions.

3.1. Research design

Our pilot study is a generic qualitative study, a suitable methodological approach. It focuses on analyzing users' comprehension of BA use and aims to find evidence and confirmation of the studied phenomenon – creativity.

Data collection is conducted through interviews, as they reveal the meaning interviewees attribute to their experiences (Harding, 2018) and allows us to study individuals, and business analysts, through their practice perspective (Orlikowski, 2000). We conducted six semi-structured in-depth interviews, gathering a descriptive and confirmatory approach but allowing the exploration and in-depth development of the conversation when interesting thoughts emerged. Interviews were conducted by selecting and sampling in an accessible location (through convenience sampling where the researcher's choice of location is often applied (Marshall & Rossman, 1999)), in a financial institution where data have an essential business value and where BA presents a vital driver of decision-making.

Data collection began on 28th December 2020 and ended on 7th January 2021. Interviews were held on-line and audio recorded (with the permission of interviewees), as it was during the Covid-19 restriction period, and lasted on average 50 minutes. The conversations, led by the interview guide, began with some initial questions (i.e., How many of your working activities include dealing with data?, Do you (in your working activities) also analyze data?, Do you like it (analyzing data)?, Why do you like/don't like it?), and proceed with key question to deeply understand the researched phenomenon (i.e., What challenges, issues, or difficulties do you face when analyzing data?, Can you identify some from individual level/perspective?, Can you identify some from organizational level/perspective?, How you deal with/solve it/them?). Additionally, we pose questions about the role of creativity in BA use, if the conversation did not evaluate in the planned direction (i.e., What business analysts should be like (characteristics, knowledge, skills)?, Can we talk about creativity in business analytics?, How could creativity be manifested in business analytics?).

3.2. Analysis and findings

Interview transcripts are analyzed through comments annotation on meaningful quotations and coding. The coding process started with three prior codes, developed from the guiding research question and the interview guide. These are business analyst (with two sub-codes: senior business analyst and business analyst), creativity, and issues important to successfully leverage BA in practice. In the coding process, we recognize the importance of communication, emphasized by interviewees, as a salient driver of BA in practice and thus develop it in an inductive code. The final analysis of transcripts is held by bridging codes, where we could find an interesting pattern that could be potentially developed in a theme through further research.

3.2.1. Users perceive creativity in BA use. In the analysis of the interview transcripts, we confirm that we can talk about creativity in BA use. Five of six interviewees prove that creativity is perceived in BA use. Furthermore, in two of the cases, there was no need to pose questions regarding creativity perception or manifestations, as interviewees spontaneously started talking about it and acknowledged its fundamental role in BA use (translated quotations):

"You will not believe it, but here is some creativity… (Interviewee 5)."

"And after all, they, business analysts, must be creative on the one hand because it may be necessary to look for new solutions. Perhaps I am thinking of creativity from a technical rather than a substantive point of view. From a technical point of view, because we can, for example, prepare data and data analysts must here be creative enough to be able to come or get the shorter path to the result… (Interviewee 4)."

3.2.2. Creativity manifests itself in BA use in different ways. Interviewees understand and perceive creativity in BA use in different ways. Thus, it is important to be aware of varying creativity manifestations illustrated in conversations if we aspire to understand the role of creativity in BA use. We can analyze conversations about BA use in practice and try to delineate manifestations of creativity in BA use through the process of BA. The process of BA is executed in different phases, i.e., assessing, selecting, cleaning, transforming, visualizing data, interpreting, and evaluating information (Runkler, 2012). In analyzing interviews, we outlined four phases of the BA process.

In the first phase, the process starts. It starts with a task or a posed question, where interviewees perceive creativity in recognizing what could be told from available data. Specifically, creativity plays an important role when business analysts strive to find meaningful information or to see connections between data and insight (translated quotations):

"*Yes, if we talk about stories, creativity is related to stories. You can turn the data so you can tell a story from it… And that creativity is closely related to looking for that story, through data that is solid and understandable enough for the audience (Interviewee 3)."*

"So, first of all, creativity is important, in that we have some ingredients and that we put them together into a whole. And then there's this whole creativity that you can also show (Interviewee 5)."

The second phase of the BA process is data acquisition, transformation, and integration. Interviewees here refer to creativity too. In the data acquisition part, specifically the data analyst's creativity

in selecting and acquiring data to foster desired insight (translated quotation):

"...but you need to be creative because before the analyst starts, that is, when he has done the interview and understands what he needs to do, he needs to think about what data he needs to get (Interviewee 4)."

In this phase, interviewees recognized creativity also when looking more broadly at the BA, as they emphasized its importance in defining data collection, organizing data storage, and managing data (translated quotation):

"Creativity is also seen in how we think strategically about data… (Interviewee 5)."

Creativity is an integral part of data analysis and insights development in the third phase of the BA process (translated quotation):

"A data analyst must be creative in that how he thinks, how he turns the data and points out if he sees anything important to look at, or suggests what could be improved. From this point of view, he can be creative and self-initiative (Interviewee 3)."

Finally, creativity was also recognized in the fourth phase of the BA process in reporting analysis or insights (translated quotation):

"…he (the business analyst) must also be creative in terms of presenting data… one piece of data can be illustrated in multiple ways, because some people understand charts, some understand tables, and some understand just text (Interviewee 6)."

Moreover, the only one of six interviewees, who disagreed with the claim that we can talk about creativity in BA use, confirmed its manifestation in this phase, particularly in designing information visualization (translated quotation):

"…I see creativity in using some colors, some charts, in their display, in this way (Interviewee 2)."

From interviews analysis, we can recognize user perception of creativity in different nuances and manifestations in different phases of the BA process, though attributing its different roles and importance. Therefore, developing knowledge about the role of creativity in BA use and its understanding should analyze BA use holistically through all phases of BA use and embrace different users' perceptions.

3.2.3. Business analyst spontaneous acknowledgment. The interview analysis proceeds with the review of the coding process, where we identified vertical connections of codes in singular transcripts. Furthermore, with bridging codes, we recognized a strong link between codes of creativity and business analysts, specifically to sub-code: a senior business analyst. The more seniority of the role of the interviewee (i.e., senior business analyst), the more the individual was convinced of the role of creativity in BA use. The two interviewees who spontaneously acknowledged creativity in the BA use in our conversations were the two most senior business analysts we had interviewed.

The perception of the role and importance of creativity in BA use connected to the professional expertise and experience is an interesting pattern, which could be developed into a prominent theme in future research on the phenomenon. We can conclude, based on the findings of our pilot study, that creativity represents a fascinating research field in the BA context, and studying it as an independent construct, specifically its role in BA use, could significantly contribute to the understanding of organizational aspects of BA, especially professional development challenges of BA users.

4. Discussion

Our research confirms that creativity remains an under-researched area in IS discipline and outlines the importance of studying the role of creativity in BA use. Prior literature suggests that organizations have largely failed to capture the benefits of BA to their full extent and are seeking ways to leverage value from the implemented systems (Ain et al., 2019), where achieving returns through BA is highly dependent on its effective use. Moreover, the literature on BA overemphasizes software and systems (Conboy et al., 2020), without focusing on the people using them. We know from prior studies that investments alone and software implementations do not generate a competitive advantage. Instead, organizations need to create their capabilities, hard to imitate and match for competitors (Gupta & George, 2016), through using implemented systems.

Furthermore, users' knowledge, abilities, and skills employed in utilizing BA play a significant role in achieving results (Shao et al., 2022). From this perspective, organizations should empower employees and create environments where they can use available data, systems, technologies, and knowledge (Otondo, 2019) to improve their operational and strategic performance, which in turn depends on creativity. As such, future research efforts should pay attention to the role of creativity and harness analysts' creativity in leveraging BA benefits.

This work has implications for practice, too, especially for BA stakeholders involved in planning, reviewing, and implementing BA initiatives. BA capability depends on organizational context, technical infrastructures, and users' skills (Shao et al., 2022). From this view, organizations should not only implement the BA systems and technologies but also focus on BA use and the business analysts' creativity to

improve decision support. In this instance, BA users' capabilities and creativity play a key role in harnessing the BA investment. Organizations should hire business analysts who are not only good at BA technicalities but also can think out of the box. The inability to hire sufficient numbers of 'creative' analysts creates "a significant constraint on realizing value" (Otondo, 2019), which consequently compromises problem-solving. The creativity scope must be inclusive, and organizations must consider the broad spectrum of BA, from data sourcing, data integration, data cleaning, and data transformation, data analysis, information visualizations through the BA use, so that BA can be best leveraged to provide creative solutions and insights for enhanced decision support. In this view, to further enrich implications for practice in the successful deployment of BA, future research should strive to understand the role of creativity in BA use and its manifestations in all nuances of BA in practice.

4.1. Limitations

Our research has its limitations. First, we limit our literature search to top-tier journals and major conferences in the field by extending the findings of literature reviews analyzing creativity in IS discipline (Mûller & Ulrich, 2013; Seidel et al., 2010). In the future research, we could expand the list of journals and conferences to comprehensively explore the phenomenon in IS discipline.

The second and third limitations regard the pilot study, specifically the number of semi-structured in-depth interviews and our interlocutors. The number of interviews could be increased with more interviews with business analysts – in order to clearly reach the saturation point. Furthermore, we could conduct interviews with other indispensable stakeholders in BA deployment (i.e., managers, employees from IS/IT departments, designers, and developers) – to explore and understand the role of creativity in BA use from different angles.

Fourth, conducting research in one organization brings many contextual factors to this study that must be considered. Future research should further expand the study with other sectors where BA plays an important role in decision-making (i.e., additional sales and services, entertainment, hospitality, tourism, etc.) to study the phenomenon and corroborate findings in different business practices.

4.2. Future research

Future studies of creativity in BA use should be conducted with both qualitative and quantitative research methods, using exploratory and confirmatory approaches. Research efforts should strive to uncover underlying meeting points between creativity and the BA use in practice through qualitative methods applied in studying the phenomenon from different angles (evolving the research to all indispensable stakeholders to deploy BA) and enrich the knowledge by analyzing different business fields and contexts of use of BA.

Finally, envisioned and explicated relationships between creativity and BA use should be applied in a confirmatory quantitative study to verify the role of creativity in BA use.

5. Conclusion

The concept of creativity continues to be poorly researched in the IS discipline. However, the link between creativity and BA, especially BA use, has been corroborated in our pilot study. The analysis of our interviews with business analysts confirms the significance of creativity in BA use and delineates different manifestations of creativity in BA use.

Our research, focusing on the creativity in BA use, enriches knowledge of IS and BA literature. We outline parallels between creativity and BA use, and confirm that creativity, understood as generating meaningful and novel outcomes, could be analyzed in BA use, where the transformation of raw data develops insights that empower problem-solving and decision-making. To conclude, creativity has to inspire BA use, data transformation, and the development of insights, drive decision-making, and enable outstanding business actions. Its intriguing role in the BA use, exposed in the findings of our pilot study, needs more attention and will drive our future research efforts, which could extraordinarily contribute to the creativity research in the IS discipline.

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