



## Correlation between knowledge exchange & combination (KEC) and leader member exchange (LMX)

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### ABSTRACT

*The purpose of this study is to understand the relationship between the Knowledge Exchange & Combination (KEC) and the Leader-Member Exchange (LMX). Research uses objects in the construction industry, which have characteristics: intense competition between players, innovation must be created in a short time, and is a form of project-based organization. This study uses a unit of analysis of the dyadic relationship between the general manager as the leader and the project manager as follower, the research sample is in the form of 121 projects scattered throughout the country, while the research object is a SOE construction company in Indonesia. The participation rate was 97.52 percent, namely 118 projects, while the analysis used descriptive statistical and correlation methods. The results showed that the KEC variable was correlated with the LMX variable, especially with the Influence Dimension of 0.789 and the Dimension of Professional Rewards 0.700. Therefore, KEC can be represented by LMX's perception of followers.*

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## Introduction

Research on the correlation between KEC and LMX is important because one of the results of the exchange between leaders and followers in the LMX is innovation which is an antecedent of performance. If the LMX is of high quality, the output of innovation is also of high quality, so that performance targets are expected to be achieved. Further, what leaders and followers trade at LMX remains unclear. Furthermore, research on exchange content within LMX has never been carried out in the construction industry. This study uses object and samples at a construction's SOE in Indonesia. The use of context in the construction industry is due to their large contribution in obtaining Indonesia's GDP.

The work unit studied in this study is projects, followers are people who serve as project managers, while leaders are people who serve as general managers who are in charge of overseeing several project managers for the projects they work on. Thus, the knowledge idea that originated from the project generates innovation at the general manager level and the results are applied back to the project. In construction projects in Indonesia, most of the innovations are aimed at overcoming geographic challenges that occur in the location. The phenomenon of each construction project is characterized by: different geographical situations and conditions; because the duration of the work has been determined from the start, the innovation must be realized immediately, namely during project preparation or within the project time frame; so that the innovations produced in each project will be different.

The choice of research object in a State-Owned Enterprise (BUMN) is due to being a leading leader in innovation initiatives and a major player in Indonesia. This BUMN has various projects throughout the regions in Indonesia, therefore it can represent a typical construction company in Indonesia. The research sample is in the form of 121 projects scattered throughout the country, while the participation rate was 97.52 percent, namely 118 projects.

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From previous researchs, new knowledge enables firms both to innovate and to outperform their rivals in dynamic environments (Grant, 1996; Kogut & Zander, 1992). Current development of Knowledge Management theory maintains that new knowledge is created within organizations through a process of exchange and combination among employees (Nahapiet & Ghoshal, 1998). Furthermore, previous research has proven that innovation is an antecedent of performance (Bierly & Cakrabarti, 1996; Brown & Eisenhard, 1995). In today's fierce competition, innovation advantage is very important in the market. Whereas in the construction industry, innovation is important to increase the effectiveness and efficiency of work methods / processes, as a means of competition, a means of growth, and a tool to shorten the project cycle (Ribeiro, 2008). In addition, the role of the construction industry in achieving Gross Domestic Product (GDP) is very important in various countries including Indonesia, with a contribution of at least 10% of GDP (Morales, Llorens-Montes, & Jover, 2007; BPS, 2013). The role of its contribution increases through various physical infrastructure developments, such as buildings, bridges, irrigation, roads, ports, airports and so on.

Based on the theory of Total Innovation Management, leaders need the help of followers to be able to create innovation (Xu, Chen, Xie, Liu, Zheng and Wang, 2007). Further, leaders and followers exchange tangible and intangible resources in their interactions (Dienesch & Liden, 1986; Liden, Sparrowe & Wayne, 1997). Furthermore, in the context of project-based organizations, leaders (general managers) have high status and comprehensive abilities, while followers (project managers) have ideas as intangible resource (Hobday, 2000). Therefore, we believe that the LMX will positively generate innovations created from the exchange between leader and follower, with the follower's strategic role as idea giver. Thus, the aim of this study is to examine the LMX exchange content between leaders and followers. Also, if the LMX exchange is of high relationship quality, there will be a high exchange between the leader and followers so as to produce high-quality innovation to create successful performance.

The results of previous studies indicate that LMX is positively related to work climate, job satisfaction, willingness to help colleagues, work performance, commitment to organizational change, satisfaction with leadership and the existence of trust between leaders and followers (Furst, 2008; Dyne et al. , 2008; Henderson et al., 2008; Ozer, 2008). Leader member exchanges have also been shown to produce effective communication between leaders and followers (Fairhurst et al., 1987). In high-level innovative job engagement, LMX exchange is associated with positive feelings of energy for employees (Atwater & Carmeli, 2009), and encourages innovative behavior (Basu & Green, 1997; Scott & Bruce, 1998). Furthermore, according to Nahapiet and Ghoshal (1998), new knowledge is created in the organization through a process of exchange and combination among employees. However, it is not clear whether it is lateral or vertical. Therefore, this study not only examines the existence of knowledge exchange and combination (KEC) content in the LMX, but also tests that there is a vertical exchange and combination of knowledge between leaders and direct followers in the LMX. Furthermore, it will be proven that if KEC is high, then the LMX is in high quality, resulting in high quality innovation, and subsequently successful performance.

## **Literature Review**

Innovation requires that individuals acquire knowledge now and that they share that knowledge within the organization (Cohen & Levinthal, 1990; Hage, 1999; Kogut & Zander, 1992; Nonaka & Takeuchi, 1995; Stata, 1989). As Nonaka (1994) suggests that innovation will occur when employees share their knowledge within the organization and when the knowledge shared creates new and shared insights. The ability to create new knowledge (knowledge creation) allows companies to innovate and beat competitors in a dynamic environment (Grant, 1996; Kogut & Zander, 1992). The ability to create new knowledge (knowledge creation) is a specific resource of a company that can generate income from the creation of new opportunities, and respond effectively to rapid environmental changes (DeCarolis & Deeds, 1999; Grant, 1996). Knowledge creation is defined as a direct product of the knowledge creation process, especially the development of new ideas that reflect a significant elaboration or enrich current knowledge (Johnson, 2002; Tse & Mitchell, 2010). Nahapiet and Ghoshal (1998) argue that new knowledge (knowledge creation) is created in the organization through the process of exchange and combination among employees. Implicit in this argument is the note that exchange and combination create new knowledge by connecting previously unconnected ideas and knowledge or recombining previously connected ideas and knowledge in new ways (Kogut & Zander, 1992; Nahapiet & Ghoshal, 1998).

Most previous empirical studies have shown that innovation is an antecedent of performance (Bierly & Cakrabarti, 1996; Brown & Eisenhard, 1995). This is due to the role of innovation in dealing with external environmental turbulence and, the main driver in business in dynamic markets for long-term success (Baker & Sinkula, 2002; Utterback, 1994; Wolfe, 1994). Furthermore, innovation in the construction industry is important to increase the effectiveness and efficiency of work methods / processes, as a means of competition, a means of growth, and a tool to shorten the project cycle (Ribeiro, 2008). In addition, the role of the construction industry in achieving Gross Domestic Product (GDP) is very important in various countries including Indonesia, with a contribution of at least 10% of GDP (Morales, Llorens-Montes, & Jover, 2007; BPS, 2013). The role of its contribution increases through various physical infrastructure developments, such as buildings, bridges, irrigation, roads, ports, airports and so on. So, based on previous research, it can be concluded that innovation, especially in the construction industry, will result in the achievement of performance targets.

The definition of leadership is a mechanism by which a leader influences his subordinates to obtain performance targets (Northouse, 2007). Meanwhile, according to Bass and Bass (2008), followers play an important role in the leadership mechanism. The success of leaders and followers depends on the dynamics of the relationship between them. Leaders and followers are closely related. Leaders cannot lead without having followers, and followers cannot be followers without leaders. The bottom line is that each other needs

each other, and the quality of the relationship determines how followers will behave. That's why it's important for leaders and followers to focus on developing mutually respectful and beneficial relationships. Furthermore, Bossidy (2007) states that leaders clearly want followers who are productive, reliable, honest, cooperative, proactive and flexible. Leaders want to have followers who have competence and ability (Day & Crain, 1992; Dockery & Steiner, 1990), on the other hand followers prioritize their interpersonal relationships with the leader (Dockery & Steiner, 1990; Maslyn & Uhl-Bien, 2001). Followers prioritize the interpersonal aspects of the relationship with the leader and how to achieve personal goals in the group, while the main concern of leaders is the achievement of group productivity (Huang, Wright, Chiu, Wang, 2008).

Various researchers (Dansereau, Graen & Haga, 1975; Graen & Cashman, 1975; Graen & Scandura, 1987; Graen & Uhl-Bien, 1995) have the same opinion regarding the definition of leader-member exchange leadership types that revolve around developing dyadic relationships between leaders with followers reporting directly to him. Leader-member exchanges focus on the quality of the relationship between the leader and follower instead of the behavior or nature of the leader or follower. Furthermore, based on Dansereau, Graen, Haga (1975) as a result of this process of delegating roles, two types of leader-member exchange relationships arise. The first type of leader-member exchange is called an in-group exchange. In this relationship, leaders and followers develop a partnership with the characteristics of reciprocal influence, mutual trust, respect and liking, and a sense of common fates. In the second type of leader-member exchange is referred to as an out group exchange, where the leader is characterized as a supervisor who fails to create a sense of mutual trust, respect, or common fate. Leader-member exchange (LMX) theory describes that effective leadership occurs when leaders and followers develop high-quality dyadic relationships, which enable followers to gain access to various benefits (Graen & Cashman, 1975; Graen & Scandura, 1987; Graen & Uhl-Bien, 1995). The theory states that leaders tend to develop different exchange relationships with different followers (Graen & Cashman, 1975; Graen & Scandura, 1987). In the process of developing a dyadic relationship, leaders and followers tend to test their respective roles in work based on specific role expectations. The extent to which these mutually beneficial expectations are met by one another will affect whether they will proceed to a high quality exchange (Bauer & Green, 1996; Dienesch & Liden, 1986; Graen & Cashman, 1975; Graen & Uhl-Bien, 1995; Maslyn & Uhl-Bien, 2001).

If the leader-member exchange model is implemented correctly, there is a significant relationship between leader-member exchange types and work-related outcomes. A positive leader-member exchange type (in group exchange) will positively related to work climate, job satisfaction, willingness to help colleagues, work performance, commitment to organizational change, satisfaction with leadership and the existence of trust between leaders and followers (SA Furst, 2008; Ozer, 2008). Leader member exchanges have also been shown to produce effective communication between leaders and followers (Fairhurst et al., 1987). Leader-member exchanges also have a positive effect on citizenship behavior (Ilies, Nahrgang & Morgeson, 2007) and produce retaliatory behavior from followers at a low level (Townsend, Phillips, Elkins, 2000). Positive leader-member exchanges have also been shown to help predict not only turnover but also career achievement, such as promotions, salary levels and bonus receipts (Graen, Liden & Hoel, 1982), and also helps control the turnover rate over seven years (Wakabayashi & Graen, 1984).). Four of the five relationship-oriented behaviors (recognizing, delegating, consulting, and supporting) are strongly correlated with leader-member exchange (LMX). Meanwhile task-oriented behavior (claryfing, planning, monitoring) was not significantly correlated with exchange leader-member (Yukl, O'Donnell and Taber, 2008). The results of studies on full-time employees of companies in Turkey prove the relationship between leader-member exchanges with delegation and job satisfaction (Pellgrini & Scandura, 2006). There is also a positive relationship between leader-member exchange and organizational commitment with the role of mediating the quality of participation (Torka, Schyns, Loose, 2010). In high-level innovative job engagement, LMX exchange is associated with positive feelings of energy for employees (Atwater & Carmeli, 2009). LMX affects organizational performance positively (Graen & Ginsburgh, 1997; Keller & Dansereau, 1995; Liden & Maslyn, 1995; Wayne, Shore & Liden, 1997). So based on previous research, it is concluded that a quality LMX will result in the achievement of performance targets.

### **Hypothesis Development**

In this research in the construction industry, we estimate that Knowledge Exchange & Combination (KEC) can be represented by the LMX perception of follower, where in the leadership process (Northouse, 2007) a leader will ask for ideas & knowledge from followers in the mechanism of exchange and combining knowledge in to create Leader's Innovativeness. Because the process of exchanging and combining knowledge is carried out between leaders and followers, it can be represented by the follower perception LMX variable. Followers have intangible resources of quality ideas to exchange and combine with their leaders' ideas. Followers need exchange to present themselves to achieve personal goals such as career development, opportunities for training and increases in salary (eg Graen & Scandura, 1987; Graen & Uhl-Bien, 1995; Huang, Wright, Chiu. & Wang, 2008). Leaders, on the other hand, are interested because these followers may have a resource of ideas that leaders need to do their job (eg Dockery & Steiner, 1990; Huang, Wright, Chiu & Wang, 2008). Therefore, both leaders and followers are interested in being involved in the exchange and combining of knowledge on their ideas. Furthermore, the knowledge of ideas obtained from followers is exchanged and combined with the knowledge of the leader's own ideas to produce leader's innovation.

This innovation is then conveyed back by the leaders to be implemented in projects managed by followers in order to achieve project performance targets. Accordingly, we can hypothesize that:

*H1. KEC correlates positively with LMX perception follower and is in high quality*

## Research and Methodology

### Methods of Data Collection

As an object of research in the construction industry, a state-owned construction company was chosen. At the time of the survey, the number of company employees was 849 people, with a category of 584 technical personnel and 265 non-technical personnel. The managerial composition consists of 5 directors, 28 general managers, and 138 senior managers (project managers). A construction company is a typical project-based organization. This state-owned construction company has projects in various regions in Indonesia, so it was chosen to be the object of research on the grounds that it could represent the construction industry in Indonesia. Another added value of this company is to become the leader of innovation in the market by implementing various construction projects, especially flyovers, ring roads and toll roads. Completion of work that is faster than the target, as a result of the innovations created, causes this company to win various innovation competitions that it participates in.

The implementation of this research used all existing projects at the time of the survey, namely as many as 121 projects. As a unit analysis is the dyadic relationship between the general manager (as a leader) and the project manager (as a follower). Each general manager will assess 10-15 project managers and vice versa, so that the sample size is 121 pairs. The number of returned questionnaires was 118 pairs, so the participation rate was 97.52 percent. This is according to management research for the senior executive level in a company, far above the average participation rate of 20-25 percent (Morgan and Strong, 2003; O'Regan and Ghobadian, 2004).

As previously explained, the focus of this research is on projects that are at the forefront of the construction business, where in the project location ideas and knowledge will emerge as a response to the challenges and geographical constraints experienced. The general manager as a leader wishes to exchange ideas and knowledge with the project manager as subordinates, because the innovations resulting from this exchange will increase project performance, which in turn will have an effect on improving company performance and their own performance. This is the main reason for both parties to exchange between them. The result of the exchange and the combination of knowledge is the innovation created by the General Manager, then the general manager supplies the innovation back to the project manager to be implemented in the project managed by the project manager. General managers are the main providers of innovation because they have the authority to implement innovations in projects. Meanwhile, the project manager is the main implementer of innovation.

Measurement of the follower perception LMX variable is in Table 1, while the data collection scheme is in Table 2

**Table 1:** Measure of Variables

Variable	Dimension	Measure	References
1. LMX perception Follower	Affect, Loyalty, Contribution and Professional Respect.	LMX-MDM, consist of 12 items using six-Likert scale	Lyden & Maslyn (1998); Dienesch & Liden (1986)
2. Knowledge Exchange & Combination	Eight (8) Dimension of items	KEC, consist of 8 items using six-Likert scale	Collin & Smith (2006); Argote et al (2003); Nahapiet & Ghoshal (1998)

**Table 2:** Data Collection Scheme

No.	Variable	Respondent	Asked about
1.	Leader-Member Exchange	Project Managers (Followers)	General Managers (Leaders)
2.	Knowledge Exchange & Combination	Project Managers (Followers)	General Managers (Leaders)

### Data Analysis Methods

Descriptive Statistical Analysis and Correlation Analysis were used to perform the analysis

## Results

### Descriptive Statistics Analysis

Descriptive Statistical Analysis The composition of respondents consisted of 9 general managers and 121 project managers, where all general managers were men, while on the project manager side there were 119 men (98.35 percent), and as many as 2 women

(1.65 percent). There were 3 non-return questionnaires from 3 male project managers. The data obtained from the study are the mean and standard deviation, as shown in Table 3 below, with a Likert scale of 1 to 6.

**Table 3:** Descriptive Statistics Analysis

<i>Latent Variable</i>	<i>Mean</i>	<i>Deviation Standard</i>	<i>Information</i>
<i>LMX Perception of Follower</i>			Measured by follower
• <i>Affect</i>	4,72	0,87	
• <i>Loyalty</i>	3,84	1,03	
• <i>Contribution</i>	4,34	0,99	
• <i>Professional Respect</i>	4,83	0,91	
Mean	4,44	0,70	
<i>Knowledge Exchange &amp; Combination</i>	5,00	0,95	Measured by follower
Mean			

In Table 3, it can be seen that in the latent variable of LMX follower perception there is a Professional Respect dimension with the highest mean score of 4.83. This means that in their interactions with the leader, the follower highly respects the knowledge, competence and expertise possessed by the Leader. For the Affect, Loyalty, and Contribution dimensions, it can be seen that the mean score is also high, while the mean score for the overall dimension is 4.44 for the LMX variable follower perception. So it can be said that the LMX quality between the leader and follower is high, and there is a uniformity of dimensional characteristics possessed. While the Knowledge Exchange and Combination variable has a high mean score of 5 which means there is an exchange and combination of knowledge with high quality between the leader and the follower.

Therefore, based on the average answers to the questionnaire, it appears that the Follower views the relationship with the leader as high quality for all LMX dimensions: influence, loyalty, contribution and professional rewards. Likewise, followers perceive an exchange and combination of high quality knowledge with leaders. Even though the standard deviation is inserted in the analysis, the latent variable values are still high above the average.

**Correlation Analysis**

The correlation analysis between the KEC variable and the follower perception LMX was carried out to ensure that the KEC variable could be represented by the follower perception LMX. The analysis results are shown in Table 4. It can be seen that the KEC variable is correlative with the LMX variable, especially with the Affect Dimension of 0.789 and the Professional Respect Dimension of 0.700. Therefore the KEC variable can be represented by the follower perception LMX variable.

Table 4: Correlation between KEC and LMX

<b>Correlations</b>		<b>KEC</b>
Affect	Pearson Correlation	.789**
	Sig. (2-tailed)	.000
	N	118
Loyalty	Pearson Correlation	.244**
	Sig. (2-tailed)	.008
	N	118
Contribution	Pearson Correlation	.320**
	Sig. (2-tailed)	.000
	N	118
ProfResp	Pearson Correlation	.700**
	Sig. (2-tailed)	.000
	N	118

\*\* . Correlation is significant at the 0.01 level

**Discussion**

The aim of this study was to examine the correlation between KEC and LMX and both are in high quality. The results show that the KEC variable is correlative and can be represented by LMX, and both have high quality. The KEC variable is correlative with the LMX variable, especially the Affect Dimension of 0.789 and the Professional Respect Dimension of 0.700. The Affect dimension and the Professional Respect dimension are the social interaction dimensions compared to the Loyalty and Contribution dimensions, which are mostly job and task related interactions. (Bhal, Ansari & Rehana, 2007; Liden & Maslyn, 1988). In implicit leadership theory, people identify someone based on the suitability between their implicit leader prototype and the observed characteristics of leader behavior (Lord & Maher, 1991; Phillips & Lord, 1981). So based on this argument, followers at PT. "X" admit that their superior position as a leader is based on the social interaction dimension rather than the job or task dimension.

Furthermore, the research shows that General Managers and Project Managers develop high quality LMXs in the interests of both parties. The General Manager will achieve performance targets against projects under his control, while the Project Manager will achieve successful performance on the projects he leads, and have a great opportunity for career advancement, training and higher salaries, as his personal goals. It can be seen that the perception of LMX followers has a high score with an average of 4.44 using a Likert scale of 1 to 6. In addition, the highest score dimension is the Professional Award for the leader with an average score of 4.83. Likewise, it turns out that the General Manager and the Project Manager developed a high-quality knowledge exchange and combination with an average score of 5 using a 1-6 Likert scale.

### **Implication**

The research implication is that in the construction industry, the exchange and combination of knowledge (KEC) between leaders and followers is an important issue. The exchange and combination of knowledge between ideas and knowledge possessed by the project manager as the main idea provider, with the ideas and knowledge possessed by the general manager as the owner of the innovation creation authority, is very important to produce high quality innovation. These findings enrich the literature that KEC can be represented by LMX. Furthermore, the direction of exchange in KEC theory, which has not been clear laterally or vertically, from this research in the construction industry, it is found that there is an exchange and combination of knowledge with the vertical middle top down direction: from project manager to general manager, then it is implemented back into the project being worked on.

### **Conclusions**

The above findings have drawn conclusions to the central question of research, that KEC is correlative with LMX. Therefore there is an exchange content of KEC in LMX. The results show that the KEC variable is correlative and can be represented by LMX, and both have high quality. The KEC variable is correlative with the LMX variable, especially the Affect Dimension of 0.789 and the Professional Respect Dimension of 0.700. The Affect dimension and the Professional Respect dimension are the social interaction dimensions compared to the Loyalty and Contribution dimensions, which are mostly job and task related interactions. (Bhal, Ansari & Rehana, 2007; Liden & Maslyn, 1988). In implicit leadership theory, people identify someone based on the suitability between their implicit leader prototype and the observed characteristics of leader behavior (Lord & Maher, 1991; Phillips & Lord, 1981). So based on this argument, followers at PT. "X" admit that their superior position as a leader is based on the social interaction dimension rather than the job or task dimension.

Further answering other central research questions, the results show that in the context of the construction industry (project-based organizations) there are high quality KEC and LMX between leaders and followers. According to descriptive statistics table, it can be seen that KEC has mean score of 5 and LMX has mean score of 4.44. For latent variable LMX *perception of follower*, there is a Professional Respect dimension with the highest mean score of 4.83. This means that in their interactions with the leader, the follower highly respects the knowledge, competence and expertise possessed by the Leader. For the Affect, Loyalty, and Contribution dimensions, it can be seen that the mean score is also high, while the mean score for the overall dimension is 4.44 for the LMX variable follower perception. So it can be said that the LMX quality between the leader and follower is high, and there is a uniformity of dimensional characteristics possessed. Although deviation standard inserted in analysis, the score of latent variable still high above average.

It can be concluded that Knowledge Exchange & Combination (KEC) plays an important role in the exchange of high quality LMXs in the construction industry. In theory KEC this research has contribution that there is a vertical exchange and combination of knowledge between leaders and followers. Also that the KEC variable is correlative and can be represented by the LMX variable. We noted from previous KEC theory that it was not clear whether the direction of knowledge exchange in KEC was vertical or lateral. Furthermore, this research also contributes to the LMX theory, with the existence of high-quality LMXs between leaders and followers in the construction industry as a type of project-based organization and there is the contents of the KEC exchange in the LMX exchange.

This study has limitations, despite its findings and contribution to the management literature. The first limitation is the use of respondents' perceptions in data collection. Where this method will tend to be consistent (Podsakoff & Organ, 1986), so that respondents' answers to all questionnaires to logically related questions will tend to have consistent perceptions. Furthermore, general managers can be consistent with their followers in filling out questionnaires about them. Another possibility of consistency bias is the concern and caution of followers in filling out questionnaires for leaders whose contents can be considered to be underestimating the leadership. Therefore, we have tried to create a questionnaire that is accurate, to minimize the occurrence of bias (Huber & Power, 1985), so that respondents do not easily maintain consistency, where logically connected items and parts are separated, also we treat every response as confidential.

The second limitation of this research is its validity to be applied in other industrial contexts that have different characteristics, apart from the construction industry. Therefore, future research options can be carried out in service industries with rapid technological developments. It is also important to look at continuous innovation and confront companies with short-term versus long-term dilemmas.

The third limitation of this study is related to the KEC variable studied in this study, namely the respondents are in a vertical position. It should also be demonstrated that there is an exchange and combination of knowledge laterally and not only vertically in various types of organizations. This can be done by changing the object of research with the respondent's position sideways for further research. Based on Ghohal and Nahapiet (1998) new knowledge is created through knowledge exchange and combination between employees in the organization. Further research can also be aimed at finding out the content of other exchanges in the LMX between leaders and followers.

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