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Bridging the Gap between Insights and Action: the Role of Analytical Storytelling

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Abstract

Despite huge investments in Big Data Analytics (BDA) projects, the success rate of these projects and the strategic value created from them are still unclear. One of the most important objectives of using BDA is to improve the decision-making process. However, data insights will be useless for decision-making unless they lead to dialogues that drives action. Compelling communication using data-driven storytelling is required to ensure that critical insights are conveyed to the audience in a way that maximizes the likelihood of taking action. Building on the process view of BDA, the main contribution of this study is to investigate the role of analytical storytelling in moderating the link between insights and action, which depends on BDA task complexity and audiences' levels of BDA literacy.

Keywords

Big data analytics, analytical storytelling, BDA task complexity, BDA literacy, business value.

Introduction

The widespread use of digital technologies allows companies to collect ever-greater amounts of data and, as a result, need even more powerful ways to make sense of that data. Big data analytics (BDA), which encompasses not only the data but also elements of tools, infrastructure, models, and means of visualizing and presenting insights, fills that need. While there is considerable hype about the value of BDA, many companies still do not fully understand how to apply analytics to extract business value and it is one of the top concerns of information technology leaders (Grover et al. 2018). Consequently, they are interested in understanding how to use BDA to improve the business and obtain insights that can make real differences.

There is some evidence that using BDA can help organizations improve their performance (Ghasemaghaei et al. 2018). However, data itself does not generate value. It is rather the combination of insight generation and its actual use that will (Grover et al. 2018). Although research on data analytics and big data has received increasing attention in the past few years, research on the business value remains scarce (Grover et al. 2018; Mikalef et al. 2018). In other words, it is not clear why two organizations investing in comparable analytics resources get different values.

The limited empirical evidences restrict our understanding and our ability to help organizations gain the full benefits of their data investments. This is attributable to the (1) assumption that managers successfully act on data analytics insights to support their decisions and (2) limited understanding of the process by which human analytics talents convey potential BDA outputs to audiences (McAfee and Brynjolfsson 2012). Therefore, this study addresses a specific emerging challenge in the practice of BDA and aims at examining the following two research questions: (1) how audiences can make insights more actionable from using BDA outputs and (2) what are some factors influencing that process.

The goal of this research is to deepen the knowledge about the process to achieve value from BDA by looking at a specific step of the analytics process: "the insight to action phase". The outcome of this study is the development of two research propositions of the insight-action process. As shown in Figure 1, three main constructs have been used to develop the proposed conceptual framework: (1) analytical storytelling, (2) the level of BDA task complexity, and (3) the audience's level of BDA literacy. Understanding the key

process that constitutes BDA capability and its antecedents should shed light on the mechanism of business value creation while BDA is deployed.

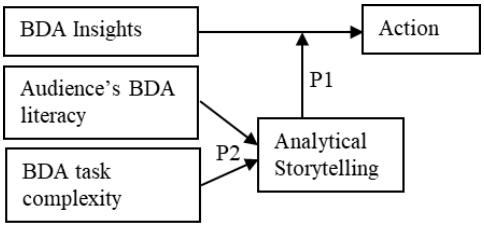

Figure 1. Proposed research model

Process view of converting insights to action

Building on the concept of analytical storytelling and a process view of how BDA contributes to business value, the capability to transform BDA insights into actions is explored. Previous research has called for a better understanding of the link between BDA insights and action, how to take action to harness the insights (Mikalef et al. 2018; Sharma et al. 2014), and how it is used by decision-makers. Accordingly, as shown in Figure 1, the fundamental premise of the proposed conceptual framework is that audiences (i.e. consumers) will need analytical storytelling by data scientists (i.e. producers) to ensure that BDA insights are conveyed to them in a way that maximizes the likelihood of taking action on those insights. The role of storytelling has been shown as an important factor in IS research and an essential skill for data scientists (Boldosova and Luoto 2019). Furthermore, two factors influencing analytical storytelling are proposed, which are BDA task complexity and audience's BDA literacy. BDA insights, which refer here to a deep understanding of phenomena arising from the use of BDA, need to be leveraged by audiences into strategic and operational actions to generate value (Lycett 2013).

The role of analytical storytelling in the insight-action process

While it is reasonable to expect that there is a relationship between data analytics insights and action, it is not clear under what conditions better outcomes would be observed (Boldosova and Luoto 2019). It was argued that organizations are focusing on how complex insights can be better communicated so they can be quickly absorbed and action can be taken (LaValle et al. 2011). Data scientists who report insights have cited communicating assumptions and building reports as the two main challenges when sharing insights. If insights are not understood and are not compelling, no one will act on them (Welbourne 2015).

Therefore, it has been suggested that analytical storytelling, which refers here as data scientists conveying data-driven insights and recommendations to audiences in the form of a narrative that keeps the audience interested, engaged, and likely to retain and act on the recommendations given, can be used to trigger user-interaction. Simply stated, it is the process of bringing data to life to to tell a well-constructed narrative. Analytical storytelling is about creating persuasive stories where analytical insights are organized as a guiding pathway, taking audiences to the source of data.

Analytical storytelling can be critical because when data scientists rely solely on facts, statistics, and theories to persuade an audience, that audience may reject these things in favor of their theories and beliefs (Boldosova and Luoto 2019). Data analysis must go beyond reviewing the data results and instead, it must tell a story that can create an emotional connection between the audience and the BDA initiative itself (Welbourne 2015). Stories, in contrast, are capable of conveying a similar amount of information and cognitive science research argues that memorable information is more likely to be acted upon than is information that is not retrieved from memory (Swap et al. 2001). Furthermore, analytical storytelling can help break down managerial inertia and apathy toward data by adding context and making it more accessible. Indeed, storytelling has already been recognized as an excellent business tool in various organizational areas. In IS research, it has been recently used to explore how organization-driven stories influence employees' attitudes toward BDA adoption (Boldosova and Luoto 2019). Therefore, professional interactions that tend to make information more memorable and relevant will have a greater likelihood of assuming significance (Bačić and Fadlalla 2016). This drives the first research proposition.

Proposition 1: Analytical storytelling will moderate the relationship between BDA insights and action.

Influencing factors

There are different kinds of stories members of analytics teams can tell to connect with audiences (Ojo and Heravi 2018). Therefore, some external factors may influence how the storytelling process will unfold (Lee et al. 2015). For instance, various factors such as time, focus, depth, analytical methods, and target audience can influence the types of stories told (Davenport 2014; Lee et al. 2015). It was also argued that storytelling will be different depending on if it is an author versus a reader who drives the storytelling (Segel and Heer 2010) and deliberate or intentional (Boldosova 2019).

Considering the limited conceptual and empirical work on contingency factors influencing storytelling in a BDA setting, two contingency factors are proposed here, namely (1) the level of BDA literacy of the audience and (2) the level of complexity of the BDA task. Considering that various categorizations of audiences have been proposed, it is argued that the audience is viewed here as the level of BDA literacy (Stikeleather 2013).

The level of BDA literacy of the audience

It is argued that not all audiences are equal in their abilities to understand data analytics outputs and insights, which will necessitate different types of storytelling (Lee et al. 2015). People's willingness to embrace a data-driven approach to decision making can vary extensively both within and across organizations (Phillips-Wren et al. 2015). Indeed, data-driven culture has shown to influence leaders and audiences in using data and analytics information in decision-making (Grover et al. 2018; Wang and Byrd 2017). As a result, data analytics leaders struggle to get their message across and information assets go underutilized. Based on previous definitions of data literacy, BDA literacy is defined here as the ability of the audience to understand and use BDA effectively, including an understanding of data sources, analytical methods, and techniques applied, to inform decisions (Stikeleather 2013). It is suggested that discerning an audience's level of BDA literacy will help the storyteller create a narrative that will be best suited to the characteristics and needs of the targeted audience. In the same direction, good storytelling demands an understanding of the viewpoint of the audience. Therefore, different approaches to storytelling are likely to emerge depending on the level of BDA literacy.

The level of complexity of the BDA task

Similarly, it is useful to distinguish between the different kinds of BDA tasks because they can have implications not only to how the story will be told but also the technologies and tools used (Watson 2014). Four major types of analytics methods have been identified from less complex (descriptive, diagnostic) to more complex (predictive and prescriptive) ones (Delen and Zolbanin 2018). Here, the level of complexity of the BDA task is defined as the complexity of the analytical methods used for a specific BDA task. Thus, the level of complexity of the BDA task is likely to influence the types of storytelling needed. When long, analytically-driven searches for a solution to a complex problem are needed, the types of analytical storytelling are also typically long, important, and expensive (Davenport 2014). Stakeholder buy-in is critical to get the plan accepted and may necessitate more extensive analytical storytelling. For instance, prescriptive analytics involve assumptions and greater explanations to nontechnical audiences since the methods used and the outputs are not familiar to non-data scientists. Only visual representations of findings may not be appropriate in this case, which focuses on *how to address an issue*. The analytical storytelling must explore various ways to improve the situation identified and more time and energy are necessary (Davenport 2014). At the opposite, analytical storytelling for descriptive analytics, where basic data visualization tools may prevail, may be less elaborated since nontrivial patterns and relationships in data are easily identified (Liberatore and Luo 2010). Furthermore, the outputs of descriptive analytics are usually well understood by audiences. These two influencing factors guide the second research proposition.

Proposition 2: The analytical storytelling approach will depend on the level of BDA's task complexity and the audience's level of BDA literacy.

Research methodology proposal

The conceptual nature of this paper calls for empirical validation of the two main research propositions. To do so, a positivist case study methodology (Dube and Pare 2003) is proposed here as the preferred research methodology. This method will allow the investigation of the topic in a real organizational setting while maintaining focus on a set of limited and predefined theoretical concepts. In terms of sampling, we intend

to study multiple large organizations in which BDA departments work in collaboration with other functional departments for achieving BDA initiatives. Studying organizations with such characteristics will increase our chances of capturing varying levels of audience BDA literacy and task complexity across multiple BDA storytelling episodes. Semi-structured interviews with members of analytics teams who performed data storytelling will serve as the main data collection strategy for studying how data storytelling episodes have been adapted to various levels of BDA literacy and task complexity. Internal corporate clients who qualify as members of the BDA audience (e.g. middle managers, senior executives) will also be interviewed to assess the success of the data storytelling episodes. Data will be analyzed using a discourse analysis approach, where conceptual convergence with key constructs of the framework will help validate the two main research propositions. However, we also seek for the emergence of new insights regarding the distinctive properties of successful storytelling episodes.

Contributions and future research

While much discussion has focused on the ability of BDA to generate better insights and decisions, the focus on the potential to capture its value has been limited. Too many audiences still overlook, ignore, or avoid BDA insights delivered to them. Analytical storytelling can help break down managerial inertia and apathy toward data to make it more actionable. Given the discussions and the arguments developed in the previous sections, the objectives for this research were to (1) gain insights and develop a better understanding of the notion of business value from BDA, (2) attempt to identify the role of storytelling in moderating the link between insights and action, and (3) identify the factors influencing analytical storytelling.

The research framework proposed shows that analytical storytelling offers a relevant theme to study the conversion of BDA insights into action (Boldosova, 2019; Boldosova and Luoto 2019). This may help remedy the problems that have resulted from the relatively simplistic conception of a direct relationship between insights and decision-making. Indeed, few studies have looked at the detailed mechanisms by which BDA improves performance (Grover et al. 2018). Finally, how organizations involved in BDA might utilize analytical storytelling should be of great interest to the IS community. Not all investments in data analytics should be expected to show measurable returns, therefore the IS community, as well as organizations, will benefit from this improved understanding.

For practice, this study will help managers gain understandings into why some organizations can extract value from their BDA investments while others failed. An analytical storytelling led approach can transform how analytics and data science teams work by getting them to focus on how their audience — often nontechnical audiences. Organizations can change their BDA practices to a fact-based art of storytelling that not only informs and inspires meaningful decision-making but also keeps key stakeholders aligned and engaged. It may also help them better understand the importance of having a data analytics team with experts in analytical storytelling. Often organizations tend to underestimate the business and communication aspects of data science while data scientists tend to focus on programming aspects and are not very good at creating or telling stories.

Finally, future research could look at other contingency factors that might influence analytical storytelling such as the hierarchical level of the audience. Furthermore, while the proposed framework is useful in identifying contingency factors, it does not provide a "ready-to-use" toolkit to dictate the actions of members of analytics teams as they initiate an analytical storytelling process. While such a task remains beyond the scope of the study, it would enhance the practical contributions of the framework.

Conclusion

Making BDA come to life may well become the biggest benefit of making data-driven insights to those who need to use them. As more and more organizations seek to implement BDA as a core capability, research is needed to further understand how data insights can be converted into productive actions. To address this issue, the present paper provides a new conceptual framework in which analytical storytelling is depicted as an essential catalyst between data insights and action. To reflect organization's heterogeneous practices and views towards BDA, the framework also suggests that the level of BDA data literacy of the targeted audience and the level of complexity of the BDA task are likely to influence analytical storytelling. By doing so, the study suggests that firms will benefit from developing a flexible BDA capability, as different approaches can be used to transform data insights into value-added action.

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