"Too much of a good thing?" How Big Data changes managerial decision making in marketing.

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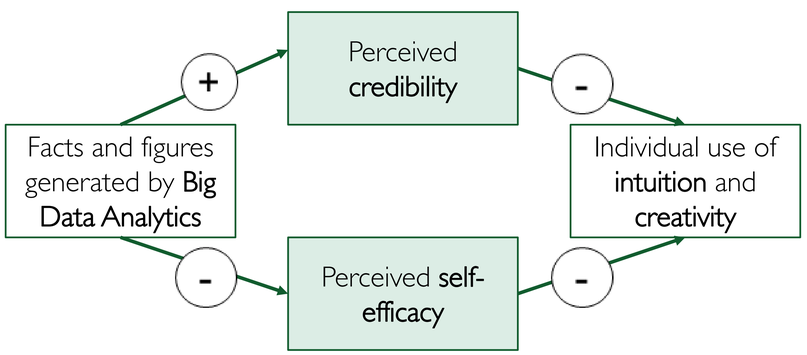
Abstract

The increasing digitalization of business processes generates massive amounts of available data sources. Having triggered great enthusiasm among practitioners and researchers alike, without doubt, these developments are of particular relevance and impact. Whereas organizations aim to generate actionable insights from Big Data, researchers want to better understand human decision processes and develop increasingly sophisticated analytical models. Surprisingly, **potential negative consequences of Big Data** are widely unexplored. Addressing this research gap, this project examines whether Big Data may **inhibit managers' creative and intuitive thoughts**, thereby limiting an organization's innovativeness. Finally, **psychological mechanisms** and ways to counteract these detrimental effects are investigated.

Theoretical background

Managers do often rely on intuition, expert knowledge and working experience when it comes to decision making (Bonabeau, 2003). However, we assume that the rise of Big Data could change this situation quite substantially. Based on the Theory of Technology Dominance (Arnold & Sutton, 1998), we propose that a strong emphasis on **Big Data** may lead managers to make **less use of their intuitive and creative potential**, because it can be perceived as a handling instruction rather than a decision aid due to its precise implications (e.g., for addressing customers). Due to outlining how decision makers reach decisions when being faced with technological advice, this theory forms a reasonable foundation for this study. With reference to this, we assume (among other things) the following relationships:



Methodology

As an initial study, a controlled **paper-and-pencil experiment** ("between subject") has been chosen to investigate the hypothesized relationships. Our proprietary executive panel with approx. 2,500 top managers is the main source of data. From this panel, we have already **recruited n=40 top managers** to come to our research lab in order to participate in our initial study. Three further dates each with 20 participants are already scheduled, resulting in an expected final sample of 100 executives. The **degree of information for a special product** presented to the managers (subjective, market research and Big Data information) can be regarded as the **main stimulus in the respective experiments**. The dependent variable is the individual use of creativity (Guilford, 1967).

Results

Fig.1: Perceived credibility (index)

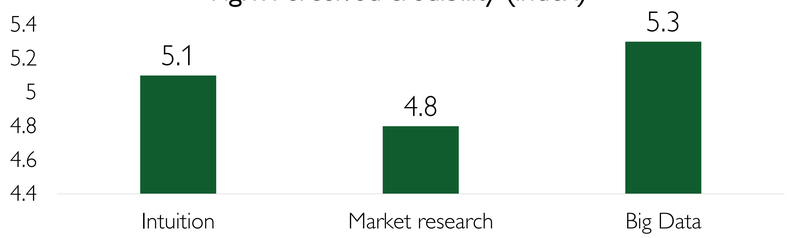


Fig.2: Agreement with product proposal

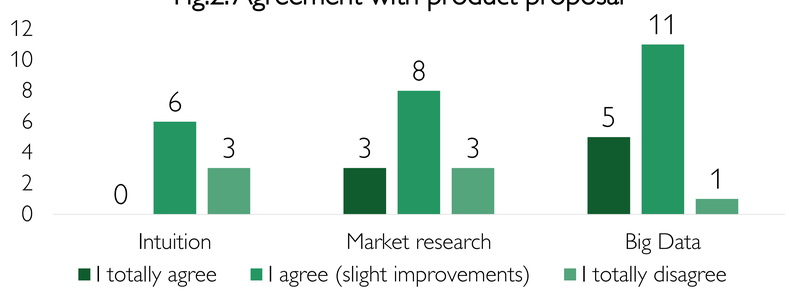
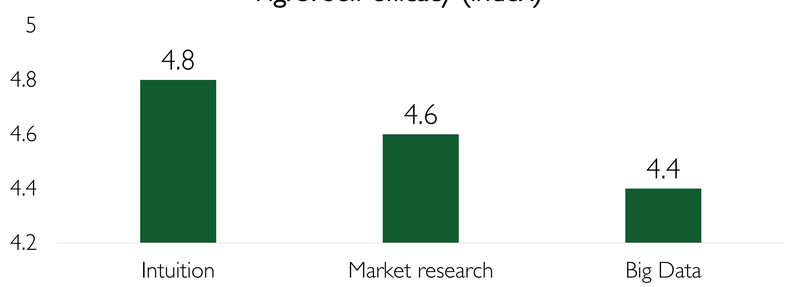


Fig. 3: Self-efficacy (index)



Discussion

Due to the limited amount of conducted interviews (n=40), the displayed results are yet only descriptive (and preliminary). However, it can be seen that the **perceived credibility** differs between the diverse information sources (see figure 1) and, as hypothesized, Big Data has the highest value in this case. In addition, when being confronted with information derived by Big Data analyses, participants tend to **accept the product proposal** resulting in a lower willingness to make further adaptions (see figure 2). This is in line with the above outlined higher perceived credibility of Big Data compared to other information sources. Furthermore, the **individual and situational levels of self-efficacy** differentiate as well – even though only just slightly (see figure 3). As assumed, the individual self-efficacy level in the Big Data condition is lower than in the other ones. This might be explained by the fact that the participants feel that their work and ideas become less appreciated which, in turn, might very well induce them to be increasingly reluctant to contribute their own creativity.

What are the next processing steps? At first, we have to **measure the individual level of creativity**, which is quite a demanding task because it requires two experienced and independent raters. Besides, we have also thought about potential **dissolving mechanisms** for the hypothesized relations. In this context, two different approaches seem reasonable: **nudging and boosting**. You can either change the working environment of managers (nudge), for instance by using anthromorphic techniques (Aggarwal & McGill, 2007), or educate them in dealing with Big Data (boosting).

References

Aggarwal, P., & McGill, A. L. (2007). Is That Car Smiling at Me? Schema Congruity as a Basis for Evaluating Anthropomorphized Products. *Journal of Consumer Research, 34*(December), 468-479.

Arnold, V., & Sutton, S. G. (1998). The theory of technology dominance: Understanding the impact of intelligent decision aids on decision makers' judgments. *Advances in Accounting Behavioral Research, 1*(3), 175-194.

Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist, 37*, 122-147.

Bonabeau, E. (2003). Don't Trust Your Gut. *Harvard Business Review, 5*, 1-6.

Boyd, D., & Crawford, H. (2012). Critical Questions For Big Data. *Information, Communication & Society, 15*(5), 662-679.

Gigerenzer, G. (2014). *Risk savvy: How to make good decisions.* New York: Penguin Group.

Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.

Kayande, U., De Bruyn, A., Lilien, G. L., Rangsaswamy, A. & van Bruggen, G. H. (2009). How Incorporating Feedback Mechanisms in a DSS Affects DSS Evaluations. *Information System Research, 20*(4), 527-546.

Lilien, G. L. (2011). Bridging the Academic-Practitioner Divide in Marketing Decision Models. *Journal of Marketing, 75*(July 2011), 196-210.

Park, J.K. & Roedder John, D. (2014). I Think I Can, I Think I Can: Brand Use, Self-Efficacy, and Performance. *Journal of Marketing Research, 51*(2), 233-247.

Sadler-Smith, E. & Shefy, E. (2004). The intuitive executive: Understanding and applying "gut feel" in decision-making. *Academy of Management Executive, 18*(4), 76-91.

Trumbo, C. W. & McComas, K. A. (2003). The Function of Credibility in Information Processing for Risk Perception. *Risk Analysis, 23*(2), 343-353.