

THE EFFECT OF SUPPLY CHAIN DRIVERS ON PRODUCTION PERFORMANCE IN THE INDOONESIAN FOOD AND BEVARAGE MANUFACTURING INDUSTRY

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ABSTRACT

The food and beverage industry is a major contributor to the Indonesian economy, and the Covid-19 epidemic heavily influence on its supply chain sustainability. The purpose of this study was to examine the effect of innovation and demand optimization on partnerships in production and production performance in the food and beverage manufacturing industry in Indonesia. This research is a quantitative study using PLS-SEM. Data collection in this study was carried out by distributing questionnaires with a sample of 54 respondents of owners and managers working in the medium-large food and beverage manufacturing companies in Indonesia. The findings indicate that innovation and demand optimization can encourage companies to do partnerships in production. Innovation and demand optimization also shown to improve company's production performance. However, there is no significant effect between partnerships in production and production performance. This is because partnerships often experience a dilemma due to the influence on company performance which may either be favorable or unfavorable to the production performance. The research findings extend literature of supply chain management in the context of internal perspectives of the companies. The context of the research is limited to small numbers of medium-large companies in Indonesia, thus, call for further examination with a larger sample size and in different contexts for further finding generalization. This research provides broader view on the internal perspectives of company's supply chain management through the perspective of Resource Based View, as well as providing several suggestions for managers of medium-large food and beverage manufacturing companies in developing countries.

Keywords: Innovation, Demand Optimization, Partnership in Production, Production Performance

ABSTRAK

Industri makanan dan minuman merupakan kontributor utama perekonomian Indonesia, dan pandemi Covid-19 sangat mempengaruhi keberlanjutan rantai pasokannya. Tujuan dari penelitian ini adalah untuk menguji pengaruh inovasi dan optimalisasi permintaan terhadap kemitraan produksi dan kinerja produksi pada industri manufaktur makanan dan minuman di Indonesia. Penelitian ini merupakan penelitian kuantitatif dengan menggunakan PLS-SEM. Pengumpulan data pada penelitian ini dilakukan dengan menyebarkan kuesioner dengan sampel sebanyak 54 responden pemilik dan manajer yang bekerja pada perusahaan manufaktur makanan dan minuman menengah-besar di Indonesia. Temuan menunjukkan bahwa inovasi dan optimalisasi permintaan dapat mendorong perusahaan untuk melakukan kemitraan dalam produksi. Inovasi dan optimalisasi permintaan juga terbukti meningkatkan kinerja produksi perusahaan. Namun, kemitraan produksi tidak berpengaruh signifikan terhadap kinerja produksi. Hal ini disebabkan karena kemitraan produksi seringkali mengalami dilema apakah bisa menguntungkan atau merugikan terhadap kinerja produksi. Temuan penelitian ini memperluas literatur manajemen rantai pasokan dalam konteks perspektif internal perusahaan. Konteks penelitian ini terbatas pada sejumlah kecil perusahaan menengah-besar di Indonesia, sehingga memerlukan penelitian lebih lanjut dengan jumlah sampel yang lebih besar dan dalam konteks yang berbeda untuk meningkatkan generalisasi temuan penelitian. Penelitian ini memberikan pandangan yang lebih luas mengenai perspektif internal manajemen rantai pasok perusahaan melalui perspektif Resource Based View, serta memberikan beberapa saran bagi para manajer perusahaan manufaktur makanan dan minuman menengah-besar di negara berkembang.

Kata Kunci: Inovasi, Optimasi Permintaan, Kemitraan Produksi, Kinerja Produksi.

1. INTRODUCTION

The development of the logistics industry according to Supply Chain Indonesia (SCI) in 2019 increased by

11.56 percent, and in 2020 it was predicted to increase by 9.18 percent. One of Indonesia's backbone industrial sectors for economic growth is the food and

beverage industry. As one of the pillars of the Indonesian economy, the food and beverage industry is one of the largest industries with large numbers of companies within the industry, ranging from micro enterprises to medium-and-large enterprises and from food and beverage stalls to food and beverages manufacturers. This is proven by the increase in investment in 2018, contributing Rp. 56.60 trillion and the productivity of the year 2018 was 7.91%, exceeding the economic, employment, and exports growth. However, a new obstacle emerged, namely the unpredictable Covid-19 pandemic (Ongkowijoyo et al., 2020) and weaken the industry's supply chain.

Covid-19 pandemic is a savage reminder to all companies that disruption is inevitable. Lock downs and strict restrictions had greatly hindered supply chain operations worldwide, which threatened the sustainability of the supply chain (Karmaker et al., 2021). Supply chain is series of companies' business networks and relationships that links intra- and inter-company boundaries (Lambert, 2010), therefore when one company's operation and its performance are threatened, the impact is not only absorbed in that company, but the impact is dispersed throughout the all the stakeholders of the supply chain. Due to this phenomenon, companies' production performances are greatly disrupted, less transactions occurred, and thus slowing down the global economy. Undeniably, this big impact disrupted the Indonesian food and beverage industry, indicated through decreased income and bankruptcy (Farida, 2020). Products produced by the food and beverage industry are perishable items, which they have to be fresh and have a short sales cycle (Lin & Hu, 2022). All partners in the supply chain must plan for sales, reducing the danger of cost loss and

product scarcity, which there are possibilities of uncertainty in the midst of supply chain disruptions, as such the Covid-19 pandemic, therefore, companies must be ready to face future challenges. This brings to the aims of this study, which is to examine factors that affect production performance of companies in the Indonesian food and beverage manufacturing industry.

The food and beverage manufacturing industry consists of medium to large companies, which largely to the Indonesian GDP as well as employing large numbers of workforce. This study focuses on the internal perspective of the company to maintain and increase production performance. In order to improve production performance, partnership in production may play a big role. A company's process of using resources aims to adjust or create market changes (Eisenhardt & Martin, 2000). Partnering allows companies to leverage their own unique expertise and skills to "lock out" competitors (Lambert et al., 1996), through optimizing companies' resources. Resources between partners will complement each other to achieve competitive advantage that can be achieved using the Resource-Based View (RBV) theory (Barney, 1991; Sutrisno, 2019). The capacity of management to integrate the company's complex network of commercial contacts will be crucial to its long-term success in this more competitive climate (Lambert, 2010). Through partnerships, companies can access new technologies or new markets, have the ability to offer products or services with a wider range, create economies of scale in research or production, and have access to knowledge (Mohr & Spekman, 1994). Partnering companies are able to share tacit knowledge to pursue competitive strategies. Companies involved in production partnership are influenced by

several factors, such as innovation and demand optimization, which are part of the supply chain drivers (Rezaei et al., 2018). The underlying premise of all these concepts is that companies need to create agreements with other supply chain members in order to successfully compete in their respective industries (de Leeuw & Fransoo, 2009).

Companies choose innovation as one of the reasons for collaborating as it helps companies to innovate products and systems, as well as assist companies to cope with increasingly rapid technological changes (Rezaei et al., 2018). This becomes one of the purposes of the industrial revolution 4.0 (Lasi et al., 2014). According to the government, the food and beverage industry is able to continuously to grow by reflecting the current manufacturing trend heading towards industry 4.0 where companies can utilize technology to increase the efficiency and effectiveness of their production. The role of technology is very important to improve quality and create new products. This operational trends in industry 4.0 can help companies to increase their export contribution, which in turn will positively affect the country's financial position.

According to Rezaei et al. (2018), demand optimization is important for companies to maximize the use of scarce resources more efficiently. Demand optimization has an important role for companies to collaborate because it can help companies handle seasonal or cyclical demand fluctuations, able to optimize demand for products or services, and deal with demand uncertainties (Rezaei et al., 2018). Therefore, good cooperation and collaborations among partners will affect production performance. In addition, production performance also plays an important role in the food and beverage industry in the decision-making process to face the

challenge of optimizing system delivery capacity (Qarahasanlou et al., 2017) as well as improving production quality (Sahoo & Yadav, 2017). Thus, in this research, innovation and demand optimization will be examined whether they affect partnership in product, which in turn will affect production performance of food and beverage companies in Indonesia. This research gives a broader insight on the internal viewpoints of company's supply chain management through the Resource Based insight, as well as presenting numerous ideas for managers of medium-large food and beverage manufacturing enterprises in developing nations in which there is a lack of research in this field of study especially in Indonesia. The next section of the paper focuses on literature review and hypothesis development, research methodology used, and then the research result, following with the discussion, implications and suggestions.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Drivers are factors that compel or motivate companies to engage in partnership (Lambert, 2010). Supply chain drivers are factors that motivate companies to participate in partnership. Several internal factors of the company that act as one of the supply chain drivers are innovation and demand optimization (Lambert, 2010; Lambert et al., 1996; Rezaei et al., 2018). This study explains that the supply chain drivers used include innovation and demand optimization.

Innovation is a new implementation of a product or process with new characteristics, new organizational methods in business practices, workplace organization and external relations (Mahulae et al., 2022; OECD & Eurostat, 2005). There are several strategies that companies can use when innovating, including strategic

innovation, new technology, new services, new ways of doing business model to generate new value (Rajapathirana & Hui, 2018). Innovation in products and production systems can be improved through partnerships in production (Belderbos et al., 2004; Rezaei et al., 2018). In addition, each company must have different innovations, in order to trigger companies to establish partnerships in production, which will help companies control production activities efficiently. Innovation can lead companies to be able to increase partnership in production and will have an impact on production performance.

According to Lambert et al. (1996), partnership is a specially crafted business relationship among companies that produces competitive advantage, which then result in greater business performance than what would have been achieved by each individual company. A partnership relies on mutual trust, openness, as well as shared risk and rewards among companies. Partnership in production is a business relationship among several companies that involves production of a company's product.

Demand optimization is an important supply chain driver for partnership in production in companies with the aim of optimizing the demand for a product. Optimization is carried out by presenting a framework for managing inventory and customer needs dynamically in the supply chain (Braun et al., 2003). Uncertainty in demand can be mitigated by a strong coordination between companies with partnerships in production (Pan & Nagi, 2010). Collaboration or partnership among supply chain members contribute to smoothen company's material and production flow, whereas partnerships that includes technology adoption can increase reliability and transparency among supply chain members (Karmaker

et al., 2021). Thus, partnership in production can help companies to smoothen and other cycles (Rezaei et al., 2018). In addition, demand optimization also has an important role in production performance within a company that aims to boost production capacity to help companies maintain market share stability (Rezaei et al., 2018). This is supported by previous research showing that there is a relationship between innovation and demand optimization on partnership in production and production performance. Therefore, in this study, we proposed:

H₁: Innovation significantly affects partnership in production in the food and beverage manufacturing companies in Indonesia.

H₂: Demand optimization significantly affects partnership in production in the food and beverage manufacturing companies in Indonesia.

H₃: Innovation significantly affects production performance in the food and beverage manufacturing companies in Indonesia.

H₄: Demand optimization significantly affects production performance in the food and beverage manufacturing companies in Indonesia.

There are several partnership benefits for customers (reducing lead time, increasing market share and improving product quality), productivity (reducing material costs) and innovation (implementing new processes) (Cetindamar et al., 2005). Partnership in production allows companies to able to increase production capacity, utilization of quantity, and reduce the number of defective products and operating costs (Rezaei et al., 2018). This is related to production performance because it helps provide an understanding and evaluation of the condition of the company (Zainal et

al., 2018). As explained by Lorentz (2008) that there is a positive correlation between partnerships in production and performance differences in production quality.

According to Vicario and Nawangpalupi (2020) partnership in production also involves information sharing among parties within a supply chain. This will aid optimal demand forecasting. Furthermore, companies that combine internal resources and external expertise become more innovative. To develop their innovation capabilities, they must have access to external sources of information, expertise, and technology. Supply chain partnerships between companies with access to external source can exchange expertise and/or enhance work-related skills (Legg-Jack & Ndebele, 2022), resource pooling, information, and technology, as well as risks (Agustin et al., 2023; Vicario &

Nawangpalupi, 2020). Therefore, we proposed:

- H₅: Partnership in production significantly affects production performance in the food and beverage manufacturing companies in Indonesia.
- H₆: Partnership in production mediates the relationship between innovation towards production performance in the food and beverage manufacturing companies in Indonesia.
- H₇: Partnership in production mediates the relationship between demand optimization in the food and beverage manufacturing companies in Indonesia.

Based on the literature review discussed above, the research model in the study can be drawn as follows (Rezaei et al., 2018):

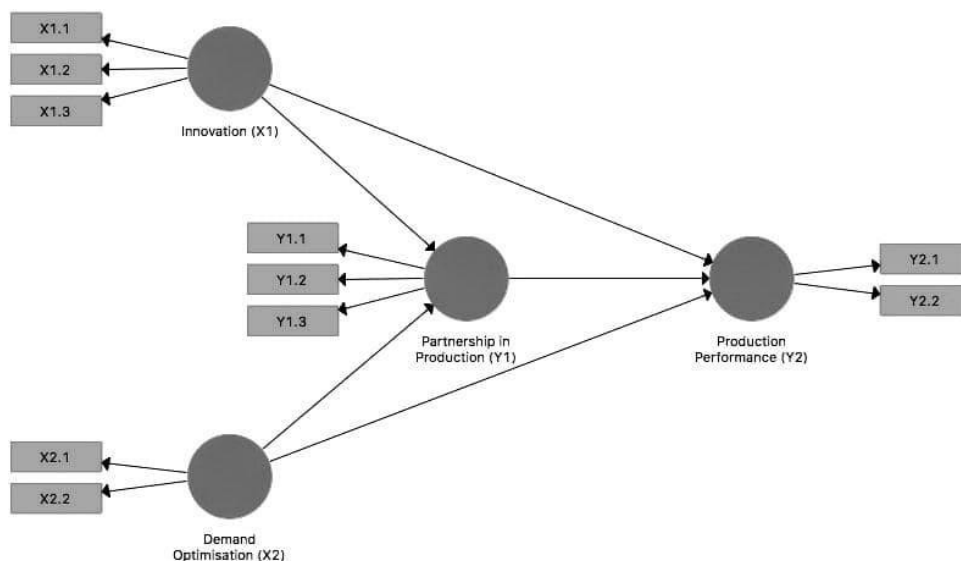


Figure 1. Research Model

3. RESEARCH METHOD

Quantitative research methods have a clear direction of objectives, subjects, samples, research steps and data sources, and are carried out if all data has been collected (Cooper & Schindler,

2014). Data collection using questionnaires distributed to managers of manufacturing companies spread across several provinces in Indonesia. Table 1 shows a detailed list of the province origins of the respondents.

This study uses Partial Least Square Structural Equation Modeling (PLS-SEM). The sampling technique used in this study was random sampling. Sample criteria are company owners or managers working in the food and beverage manufacturing industry in Indonesia. Question items in the questionnaire can be seen in Table 1 using an interval scale of 1 (strongly disagree) to 7 (strongly agree) to measure the research indicators in the questionnaire. Indicators of the variables are adopted from Rezaei et al. (2018), whereby indicators of innovation include “jointly product development and product innovation, access to technology, and enhancing innovation potential”; indicators of demand optimization includes “seasonal levelling and other cyclical levelling”; indicators of partnership in production include “control production, decision production and communication production”; and indicators of production performance include “cost per operation hour and capacity utilization”.

Questionnaires were distributed directly to company owners/managers via online, namely telegram. The hypotheses were tested using smartPLS software. Two stages of analysis techniques were done, namely the measurement (outer) model test and the structural (inner) model test. In addition, there are four measurements used to test validity and reliability in this research: value of the

loading factor, Average Variance Extracted (AVE), Cronbach’s alpha, and composite reliability.

Data collection has been carried out using a questionnaire that was distributed to managers of manufacturing companies in Indonesia using Google form via Indonesian Production and Operations Management Society (IPOMS) Telegram social media. This research focused on medium and large manufacturing companies as these companies deal with supply chain issues and are big enough to have faced more complex management issues. Especially in the food and beverage industry, whereby during the Covid-19 pandemic period had been critical to the country’s food supply. The sampling technique used was purposive sampling, whereby owners and managers of medium and large manufacturing companies are the research subject as they have sufficient understanding and in depth knowledge about the company’s supply chain. The minimum sample size required according to Hair et al. (2017) is 10 times the numbers of arrow heads pointing towards the endogenous variable, thus, the minimum sample size for this research is 50 respondents. There were 74 respondents obtained in the year 2022. The total number of respondents that can be processed are 50 respondents who are under the category of manufacturing companies. The data was analyzed using Partial Least Square (PLS).

4. RESULT AND DISCUSSION

4.1 Statistical Results

Table 1. Respondents Demographics

No	Characteristics	Total	Percentage	
1.	Companies operating in the food and beverage manufacturing industry	Yes	54	75.7%
		No	18	24.3%
2.	Work tenure	<1 year	3	5.6%
		1-2 years	12	22.2%
		2-3 years	8	14.8%
		3-4 years	4	7.40%
		>4 years	27	50.0%
3.	Number of employees	< 100	23	42.6%
		Between 100-500	17	31.5%
		Between 500-1000	6	11.1%
		Between 1000-3000	2	3.7%
		> 3000	6	11.1%
4.	Company location	East Java	23	42.6%
		Central Java	3	5.6%
		West Java	8	14.8%
		Jakarta	3	5.6%
		Banten	5	9.3%
		Bali	2	3.7%
		Central Kalimantan	1	1.9%
		South Sulawesi	7	13.0%
		South Sumatra	1	1.9%
		Riau Islands	1	1.9%
5.	The impact of covid-19 on the company's supply chain	No effect	2	3.7%
		Slight effect	22	40.7%
		Medium effect	15	27.8%
		Big effect	12	22.2%
		Massive effect	3	5.6%

Source: Processed Data (2023)

The total population in this study is 711 companies in the food and beverage manufacturing industry in Indonesia. The companies are represented by owners or managers. While the number of samples received by the researchers was 72 respondents, however the number of samples that met the criteria so that it was feasible to be analyzed was 54 respondents resulting in a response rate of 54%. Based on the results of filling out the respondents from

the distributed questionnaire, the data obtained is shown in Table 1.

The characteristics of the respondents in this study focused on the food and beverage manufacturing industry in Indonesia with a total of 54 people (75%). Most of the respondents in this study have worked in the food and beverage manufacturing industry in Indonesia for more than 4 years, approximately 27 people (48.2%) who have more experience and carry out internal development and know the

problems that exist in companies. The majority of respondents (57.4%) answered that there are 100 to >3000 employees in the food and beverage manufacturing industry in Indonesia, whereas 23 people (42.6%) claimed that there are less than 100 employees within their company. There are around 23 companies (42.6%) located in East Java. In addition, based on the survey results, 96.3% answered that the Covid-19 pandemic had slight to massive impact on the food and beverage manufacturing industry' supply chain in Indonesia. With sufficient work experience and human resources, the company needs innovation, demand optimization and collaboration

between partners to produce good performance for the company.

In Table 2, the factor loading value for each indicator has exceeded the minimum limit of 0.7 and the Average Variance Extracted (AVE) value also exceeds the minimum limit of 0.5, therefore, the research indicators have good validity. While Cronbach's alpha of each variable has a value above 0.6 and the composite reliability of each variable also has a value above 0.7. Table 3 shows that the result of discriminant validity has been met in which the square root of AVE of each construct is greater than the correlation among other constructs. Therefore, the research variables have a good level of validity and reliability.

Table 2. Convergent Validity and Reliability Testing Results

Variables	Item	Convergent Validity		Reliability	
		Factor Loading	AVE	Cronbach's Alpha	Composite Reliability
Innovation (X1)	X1.1	0.898	0.780	0.859	0.914
	X1.2	0.891			
	X1.3	0.861			
Demand Optimization (X2)	X2.1	0.931	0.860	0.837	0.925
	X2.2	0.923			
Partnership in Production (Y1)	Y1.1	0.881	0.787	0.865	0.917
	Y1.2	0.883			
	Y1.3	0.898			
Production Performance (Y2)	Y2.1	0.883	0.830	0.800	0.907
	Y2.2	0.938			

Source: Processed data (2023)

Table 3. Discriminant Validity Testing Results

Variables	Demand Optimization (X2)	Innovation (X1)	Partnership in Production (Y1)	Production Performance (Y2)
Demand Optimization (X2)	0.927			
Innovation (X1)	0.434	0.883		
Partnership in Production (Y1)	0.649	0.483	0.887	
Production Performance (Y2)	0.638	0.590	0.603	0.911

Source: Processed data (2023)

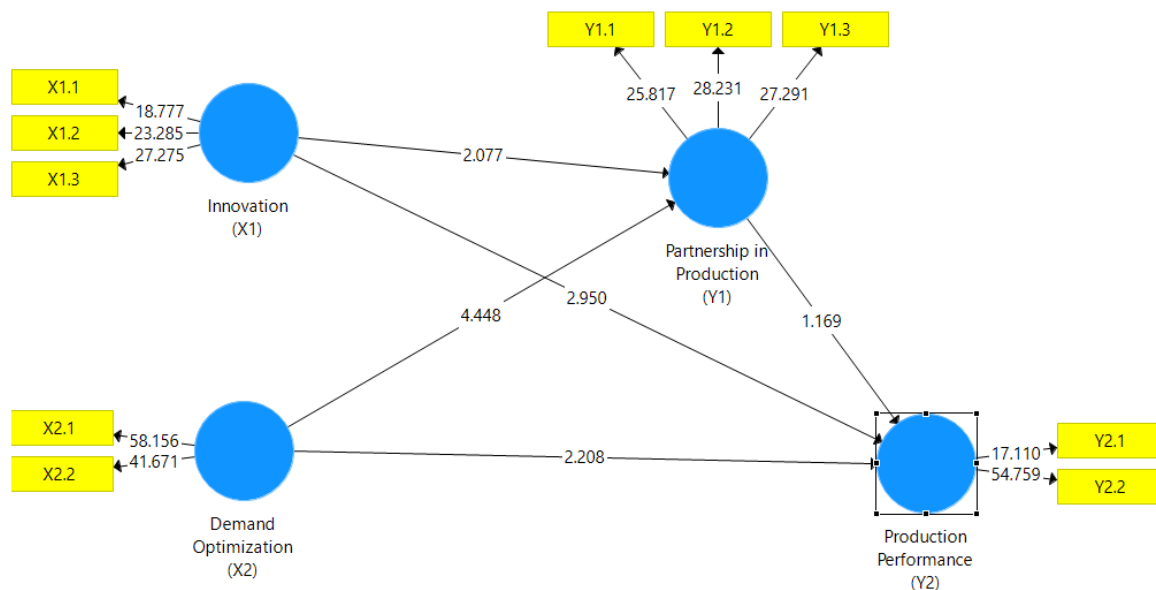


Figure 2. Inner Model Result
Source: Processed data (2023)

Table 4. Hypothesis Testing Results

	Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
H1	Innovation (X1) -> Partnership in Production (Y1)	0.248	0.267	0.120	2.077	0.038
H2	Demand Optimization (X2) -> Partnership in Production (Y1)	0.541	0.531	0.122	4.448	0.000
H3	Innovation (X1) -> Production Performance (Y2)	0.334	0.349	0.113	2.950	0.003
H4	Demand Optimization (X2) -> Production Performance (Y2)	0.356	0.362	0.161	2.208	0.028
H5	Partnership in Production (Y1) -> Production Performance (Y2)	0.211	0.189	0.181	1.169	0.243

Source: Processed data (2023)

The results of the hypothesis testing Partial Least Square (PLS) analysis are shown in Figure 2 and in Table 4. Figure 2 depicts the hypothesis testing visually, whereas Table 4 shows that 4 out of 5 hypotheses are supported. Hypothesis 1 and 2 are both supported, which proves that innovation and demand optimization have significant influences on partnership in production. These are indicated by a positive path coefficient of 0.248 for innovation and 0.541 for demand optimization, both with a significance level of < 0.05 or t-statistics

value of > 1.96 . Hypothesis 3 and 4 are further both supported, proving that innovation and demand optimization have significant influences on production performance. These are shown by a positive path coefficient of 0.334 for innovation and 0.356 for demand optimization, with significance levels or p-value < 0.05 or t-statistics value > 1.96 .

However, hypothesis 5 is not supported. Partnership in production has no significant effect on production performance. This is indicated by a significance level of > 0.05 or < 1.96 . The

standard deviation values for each hypothesis tests are <1 and leaning to the value of 0, which is considered low. Therefore, the data presented are relatively accurate as lower standard deviation indicates less dispersion and higher predictive accuracy.

On the other hand, based on Table 5, mediation hypotheses (H6 and H7) are all rejected. Partnership in production is found not to have a significant mediation

effect on the relationship among innovation and demand optimization towards production performance. The p-value of H6 is $0.340 > 0.05$ and the p-value of H7 is $0.289 > 0.05$. Therefore, there is no indirect effect found in this research in order to improve the production performance of food and beverage manufacturing companies in Indonesia.

Table 5. Mediation Hypothesis Testing Results

	Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
H6	Innovation (X1) -> Partnership in Production (Y1) -> Production Performance (Y2)	0.052	0.049	0.055	0.956	0.340
H7	Demand Optimization (X2) -> Partnership in Production (Y1) -> Production Performance (Y2)	0.114	0.101	0.108	1.061	0.289

Source: Processed data (2023)

Table 6. R² Test Result

Endogenous Variable	R Square	R Square Adjusted
Partnership in Production (Y1)	0.472	0.451
Production Performance (Y2)	0.551	0.524

Source: Processed data (2023)

Table 7. F² Test Result

Variable	Demand Optimization (X2)	Innovation (X1)	Partnership in Production (Y1)	Production Performance (Y2)
Innovation (X1)			0.095	0.184
Demand Optimization (X2)			0.450	0.158
Partnership in Production (Y1)				0.052
Production Performance (Y2)				

Source: Processed data (2023)

Table 8. Q² Test Result

Variables	SSO	SSE	Q ² (=1-SSE/SSO)
Innovation (X1)	162.000	162.000	
Demand Optimization (X2)	108.000	108.000	
Partnership in Production (Y1)	162.000	104.920	0.352
Production Performance (Y2)	108.000	62.819	0.418

Source: Processed data (2023)

Explained variance of the endogenous variables is tested using the coefficient of determination R^2 test. Based on Table 6, partnership in production is explained by innovation and demand optimization for 47.2%, which is considered moderate. Partnership in production has 53.8% that can be explained and affected by other variables that are not considered in this research. Whereas, production performance's variation can be explained 55.1% by innovation, demand optimization and partnership in production of a company. 44.9% of production performance's variation are explained by other variables outside of this research. Taking into considerations of the R^2 adjusted for production performance as it is affected by more than 2 exogenous variables, there is not much difference between the R^2 and R^2 adjusted. Both results show that production performance is moderately explained by innovation, demand optimization and partnership in production of a company.

The effect sizes of the exogenous variables on the endogenous variables are tested using the F^2 test. Based on Table 7, innovation has a very low effect size on partnership in production, while demand optimization has moderate effect size on partnership in production. On the other hand, both innovation and demand optimization have a relatively low effect size on production performance, while innovation and demand optimization have very low effect size on production performance. This emphasizes that managers should focus on demand optimization in order to improve partnership in production as it has a moderate influence.

The predictive relevance of the model is tested using the Q^2 test. Table 8 shows that the Q^2 results are > 0 , therefore the research model has a good predictive relevance that of exogenous variables can

predict the endogenous variables. This shows that innovation and demand optimization have relatively moderate predictive relevance towards partnership in production and production performance.

4.2 Discussion

The results of the study show that innovation is significantly affecting partnership in production and production performance of companies in the food and beverage manufacturing industry. Innovation is the main driving force for companies to be involved in partnership in production especially innovation in technology can help the company's success in the long term, as well as able to influence the production performance of the company (Ettlie & Reza, 1992). Companies that have entered a market with innovation will be able to understand consumer needs and technological developments better (Wahab et al., 2020), which can improve the overall performance of the company.

In addition, the Covid-19 pandemic has forced companies engaged in the food and beverage manufacturing industry to start managing inventory flows, optimizing demand with partners and maximizing the use of resources to improve company performance. The reason companies participate in partnership in production is to deal with uncertainty in demand (Pan & Nagi, 2010). This is also reinforced by Rezaei et al. (2018), who explained that the existence of a partnership in production can help companies utilize partners' production capacity to handle seasonal demand fluctuations, be able to optimize demand for products or services, and deal with uncertainties in demand. This is done by collaborating in product development and innovation and mutual proactiveness in enhancing each other's innovation potential. In addition, companies that

innovate within their partnership in production also access inter-firm technology, which may be prohibited for individual companies to share to others.

Based on the result of this study, demand optimization also has a significant effect on partnership in product and production performance of food and beverage manufacturers in Indonesia. Companies that are aware of seasonal and other cyclical demands within the industry, such as increased demand that is greater than production capacity due to market growth (de Leeuw & Fransoo, 2009), they are inclined towards finding ways to optimize and meet the market demands. For instance, in Indonesian food and beverage industry, demand is at its peak approaching and during the holiday seasons. This encourages companies to engage in partnership in production to collaborate production capacity and other resources and capabilities to fulfill production targets.

Demand optimization is also able to assist companies in production performance to make decisions to face the challenges of optimizing system delivery capacity (Qarahasanlou et al., 2017). Facing uncertain demands, companies must be able to manage its production capacity according to demand fluctuations. Companies that are able to optimize its demand should be able to meet production targets with efficient production cost despite production input fluctuation lead time and other procurement challenges. Thus, in developing the food supply chain within a company, it is necessary to carry out demand optimization that requires the involvement of partnerships in production to produce good production performance within a company.

The results of the study prove that partnership in production is not significantly affecting production

performance, which means partnership in production does not mediate the relationship between innovation and demand optimization towards production performance. This finding is contrary to the findings from Rezaei et al. (2018), Vicario and Nawangpalupi (2020), and Febrianto et al. (2023). The previous research findings were in the context of micro-small-enterprises (MSEs) and small-medium-enterprises (SMEs), whereas this research focused on medium-large-enterprises. MSEs and SMEs are small and have limited production capacity and capabilities, thus, in comparison to medium-large companies, MSEs and SMEs need to rely on partnerships to improve their production performance.

A research by Febrianto et al. (2023) focused on the companies involved in the livestock supply chain partnership of Indonesian broiler chicken, ranging from farmers, production facilities provider, and marketing. This type of partnership was able to provide a significant positive impact of partnership production towards production performance as different companies have different roles and each company was able to conduct efficient operational activities, therefore benefiting the entire supply chain production performance. Whereas this research was focused on medium to large food and beverage manufacturing companies that produces food and beverage products. Therefore, the partnership in production does not always include upstream to downstream supply chain parties, unlike previous research by Febrianto et al. (2023) that includes farmers to marketing companies.

On the other hand, the Covid-19 pandemic made collaboration among partners and companies engaged in the food and beverage manufacturing industry difficult due to the Work From Home (WFH) regulations in the early

pandemic period, thus companies overall performances were disrupted. Partnerships activities have been disrupted as the impact of lock downs and restrictions hindered daily operations, which in turn negatively affecting companies' ability to meet partnership obligations. In the new normal era, companies are still recovering from its setback, not to mention medium and large companies with high financial debts struggle the most to recover. Therefore, companies are less aggressive and require more time to make comeback with the mindset of 'wait and see' of what is yet to come. Lessons learned from the Covid-19 pandemic have made companies more careful and meticulous in strategizing and engaging in partnership initiatives.

Furthermore, company failures in meeting partnership obligations that affect their overall performance usually occur due to mistakes in selecting partnerships (Han et al., 2017). In some instances, companies' expectations to improve production performance cannot be understood properly and are not supported properly by their partners, which may result in failure of partnership in production. This is reinforced by a study by Lo and Pushpakumara (1999) stating that partnerships are sometimes able to make a positive contribution to one aspect, while other times are able to make a negative contribution to other aspects. In such situations, companies need to do corrective actions in choosing partnerships and establish good relationships with their partners to improve overall performance of the company. Therefore, partnership in production in this research is not shown to be affecting company's production performance.

This study contributes to extend the supply chain management body of knowledge with the internal perspective of companies as members of the supply

chain. In particular, confirming the Resource Based View theory (Barney, 1991) that internal capabilities of the company, such as innovation and demand optimization contribute to the company's success, in particular partnership and production performance. Innovation and demand optimization are found to be positively and significantly influencing partnership in production and production performance, thereby confirming previous research by Rezaei et al. (2018). However, an interesting finding that is contrary to previous researches by Rezaei et al. (2018) and Vicario and Nawangpalupi (2020) that partnership in production does not significantly influence production performance. Overall, this research also contributes to the medium-large scale food and beverage manufacturing companies' internal capabilities to improve production performance in the context of developing country. Therefore, findings of this research call for further examination with larger sample size and in different contexts for further finding generalization.

From the practical point of view, this research emphasizes that food and beverage manufacturing companies, especially those that are medium-large scaled companies, need to prioritize innovation and demand optimization within the company to be able to improve production performance. Based on Table 1, almost all respondents (96.3%) claimed that the Covid-19 pandemic affected their company's supply chain. More than half of the respondents (55.6%) experienced medium to massive effect. This confirms that the effect of the Covid-19 pandemic has been spread throughout diverse food and beverage manufacturing companies across Indonesia, which caused them to experience some setbacks and losses. These impacts of the Covid-19 pandemic as discussed in the previous section have

contributed to partnership in production not performing well to contribute to production performance. Therefore, managers are recommended to consolidate their company's partnership initiatives to focus on internal capabilities to recover from their company's setbacks. Managers should focus on tapping into technology and enhance innovation potential, as well as carefully level seasonal and other cyclical demands. This will help companies to maintain and be more efficient in their cost per operation hour and production capacity utilization.

5. CONCLUSION

The food and beverage industry are often referred to as one of Indonesia's main industrial sectors for economic growth. Therefore, companies engaged in the food and beverage manufacturing industry, which absorb massive amount of workforce, need to be able to survive throughout the economic and environmental fluctuations. In particular, the food and beverage manufacturing industry have the higher-end of economic contributions within the general good and beverage industry. This research employed quantitative analysis using PLS SEM. The findings show that innovation and demand optimization have been found to encourage companies to do partnership in production. Innovation is able to trigger companies to establish partnerships in production which will help companies control production activities efficiently. In addition, innovation is the main driver for companies to be involved in partnership in production, especially in access to technology which can help the company's success in the long term. Collaboration between production partners is also able to assist companies in facing existing challenges, such as utilizing partners' production capacities to handle seasonal demand fluctuations, optimizing demand

for products or services, and dealing with uncertainties in demand. This is supported by previous research by Rezaei et al. (2018).

Innovation and demand optimization have also proven to have significant effects on production performance, which can help companies improve performance and make decisions to face the challenges of optimizing company capacity. However, the results of this study indicate that there is no significant effect between partnership in production and production performance, because there is a dilemma when carrying out the partnership implementation process that does not always result in a positive contribution to company performance (Han et al., 2017). The presence of Covid-19 pandemic impact towards the Indonesian food and beverage manufacturing industry's supply chain has contributed to companies' setback to perform well in production partnerships.

5.1 Theoretical and Practical Implications

Overall, this research provides broader view on the internal perspectives of company's supply chain management through the perspective of Resource Based View (Barney, 1991), as well as providing several suggestions for managers of medium-large food and beverage manufacturing companies in developing countries. By examining businesses internally as supply chain participants, this study adds to the collection of knowledge on supply chain management. In particular, supporting the Resource Based View (Barney, 1991), which holds that the company's internal capabilities—such as innovation and demand optimization—contribute to its success, particularly in terms of production performance and partnerships. From a practical standpoint, this study highlights the necessity for medium- and

larger-sized food and beverage manufacturing enterprises to focus internal demand optimization and innovation in order to boost production performance. As challenges posed by external disruptions, companies could not meet partnership demands due to supply chain setbacks, which hindered production process, thus production performance was not improved significantly by having partnerships in production. Therefore, research also highlights that partnership in production among the food and beverage manufacturing industry is not the key to improve production performance.

5.2 Recommendations

Managers should centralize their company's collaboration endeavors in order to focus on internal competencies

by using technology to increase innovation potential. Managers must pay close attention to seasonal and other cyclical demands, which will assist businesses sustain and be more efficient in their cost per operation hour and manufacturing capacity utilization. Managers are advised to consolidate their company's partnership initiatives to focus on internal capabilities to recover from their company's setbacks due to external disruptions or crisis.

This research is limited to be generalized to the medium-large sized food and beverage manufacturing enterprises in developing countries. Future researches are called for exploring and confirming findings in different industry sectors, enterprise scales, as well as countries.

REFERENCES

- Agustin, E. S. A. S., Offermans, A., & Arifin, B. (2023). The Impact of Partnership Forms on the Improvement of Coffee Farmers Welfare. *Sustainability Science and Resources*, 5, 20-32. <https://doi.org/10.55168/ssr2809-6029.2023.5002>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>
- Belderbos, R., Carree, M., & Lokshin, B. (2004). Cooperative R&D and firm performance. *Research Policy*, 33(10), 1477-1492. <https://doi.org/10.1016/j.respol.2004.07.003>
- Braun, M. W., Rivera, D. E., Flores, M. E., Carlyle, W. M., & Kempf, K. G. (2003). A Model Predictive Control framework for robust management of multi-product, multi-echelon demand networks. *Annual Reviews in Control*, 27(2), 229-245. <https://doi.org/10.1016/j.arcontrol.2003.09.006>
- Cetindamar, D., Çatay, B., & Serdar Basmacı, O. (2005). Competition through collaboration: insights from an initiative in the Turkish textile supply chain. *Supply Chain Management: An International Journal*, 10(4), 238-240. <https://doi.org/10.1108/13598540510612686>
- Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods*. McGraw-Hill Irwin.
- de Leeuw, S., & Fransoo, J. (2009). Drivers of close supply chain collaboration: one size fits all? *International Journal of Operations & Production Management*, 29(7), 720-739. <https://doi.org/10.1108/01443570910971397>

- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10-11), 1105-1121. [https://doi.org/10.1002/1097-0266\(200010/11\)21:10/11<1105::AID-SMJ133>3.0.CO;2-E](https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E)
- Ettlie, J. E., & Reza, E. M. (1992). Organizational Integration and Process Innovation. *The Academy of Management Journal*, 35(4), 795-827. <https://doi.org/10.2307/256316>
- Farida, N. L. (2020). Dampak Corona terhadap Industry Food and Beverage dan Solusi yang ditawarkan agar Bisnis Tetap Berjalan. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3623058>
- Febrianto, N., Akhiroh, P., Helmi, M., & Hartono, B. (2023). Effects of Partnership Patterns on Broiler Chickens Performance in the Agribusiness System of Indonesia. *Journal of World's Poultry Research*. <https://doi.org/10.36380/jwpr.2023.36>
- Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Sage.
- Han, W., Huang, Y., & Macbeth, D. (2017). Performance measurement of cross-culture supply chain partnership: a case study in the Chinese automotive industry. *International Journal of Production Research*, 56(7), 2437-2451. <https://doi.org/10.1080/00207543.2017.1377357>
- Karmaker, C. L., Ahmed, T., Ahmed, S., Ali, S. M., Moktadir, M. A., & Kabir, G. (2021). Improving supply chain sustainability in the context of COVID-19 pandemic in an emerging economy: Exploring drivers using an integrated model. *Sustain Prod Consum*, 26, 411-427. <https://doi.org/10.1016/j.spc.2020.09.019>
- Lambert, D. M. (2010). Supply Chain Management – Processes, Partnerships, Performance. In *Dimensionen der Logistik* 553-572. https://doi.org/10.1007/978-3-8349-6515-8_29
- Lambert, D. M., Emmelhainz, M. A., & Gardner, J. T. (1996). Developing and Implementing Supply Chain Partnerships. *The International Journal of Logistics Management*, 7(2), 1-18. <https://doi.org/10.1108/09574099610805485>
- Lasi, H., Fettke, P., Kemper, H.-G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, 6(4), 239-242. <https://doi.org/10.1007/s12599-014-0334-4>
- Legg-Jack, D., & Ndebele, C. (2022). Relevance of industry stakeholder partnership in the production of skilled electrical engineering trade graduates. *International Journal of Research in Business and Social Science (2147- 4478)*, 11(10), 398-409. <https://doi.org/10.20525/ijrbs.v11i10.2148>
- Lin, K.-Y., & Hu, L. (2022). Supply and Demand Optimization of Agricultural Products in Game Theory: A State-of-the-Art Review. *Journal of Engineering Management and Systems Engineering*, 1(2), 76-86. <https://doi.org/10.56578/jemse010205>

- Lo, E. K., & Pushpakumara, C. (1999). Performance and partnership in global manufacturing-modelling frameworks and techniques. *International Journal of Production Economics*, 60(61), 261-269. [https://doi.org/10.1016/S0925-5273\(98\)00150-9](https://doi.org/10.1016/S0925-5273(98)00150-9)
- Lorentz, H. (2008). Collaboration in Finnish-Russian supply chains. *Baltic Journal of Management*, 3(3), 246-265. <https://doi.org/10.1108/17465260810902351>
- Mahulae, B. C., Seciawang, S. J., Wahyuningsih, & SD, T. (2022). Peran Praktik Lean, Strategi Manajemen Inovasi Dan Orientasi Lingkungan Pada Keberlanjutan Organisasi Melalui Manajemen Rantai Pasokan Hijau Pada Industri Ecommerce Di Indonesia. *Development of Research Management*, 17(1), 99-117. <https://doi.org/10.19166/derema.v17i1.5128>
- Mohr, J., & Spekman, R. (1994). Characteristics of partnership success: Partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal*, 15(2), 135-152. <https://doi.org/10.1002/smj.4250150205>
- OECD, & Eurostat. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3rd ed.). OECD Publishing.
- Ongkowijoyo, G., Sutrisno, T. F. C. W., Teofilus, T., & Hongdiyanto, C. (2020). Adaptive Supply Chain Management under Severe Supply Chain Disruption: Evidence from Indonesia. *Journal of Distribution Science*, 18(11), 91-103.
- Pan, F., & Nagi, R. (2010). Robust supply chain design under uncertain demand in agile manufacturing. *Computers & Operations Research*, 37(4), 668-683. <https://doi.org/10.1016/j.cor.2009.06.017>
- Qarahasanlou, A. N., Barabadi, A., & Ayele, Y. Z. (2017). Production performance analysis during operation phase: A case study. *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, 232(6), 559-575. <https://doi.org/10.1177/1748006X17744383>
- Rajapathirana, R. P. J., & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge*, 3(1), 44-55. <https://doi.org/10.1016/j.jik.2017.06.002>
- Rezaei, J., Ortt, R., & Trott, P. (2018). Supply chain drivers, partnerships and performance of high-tech SMEs. *International Journal of Productivity and Performance Management*, 67(4), 629-653. <https://doi.org/10.1108/IJPPM-01-2017-0017>
- Sahoo, S., & Yadav, S. (2017). Entrepreneurial orientation of SMEs, total quality management and firm performance. *Journal of Manufacturing Technology Management*, 28(7), 892-912. <https://doi.org/10.1108/JMTM-04-2017-0064>
- Sutrisno, T. F. C. W. (2019). Relationship Between Total Quality Management Element, Operational Performance And Organizational Performance In Food Production

Smes. *Jurnal Aplikasi Manajemen*, 17(2), 285-294.
<https://doi.org/10.21776/ub.jam.2019.017.02.11>

- Vicario, V., & Nawangpalupi, C. B. (2020). The Role of Partnership in Production Towards Performance of Indonesia's Micro and Small Enterprises. *International Journal of Economics, Business and Accounting Research*, 4(4), 1000-1011.
- Wahab, N. Y. A., Yusuff, Y. Z., Musa, R., & Rusnifaezah, R. (2020). The Influence of Innovation on SMEs Business Performance in the Manufacturing Sector. *International Journal of Supply Chain Management*, 9(2), 263-267.
- Zainal, N. N., Hassam, S. F., Shaharudin, M. R., Akbar, J., & Mustafa, M. A. (2018). Contributing Factors of Production Performance in the Food Processing Industry. *International Journal of Supply Chain Management*, 7(6), 221-230.