

## **Determinants of Organizational Capabilities and Its Impact on Corporate Performance in the Current Era of Big Data**

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**Abstract.** Heterogenous datasets, otherwise known as big data, has grown to include different quantities and types of information, thus revolutionizing knowledge management in organizations and old business models by allowing managers to know about their competitors, organization, and customers. Human resources (HR) related challenges in managing them are techniques that tend to be effective because companies must ultimately find unique ways to attract, retain, and motivate employees that are more difficult for competitors to imitate. This study reveals how organizational capabilities of companies are at risk of being affected by overlapping issues in big data management.

This research was conducted using quantitative research methods. Data was collected from 678 middle managers and was then analysed using structural equation modelling. Results show that requirements such as Manufacturing Capability, Managerial Capability, Marketing Capability, Learning Capability, Technology Capability, Inter-Organizational Communication, and Integrative Capability simultaneously and partially affected corporate performance. The study ultimately provides empirical proof of the studied topic and acts as information for stakeholders and company management in inventorying alternatives to improving company performance by studying determinants of organizational capacity.

**Keywords:** Organizational Capability, Inter-Organizational Communication, Corporate Performance, Big Data.

## 1. Introduction

Data surrounds everyone in their daily lives (Ghasemaghaei & Calic, 2019a; Gobble, 2013; Im et al., 2013; Zhuravleva, 2019). The emergence of big data as a new instrument for technical innovation is also fast changing the way we view the world (Ghasemaghaei & Calic, 2019b; Symons & Alvarado, 2016; Yadi et al., 2019) and is even expected to usher in a new period of managerial change (Fosso Wamba et al., 2019; McAfee & Brynjolfsson, 2012; Tunstall, 2007). The adoption of big data is caused by internal factors such as managerial transformation (Fosso Wamba et al., 2019; Gil-Gomez et al., 2020; McNabb & Barnowe, 2009), or external ones such as technological barriers and digital competition (Abdulkarim, 2018; Ruel et al., 2021; Singh & El-Kassar, 2019a). When institutions and policy changes merge in unexpected and uncontrolled ways, needs and opportunities coexist (Busaibe et al., 2017; Mirzania, 2019; Schot & Steinmueller, 2018). The knowledge management of organizations and old business models are also being revolutionized by the emergence of heterogeneous datasets, referred to herein as big data (Khan & Vorley, 2017; Pauleen & Wang, 2017) and has since allowed managers to have knowledge about their competitors, organization, and customers (Zhang, et al., 2017). Only when companies effectively and creatively manage the challenge pressures of this revolution will they be able to reap the competitive benefits of moving to big data (Carayannis et al., 2017; Hanelt et al., 2021; McAfee & Brynjolfsson, 2012; Mikalef et al., 2018). Some studies (Acharya, 2021; Fosso Wamba et al., 2019; Singh & El-Kassar, 2019b) outline five things that best represent the main contrast in big data: 1) "Volume", wherein a sizable volume of data that businesses can be used from a variety of independent sources; 2) "Speed", where data is produced quickly, allowing businesses to check information that is current or almost up to date; 3) "Veracity", where data is created from a variety of sources and formats, including signals from sensors, social media photos, and cell phone signal; 4) "Value", which outlines the importance of gaining financial benefits from the big data available; and 5) "Truth", which is the value of high-quality data and the degree of trust in the data source.

Human resources personnel in organizations map general goals and priorities, plan work processes, produce goods and/or services, track efficiency, allocate financial resources, and sell goods and/or services (Bratton et al., 2017). HR personnel are one of the most important and vital organizational resources for organizational success due to the increasingly high competition between organizations in the fight for efficient and talented human resources (A. M. Obeidat et al., 2018); (Törstena et al., 2019).

The better the performance of human resources are, the better the overall performance of the organization. The most potential factor in achieving competitive advantage for the company is the provision of human resources (HR) and is also ultimately related to its management (Rusdin, 2015); (Tahir et al., 2019).

Human resources management is a technique that tends to be effective, because it is the most effective strategy for companies in finding unique ways to attract, retain, and motivate employees that are more difficult for competitors to imitate (Rusdin, 2015); (Tahir et al., 2019). Therefore, an organization must have good employees to solve the necessary tasks (Andry, J.

F. et al., 2020; Mello, 2017; Urlich, 2018). Nevertheless, discretionary activities are directed at learning and promoting employee engagement, participation, knowledge sharing, and acceptance of failures (A. Obeidat & Otibi, 2015).

Symptoms may also appear to be related to the condition of organizational capability which are already good, but are not optimal. Said conditions can be seen manifesting from the following: 1) Manufacturing Capability; 2) Managerial Capability; 3) Marketing Capability; 4) Learning Capability; 5) Technology Capability; 6) Inter-Organizational Communication; and 7) Integrative Capability. These symptoms indicate that the organizational capability of companies that have carried out stock issuance is still weak. If allowed, it is suspected that these will have an effect on declining organizational performance.

Furthermore, if associated with the results from Serrano & Robledo (2013) the capabilities of the organization thus support the achievement of the company's goals of systemic innovation, which is the

result of strategic and operational management. Such capabilities must then be identified in each dimension of the organization to respond and adapt to the changing environment, thereby enabling relationships with systems of innovation and the creation and dissemination of knowledge that contribute to technology, economy, and social development (Serrano & Robledo, 2013; Amini & Pirali, 2016; Chatzoglou & Chatzoudes, 2018; Yao & Qin, 2016).

The seven categories of technological innovation capacity that are the basic building blocks of the innovation presented, are adapted into the context of HEIs context and are defined as follows:

(1) R&D capabilities - organizational skills for idea creation, strategy, implementation, project portfolio management and R&D transfer;

(2) Production ability - organizational skills to turn R&D results into products;

(3) Strategic planning ability: organizational skills to establish policies, programs, and strategies for development and implementation in accordance with the company's vision and mission, determined by its context;

(4) Organizational relationship ability - organizational skills for effective interaction in permanent integration with innovation system actors at the local, national and international levels;

(5) Organizational learning ability - organizational skills to manage knowledge and build learning organizations;

(6) Resource management ability - organizational skills to manage, acquire and allocate resources appropriately for innovative development; and

(7) Marketing ability - organizational skills to advertise and sell research products, innovation based on understanding the needs of society, costs, benefits, competitive environment, and acceptance of innovation (Serrano & Robledo, 2013).

Although the innovation of the enterprise is widely known as a means of improving the performance of the organization (Liao, et., al., 2017), many companies are unable to develop it well enough, so researchers instead focus on what allows companies to develop innovations, looking for answers beyond the semi-automatic stimulus-response process (Zollo dan Winter, 2012). Many studies thus focus on the analysis of organizational factors. In this case, these studies highlight the simultaneous influence of both types of factors, Organizational Learning and Organizational Capabilities (Latemore, 2014; Edú-Valsania et al., 2016; Chang, 2016). Furthermore, the influence of these two variables improves organizational performance by implementing sources of knowledge into an organization (Liao, et., al., 2017).

This research provides practical and theoretical contributions by forwarding empirical proof in forming a capability model and by becoming a study for companies in inventorying alternatives to increase company capability by paying attention to dimensions of capability. The literature review shows that this kind of research has not been carried out in related dimensions such as Manufacturing Capability, Managerial Capability, Marketing Capability, Learning Capability, Technology Capability, Inter-Organizational Communication, Integrative Capability, and Cultural Co-Evolution, which are of specific important to public companies in countries such as Indonesia.

## **2. Literature Review**

According to McAfee & Brynjolfsson (2012), big data is revolutionizing management practices and management research, which has increasingly gained attention in the academic literature (see also Fosso Wamba et al., 2019). A lot of research on the extraction of value from big data has been done. For example, Singh & El-Kassar (2019b) developed a holistic model and found that big data and predictive analytics positively influenced organizational performance. Dubey et al., (2019) found that big data analytics capabilities had a significant positive effect on supplychain agility and competitive advantage based on data from Indian automotive component manufacturing organizations.

Fosso Wamba et al. (2019) using data from 302 business analysts in France and the US, found that the general quality of information in big data analytics also had a significant favorable impact on

company performance (see also Fitriati & Mulyani, 2015; Masri et al., 2020). Acharya (2021) found that big data helped in the co-creation of data-driven knowledge from four fashion retail organizations. Although previous research has found that big data creates transparency, allows experiments to find necessary needs, group populations to adapt to action, support human decision-making, innovate in new businesses, and jointly create (Acharya, 2021; Fosso Wamba et al., 2019; Singh & El-Kassar, 2019b), some of them concentrate on talent management in the era of big data, such as McAfee & Brynjolfsson (2012). As data becomes more affordable and available, they must also deviate from their conventional quality, as shown in the great "5 Vs" that characterizes the era of big data: Volume, Velocity, Variety, Value, and Veracity, which revolutionized everything, talent management is very important in an organization (Acharya, 2021; McAfee & Brynjolfsson, 2012). Thunnissen (2016) also discusses what is really happening in talent management to help build a more comprehensive and comprehensive ethical theoretic framework for talent management that takes into account the influence of interconnected organizational contexts and actors.

Due to the enormous numbers, rapid changes, wide variance, high degree of uncertainty, and wide ambiguity of data, big data has caused people to face higher pressures in the workplace. To explain the impact of stressors, scientists have recently developed a framework for dealing with challenges, arguing that understanding the nature of stressors is critical to understanding their impacts. (Bakker & Costa, 2014; Tetrick & Winslow, 2015; Tongchaiprasit & Ariyabuddhiphongs, 2016). Likewise, Sadowski (2019) views that it may be more effective to assess the purpose, use, and effects of datafication as a political economy regime by conceptualizing data as a form of capital. A person's perception of his work environment in terms of the level of demands, such as role conflicts, role ambiguity, politics, bureaucracy, and job insecurity, is referred to herein as "stressors" (Garg & Dhar, 2014; Wang et al., 2018). For Lamb & Kwok (2016), environmental stress decreases a person's ability to think clearly while working and their productivity by reducing motivation. Work performance decreases almost linearly as the number of stress variables increases, proving that environmental stress factors are additive rather than multiplicative. Significant changes and challenges are commonplace in the management revolution; these may be seen as ultimately triggering challenges (Aikens et al., 2014; Randmaa et al., 2014; Tetrick & Winslow, 2015).

Following the importance of human resources that have been described earlier, changes to the organization are also issues that must be fixed along with technological developments and environmental changes that are likewise increasingly rapid (Hamdi, 2018). The purpose of organizational change is to modify procedures and systems, organizational structures and responsibilities, and skills (Gupta, 2017). In this new construction, the manager must support the employee to go through the changes (Hao & Yazdanifard, 2015). Organizational change, as it is widely known today, is how to manage a change in the company's organization, how technology is needed in changing an organization in the era of globalization, and how important training is for employees when facing changes in the company (Rosyida, Raharja, and Tahir, 2020).

### **3. Research Method**

Employee information data was obtained from 678 Indonesia companies going public. The "big data driven" agenda as underlined in their public documents. The replication of big data-based strategies give manufacturing and service companies a competitive advantage in today's era of the management revolution (McAfee & Brynjolfsson, 2012), with business leaders urging their companies to adopt big data strategies as its benefits become increasingly apparent (Gobble, 2013; Wamba et al., 2020).

To minimize common methods bias, we used a set of questionnaires to collect data from a variety of sources obtained from middle managers. Each manager as asked to fill out a questionnaire that simultaneously assessed Manufacturing Capability, Managerial Capability, Marketing Capability, Learning Capability, Technology Capability, Inter-Organizational Communication, and Integrative Capability, which partially affect organizational performance. Additionally, the questionnaire extracted

data about demographic information about middle managers, including their gender and educational background.

Respondents rated the measure on a 5-point Likert scale consisting of the following: Strongly Disagree (1), Disagree (2), Hesitate (3), Agree (4) and Strongly Agree (5). The table below measures each indicator of organizational capabilities using a Likert scale referring to the study H. Zhang et al., (2014) for all dimensions.

Table 1 Dimension and Indicator of Organizational Capability

No	Dimensions	Indicators
1	Manufacturing Capability (8 Indicators)	<ol style="list-style-type: none"> <li>1. Provides a wide range of products</li> <li>2. Customizes product mix</li> <li>3. Provides fast delivery</li> <li>4. Minimizes manufacturing time</li> <li>5. Meets changing demand needs</li> <li>6. Provides a reliable process to produce quality products</li> <li>7. Provides quality products minimizing production costs,</li> <li>8. Inventorying of management costs</li> </ol>
2	Measuring Managerial Capability (5 Indicators)	<ol style="list-style-type: none"> <li>1. Motivates employees to improve performance</li> <li>2. Improves coordination among all parts of the organization</li> <li>3. Accurately assesses the opportunities and threats of the organization</li> <li>4. Achieves good overall control over the performance of the organization in general</li> <li>5. Manages a good social network of customers, competitors, supply chain members and government officials</li> </ol>
3	Marketing Capability (4 Indicators)	<ol style="list-style-type: none"> <li>1. Develops various marketing techniques and sales strategies to reach customers,</li> <li>2. Informs, persuades, and reminds customers directly or indirectly about the product</li> <li>3. Conducts market research</li> <li>4. Sets prices</li> </ol>
4	Learning Capability (2 Indicators)	<ol style="list-style-type: none"> <li>1. Has the will to continue learning</li> <li>2. Develops oneself and has the same goal of advancing the organization</li> </ol>
5	Technology Capability (6 Indicators)	<ol style="list-style-type: none"> <li>1. Engages in technology research and development activities</li> <li>2. Provides regular training to improve the technical abilities of employees</li> <li>3. Overcomes various technological barriers</li> <li>4. Takes advantage of opportunities by using technology</li> <li>5. Conducts assessments by utilizing technology</li> <li>6. Improves performance by using technology</li> <li>7. Develops oneself to always be ready in the application of future technology</li> </ol>
6	Inter-organizational communication (2 Indicators)	<ol style="list-style-type: none"> <li>1. Continuously maintains communication between departments and organizational colleagues</li> <li>2. Exchanges the necessary information</li> </ol>
7	Integrative Capability (4 Indicators)	<ol style="list-style-type: none"> <li>1. Provides resources to partners to achieve common goals,</li> <li>2. Ensures the resources provided in the partnership relationship can be operationally beneficial,</li> <li>3. Maximizes the strength of the organization to achieve the objectives</li> </ol>

		4. Efficiently completes operational tasks
8	Cultural co-evolution (4 Indicators)	1. Adapts culture and values in the organization 2. Aligns values with partners 3. Handles business with partners 4. Adapts to emerging changes to achieve sustainable Joint development

This scale was applied commonly throughout earlier studies (Sonntag & Fritz, 2015; Wheelock et al., 2015). The Cronbach’s alpha measured some of the above dimensions with the following result can be seen on the below table:

Table 2. Standard Criteria for Instrument Validity and Reliability Test

Validity	Reliability	Model
.5	.8	Good
.3	.7	Acceptable
.2	.6	Marginal
.1	.5	Poor

Using the route analysis method, our hypothesis was tested, and a bootstrap study was conducted to determine the significance of the indirect effect. SPSS was used to measure the model, mediation, and moderated mediation. Significance tests were performed for indirect effects using bias-corrected confidence intervals originating from 5,000 bootstrap samples.

#### 4. Results and Discussion

Table 3. Alpha Cronbach measurement

No	Dimensions	Alpha Cronbach measurement Result	Reliability Test Conclusion
1	Manufacturing Capability	.87	Reliable
2	Measuring Managerial Capability	.92	Reliable
3	Marketing Capability	.78	Reliable
4	Learning Capability	.89	Reliable
6	Inter- organizational communication	.93	Reliable
7	Integrative Capability	.78	Reliable
8	Cultural co- evolution	.89	Reliable

Sources: Output SPSS (2022)

Note: Cronbach’s alpha is a statistical method commonly used to demonstrate that tests and scales that have been constructed or adopted for research projects are fit for their purpose.

Table 4. Organizational Capability Validity Test Results

Questionnaire Items	Validity Value	Sig. Level	Validity Test Conclusion
OrCp1	.591**	.000	Valid
OrCp2	.534**	.000	Valid
OrCp3	.571**	.000	Valid
OrCp4	.588**	.000	Valid
OrCp5	.472**	.000	Valid
OrCp6	.604**	.000	Valid
OrCp7	.678**	.000	Valid
OrCp8	.792**	.000	Valid
OrCp9	.775**	.000	Valid
OrCp10	.720**	.000	Valid
OrCp11	.693**	.000	Valid
OrCp12	.718**	.000	Valid
OrCp13	.683**	.000	Valid

OrCp14	.666**	.000	Valid
OrCp15	.699**	.000	Valid
OrCp16	.725**	.000	Valid
OrCp17	.764**	.000	Valid
OrCp18	.782**	.000	Valid
OrCp19	.759**	.000	Valid
OrCp20	.723**	.000	Valid
OrCp21	.706**	.000	Valid
OrCp22	.738**	.000	Valid
OrCp23	.708**	.000	Valid
OrCp24	.631**	.000	Valid
OrCp25	.745**	.000	Valid
OrCp26	.774**	.000	Valid
OrCp27	.800**	.000	Valid
OrCp28	.757**	.000	Valid
OrCp29	.671**	.000	Valid

Sources: Output SPSS (2022)

Results of a preliminary study conducted on 678 managers at companies going public revealed that the Condition of Organizational Aspects reached 58.62%, while the Condition of Individual Aspects reached 63.12%, and the Condition of the Change Process reached 62.43%. Companies that have carried out stock issuances are generally able to analyze organizational structures and processes (63.23%), create change management strategies (73.62%), plan for changes (60.23%), design communication programs (53.16%), conduct training to prepare employees for change (47.67%), and evaluate the results of change programs to organizational performance (53.74%). This shows that the company's readiness to face changes has generally been less than optimal.

Furthermore, if this symptom is allowed, it affects the company's performance, the narrowing of knowledge of the employee's work area, and the difficulty of management to change employee behavior in a better direction. This provides implications for the decline in employee performance and organizational performance.

Following Rieszescu & Tileaga (2017), at every level, organizational managers must have the knowledge necessary to achieve continuous change to support staff through periods that have proven to be stressful for most employees. Different mindsets and different value systems will bring more success. To be successful in today's globalized era, organizational change must focus on the following: (1) Moving from the idea of competition to cooperation with a global outlook; (2) Prioritizing identification of customer needs; (3) Recognition and investment in the overall profit of the organization; and (4) Recognition of the position of the individual involved in and around their organizational structure (Rieszescu & Tileagă, 2017).

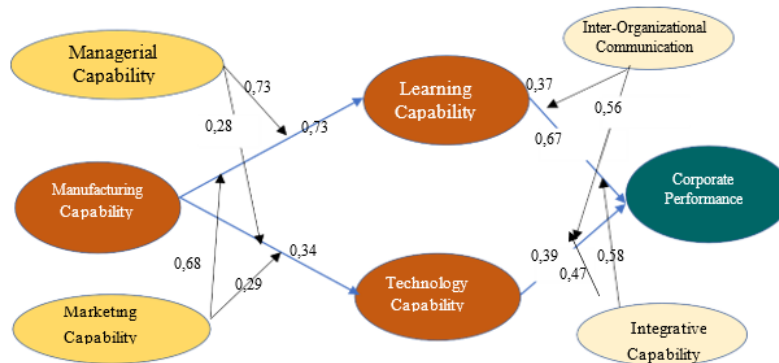


Fig.1: Model Corporate Performance in the face of the Big Data-based Management Revolution

Organizational change is rooted in a deliberate style of thinking or operation which adapts to the organizational environment to improve the performance of the organization itself. This increase in performance is important so that the organization can develop, succeed and survive in an environment that is constantly undergoing changes (DeGhetto, Russell, & Ferris, 2017; Liao & Ai Lin, 2018).

According to the degree of intentionality, there are two types of changes in the organization: (1) Planned changes, which are controlled changes from the current organizational system to the organizational system that has undergone changes; and (2) Spontaneous change, which occurs without direction from the agent of change. (Dolyatovskiy, Barnagjan, & Dolyatovskiy, 2019). The characteristics of Organizational change (Yi, Gu, & Wei, 2017) include the following: (1) Types of change activities; (2) The process by which change and implementation; (3) Inertia, or the obstacles in the organization; (4) The time at which the change occurred and how long it lasted; (5) Depth to describe the extent of organizational change; and (6) The readiness of the organization that is undergoing change.

There are two causes of organizational change, namely internal factors and external factors. Internal Factors are changes caused by factors from within an organization such as changes in goals, changes in the number of employees, decreased morale. Problems are overcome through decision-making from organizational leaders, therein determining new policies to address existing problems. (Ulen, 2010) Meanwhile, external factors come from outside the organization, namely government regulation, economic conditions, competitor actions which hinder the growth and development of the organization in realizing the goals of the organization. This factor can be overcome by means of cooperation between organizations (Hassan & Mouakket, 2018) (Çelik & Ozsoy, 2016).

The success factors of organizational change (Appelbaum, Profka, Depta, & Petrynski, 2018), refer to the success of the model in (Tohidian & Rahimian, 2019) planning organizational change, some of which include: creating urgency, forming a powerful guiding coalition, creating a vision, communicating the vision (Rajan & Ganesan, 2017, empowering others to act on the vision, planning for and creating short-term (quick) wins, consolidating improvement and continuous production of change, and institutionalizing new approaches.

Corporate performance is generally conceptualized as the results achieved by an organization compared to the expected results (or goals and objectives) (Short, Kethen, Palmer & Hult, 2017). The level is determined by a number of contributing factors including operational efficiency, mergers, acquisitions, diversification rates, organizational structure, compensation of top management teams, and political and or social influences that interfere with market suitability (Mankins & Steele, 2005). King (2007) adds that varying interpretations of socially, internationally and intercultural activities towards expansion and adaptation, and other organizational factors and or sectoral phenomena are also antecedents of corporate performance.

Thus, the dimensions of organizational capability, which include manufacturing capability, managerial capability, marketing capability, learning capability, technology capability, inter-organizational communication, integrative capability, and cultural co-evolution all simultaneously have a positive and significant effect on company performance. Manufacturing capabilities, through learning capabilities, thus have a positive and significant effect on company performance. Likewise, manufacturing capabilities, through technology capabilities, have a positive and significant effect on company performance. Examination of the conditional indirect influence of manufacturing capability on company performance through managerial capability or inter-organizational communication provide two capability learning values. This includes either the indirect effects of manufacturing capability through technology capability or through learning capabilities differ significantly when managerial capabilities are at high versus low levels. Particularly, the indirect effects of manufacturing capabilities through learning capabilities at the managerial level of low capability are stronger compared to the entire level of high marketing capability. The results herein are still relevant and support the results of previous research.



## 5. Conclusion

First, our study serves as empirical proof in adding knowledge about manufacturing capability, managerial capability, marketing capability, learning capability, technology capability, inter-organizational communication, integrative capability and corporate performance in the context of the big data revolution. The technological and managerial revolutions, both triggered by big data, with the capability management revolution being one of the alternatives in creating company performance by studying determinants. The management revolution focuses on capabilities in the context of learning and organizational growth, along with finding out ways to utilize big data.

Second, big data puts more burden on workers as they have to learn how to use this new technology. Employee performance must therefore be improved as part of the big data strategy for companies to gain a competitive advantage. This study provides new information in the capability management literature by examining the relationship between manufacturing capability, managerial capability, marketing capability, learning capability, technology capability, inter-organizational communication, integrative capability and how it simultaneously and partially affects company performance in the big data era. To explain the impact of determinant capability on a company's performance in big data arrangements, we propose two conflicting intermediary processes. This proposed explanation explains the contradictory results found herein, suggesting that there may be limit conditions in the relationship explored.

Third, we looked into elements of disposition and environment which enhance the beneficial effects of organizational capability while reducing the unfavorable effects on the company's performance. Results show that both managerial capability and marketing capability reduce the negative effects of manufacturing capability on company performance through learning capability, while increasing their positive effect through capability technology. These findings allow us to expand the organization's existing capability literature by identifying two important moderators and adding new insights to the limit conditions of their effects.

Theoretical and practical implications are also forwarded. For employees, there must be a conscious effort towards improving the company which is the main pillar of improvement, learning, and development both individually and organizationally. For the human resource personnel, the study serves as a reference in improving individual performance in a better direction at work. For the company, it provides input to management to achieve better company performance by designing the right organizational capabilities to achieve its best performance so that it can be used as a guide for related parties in improving company performance. For stakeholders, providing empirical clarity on the influence of dimensions organizational capabilities on corporate performance. For the general public, the study enriches empirical references regarding the influence of the organizational capabilities dimension on corporate performance.

Theoretically, the study serves as empirical proof of the influence of organizational capabilities on corporate performance as a study in organizational theory and management science. For organizational theory, this research adds and complements the characteristics of existing theories to empower organizational structure, organizational design, and organizational culture as components in building organizational theory. For the theory of organizational behavior, this research adds and complements the characteristics of existing theories to increase the role of individuals, groups, and organizational systems in increasing the human resource performance. For Management scientists, the study adds and complements the existing MSDM science characteristics to improve employee performance and organizational performance. For other interested researchers, it can be used as a reference for possible research on related topics.

This study is limited to companies going public on the Indonesia Stock Exchange Jakarta less than 1000 companies. While companies that are facing the big era but more than 1000 companies. Therefore, subsequent studies should be directed with a sample on private companies that have not yet gone public.

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