

# Inter-firm Collaboration and Knowledge Sharing as mediators of the interrelation between Asset Specificity and Innovative Performance

Gede Ariadi<sup>1</sup>

<sup>1</sup>Department of Management, Faculty of Economics and Business, Universitas Kristen Satya Wacana, Salatiga  
e-mail: gede.ariadi@uksw.edu

## Abstract

*This study explores the asset specificity in bottle drinking manufacturing in Indonesia, affecting the innovative performance by mediating constructs. Employing the theory of relational exchange theory to discover these links, some hypotheses are built by viewing inter-firm collaboration and knowledge sharing as an intervening variable. A partial least square-structural equation model explores the study, and 121 firms were compiled as the data respondent. The empirical outcomes exhibit that inter-firm collaboration and knowledge sharing mediate asset specificity on innovative performance. In theory, the research exposes which theory of relational exchange creates synergy relation asset specificity on innovative performance across the intervening variable.*

**Keywords:** *Inter-firm collaboration, Knowledge sharing, Innovative Performance, Asset Specificity.*

## 1. Introduction

Increasingly, the companies, specifically the bottled drinking manufacturing in Indonesia, need to reflect innovative as a fundamental scheme in the existing era to continue the fierce and knowledge-recognized commercial condition (Wu, 2017). With the inclination toward open innovation, the latest concept for innovation has moved to a cooperative paradigm; several companies realize innovation by collaborating with other institutions; the prospective external affiliates, suppliers, and consumers are mainly mutual associates (Melander, 2017). Collaboration is critical, while supply chains directly confirm financial, ecological, and social performance (Gold et al., 2010). Moreover, innovation has been progressively vital in sustainable performance, significantly improving product innovation (Wu & Tsai, 2018).

However, manufacturing companies such as the drinking bottle industry face substantial challenges in improving innovation performance such as new product development (Padalkar & Gopinath, 2016; Ariadi et al., 2021). One of the glitches ensuing from innovation performance is linked to enhancing new processes and products (Laine et al., 2016). The type of innovation integrally engages a high degree of ambiguity, and its degree is possible to enhance while the innovative performance needs unique parts, new components, or technology (Yan & Wagner, 2017). When substantial attempts have been formulated to enhance innovative performance, prior studies have neglected to generate consistent outcomes between asset specificity and innovative performance (De Vita et al., 2011; Tabesh, Batt, & Butler, 2016; De Vita & Tekaya, 2015; Yan & Dooley, 2013). Conclusively, these seek to fulfil the research gaps by studying the impact of asset specificity on the innovative performance of drinking-bottled manufacturing's in Indonesia.

Asset specificity refers to the physical or individual sources committed to a particular business affiliate and dedicated to the business affiliate's assets, which are a joint attribute of many collaboration relations (Rokkan et al., 2003). Because of the assignment and support requirements, affiliates should perform specific assets to accommodate innovation (Lui et al., 2009). Luo et al. (2015) stated that the customer-supplier relationship affects inter-firm collaboration via asset specificity. How specific investments influence cooperative innovation performance persists vague, specifically in the product innovation context. To deliver how to improve the success of the innovative performance, portraying from the theory of relational view (Dyer, 1998), the author uses two mediator variables as inter-firm collaboration and knowledge sharing, both of that frequently occur in the scope of inter-organizational relations.

The rationality of the two mediator variables involved in this study model is established on contentions in which inter-firm collaboration is enabled as a technique of handling the improving product (Melander & Lakemond, 2015). Conversely, collaboration with outer affiliates, in reaction to enhancing products, has been regarded as affecting customer demand because industries can profit from utilizing external sources, allocating risks and shortfalls, and absorbing diverse technological proficiency (Yan & Wagner, 2017). In this study, the author adopts relational exchange theory to examine inter-firm collaboration and knowledge sharing as the mediator that bridge the relationship between asset specificity and innovative performance. This theory intends asset specificity for encapsulating the longstanding investment in a collaboration's persons, resources, and practices (Morgan & Hunt, 1994). The relational exchange view is described by mutual standards like cohesion, elasticity, and information sharing (Heide & John, 1995). Lui et al. (2009) stated that the expectations of relational exchange theory concerned with collaborative behaviour created by asset specificity. The present study regarded relational exchange theory proposes that asset specificity leverages faith among allies, endorsing collaborative behaviour and well relationship deeds. In line with the arguments, implementing relational exchange theory delivers the most acceptable aims of developing the study model.

Collaboration requires sharing more sources, and firms should realize teamwork deeds within structural borders to get the essential data, knowledge, and sources for innovation (Noci & Roberto, 1999). Amid the collaboration relations, supplier-customer interchange relations are single of several types of inter-firm cooperation (Kam & Lai, 2018). Prior research stated that the gains of innovative performance involve primarily two parts: The first is to decrease commercial unused, and the rest is to enhance operational and financial performance (Azevedo et al., 2011). In innovative performance, all associates should keenly interact with each member and obtain included in collaboration-linked accomplishments, such as running for started shared aims and delivering further significant competencies to the collaboration relationship. The relationship is fundamental to realizing partnership, and asset specificity is represented as a way to corroborate and keep the relationship.

Wagner and Bode (2014) defined that the central aspect in establishing if suppliers keenly deliver innovative notions to buyers was the degree of suppliers' relation-asset specificity. Affiliates create asset specificity not only as these assets can enhance the efficacy of the alliance but also as such assets are the dedication to outlook gains for the allies. Dyer (1997) stated which asset specificity can enhance the collaboration's collaborative behaviour and business value. Furthermore, Dyer and Singh (1998) argued that collaborative firms could produce relational rents via particular relational assets, knowledge communication habits, complementary sources and competencies. The specialized assets empowered in collaborations enhance opportunism, which can increase the gains of asset specificity (Heide & Stump, 1995). For instance, some automotive industries have revealed better enthusiasm to capitalize on specific assets that create more distinctive parts for consumers and capitalize on more specific assets (Yen & Hung, 2013; Espino-Rodríguez, 2017). Based on the prior studies, associates who are specifically in a relationship are motivated to collaborate with their partners to enhance product innovation. Hence, the author hypothesizes:  $H_1$ : Asset specificity is positively impact on innovative performance.

Knowledge sharing does not simply arise from the knowledge concept viewpoint because it can generate a knowledge trickle. Knowledge sharing is an effort since the basis of knowledge endeavors to assist affiliates in recognizing the delivered acquaintance (Wahyuni et al., 2021). Due to several obstacles, knowledge is commonly complicated to be conveyed. To form trust, asset specificity indicates long-term supply chain relations that create the supplier's or consumer's emphasis on typical durable gains, then levelling the obstacles of knowledge sharing. While providing assets specificity in product innovation, the allies should collaborate as a team, correspond regularly, and resolve inquiries keenly, and this practice is attended by knowledge sharing. Inemek and Matthyssens (2013) stated which relation-asset specificity, practices, and control processes for knowledge collaboration can bridge knowledge sharing.

The knowledge sharing between allies is extensively highlighted as a considered concern for company rivalry and innovative (Albino et al., 1998). Several prior studies defined that knowledge sharing can directly affect firm R&D, copyrights, and other innovative products (Caloghirou et al., 2004). As a combined innovation practice contains the achievement and retrieving of knowledge, the efficacy of knowledge sharing is the main for product innovative performance. Knowledge sharing can assist firms in recognizing knowledge and implementing it in the institution's knowledge practices. Across the extensive interchange developments of acquaintance, R&D departments can recognize their necessities and encourage the improvement of particular activity strategies for the innovative product. As product improvement needs regular knowledge sharing, firms enhance their innovative performance by allocating knowledge toward feature product requisites. By obtaining the helpful expertise accessible and distributing it to associates on the product innovation, the company construct the best quality products and decreases reject lessening processes (Cheng et al., 2008). Zheng et al. (2013) stated that cooperative innovation facilitates firms to improve their knowledge degree and accelerate knowledge attainment. Yang et al. (2016) stated that exchanging tacit and explicit knowledge among interchange collaborators in product innovation improves acquiring partnership performance. Knowledge sharing in innovative products has developed an essential force for innovative firms (Boschma & Ter Wal, 2007). The author hypothesizes: H<sub>2</sub>: Knowledge sharing mediates the relationship between the asset specificity and innovative performance.

Asset specificity is applied to perform a practice that can be redistributed for alternate utilizes and by alternative workers without forgoing production importance. From this context, inherent uncertainty such as product complication, technological innovation, and task linkage is comprised of asset specificity, including physical or personal assets, which cannot simply be redistributed (Heide, 1995). To optimize the success of asset specificity within ambiguity, cooperative deeds among firms are vital (Peng et al., 2014). A greater degree of product intricacy may direct to ambiguous interpretation, which can affect non-economic and economic deficiencies. To counter such misinterpretations from ensuing, two unrelated companies are needed to create collaborative conduct (for instance, information exchanging and mutual decision-taking) so that the companies can handle complexities in practical approaches (Ariadi et al., 2020). So, collaborative actions are required to perform significant parts in conducting defies reclining in the project (Peng et al., 2014). Precisely at the early phase of co-inventing new products, where the marketability is volatile, the companies may deteriorate from forecasting and recognizing profitability. The scheme of collaborative deeds would assist manage the complexities (Peng et al., 2014). Conclusively, below a higher degree of task interrelationship, the fostering number of modifications by an adjustment in the design of the product would request for a practice of collaborative decision-making that assists organize timetabling and enhancing the pace of matching the change (Yan & Dooley, 2013). Thus, this research proposes which asset specificity will increase for a higher degree of inter-firm collaboration.

The excellent support for the linkage between inter-firm collaboration and performance fully enhances innovative performance (Cao & Zhang, 2011). Information exchanging facilitates affiliates to precisely forecast demand and market adjusts, collaboratively create a product, and decrease probable inaccuracies (Yan & Dooley, 2013). Joint decision-making enhances receptiveness in timely conduct. Rapidness can be increased via the cooperative decision-making process, which development allows products to be commenced faster than other rivals' ones by elucidating problems earlier. Thus, collaboration can empower as an enabler of innovative performance. Then, the author proposes the following hypothesis: H<sub>3</sub>: Inter-firm collaboration mediates the relationship between the asset specificity and innovative performance

Knowledge is the midpoint of construction and keeps on innovation. At the same time, companies collaborate with other institutions to create innovative products, the achievement of innovation hinges on the conveying of acquaintance (Lau & Lo, 2015). Then, the author proposes that knowledge sharing is a primary aspect impacting innovation, postulating that it can have a mediation function concerning asset specificity and innovative performance.

Conversely, knowledge sharing is argued since it signifies an expense to the basis of knowledge in periods and attempt expended aiding people to recognize the basis's acquaintance (Wahyuni et al., 2020). Even though Cummings and Teng (2003) argued which affiliate's relation impacted the accomplishment of knowledge sharing, authors assume that inter-firm collaboration is an effectual approach to keep the mutual link that can have a mediator part in the relation between asset specificity and innovative performance.

As a whole, this research delivers two essential concerns. First, what aspects impact the innovative performance of the bottled drinking industry in Indonesia? The author contemplates this concern from the viewpoint of asset specificity. Second, how does asset specificity impact the innovative performance, which is mediated by some variables? Based on the knowledge management approach, the author examines the mediating part of knowledge sharing and inter-firm collaboration, which bridges the relationship between asset specificity and innovative performance.

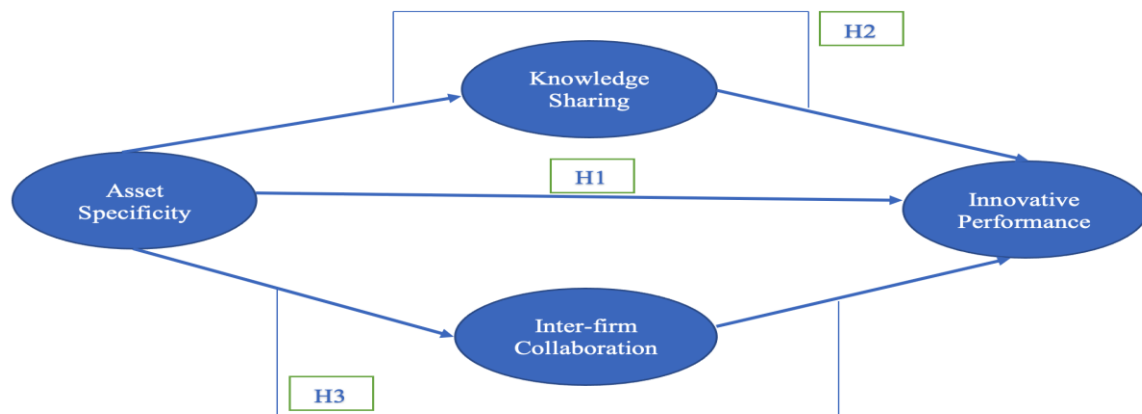


Figure 1. Conceptual Model

## 2. Methodology

This research developed and embraced construct measures adapted from the extant sources. Asset specificity is assessed by four items we and our affiliate have created substantial investments in assets committed to customer-supplier relations; have been customized to match the necessities of the innovation; have frequent communication with each other for this buyer-supplier relationship; have expended time and capital for customer-supplier relations (Wu & Li, 2020). Knowledge transfer is measured by four items that we reveal high-degree innovation ability with this supplier; we are eager to share technologies with our supplier; Interaction with our suppliers frequently starts to ensue timelier in the product innovation development; Technical assistance by our supplier frequently supports us resolve technical drawbacks (Oliveira et al., 2020). Four items measure inter-firm collaboration we cooperatively elaborate demand projections; we together control inventory; we exchange relevant information; we allocate several costs proportionately (Um & Kim, 2018). Innovative performance is determined by four items our companies have developed new products; our companies have developed new processes; our companies have improved our existing products; our companies have developed our existing processes (Khraishi et al., 2020). Respondents were asked to grade all substances using a five-point Likert scale (1 "strongly disagree" and 5 "strongly agree").

Data information was gathered from a database of the Organization for Drinking-Bottled companies in Indonesia. The analytical entity is at the company level. The operational directors, plant managers, and supply chain managers were directed as respondents. In a randomly selected manufacturing firm sample in Indonesia, the author has used a record of 196 executives with more than 100 staff and above IDR15 billion in annual sales revenue. The respondent data has been acquired via e-mail. One hundred twenty-one

accomplished questionnaires, representing 61.73 per cent, were taken on paralleled to other prior studies (Li et al., 2006).

To discover asset specificity's direct and indirect impact on innovative performance with the mediator role of knowledge sharing and inter-firm collaboration in Indonesia's bottled drinking manufacturing. The PLS-SEM method was used to evaluate the entire conceptual model compiled by SmartPLS software. *Convergent validity* is a test used to show the extent to which the questionnaire instrument used is valid when measured on a large scale. Examining convergent validity is valid if the outer loading is higher than 0.7, composite reliabilities are higher than 0.8, and the average extracted variance (AVE) must be greater than 0.5 (Fornell & Larcker, 1981). Regarding the study results, the loading factors, composite reliabilities, and AVE fulfilled the criteria. So, the outcomes show that the research model matched the benchmark of convergent validity.

HTMT is a proposed alternative way to assess discriminant validity. This procedure employs a Heterotrait-Monotrait Ratio of Correlations (HTMT) as the base for calculation. The HTMT score should be lesser than 0.9 to confirm discriminant validity between the two reflective variables (Henseler et al., 2015). The calculation of the goodness-of-fit model was presented to be satisfactory (Standardized Root Mean Square Residual [SRMR] = 0.052, and Normal Fit Index [NFI] = 0.914) and verified the recommended model due to SRMR score <0.08 and NFI score >0.9 (Henseler et al., 2015). In conclusion, the author exposes that the statistic conceptual model is valid. Thus, all of the hypotheses could be examined properly.

### 3. Result and Discussion

The result shows that asset specificity has no significant effect on innovation performance ( $\beta = 0.120$ ,  $p > 0.05$ ). This outcome is coherent with the previous study, in which asset specificity does not enhance innovative performance such as improving feature products, especially facing uncertain conditions (Wacker et al., 2015). In our study, the results indicate that when facing environmental uncertainty, some companies primarily depend on the relational way but not contractual governance to lessen performance ambiguity. It is due to less informal relational governance so that there is distrust from one party and an increased risk of uncertainty (e.g. coordination of information on raw material retrieval from suppliers). For example, asset specificity can enhance contract elements for safeguard instead of opportunism. Therefore, the resolution to confirming effective customer-supplier linkages is the right selection and employment of diverse governance ways to diminish opportunistic acts and supplier performing uncertainty.

The outcome reveals that the indirect link of asset specificity to innovative performance bridged by inter-firm collaboration was positive significant ( $\beta = 0.304$ ,  $p < 0.01$ ). The results imply that the greater degree of asset specificity could intensify the requirement for inter-firm collaboration. The asset specificity such as humans contains hesitation that needs collaboration to handle complexities, essentially improving the product. For instance, exposing supplier engagement in customer product improvement through physical assets shows that with a rising portion of collaboration, suppliers are pushed to deliver asset specificity in Research Development or particular consumer knowledge to be comprehended as a prospective business affiliate by the consumer (Kleinaltenkamp & Ehret, 2006). To enhance product improvement performance, this research proposes that consumers can demand their suppliers deliver products by enabling special tools or services to match their product necessities. The streamlining of manufacturing activities and enhancing quality via such assessments as better return rates are methods in that suppliers could assist consumers control product elaboration. Well-timed and attentive product modification by suppliers for consumers openly influences product improvement's incredibly innovative performance. This finding shows that inter-firm collaboration is a full mediator and fulfils the research gap linking asset specificity and innovative performance.

The outcome reveals that the indirect link of asset specificity to innovative performance mediated by knowledge sharing was positive significant ( $\beta = 0.103$ ,  $p < 0.05$ ). The asset specificity such as a supplier or human enhances consumer-supplier knowledge sharing

where suppliers eager to put on behalf of a particular consumer inclined to exchange information and knowledge toward on customer. This research reveals which asset specificity can improve joint knowledge sharing between consumer and supplier due to the motivation of customer recognized relationship eminence. If suppliers put asset specificity in consumer requirements and convince, customers sense relationship eminence, which consumers would prefer to exchange knowledge with the supplier. So, consumers do not waver to reveal acquaintance to their suppliers, specifically knowledge linked to responsive technologies and product descriptions. Thus, customers are significantly eased about exchanging knowledge with suppliers. When the consumers experience contented with service supplier and corroborate which supplier is reliable, the consumer comprehends the link to be sound quality and converts more possibly to distribute knowledge toward supplier. This research displays that for perform to construct more solid relations with consumers of boosted faith and pleasure, suppliers must deliver to consumers with effective interaction and convey assurances created to consumers (Yen et al., 2011). This outcome shows that knowledge sharing is a full mediator and fulfils the research gap linking asset specificity and innovative performance.

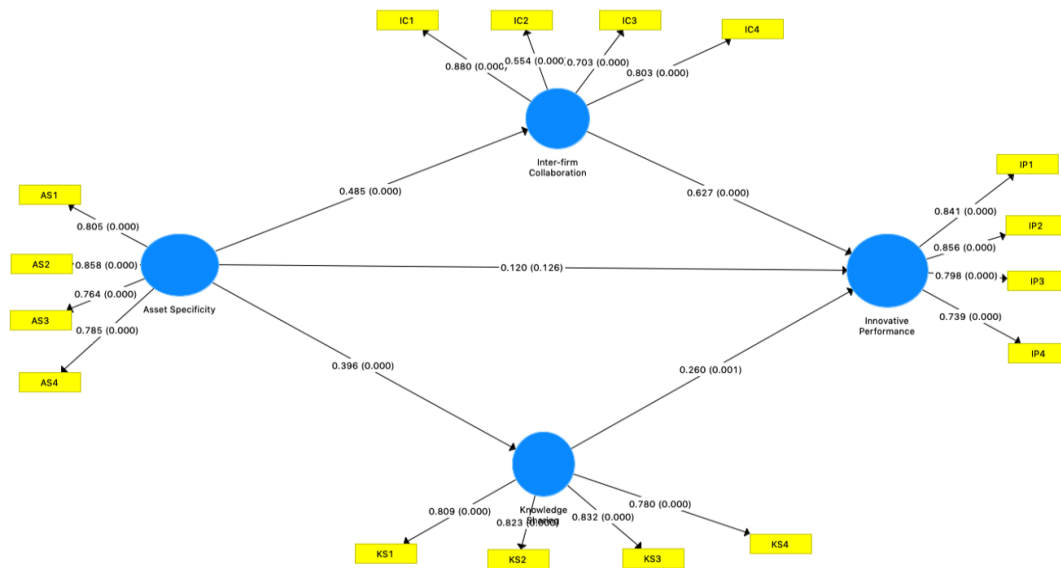


Figure 2. Results of path analysis

#### 4. Conclusion and Limitation

The result of this study intends the mediator role as inter-firm collaboration and knowledge sharing to bridge the relationship between asset specificity and innovative performance in the drinking-bottled company in Indonesia. Conversely, there is no impact on the relationship between asset specificity and innovative performance. The findings show that inter-firm collaboration is a powerful intermediary evaluated by the other mediators for enhancing the influence of asset specificity for innovative performance. The limitation of this study studies only examines the bottle drinking industry in Indonesia. Furthermore, this study can be widened to practice in other industries.

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