Creative Performance of Indonesian Game Developers: An Empirical Study of Mediation Models of Creative Self-Efficacy and Creative Process Engagement

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Abstract: - Prior empirical research focused on creative performance was restricted to companies in the fashion industry and manufacturing industries. However, research on creative performance in the game industry is still lacking. Millennials and gen Z are the largest generational cohort in most companies. Previous studies show that both generations will work better in a non-formal environment. This study investigates the connection between creative performance and leader-member exchange in the context of game developers in Indonesia. Also examined were the relationship's mediation effects of creative self-efficacy and engagement in the creative process. The study sample included 253 Indonesian game development companies respondents, and the data was analyzed using SMART-PLS. The findings showed that the relationship between a supervisor and a subordinate positively connected to creative performance and that creative self-efficacy and participation in the creative process mediated this positive association. This study recommends that managers and staff members establish informal interactions outside of work. Both sides must understand that creating such partnerships can lead to several advantageous results, including an increase in creativity.

Key-Words: - Creative Performance; Creative Self-Efficacy; Creative Process Engagement; Leader-Member Exchange; Game Developers.

1 Introduction

If an organization wants to stay ahead of the competition in today's quickly changing business climate, it must constantly generate new ideas, [1]. Creativity is closely linked to innovativeness, [2], meaning that new product development depends on the amount of creative performance. Prior empirical research focused on creative performance was restricted to companies in the fashion industry, [3] and manufacturing industries, [4]. However, research on creative performance in the game industry is still lacking. Creative performance is the primary source of encouraging innovation, increasing competitiveness, and gaining a competitive advantage in business competition, [5]–[7]. These advantages have made it crucial to understand what inspires creative performance.

Previous studies have characterized employee creativity as being influenced by top-down leadership characteristics. Previous research has looked into the advantages of transformational leadership, [8], benevolent leadership, [9], moral

leadership, [10], and humble leadership, [11], among leadership-related characteristics. There has been little study on the connection between management-employee interaction and creative performance, and these studies tended to be top-down appraisals of leadership. A dyadic interaction may provide non-significant effects; nevertheless, not all research has shown consistently favourable impacts of leader-member exchange on creative performance. When perceived responsibility entered the interaction, the effect of LMX on employee creativity was no longer significant, [12]. The lack of consistency in LMX's effect on creative performance suggests that the link may be dependent on a complex intervening process. To summarize, we feel that the underlying LMX mediating mechanism that influences creative performance should be further studied.

Managers and academics must comprehend how each team member's creative self-efficacy affects team creative performance because creative performance is so frequently used as the fundamental unit of creative production in today's organizations and businesses. Various mediation mechanisms have been used in research to evaluate the relationship between LMX and creative performance like positive moods and intrinsic motivation, trust in the supervisor, and knowledge, [8], [11]. The outcomes of previous studies support the justification for using creative self-efficacy as a mediating variable in this study. When it comes to forecasting team creative performance, creative self-efficacy is a crucial factor, [13]. Furthermore, creative self-efficacy can promote company success by inspiring innovation, [14]. This approach could be used to explain how benevolent leadership affects team creative performance. It indicates that this influence is moderated by creative self-efficacy.

Despite these important findings, further study into another mediating influence of LMX on creative performance is warranted. According to certain research, engaging in the creative process positively impacted employee creativity, [15]. Additionally, engaging in the creative process is a crucial first step toward new work practices, [16]. However, creative process engagement can also have a non-significant effect on creative performance, [17]. The previous research findings are inconclusive and should be investigated further. As a result, we propose that creative process involvement serves as a secondary mediator in the LMX-creative performance relationship.

According to research in the field, the impact of leader-member exchange can significantly impact creative self-efficacy and creative process engagement. Ultimately, these factors can influence the creative performance of the employees. However, little research has been done to identify influencing factors and consequences of creative performance in game development companies. The study's first goal was to determine the effects of leader-member interaction on creative performance and the mediating function of creative self-efficacy in the setting of video game developers. Second, this study investigates how the creative process mediates how LMX and creative performance interact. The current study adds to the body of knowledge regarding the creative performance of video game developers.

2 Problem Formulation

2.1 LMX to Creative Performance
The LMX theory is built on the premise that leaders do not treat all subordinates equally and instead form high-quality social exchange relationships with some and low-quality economic exchange relationships with others. It was originally developed as a counterargument to the traditional leadership style, [18]. When subordinates and their superiors engage in social interactions, they feel obligated to respond with productive work habits, [19].

Employees are often more creative and imaginative because their leaders inspire them with their knowledge and problem-solving talents and as a source of informational feedback to help them develop existing ideas and come up with fresh ones, [20]. In addition, employees who reported having better ties with their bosses were also more creative, according to empirical research, [21].

Given that prior research has focused chiefly on the impacts of LMX, the current study applies the findings to the scientific research method of creative performance in video game developer settings. As a result, we come up with this hypothesis:
Hypothesis 1: Leader-member exchange is positively related to creative performance.

2.2 Mediating Role of Creative Self-efficacy
Self-efficacy in the context of creativity or innovation is the conviction that one can carry out and complete specific tasks involving creativity or innovation, [9]. The social cognitive theory claims creative self-efficacy improves creative performance when team members work on challenging, unpredictable, non-routine circumstances without preconceived solutions, [22].

Employees believed to be highly self-efficacious start innovative solutions proactively and so like and continue to do creative activities to achieve the highest levels of creativity in their profession, [23]. On the other hand, those who lack self-efficacy believe that their abilities are insufficient to attain their objectives and avoid or give up even when the work is less challenging, [24]. LMX was found to be a crucial antecedent variable for self-efficacy in a prior study on the subject [25]. Furthermore, self-efficacy could act as a mediator in the link between LMX and creativity, [26]. As a result, we come up with this hypothesis:

Hypothesis 2: Creative self-efficacy mediates the relationship between LMX and creative performance.

2.3 Mediating Role of Creative Process Engagement

Creative process engagement is participating in creativity-related approaches or processes involving (1) problem identification, (2) information searching and encoding, and (3) idea and alternative generation [27]. People who are highly engaged in the creative process spend more time identifying problems, looking for pertinent information, and considering choices, increasing their likelihood of developing original, effective, and practical solutions, [28].

Similarly, LMX and participation in the creative process have a beneficial relationship with creativity, [29]. The idea that LMX influences creativity through creative activities is plausible, but less attention has been paid to the conceptual mediating role of engagement in the creative process, [15]. Thereby, it is assumed that LMX will have an impact on creative performance by engaging in the creative process. As a result, we come up with this hypothesis:

Hypothesis 3: Creative process engagement mediates the relationship between LMX and creative performance.

3 Methodology

This study uses a quantitative research method. Employees at game development firms in Indonesia were polled for information. A total of 267 people took part in the survey. The participants in the study graded the LMX, creative performance engagement, creative self-efficacy, and creative performance. We gathered valuable data from 253 individuals after deleting missing and incorrect questionnaires. Most of the respondents were male (78%), and their primary responsibilities were as animators (14%), graphic designers (28%), and programmers (46%). The data were analysed using structural equation model.

Employees rated their level of creative performance via nine items including "Employees are able to use unconventional sources of reference in generating solutions," "Employees are able to produce various solutions to 1 type of problem using different approaches," and "Employees are able to provide solutions that can be implemented" (1 = "strongly disagree," 5 = "strongly agree") [30], [31]. We obtained a Cronbach's alpha coefficient of 0.891 for the scale ratings in this study.

Creative self-efficacy was measured using a nine-item scale such as "I am able to focus on generating creative ideas at work," "I am able to combine existing ideas so that it becomes a better idea," and "I am still able to generate creative ideas even though I experience obstacles in the process", [32]. Cronbach's alpha coefficient for creative self-efficacy was 0.920 in this study.

Creative process engagement was assessed using eleven-item scale, such as "I took the time to identify the problem at hand," "I can see problems from different perspectives," and "I can break down a difficult problem into sections to get a better understanding" (1 = "totally disagree," 5 = "totally agree"), [27]. Cronbach's alpha coefficient was 0.914.

Survey participants rated leader-member exchange that ten-item scale, such as "Bosses and employees help each other in completing the workload," "Bosses will defend their employees if they are blamed by other parties, both from other divisions within the company, or from outside the company," and "Bosses and employees congratulate each other on birthdays or in celebration of holidays" (1 = "strongly disagree," 5 = "strongly agree"), [33]. Cronbach's alpha coefficient was 0.914.

4 Result and Discussion

The PLS-SEM method, sometimes called partial least squares structural equation modelling, is used in this study's data analysis. This method is a two-step procedure that entails both evaluation measurements and structural models. The first is to test the composite reliability (CR), a score that will measure the construct's latent variables. To be regarded as appropriate, the CR must be 0.7 or higher. The average variance extracted (AVE) scores of all constructs likewise met the 0.5 threshold, implying high convergent validity.

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Table 1. Validity and Reliability

Variable	Items	Loadings	CR	AVE
LMX	LMX1	0.814	0.913	0.571
	LMX2	0.682		
	LMX3	0.772		
	LMX4	0.586		
	LMX5	0.779		
	LMX6	0.822		
	LMX7	0.782		
	LMX8	0.782		
CPE	CPE1	0.728	0.913	0.539
	CPE2	0.765		
	CPE3	0.730		
	CPE4	0.724		
	CPE5	0.758		
	CPE6	0.625		
	CPE7	0.751		
	CPE8	0.697		
	CPE9	0.830		
CSE	CSE1	0.780	0.920	0.560
	CSE2	0.768		
	CSE3	0.759		
	CSE4	0.800		
	CSE5	0.742		
	CSE6	0.750		
	CSE7	0.747		
	CSE8	0.647		
	CSE9	0.739		
CPE	CP1	0.763	0.913	0.541
	CP2	0.814		
	CP3	0.805		
	CP4	0.780		
	CP5	0.819		
	CP6	0.692		
	CP7	0.678		
	CP8	0.713		
	CP9	0.531		

Due to not meeting the testing requirement, we had to exclude one item from the 35 tested using Smart-PLS. The remaining items in Table 1 also have greater than 0.6 outer loadings and are reliable. Items considered reliable should have Cronbach's Alpha > 0.7, CR > 0.7, and AVE > 0.5, [34].

Table 2. Discriminant Validity (Fornell-Larcker Criterion)

Construct	CP	CPE	CSE	LMX
Creative Performance (CP)	0.735			
Creative Process Engagement (CPE)	0.722	0.734		
Creative Self-efficacy (CSE)	0.756	0.761	0.748	
Leader-member Exchange (LMX)	0.738	0.768	0.725	0.756

Examining discriminant validity (DV) is the second step in assessing the measurement model, and it determines the level at which one variable differs from the other variables in the model. In this study, we employed the Fornell-Larcker criterion to assess the DV. In Table 2, All four variables are valid, as shown by the Fornell-Larcker Criterion result and discriminant validity. This validity arises from the fact that there is a higher number of correlations between variables than between other variables. Cross Loadings can be used to examine discriminant validity in addition to the Fornell-Larcker Criterion. Based on Table 3, all measurement item loadings were higher than any other cross-loadings, showing that the model's discriminant validity has been achieved, [34].

The structural model is examined to see how the exogenous variables affect the endogenous variable [34]. Three independent factors (CSE, CPE, and CSE) and three dependent variables (CPE, CSE, and CP) are used in this study. The four primary criteria for evaluating a structural model are variance explained (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficient (β), as well as the result of hypotheses testing, [34]. Table 5 shows the outcomes of the current study's structural model, and the four criteria for evaluating the model.

From Table 4, The effect of exogenous variables on the endogenous variable is assessed using the coefficient of determination (R2). Adjusted R squared was employed in this study to calculate the effect since it corrects for standard error and provides a more reliable picture than R squared. Based on Table 4, Creative Performance (CP) obtained 0.655 of R squared adjusted. The result means that 65.5% of CP is affected by CPE, CSE, and LMX. Also, Creative Process Engagement (CPE) obtained 0.588 of R squared adjusted. Therefore, 58.8% of CPE is affected by LMX. Other than that, Creative Self-efficacy (CSE) obtained 0.524 of R squared adjusted. Therefore, 52.4% of CSE is affected by LMX.

The change in R^2 when a certain exogenous is removed from the model is referred to as effect size (f^2). It is worth noting that both CPE (1.438) and CSE (1.110) in the model had a large effect size, while CP had a medium effect size, [35]. The results of testing the model's prediction accuracy (Q^2) revealed that the path model's accuracy is satisfactory, with Q^2 values of 0.282, 0.300, and 0.347 for CSE, CPE, and CP, respectively. As shown in Table 5, both Q^2 values are greater than 0, showing that CPE, CSE, and LMX factors are predictive.

Table 3. Discriminant Validity (Cross-loading Criterion)

	LMX	CPE	CSE	CP
LMX1	0.818	0.818	0.597	0.633
LMX2	0.675	0.675	0.463	0.460
LMX3	0.766	0.766	0.492	0.592
LMX4	0.574	0.574	0.372	0.409
LMX5	0.780	0.780	0.575	0.552
LMX6	0.829	0.829	0.640	0.631
LMX7	0.789	0.789	0.609	0.578
LMX8	0.783	0.783	0.582	0.570
CPE1	0.683	0.753	0.654	0.600
CPE2	0.667	0.785	0.677	0.601
CPE3	0.642	0.756	0.624	0.610
CPE4	0.625	0.737	0.534	0.550
CPE5	0.497	0.738	0.507	0.468
CPE6	0.267	0.583	0.395	0.341
CPE7	0.457	0.732	0.492	0.504
CPE8	0.399	0.668	0.460	0.405
CPE9	0.643	0.830	0.591	0.581
CSE1	0.603	0.612	0.782	0.581
CSE2	0.613	0.631	0.772	0.581
CSE3	0.541	0.606	0.754	0.541
CSE4	0.488	0.587	0.782	0.509
CSE5	0.420	0.503	0.724	0.492
CSE6	0.386	0.511	0.727	0.513
CSE7	0.563	0.557	0.760	0.633
CSE8	0.572	0.514	0.671	0.553
CSE9	0.622	0.580	0.758	0.646
CP1	0.647	0.585	0.608	0.763
CP2	0.615	0.610	0.642	0.814
CP3	0.583	0.570	0.601	0.805
CP4	0.571	0.597	0.591	0.780
CP5	0.620	0.564	0.593	0.819
CP6	0.445	0.506	0.560	0.691
CP7	0.488	0.448	0.442	0.668
CP8	0.529	0.524	0.539	0.713
CP9	0.301	0.295	0.370	0.514

After running the validity and reliability tests, the test for bootstrapping was done with 5,000 subsamples that exhibit the path coefficient in Table 4 to evaluate the significance of the associations and established hypotheses. The original sample is used to determine if variables have a positive or negative impact. The effect is negative if the original sample number for effect contains a minus sign. The result is positive if there is not a minus sign. The significance of an effect can be seen in *the t*-statistic or *p*-value. The two-tailed *t*-value should be > 1.960, and the *p*-value < 0.050 for a significant path on a 5% error rate.

Table 4. Path Coefficients

	β	t-value	p-value	Supported?
CPE → CP	0.186	2.641	0.009	Yes
CSE → CP	0.386	5.252	0.000	Yes
LMX → CP	0.316	4.149	0.000	Yes
LMX → CPE	0.768	27.468	0.000	Yes
LMX → CSE	0.725	22.221	0.000	Yes
LMX → CPE → CP	0.143	2.638	0.009	Yes
LMX → CSE → CP	0.280	4.897	0.000	Yes

The path coefficients are computed to assess the significance of the relationships (see Table 4 and Figure 2). This requires that the strength of the correlations and the t-values be used to confirm significance. The leader-member exchange appears to have a positive and significant direct impact on creative performance. (β = 0.316/t = 4.149). Thus, *H1* is supported, as employees are typically more creative and inventive because of their leaders' knowledge and problem-solving abilities and as a source of informational feedback to help them develop existing and new ideas. Previous

researches have also validated the findings, [20], [21].

We checked both direct and indirect effects to test our *H2*, which states that creative self-efficacy mediates the relationship between LMX and creative performance. The direct effect of LMX on creative performance was significant ($\beta = 0.316/t = 4.149$). After introducing the mediated variable creative self-efficacy in the model, the estimate of LMX and creative performance was still significant but reduced ($\beta = 0.280/t = 4.897$). It can be concluded that creative self-efficacy partially mediated the relationship between LMX and creative performance. Hypothesis 2 was therefore supported.
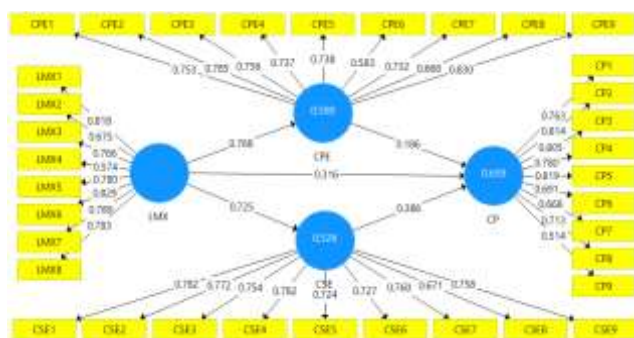
Fig. 2: Measurement Model of the Study

The next step involved checking whether the indirect relationship between LMX and creative performance was mediated by creative process engagement. Therefore, we introduced another mediator between LMX and creative performance in the presence of creative process engagement. The mediation effect was also significant ($\beta = 0.143/t = 2.638$), supporting our *H3*.

5 Conclusion

The creative self-efficacy and creative process engagement works of literature will benefit from the findings of this study. Even though past research has shown that creative performance has a favourable effect, there is a scarcity of research on the underlying mediating mechanism. Several investigations identified positive moods and intrinsic motivation, supervisor trust, [8], and knowledge, [11] were identified as mediators. Specifically, in scientific research in game developer contexts, we contributed to these findings by demonstrating that creative self-efficacy and creative process engagement mediate the favourable effect of LMX on creative performance.

The findings of our research have several speculative practical consequences. To begin,

executives and employees seeking creativity should recognize the value of actively participating in developing unique relationships with one another. As a result, managers and staff members can establish connections beyond contractual obligations by reinforcing, inspiring, and comprehending one another's needs. Both sides must understand that creating such partnerships can lead to several beneficial results, including increased creativity. Understanding those supervisor-subordinate solid relationships are a valuable resource, not a luxury, is crucial because creativity is risky but potentially profitable.

We advise team leaders or managers who want to encourage creative team performance to take the self-efficacy of team members into account and create an environment with a high average level and low variance on self-efficacy and process engagement. In the game developer context, team supervisors might begin by assigning simple tasks to subordinates and gradually raising the level of difficulty of game- developing tasks to help them develop a positive, creative self-efficacy. The management should also support exchanges of practical information and knowledge. They should increase the creative efficacy of employees by providing enough support.

Additionally, people are encouraged to pursue their passions for joy and fulfilment and participate in creativity-related activities more frequently to be creative. If the creative process engagement is missed, the good influence of the supervisor-subordinate connection may be neglected. Our study was limited to using a convenience sample, which raises questions about representativeness and generalizability. The fact that we only considered LMX from the viewpoint of the subordinate is another drawback of our study. Future studies could examine LMX from the perspectives of both leaders and members, allowing for a more thorough investigation of the connection between LMX and creativity-based innovation. Future studies should also look at the differences in creative performance between individuals and teams, using multi-level analysis to systematically examine how organizational and human factors affect how creatively a team works.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)
The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

Conflict of Interest
The authors have no conflict of interest to declare.