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Cognitive and Psychological Obstructions to Information Quality in Competitive Intelligence

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ABSTRACT Innovative Competitive Intelligence (CI) solutions prioritize unconventional methods to tackle emerging challenges faced by decision-makers, diverging from traditional information flow regulation. This study examines the cognitive and psychological barriers impacting the CI process in small and medium-sized enterprises, focusing on how factors such as perception, trust, and employee engagement influence information quality and CI effectiveness. By analyzing various companies, the study identifies that psychological aspects provide a nuanced understanding of information quality, considering both objective measures and subjective perceptions. Findings reveal that information quality is a subjective construct, shaped by cognitive and psychological factors, which vary among individuals. Recognizing these factors is essential for developing and curating information that meets quality expectations, thereby fostering trust and enhancing communication effectiveness. High-quality information perception can lead to superior decision-making and competitive advantage. The integration of psychological factors into information quality management is crucial for developing user-centered information systems, which improve decision-making, user engagement, and adaptability, while reducing cognitive overload and promoting trust. This comprehensive approach ensures that information systems align with users' natural processing and utilization of information, leading to improved outcomes. In small and medium-sized companies, where employees play a critical role in the initial and final stages of CI - identifying information needs and making decisions - the knowledge embedded in employees is a valuable yet underutilized resource. Through in-depth interviews, this qualitative study highlights the significance of addressing cognitive and psychological barriers to enhance CI processes, thereby optimizing information intelligence management and contributing to the economic development and sustainability of these companies.

KEYWORDS: competitive intelligence; business psychology; information quality; information quality management; decision making; human factors

INTRODUCTION

A company can only keep its competitive advantage for a limited period unless it continually enhances its positioning, marketing, and research more effectively than its competitors (Dacula & Gelacio, 2023). At the end of the 20th century, Porter developed a theory that provided a valuable framework for competitive analysis (Martin, 2002). Today, while the rapid increase in the volume of information is no longer surprising, the emphasis on information quality and its management has become

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increasingly important. A company's competitive position becomes vulnerable when new competitors enter the market and offer similar products or services (Birkinshaw, 2022). Competitive Intelligence (CI) is a practical field focused on maintaining an accurate profile of an organization's current and potential competitors, customers, and suppliers, as well as their likely responses to perceived threats and opportunities. Companies can sustain their competitive advantage only for a limited period unless they continuously enhance their research and insights more effectively than their competitors.

The CI process is rarely a solo endeavor. “Analysts frequently work in groups or teams and benefit from the pooling of expertise” (Fleisher & Bensoussan, 2007). Typically, it involves teams working together to gather, analyze, and disseminate intelligence. Increasingly, companies are adopting various hybrid structures, such as project-based or matrix organizations. In these structures, employees from different organizational units collaborate, with participant selection based primarily on skills and competencies rather than the status in the organizational hierarchy (Cekuls, 2018). The human aspects of teamwork - such as trust, communication, and collaboration - are fundamental to the success of CI initiatives because they enable a more fluid and adaptive approach to problem-solving. In addition to these human factors, a hypothesis serves as a tool for thinking strategically about uncertainties and making sense of incomplete information, supporting effective decision-making (Cekuls, 2019a, Cekuls, 2019b). These hypotheses are not always formally developed, tested, or reformulated, instead, they are often adjusted in real time based on available evidence. In the context of CI, a hypothesis refers to a preliminary idea, assumption, or educated guess about a competitor's behavior, market dynamics, or future industry trends. Hypotheses are formulated based on available data and insights, guiding further research and analysis. Unlike in scientific research, where hypotheses are typically rigorously tested through controlled experiments, in CI, these assumptions are often more flexible and may be adjusted or refined in real-time as new information becomes available. This flexibility allows CI professionals to remain agile and responsive to changes in the competitive environment. Fleisher and Bensoussan, scientists in the field of CI, suggest that the adaptability in hypothesis formulation and adjustment reflects the fact that business and competitive analysis is more akin to social science than to physical or pure science (Fleisher & Bensoussan, 2007). It is a continuous process of asking and answering the "So What?" question, ensuring that the analysis remains relevant and actionable (Halliman, 2003).

PROBLEM STATEMENT

Competitive Intelligence is often linked with traditional forms of information services, which can diminish awareness of CI and reduce its role to mere tactical problem-solving. Observations suggest that in many organizations, employees primarily focus on collecting and distributing secondary information that supports traditional information services. This approach tends to be episodic and does not contribute effectively to early informational warnings. Employee knowledge is a crucial resource, especially during the initial stages of CI when an information need is identified and in the final stage when a decision is made (Frishammar, 2003). However, a key issue highlighted by researchers is that the knowledge residing in employees' minds is difficult to access and leverage.

Despite the growing role of Artificial Intelligence in generating information, employees remain the most important source of knowledge within a company, highlighting the value of human information over formal data. The routine extraction of large volumes of information can delay the recognition of critical trends, leading organizations to prioritize short-term tasks over long-term goals. This approach involves classifying needs and determining standard programs of action suited for immediate requirements. While such solutions may be effective in stable environments, modern organizations operate in rapidly changing contexts.

The quality of information is influenced not only by its source, accuracy, and timeliness but also by how it is perceived, interpreted, and utilized by employees and

managers. In a dynamic environment, the quality of information is crucial for decision-making, as it significantly impacts outcomes. Therefore, organizations must establish and adhere to information quality management principles to ensure reliable information at all levels of management (Rezaei et al., 2016).

Information is data that has meaning and shows how things are connected and consistent. In a capitalist economy, information is valued only when it can be used and sold or when it doesn't interfere with business costs (Mihajlović & Stanisavljević, 2022). Every day, business faces new challenges and changes. Success comes only if organization have enough information and persistence to overcome these obstacles and solve problems. Information quality is crucial in various domains to ensure that the information being used is accurate, reliable, and useful. However, an often-overlooked aspect of Information quality management is the influence of cognitive and psychological factors on how information is processed, assessed, and managed. Information quality is defined as the suitability of information for a specific purpose. It must be accurate, timely, complete, and reliable (Charantimath, 2022). In an organizational setting, confirmation bias can result in the selective gathering and interpretation of data, thereby compromising information quality. Information is valuable only if it meets the user's requirements and needs within a given context. To ensure such quality, company management must implement effective information quality management practices. By acquiring and validating information, organizations can develop new strategies, enhance processes, identify strengths, spot opportunities, and drive innovation.

While most data collected within an organization is valid, managing it can be challenging. Effective information management requires not only technological solutions but also an understanding of the cognitive and psychological factors that influence individuals' attitudes toward information. Since employees are the primary carriers and users of this information, addressing these factors is crucial for successful information management.

LITERATURE REVIEW

The synergy of psychological constructs and quality of information

Quality information is essential for making informed decisions, improving operational efficiency, and ensuring customer satisfaction. However, the quality of information and knowledge creation are influenced by psychological and cognitive factors that affect how individuals perceive, use, and manage information (Gilbreth, 2010).

Trust, motivation, cognitive load, and social factors are crucial elements to consider when designing and implementing information quality management systems. Organizations must focus on enhancing these aspects to ensure that decision-makers have access to high-quality information for effective decision-making. Effective leaders work hard to build teams and a corporate culture of inquiry, critical thinking and learning based on valid intelligence and counterintelligence. The goal is for intelligence to become second nature to policy formulation, decision-making and day-to-day operations (Martin, 2002).

To effectively navigate the maze of opportunities and risks and to use information for informed decision-making, organizations must continually improve their tools, processes, and technologies. Ensuring that the information used for CI is of high quality and useful for decision-making is crucial. Information quality management is an essential component for companies, as it ensures that all available information meets established quality criteria (Segoro & Sari, 2017). This management includes processes (such as data entry control and data integration), policies (such as data access rights and data management), and technologies designed to maintain and enhance the accuracy, timeliness, completeness, and reliability of information (Mendes & Jesus, 2018).

Scientists argue that organizations today must excel in communication management, risk management, and advanced technologies. Additionally, their members need to be free from paradigm traps and well-versed in the economic, political, religious, ideological, psychosocial, and cultural contexts of their target audiences (Martin, 2002). The challenges in delivering CI are complex, as CI professionals must evaluate and aggregate large volumes of information amidst an uncertain information flow. The rapid progress and intensity of science and technology intensify competition, highlighting the need for scientific analysis of this issue in both economics and psychology.

Cognitive and psychological aspects of information intelligence

Social and organizational factors, such as team dynamics, communication channels, and organizational culture, significantly influence information quality (Mas-Machuca et al., 2018). Today, information encompasses not only knowledge about products or services but also their emotional value and psychological aspects, which are challenging to define using specific criteria for information acquisition and analysis. Psychological aspects, such as perception and emotion, play a critical role in determining information quality. In the context of information overload and short attention spans, understanding the "invisible criteria" that affect information quality becomes strategically important. Krizan (1999) emphasizes that a company's informational needs, particularly when they are unique and urgent, must be interpreted or analyzed by CI specialists before being formulated into specific business information requirements.

The impact of personal beliefs on information interpretation

One of the most important factors in ensuring the quality of information is the perception of CI employees. Perception is a process in which individuals interpret and assign meaning to the quality of information based on perceptual selectivity. This means people tend to choose which information to accept and which to ignore, influenced by their prior beliefs and experiences (Malbašić et al., 2016). Individuals often search for, interpret, and remember information in ways that confirm their existing beliefs or decisions while ignoring or dismissing conflicting information. For example, if an information seeker has strong preconceptions about a particular event or phenomenon, they are more likely to focus on positive information and disregard negative information. Research shows that people prefer information that aligns with their prior beliefs and tend to overlook evidence that contradicts them (Lim et al., 2020). This selective perception can lead to a misjudgment of situations, as critical information inconsistent with existing beliefs may be ignored. Conversely, in cases of overconfidence, individuals may overestimate their ability to evaluate and interpret information, leading to an unreasonably high reliance on the obtained information, even if it is incomplete or inaccurate.

Employees sometimes perceive and use information to align with their personal or organizational interests and goals. This can result in important information being ignored or altered to fit predetermined outcomes (Matteucci, 2023). Similarly, the beliefs or values of the information user may conflict with the information received, causing critical competitive information to be misinterpreted or ignored. In such cases, the individual may experience discomfort and attempt to alleviate this tension by adjusting their perception of the information's quality. An employee's or manager's emotional state can also affect how they perceive and interpret information. For instance, stress or fear may cause them to focus on negative aspects, leading to exaggerated risk assessments or unnecessary concerns (Savioni et al., 2022).

Building trust for better information

Trust is a key psychological aspect of information quality management (Shuck et al., 2014). The results achieved by CI professionals largely depend on how much they trust their information sources. It is essential for ensuring the effectiveness of the CI process. When information sources are

perceived as reliable, employees are more likely to accept and use this information in their work. Research (Muhammad et al., 2021) has shown that a higher degree of trust between the source of information and the recipient significantly improves the perception and credibility of the information. When employees trust the source, they are more likely to consider the information as high-quality and reliable. This study demonstrates that trust in information sources not only enhances information perception but also leads to more effective information quality management within organizations.

Mutual trust among team members is also a crucial aspect of information quality management. Organizations with a high degree of trust between employees are better at ensuring the accuracy, timeliness, and relevance of information. However, researchers (Muhammad et al., 2021) caution that excessive trust can lead to biased information and decision-making. Therefore, it is important to maintain a balance between trust and critical thinking in managing information quality. This balance is a significant challenge for CI professionals, as it is essential to remain focused and communicate findings effectively to management, turning complex data into actionable insights. For a long time, researchers in the field of CI have emphasized that CI specialists must be well-trained to ensure an effective CI process, given the strategic importance of CI and its close connection to strategic decision-makers (Calof & Breakspeare, 1999).

The significance of trust in information management is further highlighted by studies showing that employees who trust the information provided by management are more inclined to use that information in their decision-making processes (McKnight, 2002). This finding underscores the critical role of trust in ensuring a smooth flow of high-quality information within organizations. Thus, building and maintaining trust, while avoiding the risks of over-reliance, is crucial for leveraging information as a strategic asset.

The level of employee involvement in an organization is another crucial factor that impacts the quality of the information obtained. Motivated employees are more likely to provide high-quality information and take an active role in maintaining it (Castelairo & Mendes, 2022). Motivation significantly influences how carefully individuals consider the quality of information. When employees are motivated and understand how quality information can improve their work and help achieve company goals, they are more attentive to the accuracy and completeness of the information (Dale et al., 2016).

The importance of reducing cognitive overload in CI

One of the most critical aspects of information quality management today is cognitive overload. Studies (Mendes et al., 2015; Shahrzadi et al., 2024) show that high cognitive load can lead to problems in information processing and result in errors, as exposing individuals to an excessive amount of information impairs their ability to make thoughtful and rational decisions. A large volume of information can lead to "paralysis in the analysis of information," where individuals either avoid making decisions or make poorly informed decisions because they feel overwhelmed (Shahrzadi et al., 2024). Information overload can strain individuals' cognitive capacity, making it difficult to distinguish between important and unimportant information for effective decision-making. However, a significant conclusion from the research is that while information overload increases cognitive load, high-quality information can mitigate this effect, even when large volumes of information are involved (Shahrzadi et al., 2024).

Organizations must ensure that their information systems are user-friendly and do not impose an excessive cognitive load. When information is clear, organized, and easily accessible, the decision-making process becomes more efficient. Conversely, complex and difficult-to-use information systems increase cognitive load and reduce the quality of information.

To enhance the perception and trust of information, companies should provide regular training for employees on the reliability of information sources, the importance of information quality, and effective management methods. This would

improve employees' skills in using information and foster critical thinking. Additionally, to build trust in information, companies should cultivate a culture of transparent communication, which includes open discussions about information sources, data collection methods, and quality control procedures.

When a company operates in a highly competitive industry with intensive implementation of innovative solutions and short deadlines for updating technical solutions, the CI team often experiences high information overload. Consequently, organizational management may quickly lose interest in the information provided. As a result, CI staff can become burdened with routine information tasks. Each situation, therefore, requires a unique interpretation and a tailored synthesis of the issues. In a negative scenario, avoiding the formalization and standardization of CI procedures and the information provided will become increasingly challenging.

Research on information overload in CI teams indicates that this issue is especially relevant in dynamic industries characterized by rapid innovation and technological changes. For instance, a study by Sun et al. (2023) on competitiveness in the digital age highlights that information overload can significantly impede effective information processing, particularly in the manufacturing and technology sectors, where the continuous influx of new data makes it challenging for teams to make optimal decisions. The Organization for Economic Co-operation and Development (OECD) also underscores that cognitive capacity limitations caused by information overload can lead to errors in information analysis and evaluation (Wang, 2020). Today, the role of artificial intelligence is being explored as a potential solution to mitigate the negative effects of information overload on CI teams.

As information evolves rapidly, particularly in high-tech industries, relying on previous needs assessments and standard solutions is no longer sufficient. Instead, a dynamic exchange of information is necessary. By considering the limitations of human perception, organizations can work to improve information quality and support better decision-making. Utilizing feedback mechanisms and trust-building strategies can help organizations effectively manage the psychological and cognitive factors impacting the CI process.

METHODOLOGY

The study focused on the cognitive and psychological barriers influencing the CI process (determining needs, collect and process data, analyze, disseminate intelligence, evaluate and control) by analyzing the situation in medium-sized companies. Small and medium-sized enterprises with 51-200 employees play a crucial role in the economic development of the country, contribute substantially to the creation of gross domestic product, and support employment. These companies are the main engine of the economy. Therefore, it is important to understand how information intelligence is managed in these companies. The topic under investigation (understanding competition, business information, etc.) is considered highly confidential among entrepreneurs and is closely related to the fundamental principles of organizational ethics. The purpose of the study is to understand the nature of the problem being investigated, rather than its numerical magnitude. To gather insights into the cognitive and psychological barriers influencing the CI process in medium-sized companies, the study utilized in-depth interviews. This qualitative method was chosen because it is particularly effective for exploring sensitive topics, such as those related to competitive intelligence and business information, which are often considered highly confidential by entrepreneurs. Information about the interview participants is summarized in Table 1.

Table 1. Informative description of interviewees

Interview's no.	Size of the company	Industry
Interview no. 1	small and medium	Health Care
Interview no. 2	small and medium	Transportation
Interview no. 3	small and medium	Health Care
Interview no. 4	small and medium	Logistics
Interview no. 5	small and medium	Retail Trade
Interview no. 6	small and medium	Transportation
Interview no. 7	small and medium	Wholesale

Data according to authors' research

Participants were carefully selected from a variety of industry sectors, including transportation, retail trade, and logistics, to ensure a diverse range of perspectives. The interviews were conducted in a one-on-one setting to provide a safe space for participants to share their experiences and insights openly. Open-ended questions were used to encourage detailed responses, allowing participants to discuss their experiences with the CI process, including how they determine needs, collect and process data, analyze information, disseminate intelligence, and evaluate and control the process. Once all interviews were conducted, content analysis was applied to the data. This involved extracting content units, categorizing the data, and defining key concepts related to the CI process. The content analysis aimed to identify common themes and patterns in the participants' responses, providing a deeper understanding of the barriers to effective CI in medium-sized companies. By using this approach, the study aimed to uncover valuable insights into the management of competitive intelligence within SMEs, focusing on understanding the qualitative aspects of the problem rather than merely measuring its prevalence.

RESULTS AND DISCUSSION

The performance of CI professionals is influenced by several key factors, particularly those related to social and organizational dynamics and psychological aspects. Effective collaboration and interactions within teams can enhance the quality of information shared and utilized. Clear and effective communication channels help in the timely and accurate dissemination of information. While trust is essential for effective information flow and acceptance, CI professionals must maintain a critical stance to avoid biases and ensure objective analysis. While trust is essential for effective information flow and acceptance, CI professionals must maintain a critical stance to avoid biases and ensure objective analysis. In the face of information overload and short attention spans, CI professionals need to identify the "invisible criteria" that affect information quality. This involves understanding the subtle, often unspoken factors that influence how information is perceived and utilized. Several statements explain a common cognitive bias known as "cognitive dissonance." This occurs when an individual encounters information that conflicts with their existing beliefs or assumptions. To reduce the discomfort caused by this contradiction, the person might question the accuracy of the new data or find justifications that align the new information with their existing beliefs. Individuals interpret and assign meaning to the quality of information based on selective perception, meaning they filter and prioritize information in ways that align with their existing beliefs and expectations. The results of the interviews revealed factors related to the cognitive and psychological barriers to information intelligence (Table 2).

Table 2. Interviews analysis

Content unit	Category	Concept
if the employee receives data that contradicts his assumptions, he may question the accuracy of this data or seek excuses to reduce the discomfort caused by the discrepancy between his assumptions and the information received	- intrapersonal contradictions - internal discomfort - cognitive dissonance	the role of perception in the stage of dissemination of results
the individual interprets and assigns meaning to the quality of information based on the selectivity of perception	- selectivity of perception - quality of information - interpretation of information	- the role of perception in the data collection stage - the importance of trusting information sources at the stage of data collection - the role of collaboration in the data collection stage
when sources of information are perceived as reliable, employees are more inclined to accept and use this information in their work	- reliability of sources - mutual trust - level of employee - involvement in the organization	- the role of mutual trust and confidence in the quality of information in all stages of CI
high information overload can lead to loss of interest	- cognitive load - perception	- data collection - data analysis - evaluation - results dissemination stage
mostly fragmented information is obtained	- selectivity of perception - quality of information - interpretation of information - confidence in the quality of information - cognitive load	- the role of perception in the data - collection stage - the importance of trusting information sources at the stage of data collection - the role of collaboration in the data collection stage
it takes someone who knows the situation and can interpret the information and integrate it into a coherent whole to make informed decisions	- selectivity of perception - quality of information - interpretation of information	- defining needs - data analysis stage - evaluation stage
information analysis is usually done by interpreting data from the general to the specific	- selectivity of perception - quality of information - confidence in the quality of information	- data analysis stage - evaluation stage - results dissemination stage
information often changes in real time	- quality of information - interpretation of information - cognitive load	- defining needs - competitive analysis planning - data collection stage
secondary information that supports traditional forms of information extraction is often collected and disseminated	- quality of information - interpretation of information - mutual trust - confidence in the quality of information	- competitive analysis planning - data collection
the quality of information is critical to decision making in a dynamic environment as it affects the outcome of decisions	- quality of information - interpretation of information - mutual trust - confidence in the quality of information	- defining needs - competitive analysis planning
cognitive overload can lead to stress, errors, decreased productivity, and impaired decision-making; the vast amount of data available from various sources - social media, market reports, news articles, competitor websites, and more - can be overwhelming. Filtering and processing relevant information can become challenging, leading to cognitive strain	- quality of information - interpretation of information - cognitive load	- data collection - data analysis - evaluation - results dissemination stage
information quality is defined as the appropriateness of the information for the specific purpose, it must be accurate, timely, complete and reliable	- quality of information - confidence in the quality of information	- defining needs

Data according to authors' research

In small and medium-sized companies, where employees play a critical role in the initial and final stages of CI - identifying information needs and making decisions - the knowledge embedded in employees is a valuable yet underutilized resource. CI professionals must work under conditions of high cognitive load, which is supplemented by the psychological aspects of work specificity. They frequently juggle multiple tasks, such as monitoring competitors, analyzing market trends, and reporting findings. This multitasking can divide attention and increase the cognitive load, reducing overall effectiveness. Additionally, many statements highlight the importance of perceived reliability in information sources. From the problems listed by respondents at the interviews, the following main problems were selected: (1) Information overload and attention span; (2) Balancing trust and critical thinking; (3) Psychological aspects of information quality; (4) Organizational factors. Psychological and cognitive aspects provide a comprehensive approach to evaluating information quality, focusing not just on objective measures, but also on how users perceive, trust, and interact with the information.

CONCLUSIONS

The CI process involves not only understanding the current state of the market but also anticipating future trends and disruptions. Therefore, CI is characterized by strategic foresight. In the face of information overload and short attention spans, CI professionals need to identify the "invisible criteria" that affect information quality. This involves understanding the subtle, often unspoken factors that influence how information is perceived and utilized. Effective CI involves scenario thinking, considering various possible futures. It helps eliminate scenario fragmentation, which is often a result of traditional information extraction methods that provide fragmented insights. For an organization to grow and develop, it is essential to interpret the gathered information and integrate it into a coherent whole. CI specialists must interpret the company's informational needs before these are formally articulated. This proactive approach helps in identifying unique and urgent information requirements effectively. However, research analysis shows that small and medium-sized companies often reject the opportunity to invest in CI development, opting instead for traditional methods of information acquisition. Employees tend to prioritize readily available information, even if it lacks comprehensiveness. This approach can result in information collection driven more by simplicity and convenience than by data quality. To address this information chaos, organizations need to develop robust and persistent CI skills. Continuous training for CI professionals is crucial, as CI has strategic importance and is closely tied to decision-making processes. Professionals must be equipped with skills to handle complex data and convert it into actionable insights.

To maintain competitiveness and help organizations model future events based on the analysis of past and current events, simply obtaining information is not enough. CI professionals must also develop cognitive abilities to effectively perceive information, manage cognitive load, and interpret data from the general to the specific in a focused manner. Reducing cognitive overload in competitive intelligence is essential for maintaining high-quality decision-making, efficiency, and employee well-being. To ensure effective competitive intelligence and safeguard the well-being of professionals, organizations must implement strategies to reduce cognitive overload. For example, prioritizing Information. Organizations should establish clear criteria for what information is most relevant to their strategic objectives. By focusing on key metrics and indicators, CI professionals can filter out noise and concentrate on valuable insights. This involves setting clear objectives for what the CI effort aims to achieve and aligning data collection with those goals. Establishing a structured CI

process with clear steps for data collection, analysis, and reporting can help manage cognitive load. Essentially, a CI professional bridges the gap between large volumes of information and targeted, future-focused solutions.

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