The Nexus of Organizational Culture, Transformational Leadership, and Technological Infrastructure on Innovative Behavior and Organizational Performance: The Mediating Effect of Knowledge Sharing

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Abstract

Purpose – The purpose of this study is to explore the effects of organizational culture (OC), transformational leadership (TFL), and technological infrastructure (TI) on innovative behavior (IB) and organizational performance (OP) through knowledge sharing (KS) in construction firms in Jakarta, Indonesia.

Design/methodology/approach – The article applied structural equation modeling to inspect the influence of OC, TFL, and TI on IB and OP through KS, based on the data collected from 315 company representatives from construction companies in Jakarta.

Findings – The findings show that OC, TI, and KS have a significant effect on OP. TL not influence OP. OC and KS have a significant impact on IB, while the TFL and TI have an insignificant aspect of IB. KS has a significant impact on OP and IB. KS mediates the nexus between OC, TFL, and TI on OP. KS mediates the nexus between TFL on IB. KS does not mediate the nexus between OC and TI on IB.

Originality/value – The article provides a more precise understanding for scholars and practitioners about the new and effective pathway to promote IB and OP.

Keyword: organizational culture, transformational leadership, technological infrastructure, knowledge sharing, innovative behavior, organizational performance

1. Introduction

The construction industry is a national economic sector associated with land preparation, construction, acceleration, and repair of buildings (Hadihardaja, 2005; Pardede, 2000; Pheng & Hou, 2019; Suhartono, 2012). Continuous development of infrastructure is one of the factors in increasing the participation of the construction sector in the Indonesian economy, with a large percentage of Gross Domestic Product (GDP) of 10,60 per cent in the third quarter of 2019 and an absorption of 1,121,092 workers (BPS, 2019). BPS data (2019) shows that Jakarta has 9,350 construction companies registered on a commercial scale at the end of 2019 or in the top five nationally. The role of the construction sector can be seen from the absorption of labour, investment, the number of infrastructure and construction projects, the reciprocal relationship with the support sectors, and even the facilitation of the movement and growth of goods and services. According to Ratnaningsih et al. (2010), construction companies are estimated to have high competitiveness if they are grouped together on the basis of capital, expertise, technology, and all the capacity needs of their resources so that they can be trusted to carry out large-scale, complex and long-term national construction projects.

A reliable and robust construction industry is needed to support the development of infrastructure. The development of infrastructure is one of the essential and crucial factors for the growth of the national development cycle. One of the determinants of foreign investment interest is the availability, condition and adequacy of the infrastructure of a country. In addition to macroeconomic factors, effective policies and excellent performance in infrastructure development are key to global competitive advantage. Dhurup et al. (2016) argued that the construction industry requires individuals with knowledge, experience, competence, and expertise. Collaboration between individuals enhances the work of the team. According to Riaz et al. (2013), teamwork is a past building culture in the successful completion of projects.

In developing countries, the construction sector is too important to ignore. The movement to encourage the construction industry was carried out by the Government of Indonesia by issuing a legal framework, namely the Construction Services Law (UUJK) issued in 1999. UUJK covers all aspects of the construction industry. UUJK describes the classification and requirements of construction services companies, such as contractors, engineering design, and supervisory consultants.

Raharjo et al. (2018) state that Indonesia's construction sector, especially construction services, is proliferating with the number of national and multinational companies. However, it should be noted that this rapid development has not been accompanied by sufficient quality of service, which is evident from the low and less competitive quality of products and services.

One of the problems with construction projects in the field is that there are delays in work, which increase the duration of work to the detriment of contractors and other stakeholders (Noumeiry & Mursadin, 2017). Criticism of the construction industry arises because it takes a longer time to complete than has been determined (Aiyetan, 2019). External factors such as resources, material and equipment conditions, government policies, environmental conditions, as well as material and soil that affect quality performance in construction implementation in Jakarta have been investigated (Surian & Sekarsari, 2018). de Rooij et al. (2019) adds that project performance is also influenced by aspects of the organization, workers, physical environment, equipment, the technology used in the project, and team quality.

Innovation plays an essential role as a critical factor in increasing company excellence within the construction industry (Gledson & Phoenix, 2017; Staniewski et al., 2016; Yusof et al., 2017). However, the construction industry is seen as conservative and not progressive (Hadihardaja, 2005; Havenvid, 2015), while project-based features constitute an innovation barrier (Davis et al., 2016; Hendrawan, 2018). Temporary project organizations are known as positive inventions (Slaughter & Slaughter, 2010). As far as the construction innovation process model (Hartmann, 2006; Ozorhon, 2013) is concerned, many factors have been described as related, such as individual variables such as clients (Tookey et al., 2011; Widhiawati et al., 2016) and leadership (Ding et al., 2017; Odusami et al., 2003; Ulfiyati & Utomo, 2015), followed by contextual variables such as strategy (Manley et al., 2009; Yunianto et al., 2015), and environment (Chan et al., 2014; Triarman et al., 2018). Furthermore, there are research results on the relationship of innovation or creativity to individual creativity (Choi, 2004). Individual attitudes arise because of the

relationship or interaction between individuals and their environment or organization (Biggio & Cortese, 2013; Verquer et al., 2003). In particular, the impact and characteristics of project managers or professionals on the innovation process have been studied (Damanpour & Schneider, 2006; Gambatese & Hallowell, 2011). Owing to time constraints, unstable temporary organisations, and diverse teams (Bakker, 2010; Maaninen-Olsson & Müllern, 2009), innovative approaches in project management are also required. In addition, leaders of temporary organisations (such as project-based organizations) must be able to demonstrate innovation and creativity to team members (Budiyanto et al., 2014; Tyssen et al., 2014).

A leadership of a project manager or leader is considered a significant capacity to enhance and inspire workers to contribute and accomplish goals (Budiyanto et al., 2014; Tyssen, Wald, & Heidenreich, 2014). It is also one of the critical project management success factors (Aga et al., 2016; Radujković & Sjekavica, 2017; Riaz et al., 2013), and one of them is also in the context of teamwork (Banks et al., 2016). For example, Aga et al. (2016) examined the effect on project success of the project managers transformational leadership style mechanism. Ding et al. (2017) explored the relationship between transformative leadership and interpersonal motivation and the mediating impact on project settings of job participation. Yet the "one leadership style fits all" approach is not appropriate to address various practical challenges (Shao, Feng, & Hu, 2016). One leadership style has many potential subsections (Lai et al., 2018). Also worthy of note is the relationship between different leadership styles and a systematic evaluation of the suitability of leadership styles and organizational processes (Shao, Feng, & Hu, 2016).

In addition, to meet project goals, the project manager must have a positive impact and face all obstacles within the project (An et al., 2019; Kissi et al., 2013). They must adapt, take chances and have the courage to innovate to different project environments (Sankaran, 2018). Individual leadership level impact has been examined with regard to innovation in building, including a direct relationship with the environment variable innovation (Chan et al., 2014) and organizational culture (Zheng, 2017).

The relationship between transformational leadership and organizational success is important in the times of today, where organizations need to be creative in order to gain competitive advantage in order to boost results (Aragón-Correa et al., 2007; Donate & Sánchez de Pablo, 2015). In addition, administrators need to inspire their staff to take part in the innovation and knowledge-building cycle that can generate new ideas for businesses (Andriopoulos & Lewis, 2010). Styles of change and transactional leadership also influence the success of organizations (Dwiantoro, 2017; Magdalena et al., 2016; Rahim et al., 2018; Ratnamiasih & Warenih, 2014).

With the increasing advancement of construction technology and the demand for complex projects, knowledge is critical (Wen & Qiang, 2016). Team coordination in projects and sharing knowledge between them are two essential things in creating organizational excellence. Project completion requires a business strategy and integration between multidisciplinary skills (Buvik & Rolfsen, 2015; Fong & Kwok, 2009). Project organizations need to face challenges in coordination and knowledge sharing in teams (Zhang et al., 2013). Furthermore, a survey of construction company leaders found that knowledge is an essential strategic asset (Fong & Chu, 2006). Sharing knowledge in

project organizations is a topic of interest to be researched (Ferguson et al., 2010; Kissi et al., 2013).

Organizational knowledge is a strategic tool and a foundation for competitive advantage, from a information-based viewpoint (Grant, 1996; Kogut & Zander, 2009; Liu & Phillips, 2011; Orga et al., 2018). Long-term achievement can be generated by the ability to develop, coordinate and consistently increase information assets (De Long & Fahey, 2000). Companies that use knowledge in the internal environment have more competitive advantages (Argote & Ingram, 2000; Rahimli, 2012). While the benefits of sharing information in projects have long been recognized (Ajmal & Koskinen, 2008; Pemsel & Wiewiora, 2013), there are still challenges and difficulties in the implementation of successful use of information in projects (Bartsch et al., 2013; Wiewiora et al., 2020).

Most scholars believe that organizational culture is the greatest obstacle when exchanging information in projects (Ajmal & Koskinen, 2008; Wiewiora et al., 2013). Organizational culture affects the decisions of the project team leaders to communicate and exchange perspectives related to the project (Ajmal & Koskinen, 2008), where this is limited to the time of negotiation and has to do with staff rivalry (Eskerod & Skriver, 2007). Corporate culture, organizational structure, leadership, and IT structures as important factors in sharing information (Fullwood & Rowley, 2017). Based on the literature, three items are essential to achieving realistic information sharing in organizations, namely organizational culture, organizational structure, and technology infrastructure (Chión et al., 2019; Islam et al., 2015). Organizational culture is recognized as a factor affecting knowledge management (Ahmady et al., 2016; Alavi et al., 2005). Organizational culture describes an organization's character, seen in the daily relationships between workers in a company, and as a guide in behaving and communicating (Ribière & Sitar, 2003).

Technology infrastructure in the context of sharing knowledge and its relationship with improving processes is related to equipment, systems, and information technology (Alavi & Leidner, 2001). Technology can play a role as a supporter of knowledge management, but it can also be an obstacle in the application or implementation stage (Mao et al., 2016). Riege (2003) has also identified potential barriers to technology in its utilization. The application of information technology also affects employee innovation and organizational performance (Prabawa & Rizan, 2015; Sartika, 2015).

Based on the description above, the phenomena that occur are thought to influence each other. To understand the relationship between these phenomena in the construction industry, especially in Jakarta, a more in-depth research is needed so that a variable linkage model can be made to solve the problems faced while providing knowledge contribution. It underlies the research with the title "The Nexus of Organizational Culture, Transformational Leadership, and Technology Infrastructure on Innovative Behavior and Organizational Performance through Knowledge Sharing among Construction Employees at Jakarta."

2. Literature Review and Hypothesis Development

2.1 Organizational Culture (OC)

Culture shared by the majority of organizational members determines how the firm relates with its internal and external environment in the search for solutions to organization's concern such as performance and survival (Joseph & Kibera, 2019). Culture conditions behavior and in turn, behavior modifies culture thereby, promoting learning by members and the organization and hence, the generation of new answer to performance-oriented questions faced by the firm (Fellows & Liu, 2013). The culture of an organization is potrayed by the dominant leadership style (Acar, 2012; Bowers et al., 2017), communication (Madanchian & Taherdoost, 2016; Sebastião et al., 2017; Welch & Feeney, 2014), organizational processes (Omidi & Khoshtinat, 2016; Schmiedel et al.,, 2014), structure (Joseph & Kibera, 2019), systems (Dubey et al., 2017; Shao, 2019), and the unique definition of success (Alofan et al., 2020; Lee et al., 2016; Shao et al., 2012) in the views of particular organizations.

Organizational culture is a sense sharing mechanism carried out by participants who differentiate an organization from other organizations (Alofan et al., 2020; McLean, 2005). In other words, organizational culture is a the process of the behaviors, values, beliefs, and habits that direct individuals behavior in an organization (Khan et al., 2020). Culture enables leaders to look difinite behaviors that should model and teach employees how to behave. In this regards, organizational culture is one of the most significant determinants of innovative work behavior, and enable leaders in organization to get competitive edge (Eskiler et al., 2016).

Cultural characteristics decide the meaning of social experiences in order to influence behavior about how a individual handles established information within the organization (De Long & Fahey, 2000). Many authors relate organizational culture to knowledge management and state that organizational culture is an significant factor in knowledge sharing (Ahmady et al., 2016; Alavi et al., 2005; Islam et al., 2015; Kathiravelu et al., 2014; Lee et al., 2016; Ryan et al., 2010; Wiewiora et al., 2013). Some of the findings of these works is that the higher the level of a information sharing-centric society, the higher the degree of knowledge sharing within an organization. Islam et al. (2015) consider that the organizational culture influences the exchange of information across three dimensions: staff cooperation, learning/development, and reliable management support. Zheng et al., (2010), who concluded that "information management thoroughly mediates the effects of the organizational culture on organizational effectiveness," reflects the fact that organizational culture has a strong influence on knowledge management.

The analysis of organizational culture has become increasingly important with respect to the following aspects: the recognition that the distribution of information is influenced by organizational culture (Brix, 2017; Fey & Denison, 2003); and the connection between organizational culture and knowledge management (Donate & Guadamillas, 2010; Zheng et al., 2010). Studies relating to the corporate culture were either constrained by the form of business being studied or by the nature of the inquiry, which is difficult to extrapolate to other cultures (Mamman et al., 2012; Stone et al., 2007; Testa, 2009). These same features also suggest that the application of technology (Dasgupta & Gupta, 2019; Hsiao et al., 2015) must be adjusted to the community they have developed (Chatterjee et al., 2020; Low et al., 2015) and have

consequences for the training of the workforce (García et al., 2019). Organizational culture also has an impact on building delays (Arditi et al., 2017).

Based on previous research, organizational culture affects organizational performance (Acar & Acar, 2012; Jogaratnam, 2017; Yesil & Kaya, 2013), innovation performance (Alexe & Alexe, 2018; Hogan & Coote, 2014; Shahzad et al., 2017), and the desire to share knowledge (Areekkuzhiyil, 2016; Kathiravelu et al., 2014; Wei & Miraglia, 2017). On the basis of the literature reviewed, we hypothesize the following:

H_1: OC has a positive impact on OP
H_2: OC has a positive impact on IB
H_3: OC has a positif impact on KS

2.2 Transformational Leadership (TFL)

In a project, leadership is the ability to encourage employees to commit and achieve the goal (Tyssen, Wald, & Heidenreich, 2014). The process is critical in shaping workers' perceptions of organizations, behaviors associated with the organizational change, acceptance of innovations, and motivation to achieve goals (Lai et al., 2018). Leadership has received considerable attention in the management area in the past few decades (Madanchian & Taherdoost, 2019; Mishra & Misra, 2017; Scott et al., 2018). Several types of leadership styles are broadly discussed in the past, such as distributed/focused leadership (Canterino et al., 2020; Hristov et al., 2018), horizontal/vertical leadership (Müller et al., 2018; Yu et al., 2018), transformational and transactional leadership (Bono et al., 2012; Deichmann & Stam, 2015; Tyssen et al., 2014), structural initiation leadership (Basker et al., 2020; Gaudet & Tremblay, 2017), servant leadership (Eva et al., 2019; Stollberger et al., 2019), and others. Among those mentioned leadership styles, transformational is one of the most popular subjects in project management area (Gundersen et al., 2012; Kissi et al., 2013; Tyssen et al., 2014).

Transformational leadership is a type of leadership that inspires followers to go beyond their interests and be able to exert a profound and extraordinary influence on their followers (Pieterse et al., 2010). Transformational leadership refers to individual concern, intellectual motivation, inspiration and idealistic influence (McColl-Kennedy & Anderson, 2005). With transformative leadership, followers feel trust, loyalty and admiration for the leader, and are inspired to do more than they initially anticipated (Podsakoff et al., 1990). Transformational leaders generate trust, pride, and respect from employees and are directly related to positive employee attitudes and behavior levels in the work environment (Braun et al., 2013; Herold et al., 2008).

Work innovation (Afsar & Umrani, 2019; Elrehail et al., 2018; García-Morales et al., 2012; İşcan et al., 2014; Ng, 2017), organizational innovation (Elrehail et al., 2018; Gumusluoglu & Ilsev, 2009; Liu & Lee, 2019; Sheehan et al., 2020), employee performance (Gao et al., 2020; Ng, 2017; Nguyen et al., 2017), citizenship behavior (Ng, 2017b), knowledge sharing behavior (E. J. Kim & Park, 2020; Mohammadi & Boroumand, 2016), and organizational performance (Birasnav, 2014; Chen et al.,

2019; İşcan et al., 2014; Samad, 2012) are influenced by transformational leadership based on research findings. Based on all these considerations, our hypothesis arises:

H_4: TFL has a positive impact on OP
H_5: TFL has a positive impact on IB
H_6: TFL has a positive impact on KS

2.3 Technological Infrastructure (IT)

The role of using technology infrastructure in the process of knowledge sharing helps to reclaim and spread information among employees (Balubaid, 2013; Lee & Choi, 2003). Research-based enhancement of processes is considered to suggest a significant amount of information management (Evans & Price, 2020; Lee et al., 2016). It's easy to note that adequate technological infrastructure is required to store, recover, and distribute this enormous amount of information. Over the years, the role of technological infrastructure in the sharing of information was a concern of several research projects. A number of works are considered groundbreaking and emphasize the importance of technical resources in information integration (Alavi & Leidner, 2001; Golosova, 2020; Grant, 1996; Teece, 2000).

From this study, the concept of information is a state of mind, a process and an entity. Knowledge is defined as a state of mind because it "focuses on expanding the personal knowledge of individuals and applying it to organizational needs" (Alavi & Leidner, 2001). Knowledge is characterized as a process since information can be used to generate new knowledge and to repeat the process through many stages of development (Carlsson et al., 1996; Darling-Hammond et al., 2020). Knowledge is defined as an entity, because it can be stored, acquired and modified (Carlsson et al., 1996). In any stage of the knowledge management process the function of technology infrastructure is fundamental: development, storage and acquisition, and exchange and application (Allameh et al., 2011; Chión et al., 2019).

Technological infrastructure related to knowledge sharing and process improvement refers to the resources, systems and information technology that enable three applications: best practice coding and sharing processes; development of a directory of corporate knowledge; and development of knowledge networks (Alavi & Leidner, 2001; Allameh et al., 2011).

The use of technology continues to lead to centralized proposals for knowledge collection, structuring, and transition (Hsu & Shen, 2005; S. C. Pandey & Dutta, 2013). Information technology is a powerful tool for creating and disseminating information within and among organizations by promoting social interactions among people from different organizational hierarchies (Wioleta Kucharska & Erickson, 2019; Ryan et al., 2010). Information technology is often widely integrated into models that affect knowledge sharing behaviors and expectations (Seba et al., 2012), or its implementation and significance in the business processes of various industries, such as manufacturing (Shu et al., 2013).

The model developed by Kim & Lee (2006) combines the role of information technology in sharing knowledge and concludes that “social networks, centralization,

performance-based reward systems, employees of information technology applications, and information technology that are simple to use are significant variables that influence ability employees to share knowledge in private organizations or public organizations". Experts such as Yuan et al. (2013) have indicated the importance of using various methods of communication to improve knowledge sharing within an organization based on the needs of each department of the company; they also state the strategic use of such tools in an organized and designed manner so that a positive effect can be produced on knowledge sharing. Finally, this study concludes that the role of technology infrastructure in knowledge sharing is focused on the same functions as the role of information technology in knowledge capture , storage, transfer and use and, on the other hand, on the the role of social networks in knowledge management (Chiu, Hsu, & Wang, 2006; Kucharska & Erickson, 2019; C. S. Lee & Wong, 2015; Nezakati et al., 2015; Zhu et al., 2016).

Based on the results of research that has been carried out, technology infrastructure affects knowledge sharing practices (Chión et al., 2019; Ningsih, 2014; Sentana & Yuniastari, 2015), innovative behavior (Anser et al., 2020; Anzola-Román et al., 2019; Jabbouri et al., 2016; Setiadi & Narsa, 2019), and organizational performance (Mao et al., 2016; Ningsih, 2014; Ong & Chen, 2014; Zhao & Priporas, 2017). Therefore, this study proposes the following hypothesis:

H_7: IT has a positive impact on OP
H_8: IT has a positive impact on IB
H_9: IT has a positive impact on KS

2.4 Knowledge Sharing (KS)

The first important thing is to understand the concept of knowledge before understanding what knowledge sharing is. Alavi & Leidner (2001) defines knowledge based on its provenance and distinguishes between data, information and knowledge, indicating that knowledge is the product of multi-stimulus cognitive processes; information is organized and ordered data; and data consists of various numbers, facts and signs. From several different points of view, information can be viewed as objects that can be manipulated, processed and acquired (Carlsson et al., 1996; McQueen, 1998; Zack, 1999); and as a mechanism related to the development, storage/acquisition, exchange and application (Alavi & Leidner, 2001; Pentland, 2013). Nonaka (1994), who distinguishes between implicit and explicit knowledge, states that it is possible to describe explicit knowledge as something that can be transmitted into formal and systematic language. Knowledge refers to specific knowledge that involves mixing information , data, experience, values, standards, and standards that can be demonstrated as definitions in the organization's documents, technical reports, or professional reports (Koriat & Gelbard, 2014; Nonaka, Toyama, & Konno, 2000).

Knowledge sharing is the process of disseminating and exchanging information, ideas, experiences, knowledge through communication, and social interactions performed by individuals with other individuals, individuals with groups, and between

groups within and outside the company which aims to create new knowledge (Almeida & Soares, 2014; Navimipour & Charband, 2016; Mueller, 2014). The process of transmitting information, experience, and skills through social interaction between individuals within a department, between departments or between organizations is known as knowledge sharing (Ghobadi, 2015; Navimipour & Charband, 2016; Trivellas et al., 2015; Wang & Noe, 2010). Sharing expertise offers benefits for organisations or businesses in creating shared intellectual resources, so that businesses need to work on applying it (Lyu et al., 2020; Tjoflåt et al., 2017). Schwartz (2005) also notes that the transition of information within organizations is important, as the transformation of personal knowledge into groups or organizations may form the basis for the creation of processes, goods and services.

Sharing knowledge influences creative actions (Akram et al., 2020; Elrehail et al., 2018; Pian et al., 2019; Vandavasi et al., 2020), performance of workers (Masa'deh et al., 2016; Ugwu, 2019), and performance of organizations (Akroush & Awwad, 2018; Nguyen et al., 2018; Wang et al., 2016). Therefore the following hypothesis is proposed in this research:

H_{10}: KS has a positive impact on OP
H_{11}: KS has a positive impact on IB

Based on research, knowledge sharing mediates transformational leadership's relationship to work innovation (Choi et al., 2016; Khan & Khan, 2019) and organizational performance (Chang et al., 2018; Gathii & K'Obonyo, 2017; Lashari & Rana, 2018; Son et al., 2020). Knowledge sharing mediates the relationship between organizational culture and work innovation (Alnesr & Ramzani, 2019) also on organizational performance (Hermanto et al., 2018; Kucharska & Wildowicz-Giegiel, 2017). Knowledge sharing mediates the relationship between technology infrastructure and work innovation (Kaewchur & Phusavat, 2013; Qammach, 2016) also on organizational performance (Ifada, 2011; Payal et al., 2019). Hence, this research proposes the following hypothesis:

H_{12}: KS mediates the relationship between OC and OP
H_{13}: KS mediates the relationship between OC and IB
H_{14}: KS mediates the relationship between TFL and OP
H_{15}: KS mediates the relationship between TFL and IB
H_{16}: KS mediates the relationship between IT and OP
H_{17}: KS mediates the relationship between IT and IB

2.5 Innovative Behavior

West & Farr (1989) defines innovative work attitudes as "the overall working attitude of employees who can produce, introduce and/or apply ideas, processes , products or procedures (in the workplace, in groups or in organizations) to benefit those who implement them." Other writers (such as De Jong & Den Hartog, 2010; De Spiegelaere et al., 2014) also describe creative work-related attitudes based on West

& Farr (1989) concepts. Agarwal (2014) notes that studies on factors that promote innovative employee actions are growing alongside the value of creativity as part of the performance and resilience of an enterprise.

Several studies have found innovation as an essential factor in organizations to increase competitive advantage over competitors (Borseková, Vaňová, & Vitálišová, 2017; Celtekligil & Adiguzel, 2019; Tu & Wu, 2021). Many studies find that employee innovation is an essential asset in organizational success in the face of rapid changes in the business world (D'Attoma & Ieva, 2020; Liu et al., 2020; Rangus & Slavec, 2017; Zhang et al., 2020). Innovative work attitudes focus on actions initiated by individuals to create new ideas for the organization and themselves (Griffin et al., 2007; Parker & Collins, 2010). Competitive advantage will not be achieved without employees in it (Abstein & Spieth, 2014). The importance of employees' innovative attitudes for organizational sustainability has been mentioned in many literature (Agarwal et al., 2012).

Innovative behavior of employees is the basis for achieving high organizational efficiency, and the identification of factors that improve innovative employee attitudes is important (Eid & Agag, 2020; Kwon & Kim, 2020; Pandey et al., 2019). Individual characteristics as a determinant factor for organizational innovation, such as leadership, individual innovation help and organizational resistance to change (Noor & Dzulkifli, 2013). Leadership is also an essential part of influencing attitudes among employees and organizing organizational activities (Akram, Lei, & Haider, 2016). Transformational leadership has also been studied to affect innovation and creativity (Gumusluoglu & Ilsev, 2009; Hughes et al., 2018; Jaiswal & Dhar, 2015; Shafi et al., 2020). Researchers have found that innovative behavior affects the efficiency of the organizations (Eid & Agag, 2020; Kalar et al., 2021; Melnik et al., 2019; Shanker et al., 2017).

2.6 Organizational Performance

Performance is an evaluation of an person, community, or organisation's effectiveness (Tseng & Lee, 2014). There's a lot of existing organizational performance definitions. Organizational efficiency, for example, can be described as the actual production of the organization against the desired outcome (Luxmi, 2014). Organizational performance is also defined as the ability to access and maintain various organizational capital to achieve organizational objectives (e.g., human, financial, and physical) (Ramezan et al., 2013). Overall efficiency, according to (Teece, 2000), depends on the organization's ability to develop, protect and leverage information assets. Organizational performance describes how effectively and efficiently the organization is achieving its objectives (Gupta & Gupta, 2020; Sardana et al., 2020; Shalihin et al., 2020). Organizational success can be seen from three different areas according to Richard et al. (2009), namely financial efficiency, product marketing performance, and stock returns. Operational performance, employee performance, innovation performance, customer performance, and economic performance can be seen in organizational performance (Maletič et al., 2016; Sadikoglu & Olcay, 2014). Wamba et al. (2017) added that organizational

performance is measured through marketing performance and innovation performance. Working in the workplace to improve organizational performance is the most important thing for getting employees in an company (Ogbonnaya & Valizade, 2018; Sundaray, 2011). To see organizational innovation, performance measurement is critical (Laursen & Foss, 2003; Laursen & Salter, 2006). It is difficult to assess organizational performance without paying attention to the organizational objectives (Sabbagha et al., 2016; Star et al., 2016). The added benefit arising from the measurement of success improves transparency and facilitates decision taking (Sole & Schiuma, 2010).

Initially, organizational performance only focused on profit or productivity, which was not sufficient to represent overall performance (Masa'deh et al., 2016). This traditional measurement of organizational performance is generally related to finance which does not adequately describe the organization in a competitive environment (Kennerley & Neely, 2003). Non-financial metrics such as service quality (Dagger & Sweeney, 2007; Kaur et al., 2020; Monica & Ramanaiah, 2018), product quality (Li et al., 2011; Parker et al., 2017), customer satisfaction (Fida et al., 2020; Rajeswari et al., 2017), process length (Matarazzo et al., 2021; Scheidt & Chung, 2019), and overall program effectiveness (Awan et al., 2020; Zhang et al., 2015) are currently the subject of organizational performance. It should be noted that measurements of both financial and non-financial performance must be recorded to obtain an optimal model for organizational performance measurement (Masa'deh et al., 2016).

Figure 1 summarizes all the predicted relationship and depicts the proposed conceptual model with knowledge sharing mediating the relationship between organizational culture (OC), transformational leadership (TL), technological infrastructure (IT), innovative working behavior (IB), and organization performance (OP).

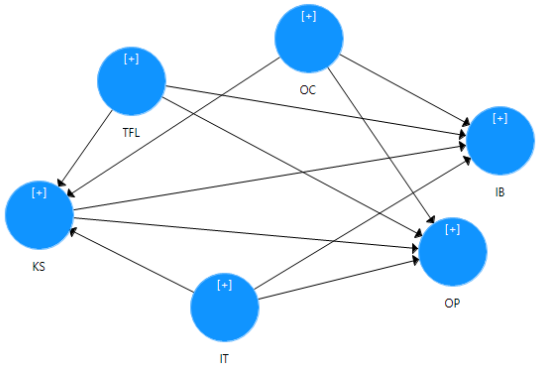

Fig. 1. The proposed conceptual model: The relationship between the key constructs

Source: Author (2020)

3. Method

3.1 Data and Sample

The object of this research were the organizations of construction companies that have been the members of *BPD Gapensi* association (Association of Construction Companies) at Jakarta, Indonesia. All the companies are registered in the Construction Services Development Board (*LPJK*). This research was conducted using survey method. We distributed the questionnaire online using Google Form to company's representative. During the survey, we asked the participants to rate their OC, TFL, IT, KS, IB, and OP. This research was carried out during July-October 2020.

The analysis unit of this research was the construction organizations/fields presented by each of the experts working in the companies that have grade small to big qualification and have been the members of Gapensi registered since 2015 and located in the territory of Jakarta, Indonesia. In this study, the observation unit (respondent) is the company leaders or the company's representative or those who represent them in the company, who become respondents and fill out the research questionnaire. The total amount of the population is 1,718 construction companies. The sample size was determined using the Isaac-Michael formula, collecting 315 valid responses. We delivered the questionnaires for 315 companies that were proportionally chosen as follows: 84 out of 460 companies from K1, 18 out of 97 companies from K2, 34 out of 183 companies from K3, 100 out of 543 companies from M1, 41 out of 225 companies from M2, 24 out of 132 companies from B1, and 14 out of 78 companies from B2. The descriptive information was shown in Table 1.

Table 1. Descriptive Analysis of Sample

	Number	Percent		Number	Percent
Gender			*Positions*		
Male	248	78.7	Engineer	2	0.6
Female	67	21.3	PMT	3	1
Education Level			Manager/Leader	306	97.1
Diploma	2	0.6	Others	4	1.3
Bachelor	312	99.0	*Company Types*		
Master	1	0.3	K1 (Small-1)	84	26.7
Org. Tenure			K2 (Small-2)	18	5.7
1-5 years	3	1	K3 (Small-3)	34	10.8
6-10 years	7	2.2	M1 (Middle-1)	100	31.7
11-15 years	305	97.1	M2 (Middle-2)	41	13
			B1 (Big-1)	24	7.6
Note: n = 315			B2 (Big-2)	14	4.4

Source: Author (2020)

3.2 Instruments

3.2.1 Organizational Culture (OC)

Company's representative ratings of organizational cultures based on a Tsui et al. (2006) nine-item test and three dimensions incorporated in this analysis, including peace (three items), social responsibility (three items) and creativity (three items). Representative of the organization was asked to rate their

organisation's cultures. Each item was scored using a five-point scale. Example items of three dimensions that were, respectively, included: “My organization supports cooperative spirit,” “My organization encourages the development of construction projects for society”, and “My organization encourages innovation and accepts changes.” The alpha value of the calculated Cronbach verified that the scale displayed good inner accuracy and reliability (alpha = 0.927).

3.2.2 Transformational Leadership (TFL)

Five-item measures of the four dimensions of transformational leadership were based on (Li & Shi, 2008). The company’s representative were asked to rate the transformational leadership of their organization. The Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used for measurement purpose. Examples of items that were included: “The leader focuses on giving individual consideration to each member in the project” and “The leader asks questions that stimulate the thinking of the project members.” The alpha value of the calculated Cronbach indicated that the scale exhibited strong internal accuracy and reliability (alpha = 0.905).

3.2.3 Technological Infrastructure

Technological infrastructure were measured with six items based on Gold et al. (2001). The company’s representative were asked to rate their technological infrastructure in their organization. Each item was scored using a five-point scale. Two examples items: (1) My company uses technology that enables workers to communicate with other individuals within the organization, and (2) My organization uses technology that enables people to benefit from different resources as a collective at various locations. The determined Cronbach’s alpha value confirmed that the scale showed good internal consistency and reliability (alpha = 0.923).

3.2.4 Knowledge Sharing

Knowledge sharing practices were measured with four item based on Park & Lee (2014) and Gemino et al. (2015). The company’s representative were asked to rate their knowledge sharing practices in their organization. Each item was scored using a five-point scale. Two examples: (1) The organization has systematic processes to ensure that best practices are shared among the various fields of the operation and (2) I shared my knowledge and know-how with my colleagues. The alpha value of the calculated Cronbach verified that the scale displayed strong inner accuracy and reliability (alpha = 0.854).

3.2.5 Innovative Behavior

We measured innovative behavior using five elements based on Scott & Bruce (1994). Representative of the organization was asked to assess their organisation's innovative behaviors. Each item was scored using a five-point scale. Two examples items: (1) I would produce creative ideas in the work process and (2) I would offer

my suggestion for the realization of other project participants' creative ideas. The alpha value of the calculated Cronbach indicated that the scale exhibited strong internal accuracy and reliability (alpha = 0.905).

3.2.6 Organizational Performance

Organizational perfomance was assessed using 21 items based on Sadikoglu & Olcay (2014) and Maletič et al. (2016), and this research applied five dimensions including organizational performance (six items), employee performance (five items), innovation performance (four items), customer performance (three items), and economic performance (three items). The company's representative were asked to rate their organizational performance in their organization. Every item had been graded using a scale of five points. The alpha value of the Cronbach determined indicated that the measure demonstrated strong internal accuracy and reliability (alpha = 0.980).

3.3 Procedure

A quantitative research approach is used in this study. Two software programs were used to analyze the data; SPSS Version 22 and Smart PLS Version 3.2.8, taking into account their respective analytical data techniques. SPSS has been used to complete the following tasks: (1) to prepare data for analysis and (2) to measure demographic numerical descriptive statistics. Using a structural equation modeling – partial least square (SEM-PLS) approach, Smart PLS was used to test the measurement and structural model. This technique is also useful for theoretical development and small sample sizes (Joseph F. Hair, Sarstedt, & Ringle, 2019).

4. Result and Discussion

4.1 Measurement Model

The relationship between the constructs and the elements was evaluated in order to determine the reliability and validity of the theoretically proposed model. Three conditions which are: (1) Factor Loadings, (2) Composite Reliability (CR) and (3) Discriminant Validity were examined when testing the suitability of the measurement model to ensure the reliability and validity of the model.

Initially factor loadings were tested to ensure the convergent validity. The minimum value for loading products as suggested by Hair et al. (2011) is 0.70, and the value for AVE should be 0.50 or greater. Inspecting the factor loads between 0.732-0.906 for each element range and the value is positive and greater than the threehold values as shown in Table 2. Convergent validity is established to the extent that numerous items which measure similar concepts are in agreement by examining the factor loadings, composite reliability and average variance values extracted (Hair et al., 2011). The items with loadings below 0.70 should be excluded from the model if the deletion of the element leads to an improvement in the values of composite reliability (CR) and the extracted average variance (AVE). Both CR and AVE surpass the required threshold values. Table 2 shows that the AVE range for all constructs is between 0.631-0.724. The study shows that all

values of AVE square root are greater than the values of intercorrelation between the constructs. However, Figure 2 explains the structures of the measuring models with the respective object loadings. The findings state that all OC, TFL, IT, KS, IB, and OP constructs are accurate measurements of their respective constructs.

Table 2. Measurement constructs

Variables	Items	Loadings	Mean	SD	T-test
Organizational Culture	OC1	0.732	3.911	0.412	18.998
CR = 0.939	OC2	0.818	3.952	0.789	41.699
AVE = 0.631	OC3	0.830	4.111	0.715	56.390
Cα = 0.927	OC4	0.834	3.892	0.833	49.479
	OC5	0.734	3.876	0.465	23.592
	OC6	0.819	3.937	0.810	41.011
	OC7	0.810	4.105	0.703	46.634
	OC8	0.811	3.860	0.858	30.148
	OC9	0.752	3.895	0.435	23.155
Transformational	TFL1	0.851	4.029	0.571	33.534
Leadership	TFL2	0.832	4.124	0.862	52.900
CR = 0.929	TFL3	0.856	4.235	0.761	92.890
AVE = 0.724	TFL4	0.853	4.038	0.915	62.361
Cα = 0.905	TFL5	0.861	4.035	0.576	54.338
Technological	IT1	0.823	4.032	0.622	35.932
Infrastructure	IT2	0.874	4.086	0.867	39.462
CR = 0.940	IT3	0.828	4.216	0.819	48.739
AVE = 0.722	IT4	0.836	4.016	0.903	36.411
Cα = 0.923	IT5	0.828	4.032	0.611	41.129
	IT6	0.906	4.070	0.877	88.322
Knowledge Sharing	KS1	0.787	3.994	0.580	40.342
CR = 0.901	KS2	0.832	4.076	0.840	32.501
AVE = 0.695	KS3	0.831	4.152	0.826	30.627
Cα = 0.854	KS4	0.882	3.984	0.896	70.284
Innovative Behavior	IB1	0.854	4.070	0.542	50.858
CR = 0.928	IB2	0.844	4.114	0.843	55.144
AVE = 0.722	IB3	0.841	4.254	0.759	48.647
Cα = 0.905	IB4	0.862	4.041	0.881	62.334
	IB5	0.848	4.086	0.548	47.700
Organizational	OP1	0.734	4.029	0.548	14.266
Performance	OP2	0.869	4.006	0.887	60.934
CR = 0.982	OP3	0.860	4.156	0.811	68.134
AVE = 0.718	OP4	0.884	3.933	0.918	68.123
Cα = 0.980	OP5	0.783	3.984	0.604	27.280
	OP6	0.834	4.003	0.878	24.065
	OP7	0.865	4.159	0.813	81.009
	OP8	0.893	3.914	0.927	73.848
	OP9	0.821	3.959	0.634	47.623
	OP10	0.868	4.010	0.889	59.457
	OP11	0.864	4.130	0.831	71.771
	OP12	0.893	3.902	0.933	70.140
	OP13	0.759	4.016	0.572	15.488
	OP14	0.864	3.990	0.900	52.232
	OP15	0.873	4.140	0.832	90.025

Variables	Items	Loadings	Mean	SD	T-test
	OP16	0.881	3.949	0.900	67.412
	OP17	0.799	3.994	0.596	34.061
	OP18	0.858	4.035	0.870	52.841
	OP19	0.869	4.140	0.820	86.644
	OP20	0.896	3.917	0.912	80.434
	OP21	0.804	3.975	0.622	37.249

Source: Author (2020)

The aim of discriminant validity is to ensure that the indicator, when evaluating the PLS path model, is consistently associated with its respective construct (Hair et al., 2014). According to Ramayah et al. (2014), the discriminating validity is defined by measuring the relationships that may overlap with other variables between constructs. Of all constructs the minimum value for the extracted average variance (AVE) must be higher than the values of the squared correlations for all other constructs (Hair et al., 2014). In other words, if the correlation values between the construct are smaller than the square root of the AVE's as indicated by Fornell & Larcker (1981), there would be no question of discriminant validity is the study model. The findings which determine the adequate discriminant validity of reflective and latent variables are given in Table 3. The bold diagonal values are greater than the correlation values of other models, and there is no problem in this analysis with discriminant validity.

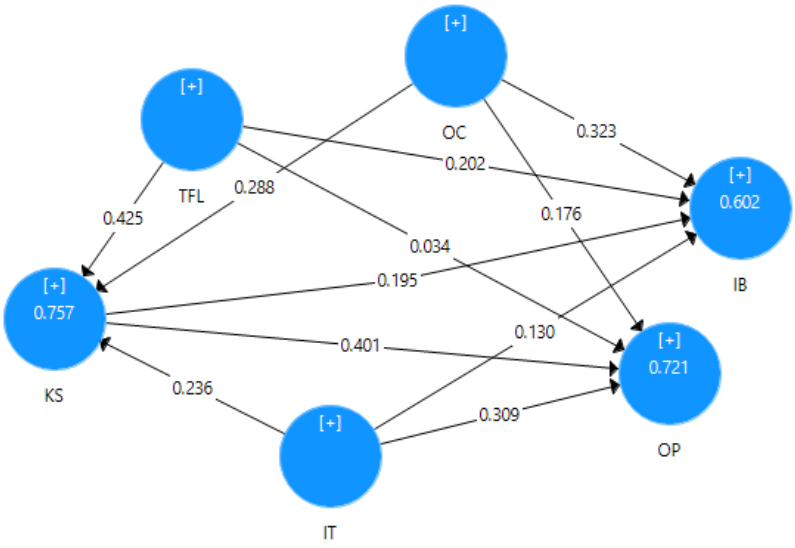

Figure 2. Outer model assessment
Source: Author (2020)

Table 3. Discriminant validity

	IB	IT	KS	OC	OP	TFL
IB	0.850					
IT	0.683	0.850				
KS	0.713	0.784	0.834			
OC	0.719	0.750	0.774	0.794		
OP	0.668	0.782	0.807	0.743	0.847	
TFL	0.699	0.781	0.819	0.727	0.731	0.851

Note: The diagonal is the square root of AVE, while the off-diagonals are the association between the variables.

Source: Author (2020)

4.2 Structural Model

Figure 3 shows the results of the structural model. From the analysis, organizational culture emerged as the strongest predictor of innovative working behavior ($\beta = 0.323$, $t = 3.334$, $p < 0.05$). Organizational performance was strongly influenced by knowledge sharing practices ($\beta = 0.401$, $t = 4.225$, $p < 0.05$) rather than by technological infrastructure ($\beta = 0.309$, $t = 3.020$, $p < 0.05$).

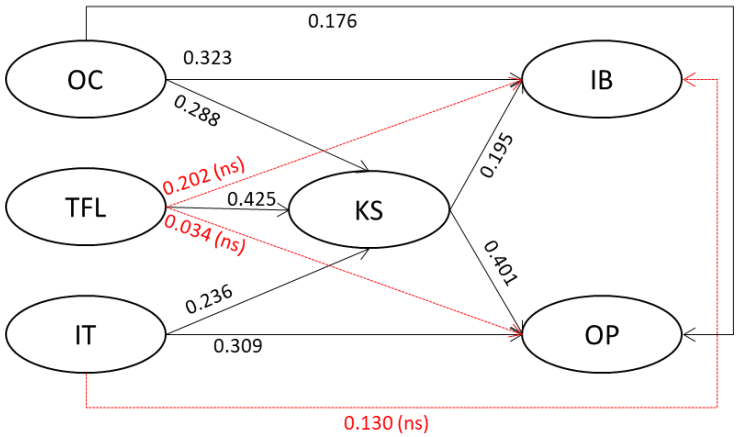

Figure 3. Structural model ($p < 0.05$)
(Note: ns = not significant)
Source: Author (2020)

The second step in PLS-SEM is evaluating the inner model to identify the theorized relationships between constructs. The path coefficients of the proposed relationships were initially examined, followed by bootstrapping method, using 5,000 bootstrapped cases from 315 cases to obtain statistically significant T-statistics. Therefore, R^2 values for criterion variables are evaluated to test each construct's mutual variance. Table 4 shows study R^2 values.

Table 4. R-Square results

	R Square	R Square Adjusted
IB	0.602	0.596
KS	0.757	0.754
OP	0.721	0.717

Source: Author (2020)

Table 5 shows R^2 value for the KS obtained at 0.757, for the IB obtained at 0.602, and for the OP obtained at 0.721. These results indicate that OC, TFL, and IT can influence 75.7% of the KS; the rest are influenced by other variables not included in the study. 60.2% of IB and 72.1% of OP are influenced by the OC, TFL, IT, and KS; the rest is influenced by other variables not found in the study.

The total value of R^2 is used to to predictive relevance (Q2). The blinfolding approach measures the predictive relevance (Q2) and the effect Q2 or impact of

exogenous constructs on endogenous constructs (Henseler et al., 2009). As shown in Table 5, the value of Q^2 in this study can be measured by the following calculation:

$Q^2 = 1 - (1 - R_1^2)(1 - R_2^2)(1 - R_3^2)$
$Q^2 = 1 - (1 - 0.757)(1 - 0.602)(1 - 0.721)$
$Q^2 = 1 - (0.243)(0.398)(0.279)$
$Q^2 = 0.973017$

The predictive value of relevance (Q^2) for the structural model in this study is 0.9730 or 97.30%, meaning that the model is able to explain the phenomenon of performance associated with several variables, namely, OC, TFL, IT, and KS. Therefore, the model can be said to be very good or the model has a very good predictive value. In the end, the model can be used for hypothesis testing.

4.3 Hypothesis Testing

For this study the inner model (structural model) evaluation basically checks the hypothesis. Hypothesis testing was carried out with the partial use of t-test (t-statistic) at each direct effect direction. The full analytical findings, included in the findings of the PLS analysis, can be found in Table 5.

The results of testing of internal models can be described as follows, based on Table 5 and Figure 3:

- OC has a positive and significant effect on OP with $p = 0.014$ (< 0.05) and a coefficient value of 0.176, OC has a positive and significant effect on OP. It means that the gap between OC and OP is significant. The positive-marked coefficient signifies the higher the OC influence, the higher the OP value and vice versa.
- OC has a positive and meaningful effect on IB with $p = 0.004$ (< 0.05) and a 0.323 coefficient value. It means that the gap between OC and IB is significant. The positive-marked coefficient means the higher the OC effect, the greater the IB value and vice versa.
- OC has a positive and significant effect on KS with the coefficient p = 0.000 (< 0.05) and 0.288. That means there is a significant difference between OC and KS. Positive coefficient means the higher the OC effect, the higher the KS and vice versa.
- TFL has insignificant effect on OP with $p = 0.773$ (>0.05) and a coefficient value of 0.034.
- TFL has insignificant effect on IB with $p = 0.065$ (<0.05) and a coefficient value of 0.202.
- TFL has a positive and significant KS effect with $p = 0.000$ (<0.05) and a coefficient value of 0.425. It means that there is a significant difference between TFL and KS. Positive coefficient means the higher the effect of TFL, the higher the value of KS and vice versa.

- IT has a positive and significant OP effect with p = 0.012 (<0.05) and a coefficient value of 0.309. It means that there is a significant difference between IT and OP. Positive coefficient means the higher the effect of IT, the higher the value of OP and vice versa.
- IT has no significant effect on IB with p = 0.231 (>0.05) and a coefficient value of 0.130. This states that there is no significant influence between IT and IB.
- IT has a positive and significant KS effect with p = 0.002 (<0.05) and a coefficient value of 0.236. It means that there is a significant difference between IT and KS. Positive coefficient means the higher the effect of IT, the higher the value of KS and vice versa.
- KS has a positive and significant OP effect with p = 0.000 (<0.05) and a coefficient value of 0.401. It means that there is a significant difference between KS and OP. Positive coefficient means the higher the effect of KS, the higher the value of OP and vice versa.
- KS has a positive and significant IB effect with p = 0.027 (<0.05) and a coefficient value of 0.195. Positive coefficient means the higher the effect of KS, the higher the value of IB and vice versa.

Table 5. Structural model: direct effect

Hypothesis	Relationship	Coefficient	*t*-test	*p*-value	Result
H_1	OC → OP	0.176	2.479	0.014	Significant
H_2	OC → IB	0.323	2.933	0.004	Significant
H_3	OC → KS	0.288	4.583	0.000	Significant
H_4	TFL → OP	0.034	0.289	0.773	Not Significant
H_5	TFL → IB	0.202	1.850	0.065	Not Significant
H_6	TFL → KS	0.425	6.148	0.000	Significant
H_7	IT → OP	0.309	2.518	0.012	Significant
H_8	IT → IB	0.130	1.198	0.231	Not Significant
H_9	IT → KS	0.236	3.157	0.002	Significant
H_{10}	KS → OP	0.401	4.225	0.000	Significant
H_{11}	KS → IB	0.195	2.212	0.027	Significant

Mediation test on the direct effects that form mediation was obtained from several studies. The result of the test in Table 6 can be presented as follow:

- The indirect effect coefficient is 0.116, and the *p*-value of 0.001 < 0.05 indicates that KS is mediating the OC effect on OP.
- The indirect effect coefficient is 0.056 and the *p*-value of 0.070 > 0.05 indicates that KS no mediates the OC effect on IB.
- The indirect effect coefficient is 0.170 and the *p*-value of 0.000 < 0.05 indicates that KS mediates the TFL effect on OP.
- The indirect effect coefficient is 0.083 and the *p*-value of 0.049 < 0.05 indicates that KS mediates the TFL effect on IB.
- The indirect effect coefficient is 0.095 and the *p*-value of 0.015 < 0.05 indicates that KS mediates the IT effect on OP.
- The indirect effect coefficient is 0.046 and the *p*-value of 0.075 > 0.05 indicates that KS no mediates the IT effect on IB.

Table 6. Structural model: indirect effect

Hypothesis	Relationship	Coefficient	*t*-test	*p*-value	Result
H_{12}	OC→KS→ OP	0.116	3.485	0.001	Significant
H_{13}	OC→KS→ IB	0.056	1.817	0.070	Not Significant
H_{14}	TFL→KS→ OP	0.083	1.973	0.049	Significant
H_{15}	TFL→KS→ IB	0.170	3.557	0.000	Significant
H_{16}	IT→KS→ OP	0.095	2.438	0.015	Significant
H_{17}	IT→KS→ IB	0.046	1.785	0.075	Not Significant

4.4 Discussion

4.4.1 Discussion of Findings

This research study has revealed a nexus between organizational culture, transformational leadership, technological infrastructure, knowledge sharing practices, innovative behavior, and organizational perfromance in the context of construction companies. The hypothesis were developed from the related literatures and tested based on the data collected from the construction companies operating in Jakarta city of Indonesia.

The first hypothesis is to find out the influence of organizational culture on organizational performance. The test showed there is an influence of organizational culture on organizational performance. This suggests that the organizations should focus on organizational culture in achieving business performance outcomes. The present findings seem to be consistent with other researchs which have found positive relationship between organizational culture and firm performance (Acar & Acar, 2012; Jogaratnam, 2017; Yesil & Kaya, 2013). The results of current study indicate three dimensions of organizational culture (e.g. harmony, social responsibility, and innovation) (Tsui et al., 2006) are directly related to firm performance.

The second hypothesis is to find out the influence of organizational culture on innovative behavior. The test result shows organizational culture influence innovative behavior. The present findings seem to be consistent with previous research (Hartmann, 2006; Shahzad et al., 2017). The culture at construction companies encourage employees to innovate in order to compete with other competitor and work process improvement. The employee is given the opportunity to innovate to improve the work process or to create solutions that can be sold to client. There are many innovative construction servives created by construction companies, for example, conducting structural evaluation for building and infrastructure.

The third hypothesis is to find out the influence of organizational culture on knowledge sharing practices. The test showed there is an influence of organizational culture on knowledge sharing practices. The present findings seem to be consistent with previous research (Areekkuzhiyil, 2016; Kathiravelu et al., 2014; Wei & Miraglia, 2017). Building and developing a culture requires a long time and is not an easy thing. In general, any changes that occur in the company will cause rejection, especially from employees. Rejection arises because of a new culture or a new system. Possible resistance is that when companies try to implement

knowledge-sharing practices, it could be due to fear of losing privacy, fear of loss of job security, and fear of losing power and status. Changes in attitudes towards a culture of knowledge sharing can be formed through the treatment of superiors towards their subordinates. If employees feel that they are not being treated well, efforts to form a culture of knowledge sharing will be in vain. Employees must also be assured that sharing knowledge with other parties will not reduce their performance and will not compete with colleagues.

The fourth hypothesis is to find out the influence of transformational leadership on organizational performance. The showed there is no influence of transformational leadership on organizational performance. The present findings contrast with previous research (Birasnav, 2014; Chen et al., 2019; İşcan et al., 2014; Samad, 2012). However, this finding is in line with research conducted by Alrowwad et al. (2016). Organizational performance was less than optimal due to knowledge gaps between very different levels of staff, e.g. knowledge of office staff with higher education and education levels is still low for project staff at project sites in general. This results in a review of the application of transformational leadership applied to all levels of staff. The application of transformational leadership at each level should be based on the level of knowledge and the level of education.

The fifth hypothesis is to find out the influence of transformational leadership on innovative behavior. The test result shows transformational leadership influence innovative behavior. This findings is contrast with previous studies (Afsar & Umrani, 2019; Elrehail et al., 2018; García-Morales et al., 2012; İşcan et al., 2014). Theoritically, the leader should mobilize innovation. The majority of construction companies in Indonesia still use the concept of seniority at the management level. They believe that the longer employees work, the more experience and knowledge they have. Employees who have worked for a long time believe that innovation will slow down the work of the project. Construction companies also entrust senior management staff to fill senior management positions. This situation allows transformative leadership not to affect the innovative behavior of employees.

The sixth hypothesis is to find out the influence of transformational leadership on knowledge sharing behavior. The test result shows transformational leadership influence knowledge sharing behavior. This finding is in line with previous studies (Kim & Park, 2020; Mohammadi & Boroumand, 2016). However, this finding is contrast with previous studies (Coun et al., 2019). When the perceptions of leadership of the employees are positive, they show a greater commitment to knowledge sharing. The way knowledge is shared within the company is greatly influenced by transformational leadership. In other words, transformational leaders could encourage employees to share, maintain and enhance their knowledge of organizational learning. This finding emphasizes the role of leaders in creating supportive work environments and strengthening the positive knowledge- and learning outcomes of employees. Moreover, transformational leaders who promote careful problem-solving and give employees personal attention will also be more likely to improve knowledge sharing.

The seventh hypothesis is to find out the impact of technological infrastructure on organizational performance. The test result shows technological infrastructure influence organizational performance. This finding is in line with previous studies (Mao et al., 2016; Ningsih, 2014; Ong & Chen, 2014; Zhao & Priporas, 2017). IT plays an important role in improving the level of coordination between employees of the company. It facilitates the flow of information between employees. Therefore, the use of IT within company enhances organizational performance dimension in this studies (e.g. economic, employee, innovation, customer, and operational performance). Appropriate technological infrastructure may help a firm to become more productive and effective in satisfying its customers. The companies must retain the capacity to continually adjust their positioning in each area, adapting their business strategy and technological infrastructure, in order to be competitive.

The eighth hypothesis is to find out the impact of technological infrastructure on innovative behavior. The test result shows technological infrastructure has not influence on innovative behavior. In contrast to prior studies (Anser et al., 2020; Anzola-Román et al., 2019; Jabbouri et al., 2016; Setiadi & Narsa, 2019) which have suggested that technological infrastructure has a direct and positive effect on innovative behavior, we did not find a direct effect of technological infrastructure on the perception of innovative behavior. It shows that even though the company has adequate technological infrastructure, it will not affect innovative behavior, idea development, and innovation in work processes. This condition can be caused by the availability or support, the dynamics of updates, and the low ability of information technology.

The ninth hypothesis is to find out the impact of technological infrastructure on knowledge sharing. The test result shows that technological infrastructure influence knowledge sharing activities. This finding is in line with previous studies (Chión et al., 2019; Ningsih, 2014; Sentana & Yuniastari, 2015). Technological infrastructure is an essential enabler for other knowledge resources such as the acquisition of knowledge and the application of knowledge. Technology facilities encourage knowledge sharing and provide the knowledge required of the employees (Abdi et al., 2018). The organization can enhance their performance by acquiring and using technologies that facilitate knowledge discovery, creation, and application in adopting cultures that facilitate interaction among employees, encouraging employees to master in their tasks correctly and that of others, and communicate freely with employees of different areas of specialization. The development of technological infrastructure has made it possible to codify, store, share, and disseminate specific knowledge beyond physical and time barriers more quickly and cheaply than ever before.

The tenth hypothesis is to find out the impact of knowledge sharing on organizational performance. The test result shows that knowledge sharing influence organizational performance. This finding is in line with previous studies (Akroush & Awwad, 2018; Allameh et al., 2014; Wang et al., 2016; Wang et al., 2014). The existence of a positive relationship between the role of knowledge sharing on organizational performance illustrates that representatives of construction

companies can use the concept of sharing knowledge by exchanging information, ideas, opinions, experiences, and knowledge they have to complete work and improve project performance so that together they can improve organizational performance. Employees' willingness to ask each other and teach each other new things can help the organization improve organizational performance.

The eleventh hypothesis is to find out the impact of knowledge sharing on innovative behavior. The test result shows that knowledge sharing influence innovative behavior. This finding is in line with previous studies (Akram et al., 2020; Elrehail et al., 2018; Pian et al., 2019; Vandavasi et al., 2020). An innovative attitude is required to work in the construction industry. Willingness to share knowledge in an organization is natural and should be done for the organization's progress. Sharing knowledge can increase innovation capabilities by discovering new ideas, new operational methods, and an increase in the number of new products or services in the market. Good cooperation between employees will make it easier to share knowledge, especially in developing new solutions or methods in construction work. It is in line with the opinion of Sáenz et al. (2012).

The twelfth hypothesis is to determine the mediation effect of knowledge sharing between organizational culture and organizational performance. Organizational culture, coupled with proper knowledge sharing implementation, will further drive the performance of the company even better. It was because having it that way would well-organize the existing knowledge sharing in the companies and could well control to support optimal performance. This research finding was consistent with the research conducted by Hermanto et al. (2018) and Kucharska & Wildowicz-Giegiel (2017), who found that organizational culture influence on organizational performance partially mediated by knowledge sharing.

The thirteenth hypothesis is to discover the role of knowledge sharing as a mediator between the link of organizational culture on innovative behavior. The test result shows that knowledge sharing does not mediate the link between organizational culture on innovative behavior. This research finding was in contrast with the research conducted by Alnesr & Ramzani (2019). The empirical findings have spotlighted that organizational culture and knowledge sharing practices can significantly affect innovative behavior directly. However, the relationship between organizational culture and innovative behavior is not encouraged because of knowledge sharing. In the organizational culture in this study, there is an innovation dimension where employees feel satisfied to be part of a construction company. When employees are satisfied, this will increase employee engagement and participation in work. If the organizational culture in a construction company is right, then innovation performance will also have a good impact without involving knowledge sharing practices as a medium.

The fourteenth hypothesis is to find out the role of knowledge sharing as a mediator between the link of transformational leadership on organizational performance. The test result shows that knowledge sharing mediates the link of transformational leadership on organizational performance. This research finding was consistent with previous studies conducted by Chang et al. (2018), Gathii &

K'Obonyo (2017), Lashari & Rana (2018), and Son et al. (2020). Transformational leadership can affect organizational performance either directly or indirectly, by stimulating employees to share knowledge. Knowledge sharing has acted as an important predictor of organizational performance. Transformation leaders still need project employees to share knowledge and be better able to accomplish project goals, achieve quality, meet customer satisfaction, and achieve complete effectiveness. In practice, these findings can be used as a reference for improving the performance of the organizations.

The fifteenth hypothesis is find out the role of knowledge sharing as mediator between the link of transformational leadership on innovative behavior. The test result shows that knowledge sharing mediates the link of transformational leadership on innovative behavior. This research finding was consistent with previous studies (Choi et al., 2016; Khan & Khan, 2019). Leaders who apply transformational leadership in their daily activities will be able to trigger the comfort of employees in working both on projects and in the office. Employees will be free to express their ideas because they trust and support the organizational leader. It is necessary to have the practice of knowledge sharing possessed by leaders or employees so that the innovations carried out can run optimally to add and develop ideas that employees have. It can enhance innovative behavior.

The sixteenth hypothesis is to find out the role of knowledge sharing as a mediator between the link of technological infrastructure on organizational performance. The test result shows that knowledge sharing mediates the link of technological infrastructure on organizational performance. This research finding was consistent with previous studies (Ifada, 2011; Payal et al., 2019). The results obtained indicate that the development of technological infrastructure carried out by the company will increase the company's understanding of work processes, products or services, customers, business strategies, and managerial activities to improve firm performance. The fact is that technology infrastructure can support knowledge-based systems by implementing that knowledge into company routines; technology can improve the integration and use of knowledge. It also allows the practice of sharing knowledge to improve company performance. This study provides direction on the importance of knowledge sharing practices within companies that can increase knowledge synergy between business units to mediate technological infrastructure and company performance.

The seventeenth hypothesis is to find out the role of knowledge sharing as a mediator between the link of technological infrastructure on innovative behavior. The test result shows that knowledge sharing does not mediate the link of technological infrastructure on innovative behavior. This research finding was in contrast with previous studies (Al-Mamoori & Ahmad, 2015; Anser et al., 2020; Kaewchur & Phusavat, 2013; Qammach, 2016). The empirical findings have spotlighted that technological infrastructure does not significantly affect innovative behavior directly, while knowledge sharing practices affect innovative behavior directly. The insignificant effect of knowledge sharing as a mediator could be as knowledge is power, the need for this knowledge makes the employees essential,

and they can not be laid out by the organisation. Therefore the employee will not actively participate in the transfer of knowledge or transfer their knowledge and expertise to each other using the company's technological infrastructure. Another possible explanation for this insignificant mediating effect is that knowledge sharing is still in its infancy and there is no precise mechanism for the organization to transfer knowledge or to benefit from knowledge sharing practices (Alaarj et al., 2017). Employees have not maximally used the use of technological infrastructure in sharing knowledge to improve innovative behavior. The process of sharing knowledge in construction projects is still done traditionally in general. It also illustrates the immature use of technology infrastructure in developing innovative employee attitudes; meanwhile, sharing knowledge is traditionally considered to be able to increase the innovation of project employees, although it is not yet optimal.

Leaders need to make effective implementation of knowledge management practices in construction projects. Implementing the management of knowledge will prevent the organization from wasting resources on repeating the same errors. To put it another way, the organization can have learned a database of its projects and document lessons and cases where problems have been solved. With this database the organization will be prevented from repeating the same procedures to find the same solution. The additional operating costs can thus be avoided and work time reduced.

4.4.2 Limitations

There are respective limitations to the current study. First, the present results are based on the reactions of the representatives of the company (single respondents), which relate to a certain degree of subjectivity. We used representative responses from the company because they could have a deep knowledge of those variables. The research follows the methods which other authors used in the past. A second limitation of this research concerns that it only examines construction companies in the Jakarta city of Indonesia. Further research shall enhance the coverage by including more construction companies and involving more respondents from which the result can be generalized to the other context. In addition to the questionnaire, other techniques can be exploited to collect the data, such as in-depth interviews and observation.

5. Conclusion

This study investigated organizational culture, transformational leadership, and technological infrastructure on innovative behavior and organizational performance through the mediating role of knowledge sharing. The findings show that organizational culture, technological infrastructure, and knowledge sharing practices have a significant effect on organizational performance; while the transformational leadership has an insignificant aspect on organizational performance. Organizational culture and knowledge sharing practices have a significant impact on innovative behavior, while the transformational leadership and technological infrastructure have a insignificant aspect of innovative behavior. Knowledge sharing has a significant impact on

organizational performance and innovative behavior. Knowledge sharing mediates the nexus between organizational culture, transformational leadership, and technological infrastructure on organizational performance. Knowledge sharing does not mediate the nexus between organizational culture and technological infrastructure on innovative behavior; while knowledge sharing mediates the relation between transformational leadership on innovative behavior.

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The author(s) have declared no potential conflicts of interest regarding this article's research, authorship and/or publication.

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