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The Impact of Human, Structural, and Relational Capital on Product Development Performance in Manufacturing Organizations in Indonesia: Mediating Role of Organizational Learning Capabilities and R&D Resources

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ABSTRACT

Recently, product development and its performance are the essential elements for the business organization that could enhance the firm performance and attains researchers' intentions. Therefore, the present study examines the impact of human, structural and relational capital on product development performance in manufacturing organizations in Indonesia. The goals also include examining the mediating role of organizational learning capabilities and R&D resources among the nexus of human, structural and relational capital and product development performance in manufacturing organizations in Indonesia. The study's quantitative data collection methods have been adopted and collect the data by using survey questionnaires. The smart-PLS, a useful statistical tool, has been employed for analysis purposes. The findings revealed that human, structural and relational capital have positive nexus with product development performance. The outcomes also show that organizational learning capabilities and R&D resources mediate the nexus of human, structural, and relational capital and product development performance in Indonesia's manufacturing organizations. These findings provide the guideline to the regulators that they should take valuable capital development and learning capabilities that could enhance the product development performance and firm performance.

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1. Introduction

The new product development (NPD) performance in the market place has gained much attention from researchers and academics. There are developing shifts in the business atmosphere, and there is increasing competition among the market rivals and constant shifts in the customers' demands. To succeed in the highly competitive market, business enterprises improve their products' quality and variety that meet the emerging market requirements and customers' demands (Terwiesch & Bohn, 2001). For survival in the up-to-date market and better business performance, the NPD performance matters much. A long-term investigation has proved that several factors significantly affect creating a new product and its performance in the market. In this context, our study attempts to address different forms of capital, such as human, relational, and structural capital, which play a crucial role in NPD's performance in manufacturing organizations (Giuliani, Chiucchi, & Marasca, 2016). Human capital is the crucial factor in creating new products and their improved performance in the market as without the participation of human capital operational, and production processes are unable. Not only this, human capital is of vital importance in the marketing of new products.

Moreover, structural capital helps to adopt up-to-date technology, techniques, and procedures to create and succeed in new products. And the relational capital arranges for the increased marketing for the new products. This paper describes the influences of human, relational, and structural capital on the NPD performance, taking evidential support from Indonesia's manufacturing organizations. This paper is an initiation in addressing two mediators like organizational learning capabilities research and development (R & D) resources between human, structural, and relational development and NPD performance.

Human capital is considered a primary source of competitiveness, organizational prosperity, and economic growth. Human resource capital has a significant contribution to creating new products and services and their performance in the emerging market as it creates sustainable competitive advantages for the products. Human capital comprises skills, knowledge, information, talents, innovativeness, and the capability to perform their functions (Nezam, Ataffar, Isfahani, & Shahin, 2016). Also, human capital has three dimensions (1) Knowledge. (2) Abilities. (3) Behavior. All three dimensions of human capital are of great importance to improving business strategies, production techniques, and procedures. The manufacturing organizations in Indonesia are increasingly laying stress on the efficiency and the adequacy of human capital in their operations, production, and marketing, raising new product performance.

Structural capital is taken one of the major components of intellectual capital, which comprises improved supportive infrastructure, procedures, techniques, and databases that are helpful to the human capital to function in the business organization (Khan, Kamaruddin, & Buyung, 2017). Structural capital has great significance to the business organization as it remains intact even after the people leave. It comprises dynamic capabilities, routines, procedures, techniques, and methods owned by the organizations even if they leave. The structural capital improves the value of the products, creates a new variety of products, and make them successful in the market as it helps to meet the emerging business and market requirements. The manufacturing organizations in Indonesia are active in keeping sound structural capital to create and better perform new products in the market even across the globe.

Relational capital is a component of intellectual capital that is considerable for creating innovation-based products and services and achieving competitive advantages for the new product among market rivals. Relational capital is the value inherent in the organization's relationship with its vendors, customers, and significant constituencies utilized to achieve innovation in the production and marketing procedures to gain competitive advantages (Sulistyo, 2016). Moreover, relational capital also consists of knowledge, capabilities, techniques, and systems that play an essential role in NPD and business performance. Based on relational capital, Indonesia's manufacturing organizations are successfully creating and introducing new products in the markets.

The organizational learning capability and R & D resources are considerable mediators between human capital, structural capital, relational capital, and NPD performance. Organizational learning capability is the organization's ability to process knowledge to create, attain, integrate and share knowledge, and change its conduct to reflect the new situation for better performance in the new knowledge-based market. Human capital, structural, and relational capital contribute to the organizational learning capability, which further improves NPD performance. Simultaneously, research and development resources are the resources used in business enterprises' innovative activities to improve existing goods and services and develop new products and services. The study examines that human capital, structural capital, and relational capital improve the R & D resources, and R & D resources add to the NPD performance.

2. Literature Review

The success of the organizations is dependent on the quality and marketing of products and services. The better quality of the goods and services and a higher rate of their marking are the surety of organizations' survival and development. Thus, it must be one of the business organizations' primary purposes to create more value in their production and marketing procedures to meet the emerging market requirements and the changing customers' demands. For this purpose, the managers must bring changes in their strategies, policies, technology,

techniques, and procedures, which is possible in the existence of human capital (organizational personnel and workforce), structural capital (infrastructure, procedures, and databases), and relational capital (sound and significant relations with stakeholders). Human capital and structural capital are beneficial in removing harmful materials, minimizing waste, reducing costs, and improving the quality and quantity of products (Wang & Zatzick, 2019). Besides, they are also helpful in raising the market for existing and new products. The analysis of manufacturing organizations' performance in Indonesia has revealed that efficient human capital and adequate structural capital applied in the business operations and production procedures guarantee NPD's superior performance. The paper examines that relational capital is essential to NPD performance as they create and raise marketing level for the newly launched products. Besides, the organizational learning capabilities and R & D resources are significant mediators between human capital, structural capital and relational capital and NPD performance as the human capital, structural capital, and relational capital affect organizational learning capabilities and R & D resources further improvement in the NPD performance.

The human resources having proper knowledge about their functions, about the business goals, market requirements, the customers' preferences, changes in technologies, and productions techniques prove to be a durable asset for the success of business organizations as they create value to the production of new products and marketing for them (Pinto, Cruz, & Combe, 2015). The human resources' abilities to use their knowledge and experience to respond to the shifts in business and market context and abilities to use up-to-date technology are crucial for creating a new variety of products and their successful marketing, which positively influences the business performance and economic growth. Besides, the human capital, in the form of the workforce's behaviors, also contributes to the NPD performance (Kato & Honjo, 2015). For instance, the organizational commitment on the part of the workforce results in the value creation and production and marketing procedures. The teamwork ability results in better work performance, solution of problems, and reductions of risks and wastes, which guarantees the better performance of new product development. Thus, it can be assumed:

H1: There is a positive link between human resource capital and NPD performance.

As proposed by Mohtar, Abdul Rahman, and Abbas (2015), structural capital is a critical element of NPD performance. Structural capital in the form of supportive infrastructure makes many contributions to the value creation in the production and achieving competitive advantages for the new products. The acquisition and implementation of innovative technology for the production of goods brings improvement in the quality of products and enables the organization to attract more customers. Similarly, the better communication network provides the management with up-to-date knowledge and information about quality material, better technology, improved logistics, market shifts, and the preferences of consumers, which is utilized for the quality improvement of production and minimizing delivery time essential for the superior performance of the new products (Aqdas, Amin, Nawaz, & Abdullah, 2020). Also, efficient operational, production, and marketing techniques and procedures are a source of success for the new products in the market and better business performance. Likewise, the databases, whether manual or computerized, are the records containing information about the transactions, marketing, and interactions with the stakeholders used by the business organizations for the value creation in the production and better marketing level. A number of Indonesian manufacturing organizations take care of the adequacy and efficiency of structural capital in their operations, production, and marketing and enjoy better marking even for their newly introduced products.

H2: The relationship between structural capital and the performance of the new product is positive

The quality of raw material keeps changing, the market trends continue to change, and there is a constant change in the technology, and most importantly, the customers' preferences change with the change in time. In this situation, the relation with the stakeholders proves beneficial for the organizations as such relations provide up-to-date information to the organizational management to turn their activities to respond to the shifts in business and market environment, technology, and customers' demands. In their article, Hosseini and Owlia (2016) suggest that the relational capital in the form of the information acquired from the

stakeholders is considerably utilized in manufacturing new, better quality products and marketing them successfully. The relations and cooperation with the people of different cultures enable the manufacturing firms to launch new products as per different cultures, which may easily attain popularity among the people of different cultures and increase firms' profitability. Besides, the better capabilities to remove defects in the production, remove contaminating material, bring change in the features of products and give a greater variety of products prove to be of great importance for the NPD performance (Yu & Huo, 2018). In Indonesia, relational capital proves to be of much more significance in manufacturing organizations as it facilitates the value creation in the new products and marketing of new products.

H3: There is a positive link between relational capital and NPD performance.

Human capital, structural capital, and relational capital add to the organizational learning capabilities, which further contribute to the new predevelopment performance. Human capital creates and makes organizational learning capabilities efficient. Whether personally attained or acquired from other reliable resources contributes to the organizational learning capabilities, and the personnel's abilities to use their knowledge in developing organizational commitment and teamwork are also significant in this context (Kianto, Sáenz, & Aramburu, 2017). Similarly, the structural capital adds to the organization's learning capabilities in creating a better innovative communication network, technology, and logistics (Akram, Siddiqui, Nawaz, Ghauri, & Cheema, 2011). While relational capital is also essential to the organizations for attaining better learning capabilities, relational capital is the source of knowledge and information acquired from stakeholders like suppliers, customers, government regulators, and the general public (Bayraktaroglu, Calisir, & Baskak, 2019). In turn, the organizational learning capability, which is organizations' ability to acquire, integrate, execute, and transfer information and knowledge to fulfill business goals, bring improvement in the quality of existing products, create new innovative products, and achieve competitive advantages for the new products.

H4: Organizational learning capability is an essential mediator between human capital and NPD performance.

H5: Organizational learning capability is a mediator between structural capital and NPD performance.

H6: Organizational learning capability play a mediating role between relational capital and NPD performance.

Human capital, structural capital, and relational capital bring improvement in the acquisition and quality of R & D resources, which play an essential role in the NPD performance. The knowledge, abilities, and behavior of the human resources in the organization add to the acquisition and quality of the R & D resources used in the innovative activities undertaken to develop new products and the improvement in the quality of existing goods. The efficient communication network, the technology, and the improved logistics enable the organizations to acquire, sort out, execute, and share accurate, reliable, and comprehensive information is a part of the research and also beneficial for improving the quality of existing products and developing new products (Marvel, Davis, & Sproul, 2016). Also, the relational capital is of vital importance in research and developing procedures and in the acquisition and quality of resources used in this regard as the relational capital is the source of awareness of the shifts in the market and business atmosphere, changes in the technology, quality of raw material, and changes in the customers' demands (Örnek & Ayas, 2015). In contrast, the R & D resources bring improvement in the NPD performance as it is their primary function to be used in the innovation activities committed to improve the quality of existing products and develop new products.

H7: R&D resources play an important mediating role between human capital and NPD performance.

H8: R&D resources are a considerable mediator between structure capital and NPD performance.

H9: R&D resources is a mediator between relational capital and NPD performance.

3. Research Methods

The current study aims to analyze the impact of human, structural and relational capital on product development performance and the mediating role of organizational learning capabilities and R&D resources among the nexus of human, structural and relational capital product development performance in manufacturing organizations in Indonesia. The study has adopted the quantitative methods of data collection. The employees of manufacturing companies in Indonesia are the respondents that are related to product development procedures. The respondents were selected based on simple random sampling and collect data by using survey questionnaires. These surveys are distributed to them by personal visit and sent about 510 questionnaires. After twenty days of distribution, only 320 questionnaires were returned with about a 62.75 percent response rate. Moreover, the smart-PLS, a useful statistical tool, has been employed for analysis purposes because it provides relevant results while in a complex model (Hair, Ringle, & Sarstedt, 2016).

Also, the present study takes two mediation in the study named as organizational learning capabilities (OLC) that has four items (Kought & Zander, 1992) while the second mediation named as R & D resources (RDR) has six items (Kang, 2019). Moreover, this study adopted three predictors such as human capital (H.C.) that has four items, structural capital (S.C.) has seven items, and relational capital (R.C.) that has four items (Hsu & Fang, 2009). Finally, product development performance (PDP) has been used as a dependent variable with five items (Griffin & Page, 1996). These variables are highlighted in Figure 1.

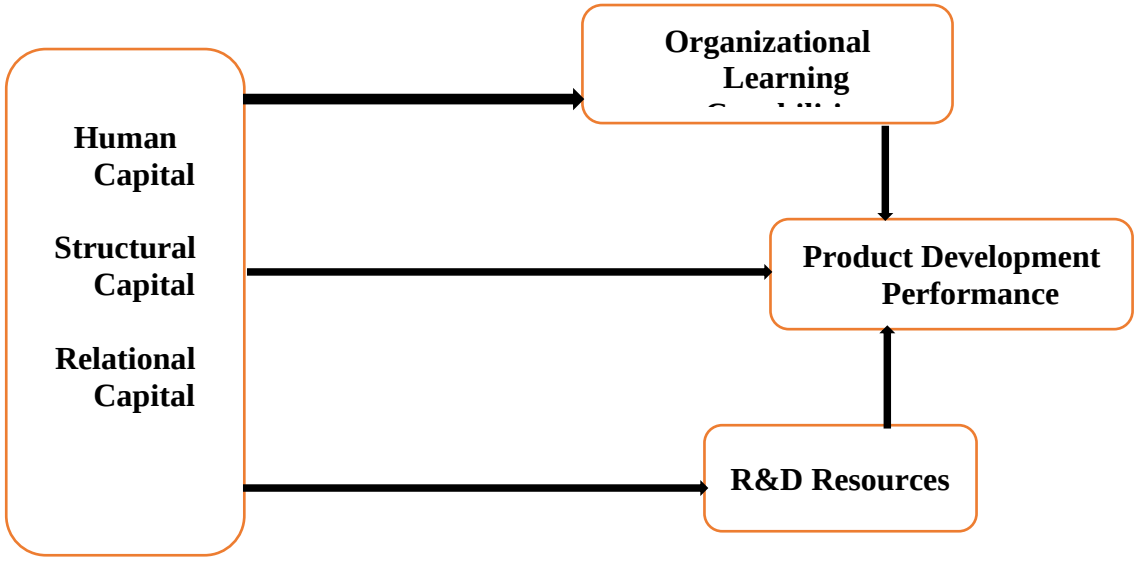

Figure 1: Theoretical model

4. Results

The results include assessing the measurement model first, and it is verified by using convergent and discriminant validity. Firstly, convergent validity related to the correlation of the items has been examined, and the figures highlighted that Alpha and C.R. are more extensive than 0.70 and loadings and AVE are more than 0.50. These are the indication of high correlation among items and valid convergent validity. These figures are shown in Table 1.

Secondly, discriminant validity related to the variables' correlation has been examined using Fornell Larcker and cross-loadings. The figures highlighted that values that highlighted the nexus with the variable itself are more than those that highlighted the nexus with other variables. These are the indication of low correlation among variables and valid discriminant validity. These figures are shown in Table 2 and Table 3.

Table 1
Convergent validity

Constructs	Items	Loadings	Alpha	CR	AVE
Human Capital	HC1	0.794	0.840	0.893	0.676
	HC2	0.833			
	HC3	0.841			
	HC4	0.821			
Organizational Learning Capabilities	OLC1	0.792	0.773	0.803	0.511
	OLC2	0.518			
	OLC3	0.743			
	OLC4	0.773			
Product Development Performance	PDP2	0.840	0.849	0.898	0.688
	PDP3	0.847			
	PDP4	0.831			
	PDP5	0.800			
Relational Capital	RC1	0.854	0.775	0.820	0.605
	RC3	0.747			
	RC4	0.726			
Research and Development Resources	RDR1	0.870	0.887	0.918	0.691
	RDR2	0.826			
	RDR4	0.877			
	RDR5	0.841			
	RDR6	0.733			
Structural Capital	SC1	0.825	0.869	0.901	0.602
	SC2	0.731			
	SC3	0.711			
	SC4	0.796			
	SC5	0.778			
	SC7	0.810			

Table 2
Fornell Larcker

	HC	OLC	PDP	RC	RDR	SC
HC	0.822					
OLC	0.555	0.715				
PDP	0.623	0.549	0.830			
RC	0.572	0.484	0.551	0.778		
RDR	0.726	0.537	0.586	0.484	0.831	
SC	0.628	0.544	0.702	0.472	0.623	0.776

Table 3
Cross-loadings

	HC	OLC	PDP	RC	RDR	SC
HC1	**0.794**	0.452	0.522	0.332	0.571	0.505
HC2	**0.833**	0.441	0.553	0.365	0.589	0.555
HC3	**0.841**	0.477	0.486	0.563	0.634	0.491
HC4	**0.821**	0.456	0.487	0.622	0.593	0.515
OLC1	0.418	**0.792**	0.417	0.389	0.385	0.400
OLC2	0.309	**0.518**	0.273	0.264	0.242	0.279
OLC3	0.482	**0.743**	0.486	0.365	0.486	0.476
OLC4	0.346	**0.773**	0.351	0.350	0.377	0.362
PDP2	0.552	0.423	**0.840**	0.554	0.521	0.554
PDP3	0.494	0.484	**0.847**	0.410	0.455	0.622
PDP4	0.501	0.470	**0.831**	0.392	0.463	0.602
PDP5	0.519	0.445	**0.800**	0.472	0.508	0.552
RC1	0.564	0.471	0.505	**0.854**	0.451	0.441
RC3	0.331	0.319	0.369	**0.747**	0.279	0.273
RC4	0.403	0.314	0.394	**0.726**	0.377	0.364
RDR1	0.600	0.481	0.441	0.418	**0.870**	0.432
RDR2	0.593	0.415	0.563	0.342	**0.826**	0.585
RDR4	0.668	0.493	0.479	0.482	**0.877**	0.510
RDR5	0.673	0.502	0.473	0.447	**0.841**	0.472
RDR6	0.466	0.332	0.473	0.317	**0.733**	0.588
SC1	0.506	0.547	0.668	0.395	0.489	**0.825**

SC2	0.576	0.413	0.630	0.409	0.594	**0.731**
SC3	0.368	0.442	0.557	0.400	0.428	**0.711**
SC4	0.493	0.354	0.448	0.331	0.470	**0.796**
SC5	0.483	0.348	0.416	0.340	0.445	**0.778**
SC7	0.473	0.375	0.468	0.293	0.438	**0.810**

Also, discriminant validity has been examined using the Heterotrait Monotrait (HTMT) ratio, and the HTMT ratio figures are lower than 0.90. These are the indication of low correlation among variables and valid discriminant validity. These figures are shown in Table 4.

Table 4
Heterotrait Monotrait ratio

	HC	OLC	PDP	RC	RDR	SC
HC						
OLC	0.727					
PDP	0.737	0.711				
RC	0.737	0.697	0.716			
RDR	0.838	0.677	0.675	0.611		
SC	0.728	0.684	0.796	0.593	0.701	

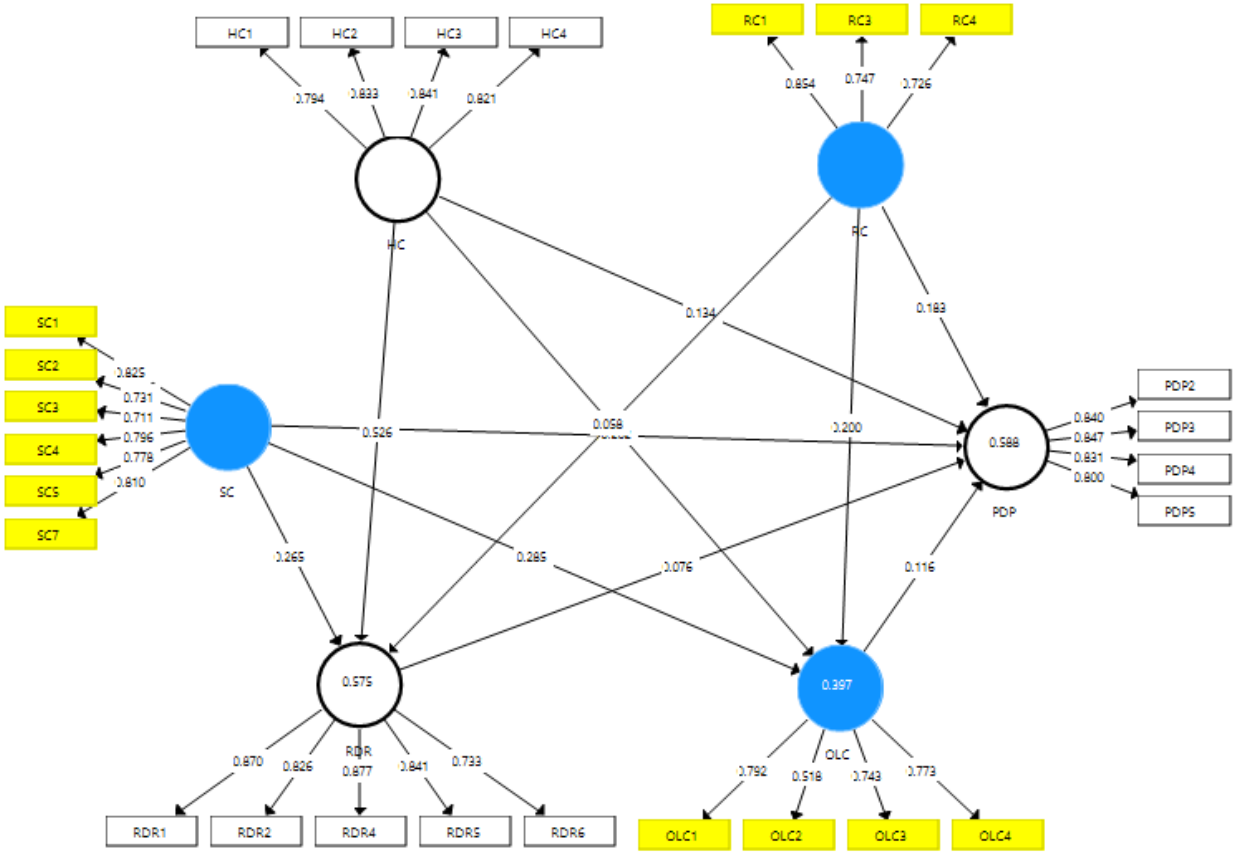

Figure 2: Measurement model assessment

Finally, the structural model has been assessed using path analysis, and the findings revealed that human, structural and relational capital have positive nexus with product development performance and accept H1, H2, and H3. The outcomes also show that organizational learning capabilities are positively mediating the nexus among the human, structural and relational capital and product development performance in manufacturing organizations in Indonesia and accept H4, H5 and H6. The output also shows that R&D resources positively mediate the nexus among human capital, structural capital, and product development performance in Indonesia's manufacturing organizations and accept H7 and H8. However, R & D resources have not mediated the nexus among the relational capital and product development

performance in Indonesia's manufacturing organizations and reject H9. These links are highlighted in Table 5.

Table 5
A path analysis

Relationships	Beta	S.D.	T-statistics	P-values	L.L.	U.L.
HC -> PDP	0.134	0.040	3.349	0.001	0.052	0.204
RC -> PDP	0.183	0.042	4.395	0.000	0.104	0.260
SC -> PDP	0.421	0.036	11.732	0.000	0.357	0.488
HC -> OLC -> PDP	0.030	0.011	2.726	0.008	0.011	0.050
RC -> OLC -> PDP	0.023	0.008	2.843	0.005	0.009	0.037
SC -> OLC -> PDP	0.033	0.010	3.211	0.002	0.013	0.050
HC -> RDR -> PDP	0.040	0.020	2.046	0.043	0.002	0.072
RC -> RDR -> PDP	0.004	0.003	1.258	0.211	-0.002	0.011
SC -> RDR -> PDP	0.020	0.010	2.058	0.042	0.001	0.034

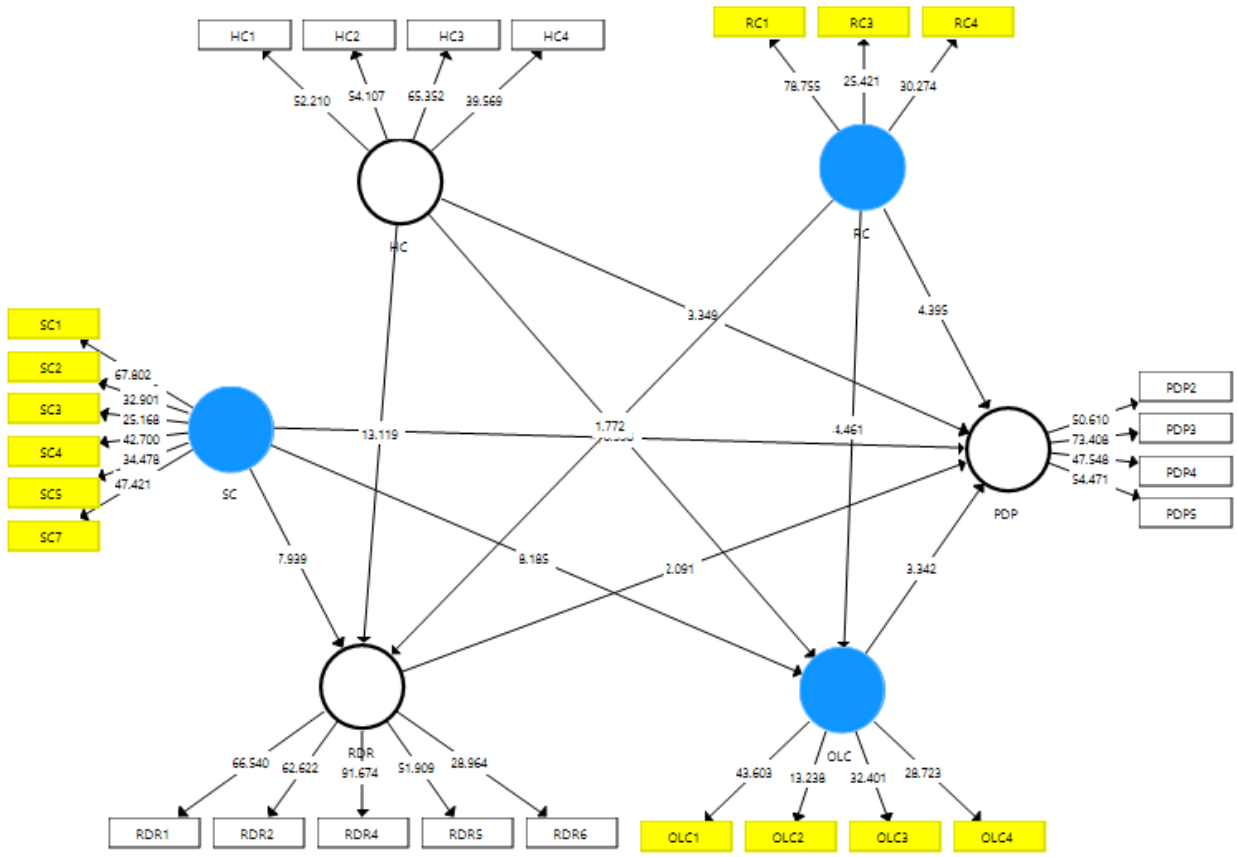

Figure 3: Structural model assessment

4.1. Discussion and Implications

The results have revealed that human capital has a positive relationship with NPD performance. These results are in line with the previous studies van Uden, Knoben, and Vermeulen (2017), where the contribution of human capital to the new product creation and its successful marketing has been shown evidently. The results have indicated that structural capital has a positive association with NPD performance. These results match with those of other studies by Yudawisastra, Manurung, and Husnatarina (2018), which also have thrown light on the fact that efficient and adequate structural capital contribute to the value creation in the production and achieving marketing advantages for them. Moreover, the results have proved that there is a positive linkage between relational capital and NPD performance. These results are approved by Allameh (2018), where the importance of relational capital has been shown in the NPD performance in the emerging knowledge-based market environment. This paper's findings have revealed that organizational learning capability is an essential mediator between human capital, structural capital, relational capital, and NPD performance. These results agree with the studies

of Sutanto (2017). The results have indicated that R & D resources play an important mediating role between human capital, structural capital, and NPD performance. These results align with the past studies Deselnicu, Vasilescu, Mihai, Purcarea, and Militaru (2016).

The study makes both theoretical and empirical implications. The study carries theoretical implications as it makes a lot of contributions to the literature on business management. The study addresses human capital, structural capital, and relational capital on the NPD performance. Moreover, the current study has introduced two mediators like organizational learning capability and R & D resources, simultaneously between human capital, structural capital, and relational capital and NPD performance. The study makes empirical implications as it guides business management to improve NPD's performance with efficient and adequate human capital, structural capital, and relational capital.

5. Conclusion and Limitations

In short, it can be concluded that human capital has a positive association with NPD performance. The study examines that structural capital makes many contributions to NPD performance. Similarly, the relational capital adds to the value creation to the production and makes the products successful in the market as per the shifts in business and market atmosphere. Moreover, the organizational learning capability and R & D resources are significant mediators between human, structural, and relational capital and NPD performance. Human, structural and relational capital influences organizational learning capability and R & D resources, further influencing NPD performance.

The paper has some limitations despite the detailed discussion on NPD performance. Many other factors, except human, structural, and relational capital, affect the NPD performance, not yet explored. Future scholars are recommended to address these unexplored factors of NPD performance. Besides, the organizational learning capability and R & D resources are used here as mediators. In contrast, the future scholar should use organizational learning capability and R & Das moderators between human, structural, and relational capital and NPD performance. This study's data has been collected using a single source, while future scholars recommend using multiple sources to collect duty for their study.

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