



**The Implication of
Business Intelligence toward Organizational Performance
with Moderating Variable of
Culture and Capability**

Affan Rizki INDRAJAYA

Sekolah Tinggi Manajemen IPMI

affan.indrajaya@ipmi.ac.id

Orcid: 0000-0001-8681-7887

Dr. Ir. Amelia Naim INDRAJAYA

Sekolah Tinggi Manajemen IPMI

amelia.naim@ipmi.ac.id

Orcid: 0000-0001-9021-902X

ABSTRACT

The emerging use of technology has been adopted in many types of industries and functions in the organization. Business Intelligence existed to provide a dashboard visualization that will help the decision maker manage their business strategically. However, the implementation of Business Intelligence has faced several barriers. The technical skills that are needed to support the system were lacking and led to miscommunication among the internal employees. This capability is essential to conduct the performance of Business Intelligence more effectively. On the other hand, companies need to address issues regarding the culture, especially from the top management support and clear vision & mission. A conducive culture that supports the Business Intelligence application will elevate its performance deeply. This study aims to analyze the effect of Business Intelligence on organizational performance based on the Balance Score Card (BSC). Furthermore, the novelty of this research is bringing the culture and capability aspect as the moderating variable to see the correlation between the two main variables. The primary data from a single case study company in the pharmaceutical industry will be collected to support the analysis. This conceptual research will be beneficial for leaders in order to formulate a strategy based on a data-driven approach. Moreover, the insight from the Business Intelligence application will make companies more agile in handling challenging factors such as the impact of COVID-19 and the war between Ukraine & Russia. It is expected that Business Intelligence will improve organizational performance and support companies in gaining a competitive advantage to face current and upcoming events.

Keywords: Business Intelligence, Culture, Capability, Organizational Performance

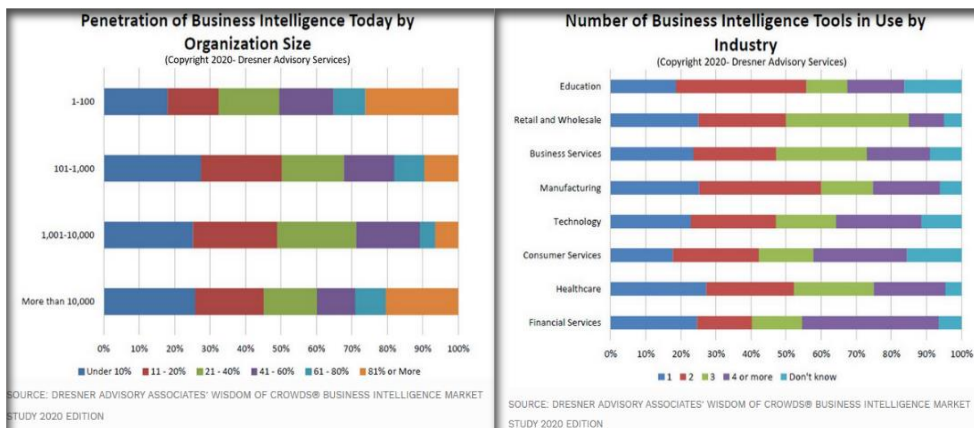
INTRODUCTION

The application of business intelligence has been emerging toward many types of industries. The concept has been proven to improve business decision making that utilize factual based data and computerized support system (Nylund, 1999). There is also evidence that shows the management support as a critical factor that influence the success of business intelligence system (Dawson & Belle, 2013). On the other hand, it is perceived that the level of skills from top management is becoming an obstacle for the implementation of business intelligence in the organization (Hartley & Saymour, 2015). Thus, top management should acquire a good technical skill to ensure a better quality of business intelligence system (Mulyani et al, 2016)

In the late 90's, the concept has been widely implemented in many sectors of companies to support the function in several levels and more importantly, the business growth. Business intelligence works as a tool to improve organizational performance through dashboard visualization that shows a structured layout to facilitate the decision making that are friendly, appealing, and easy to comprehend (Inmon, 2005).

The business value of business intelligence has been examined in performance measurement such as organizational benefit, business supplier/partner relation benefit, internal process efficiency benefit, and customer intelligence benefit (Elbashir, et al 2008). In this research, it will look through the benefit of business intelligence that might enhance the organizational performance in several aspects such as financial, internal process, customer and organizational capacity as stated in the balance score card. Moreover, the critical factor of business intelligence comes from the enabler, process, governance, and technology that plays an important role for the business performance (Abai et al, 2019). It links the development of business intelligence and analytic framework into organizational performance management in the public sector (Abai et al, 2019).

Graph 1.1



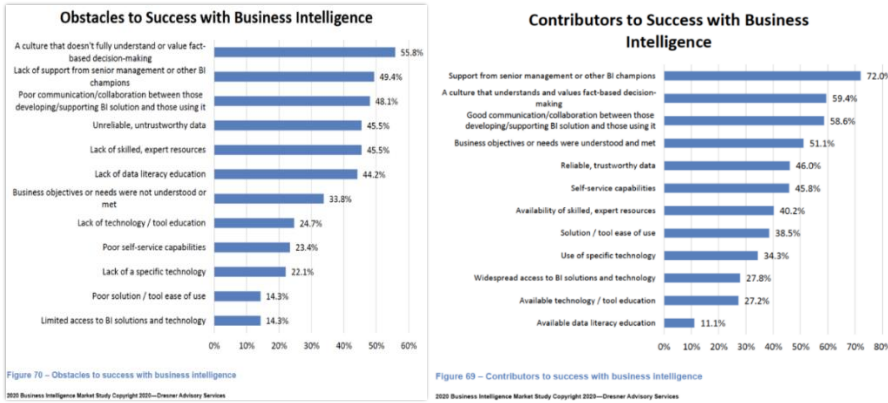
Source: Dresner Advisory Associates 2020 Edition

Dresner Advisory gives an overview of how business intelligence has already been implemented in the organization. Based on the graph above, even the smallest size of firm ranging for 1-100 employees has begun utilizing business intelligence. Moreover, business intelligence tools have been implemented in many types of industries from education, manufacturing, healthcare, financial services and many more.

The sponsorship or top-level management support plays a great role for implementing Business Intelligence. Based on the recent survey from Dresner Advisory below, the obstacles and contributor of success came from this executive management support, along with good culture

and communication. In this research, the culture in Indonesia will become a novelty to seek how it can influence the business intelligence in the organizational performance.

Graph 1.2



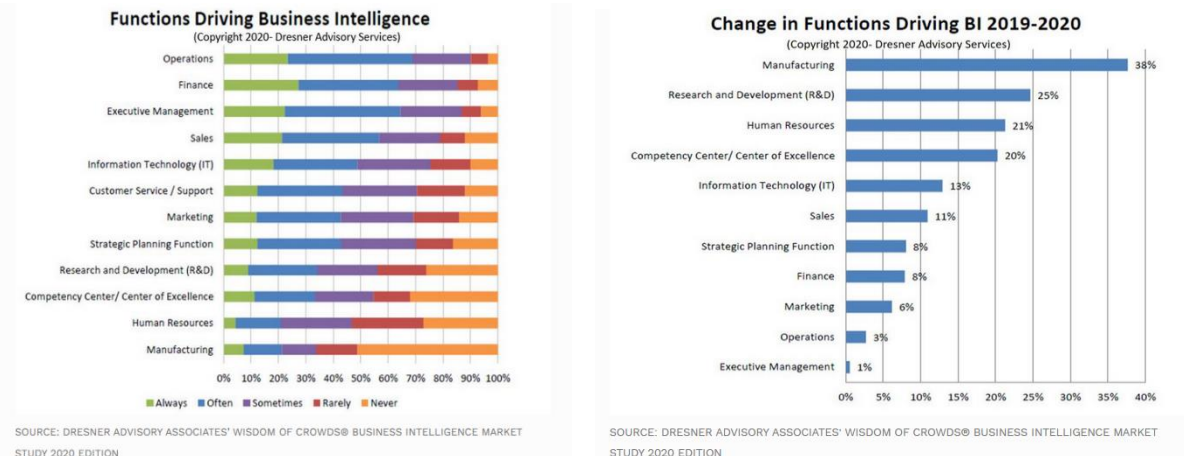
Source: Dresner Advisory Services 2020

On the other hand, the lack of technical competency has become an issue and the needs to develop sufficient skills for the staffs are crucial to assist users (Candra & Nainggolan, 2022). Even when the top-level support is essential to enhance Business Intelligence performance, their lack of knowledge will turn into an obstacle that will hinder the business intelligence system implementation (Mulyani et al, 2016). Hence, organization capability will give a moderating effect on how Business Intelligence is going to be utilized for the benefit of the organization.

To measure the organizational performance, Balance Score Card (BSC) will be measured to determine the impact of business intelligence. BSC is known to be an integrated management system because it combines several perspectives in the organizational strategy, and it is meant to connect the strategy and communication across departments (Kaplan & Norton, 2007). This research will seek further the effect of business intelligence to improve the organizational performance based on the BSC.

Based on the Dresner Advisory Services 2020, there are the critical success and barrier factors in implementing Business Intelligence in the organization. However, both elements in the factors are considered the top three issue crossing with each other. Furthermore, the lack of knowledge and technical competencies remains an important issue in the business intelligence implementation (Candra & Nainggolan, 2022). The awareness on enhancing this capability within the company is crucial.

Graph 1.3



Based on the graph mentioned by Dresner Advisory Associate above, many functions in the organization will greatly benefit from business intelligence. Nevertheless, only several types of functions began to adopt its utilization such as Operations, Finance, Marketing & Sales while they should realize the change in function is substantial even for lowest adaptor of business intelligence (For instance: Manufacturing). In addition, top management support, clear vision & mission and socialization throughout the company remains critical to guarantee the success of business intelligent system implementation (Mulyani et al, 2016).

- **LITERATURE REVIEW**

- 1.1 Business Intelligence**

- Business intelligence can be defined as the implementation of data analysis from historical performance to improve business decisions by utilizing information from multiple sources to understand the business dynamics (Maria, 2005). Business Intelligence will conceptualize the information into a dashboard visualization that are user friendly, easy to understand, and appealing that will support leaders in the organization to make a strategic decision that will drive the organizational performance (Inmon, 2005). Last, business intelligence can be described as an architecture and accumulation of operation, decision-support application and database which will give business community easy access to use business data (Moss and Atre, 2003).

- 1.2 Organization Culture**

- Organizational culture is the collection of values and behaviors that will support the unique social and psychological environment of the company (Economic Lexicon, 2011). Furthermore, organizational culture is based on shared belief, attitude, and custom whether it is written or unwritten which is transformed overtime and deemed valid by all employee within the organization (Bach et al, 2018).

- 1. Organization Capability**

- Organization capability refers to the intangible strategic assets such as firm ability to develop competencies in order to react effectively toward its environment (Kangas, 1999). In other words, it centers on competence where it emerges from an objective to combine specific resources for supporting company in a given task (Mc Grath et al, 1995). In this research, it will follow through the measurement from the STD (Sensing, Transforming, Driving) model as the business intelligence capability that will facilitates firm in improving its performance (Chen and Lin, 2021).

- 2. Organizational Performance (Balance Score Card)**

- The concept of BSC from the very beginning aims to evaluate various perspective of firm's performance (Kaplan & Norton, 2000). In this VUCA era, organizational performance explains the company's ability to achieve its goal and objective in a state of constant change. Moreover, BSC is useful in managing the tangible and intangible asset of the company (Anantadjaya, 2007; Kaplan and Norton, 2007). The research will further measure its performance by using Balance Score Card (BSC) in terms of financial, business process, learning & growth, and customer in the company.

- 3. Business Intelligence & Analytics**

- These terms explain further the action on how business intelligence put into the practice in the organization. Business Intelligence & Analytics system according to recent studies facilitate the companies to create value and obtaining competitive advantage. (Conboy et al, 2020; Larson & Chang, 2016).

- 4. DeLone and McLean Information System (IS) Success Model**

This IS success model is the most cited literature when discussing the implementation of information system. There are six important factors in DeLone and Mclean IS success model which are system quality, information quality, service quality, system use, user satisfaction, and net benefits (DeLone and McLean, 2016).

5. **Business Analytics**

Business analytics can be defined as delivering the right decision to facilitate the right people at the right time (Bronzo et al, 2013). It executes the processing of data collection, data analysis, and data transformation to support decision maker with the help of its user and technology aspect (Kaplan, 2001).

1.8 Previous Research

Integrating Business Intelligence and Analytics in Managing Public Sector Performance: An Empirical Study (Abai et al, 2019)

Case study on the implementation of business intelligence, business analytics, and OPM (Organizational Performance Management) to determine the critical factors in measuring Business Intelligence. All of the important terms might be included in the general theory to support the research.

Understanding Business Intelligence and Analytics System Success from Various Business Sectors in Indonesia (Candra & Nainggolan, 2022)

The research found out that lack of knowledge and technical competencies from staff influence the guaranteed satisfaction of implementing business intelligence. The moderating effect of “Organization Capability” has been added to understand more the causality effect of this research.

The Effect of Clarity of Business Vision and Top Management Support on The Quality of Business Intelligent Systems: Evidence from Indonesia (Mulyani et al, 2016)

The evidence stated that the clarity of business vision greatly affects the quality of business intelligent system. However, top management support works contrary. The limitation of study might explain this conclusion due to the sampling methods from people works in the financial institution in Medan. Again, the moderating effect of “Organization Culture” influence the research as Top Management Support has different effect compared to the general phenomenon.

• **CONCEPTUAL FRAMEWORK**

2.1 Research Problem

There are two main reasons for the moderating effect has becoming the crucial issue in business intelligence implementation. First, the effect of culture that can promote or hinder the business intelligence implementation. Survey from Dresner Advisory has stated that top level management support (sponsorship), communication and culture play the most influential factor on bringing a better business intelligence application. However, companies are still reluctant on analyzing this issue. The needs to overcome this barrier should be addressed swiftly in order for business intelligence result will align with the company’s vision and mission.

On the other hand, the lack of knowledge and competencies in understanding business intelligence also play a significant role. Based on the previous research (Candra & Nainggolan, 2022; Mulyani et al 2016), either the technical support or senior member in the organization have not yet grasped the essence of business intelligence and apply it fully for the benefit of the company. Therefore, a mislead communication will occur in managing the data due to this issue. Every member in the organization should have been given the opportunity to excel in

their business intelligence comprehension by attending regular scheduled training to increase their computer skills and grasp the advantage of business intelligent system tools (Candra & Nainggolan, 2022).

2.2 Research Questions

According to the research background, this research is expected to answer these questions:

- How does business intelligence effect the organizational performance?
- How does organization culture moderate the relationship effect of business intelligence and organizational performance?
- How does organization capability moderate the relationship effect of business intelligence and organizational performance?

2.3 Research Objectives

According to the research problem, the research objectives are as follows:

- To analyze the effect of business intelligence in organizational performance.
- To analyze the moderating effect of organization culture in the research proposal.
- To analyze the moderating effect of organization capability in the research proposal.

2.4 Research Benefit

This research is expected to gain several benefits that will be described as follows:

- Formulate strategy for leaders in company to make a decision based on data-driven and real time approach.
- Increase awareness of the benefit in business intelligence application in the company.
- Identify the culture and capability constraint that impact the business intelligence implementation in the organization.
- Gain competitive advantage and unique value proposition by utilizing business intelligence with the support of technology in Industry 4.0.
- Company will adapt better with the implementation of business intelligence due to the turbulence in the VUCA era especially with the disruption of technology and externalities factors such as COVID-19 and Ukraine & Russia war.

3. METHODOLOGY

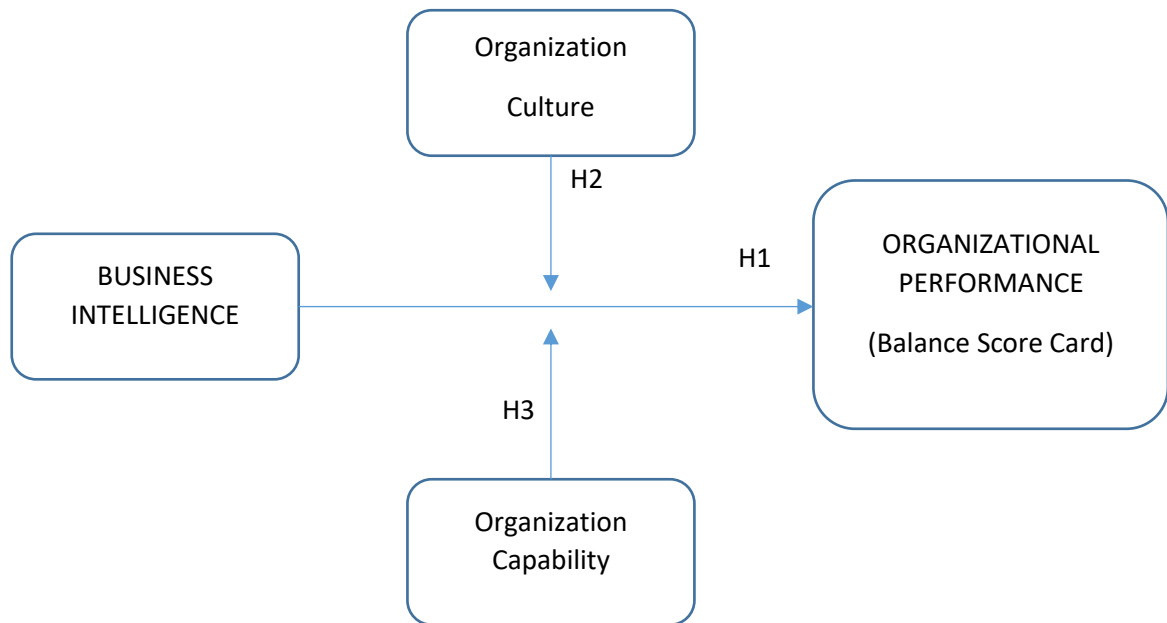
This is conceptual research based on the literature review and previous research. Arguments and propositions are derived based on previous researchers as a powerful means of theory building.

4. FINDING & DISCUSSION

Based on the previous research, it has been elaborated on how the organizational culture and capability give any impact toward the implementation of business intelligence. Organizational culture setting is required to achieve higher level of business intelligence maturity which will lead to an improved organizational performance (Bach et al, 2018). A clear business vision and top management support have a significant impact toward business intelligence implementation even though there is some issue regarding the technical skills from the senior staff (Mulyani et al, 2016). It is also supported by the evidence of how organization needs to evaluate, develop, and empower set of skills of competencies for technical staff to assist users (Candra & Nainggolan, 2022). Last, business intelligence capabilities should be integrated in strategic management to support the business more effectively to improve the organizational performance (Chen & Lin, 2021).

Research Framework

Table 1: Conceptual Framework



Source: Author (2022)

Development of the Proposition

Based on the research framework, the proposition will be derived as follows:

Proposition 1

Business intelligence has positive effect on organizational performance based on the Balance Score Card (BSC).

Proposition 2

Organization culture moderate the relationship between business intelligence and organizational performance.

Proposition 3

Organization capability moderate the relationship between business intelligence and organizational performance.

CONCLUSION

This study tries to explain the impact of business intelligence application toward organizational performance. Culture and capability stand as the moderating variable that will affect the relationship between both variables. However, there is a limitation due to the single case study that will be observed in a company from the pharmaceutical industry. Due to the model that has not been validated, a combination between qualitative and quantitative research will be applied to support the analysis.

The limitation of this study also lies in the lack of empirical research. Future empirical work should be conducted to have a more rigorous approach.

REFERENCE

- Abai, N. H. Z., Yahaya, J., Deraman, A., Hamdan, A. R., Mansor, Z., & Jusoh, Y. Y. (2019). Integrating Business Intelligence and Analytics in Managing Public Sector Performance: An Empirical Study. *International Journal on Advanced Science, Engineering and Information Technology*, 9(1), 172-180.
- Anantadjaya, Sam PD (2007), "Financial Aspects of HR Scorecard & Business Process Evaluation: An Empirical Study in Retail & Service Industries", proceeding, The 4th International Annual Symposium on Management, Universitas Surabaya, March 2007, ISBN # 978-979-99365-1-6, p. 80-98. Available online at www.ssrn.com.
- Bach, M. P., Jaklič, J., & Vugec, D. S. (2018). Understanding impact of business intelligence to organizational performance using cluster analysis: does culture matter?. *International Journal of Information Systems and Project Management*, 6(3), 63-86.
- Bronzo, M., de Resende, P. T. V., de Oliveira, M. P. V., McCormack, K. P., de Sousa, P. R., & Ferreira, R. L. (2013). Improving performance aligning business analytics with process orientation. *International Journal of information management*, 33(2), 300-307.
- Candra, S., & Nainggolan, A. (2022). Understanding Business Intelligence and Analytics System Success from Various Business Sectors in Indonesia. *CommIT (Communication and Information Technology) Journal*, 16(1), 37-52.
- Chen, Y., & Lin, Z. (2021). Business intelligence capabilities and firm performance: A study in China. *International Journal of Information Management*, 57, 102232.
- Conboy, K., Mikalef, P., Dennehy, D., & Krogstie, J. (2020). Using business analytics to enhance dynamic capabilities in operations research: A case analysis and research agenda. *European Journal of Operational Research*, 281(3), 656-672.
- Dawson, L. and J.P.V. Belle, (2013). Critical success factors for business intelligence in the South African financial services sector. *SA. J. Inf. Manage.*, 15: 1-12.
- DeLone, W. H., & McLean, E. R. (2016). Information systems success measurement. *Foundations and Trends® in Information Systems*, 2(1), 1-116.
- Economic lexicon. (2011). Organizational culture, 2nd ed. Zagreb, Croatia: Leksikografski zavod Miroslav Krleža & Masmmedia.
- Elbashir, M. Z., Collier, P. A., & Davern, M. J. (2008). Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. *International journal of accounting information systems*, 9(3), 135-153.
- Hartley, M.K. and L.F. Saymour, (2015). Beyond development Time for a new ICT4D paradigm?. Proceedings of the 9th IDIA Conference on International Development Informatics Association (IDIA), November 10-11, 2015, Zanzibar Publishers, Nungwi, Tanzania, pp: 249-265.
- Inmon, W. H. (2005). *Building the data warehouse*. John wiley & sons.
- Kangas, K. (1999). Competency & capabilities-based competition and the role of information technology: the case of trading by a Finland-based firm to Russia. *Journal of Information Technology Case and Application Research*, 1(2), 4-22
- Kaplan, R. S. (2001). Strategic performance measurement and management in nonprofit organizations. *Nonprofit management and Leadership*, 11(3), 353-370.
- Kaplan, R. S., & Norton, D. P. (2000). *The Balanced Scorecard: Translating Strategy into Action*. Boston, Massachusetts, USA: Harvard Business School Press.
- Kaplan, R. S., & Norton, D. P. (2007). *Using the Balanced Scorecard as a Strategic Management Systems*. Harvard Business Review
- Larson, D., & Chang, V. (2016). A review and future direction of agile, business intelligence, analytics and data science. *International Journal of Information Management*, 36(5), 700-710.
- Maria, F. (2005). Improving the utilization of external strategic information. *Tampere University of Technology, Master of Science Thesis*.
- McGrath, R. G., MacMillan, I. C., & Venkataraman, S. (1995). Defining and developing competence: A strategic process paradigm. *Strategic management journal*, 16(4), 251-275.
- Moss, L. T., & Atre, S. (2003). *Business intelligence roadmap: the complete project lifecycle for decision-support applications*. Addison-Wesley Professional.



5th International CEO Communication, Economics, Organization & Social Sciences Congress

- Mulyani, S., Darma, J., & Sukmadilaga, C. (2016). The effect of clarity of business vision and top management support on the quality of business intelligence systems: Evidence from Indonesia. *Asian Journal of Information Technology*, 15(16), 2958-2964.
- Nylund, A. (1999). Tracing the BI family tree. *Knowledge Management*, 60, 70-71.
- Sugiyono (2007) Statistika Untuk Penelitian. Cetakan Keduabelas. Bandung: Alfabeta.