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The Complexity of Competitive Intelligence in the Age of data ambiguity and Artificial Intelligence

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ABSTRACT The aim of the study is to explore the development aspects of competitive intelligence (CI) in terms of the challenges posed by the increase in data volume, incl. unverified data, data reliability, and the integration of artificial intelligence (AI) into data analysis processes. The primary research question explores how the role of the human factor has become increasingly important in ensuring the accuracy and reliability of data used by AI, especially in an era dominated by AI and rapid information dissemination.

The study highlights the imperative role of human judgment in the era of AI-driven data analysis, highlighting skills, competencies, and authority as critical factors in evaluating data processing outcomes. This points to the risks associated with the uncritical adoption of AI-generated solutions, which can lead to innovative but impractical outcomes that consume significant organizational resources. Furthermore, the study calls for a balanced approach to integrating AI into CI processes, supporting strategies that enhance the synergy between human analytical prowess and AI computational efficiency. This approach is critical to overcoming the challenges posed by data reliability and ensuring the effective implementation of CI strategies that are both innovative and grounded in reality.

KEYWORDS: competitive intelligence, AI tools, data analysis, decision making

INTRODUCTION

In today's era of big data and sophisticated computing technologies, the integration of AI into CI systems presents both significant opportunities and formidable challenges. In the historical aspect, the conceptual solution applied to the use of intelligence in various contexts is very important, incl. marketing intelligence, counter intelligence, and so forth (Madureira et al., 2021; Calof and Cekuls, 2023) as well as, for example, linking innovative processes with competitive intelligence (Calof and Sewdass, 2020).

AI can also be used to analyze competitors' online activities, including their social media presence, website traffic, and search engine rankings. This allows companies to stay up-to-date with their competition and respond quickly to changes in the market (Cekuls, 2022).

The emergence of artificial intelligence and big data technologies could be as transformative for the economy as the Industrial Revolution was (Abis and Veldkamp, 2024).

Data quality is crucial because it profoundly impacts decision-making, innovation, and business success. As businesses become more data-driven in their strategies and operations, the quality of their data directly affects the accuracy of insights and the effectiveness of resulting actions.

Regardless of their industry, organizations face the dual challenge of maximizing the potential of their data while managing the risks associated with poor data quality (Pansara et al., 2023).

Recent technological advancements such as the Internet of Things, big data analytics, and artificial intelligence have significantly influenced corporate operations. Among these, artificial intelligence (AI) holds the greatest potential to revolutionize marketing strategies. AI is proving to be beneficial across various sectors in today's business environment. S.Rama Krishna claims there is a broad consensus among experts that AI will shape the future of human civilization. The growth in information and communication technology has turned the world into a vast network of interconnected nodes. Consequently, investments in AI to glean insights from big data for business intelligence have increased significantly. Contrary to popular belief, AI is extensively utilized not only in sectors like healthcare, e-commerce, education, government, and business but is increasingly adopted by a growing number of companies (Rama Krishna et al., 2023). Professionals worldwide are exploring which AI solutions best fit their marketing needs. A thorough review of this research could highlight the importance of AI and big data in marketing and identify new areas for future research.
Several authors also note potential cognitive biases that involve a systematic departure from objective judgment caused by reliance on contrived shortcuts. Statistical bias occurs when there are discrepancies between true values and expected results, which often appear as systematic error in model predictions, meaning that model results do not accurately represent real-world scenarios. (Tejani, 2021)

By identifying key trends, challenges, and opportunities, the research provides valuable insights for both practitioners in the field of CI and policymakers, aiming to optimize the integration of AI tools in CI to foster more informed and strategic business decisions.

METHODOLOGY

To assess the impact of Artificial Intelligence (AI) on competitive intelligence and decision-making within organizations, this study employs a research design that integrates qualitative approach. The study focuses on a diverse selection of ten companies across industries like technology, healthcare, transportation, logistics, wholesale, and retail, which are known for their use of AI-driven tools in competitive intelligence.

The focus groups were formed in view of the industry represented by the industry represented by the company and the size of the company. Information on the focus group members has been summarized in Table 1.

Table 1. Informative description of the focus group participants

Member no.	*M/F*	*Position*	*Size of the company*	*Industry*
Interview no. 1	*F*	Supervisor	Small and medium	Transportation
Interview no. 2	*M*	Supervisor	Small and medium	Transportation
Interview no. 3	*M*	Supervisor	Small and medium	Logistics
Interview no. 4	*M*	Supervisor	Small and medium	Wholesale
Interview no. 5	*F*	Supervisor	Small and medium	Logistics
Interview no. 6	*F*	Supervisor	Small and medium	Retail Trade
Interview no. 7	*M*	Supervisor	Small and medium	Health Care
Interview no. 8	*M*	Supervisor	Small and medium	Transportation
Interview no. 9	*F*	Supervisor	Small and medium	Health Care
Interview no. 10	*M*	Supervisor	Small and medium	Communication and IT

[1] Data according to author's research

Data collection was twofold, involving semi-structured interviews and a structured survey in a focus group setting. The focus group discussion was conducted in the form of guided discussions where questions were posed to the group, allowing participants to interact. The author evaluated the structure of the given answers in relation to the research questions and concludes that the results could be applied to large companies as well. Regarding these issues, large firms had more full-time CI staff and were more likely to have a formal intelligence unit compared to the SME's (Calof, 2020).

The discussion participants were asked to present themselves, to provide a brief description of the industry of their company, etc.

After collecting and clarifying the focus group interviews, content analysis was applied, resulting in the extraction of content units, the assignment of categories and the definition of the concept.

The qualitative component consisted of interviews with supervisors or team leads from each company's representatives, focusing on their use of AI tools, the scope of data analyzed, impacts on decision-making speed and accuracy, and integration challenges.

Data analysis was conducted through thematic analysis of the interview data to extract common themes and patterns regarding the integration and impact of AI tools. This was complemented by analysis of the survey data, quantifying improvements in decision-making processes attributable to AI.

The integration of findings from both data collection methods was achieved ensuring a comprehensive understanding of AI's role in enhancing decision-making across various business contexts. This methodological approach allows for a nuanced examination of how AI technologies are being implemented in competitive intelligence, providing insights into both the strategic advantages and the challenges faced by organizations in different industries.

RESULTS AND DISCUSSION

The results of the study show that the use of artificial intelligence in decision-making is becoming more and more important and has been steadily increasing over the past year. Every day, business people are faced with an increasing number of complex decisions that depend on information obtained from various data sources. Qualitative assessment of dynamic external factors can reduce the impact of unexpected changes, thus reducing the consequences of unpredictable events.

The study details how artificial intelligence is used for competitive intelligence and decision-making. The main problem identified is the uncertainty created by both competitive forces and global political economic conditions. However, respondents emphasize the need to focus primarily on these challenging issues.

Before the discussion, participants were asked to write down associations, which, in their view, are related to using AI for decision making and the impact of technologies.

The most pressing challenges for the discussion participants are associated with:
(1) impact of increased data volume on competitive information, e.g.,
Interviewee no. 4.: "Big data has multiple implications. While it provides greater insight into market trends and consumer behavior, it also requires time and expertise to ensure that this volume of data is aligned with our strategic goals."
Interviewee no. 9.: "…over time, we have developed more complex models that can quickly extract the necessary information from the obtained data."
(2) managing and prioritizing big data sets, e.g.,
Interviewee no. 2.: "We prioritize information, giving higher priority to aspects such as customer feedback and communication on social media. This provides feedback and allows us to make quick decisions."
Interviewee no. 10.: "Automation is key. We use automated systems to tag and classify data as it comes in, helping us focus on the most relevant solution."
(3) unverified data and reliability issues, e.g.,

Interviewee no. 9.: "Unverified data poses significant risks, especially misleading information. We have invested in training our AI to distinguish between reliable and questionable sources."
Interviewee no. 3.: "The most important thing is the speed with which we can check the information, without slowing down the time for making decisions."
(4) integration of AI in data analysis processes,
(5) the role of the human factor in an AI-driven environment, e.g.
Interviewee no. 1.: "Very important professional and experienced specialist who knows how to use modern technologies, data processing and interpretation."

These responses collectively illustrate the complex interplay between technology and human expertise to overcome today's competitive intelligence challenges. Each answer highlights the importance of integrating advanced technological tools with skilled human analytics to manage and maximize the benefits of vast data resources. Based on the content analysis of the interview data, the author obtains the following consolidated results:

1. Most respondents indicated that artificial intelligence tools enable faster sorting, labeling and classification of data, which greatly accelerates the initial stages of data analysis and helps quickly identify relevant information.
2. Respondents highlighted that artificial intelligence has not only improved the accuracy of data analysis, but also improved the predictive capabilities of competitive intelligence systems.
3. A significant challenge that emerged from the responses was the difficulty in managing the veracity and validation of big datasets.
4. Despite AI advances, the role of human analysts remains critical. Respondents often cited cases where human intervention was required to interpret and correct AI-generated insights, particularly in complex scenarios where contextual understanding was paramount.
5. AI handles day-to-day data analysis, allowing human analysts to focus on higher-level tasks that require creative thinking and deep contextual knowledge.

These results show that while artificial intelligence significantly improves competitive intelligence capabilities, careful management of technology and human resources is critical to realizing its full potential. The results of this research provide actionable insights that can help organizations optimize their competitive intelligence practices in an era of data abundance and technological advancement.

CONCLUSIONS

The results reveal two-sided effects of AI on CI. On the one hand, AI facilitates the acquisition and analysis of vast data sets, offering new solutions to complex problems. On the other hand, it exacerbates the problem of data reliability by generating or processing data that may be inaccurate, incomplete, or completely fabricated. The research emphasizes the increased reliance on human expertise to critically evaluate, justify, and implement the results of data analysis into organizational decision-making processes. It also points to a significant shift in analytics, where immediate, actionable insights have become harder to come by due to the complex testing required to ensure data validity.

LIMITATIONS AND IMPLICATIONS FOR RESEARCH

Neither conclusions regarding the reasons, nor generalizations can be made on the basis of these opinions or views, because the number of participants is small; the range of the expressed opinions, however, is wide enough to gain a picture on the various aspects of the investigated phenomenon.

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