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Sustainable Corporate Growth Strategy Through Competitive Advantage in the Gypsum Board Industry in Indonesia

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Life Cycle Theory, Dynamics Capability, Agile Leadership, Innovation, Competitive Advantage, Sustainable Performance, Gypsum Board Industry.

Abstract

The gypsum board industry in Indonesia faces significant challenges in sustaining firm growth amid market competition and dynamic business environments. This study aims to examine the influence of innovation, dynamic capabilities, and agile leadership on sustainable firm growth, with competitive advantage as a mediating variable and product life cycle as a moderating variable. A mixed methods approach was applied, combining quantitative data from 27 managerial respondents analyzed using mediation and moderation regression via SmartPLS, and qualitative data from in-depth interviews with two informants representing companies in growth and decline phases. The findings reveal that competitive advantage significantly mediates the relationship between strategic factors and sustainable firm growth. However, the product life cycle does not show a significant moderating effect. These results highlight the critical role of strengthening competitive advantage as a core strategy to achieve sustainable growth in Indonesia's gypsum board industry.

INTRODUCTION

The phenomenon of the economic cycle is the fluctuation of the economy between periods of expansion (growth) and contraction (recession). Factors such as gross domestic product (GDP), interest rates, total employment, and consumer spending, can help determine the current stage of the economic cycle. The four stages of the economic cycle are also referred to as the business cycle. The four stages are expansion, peak, contraction, and trough, as shown in Figure 1.

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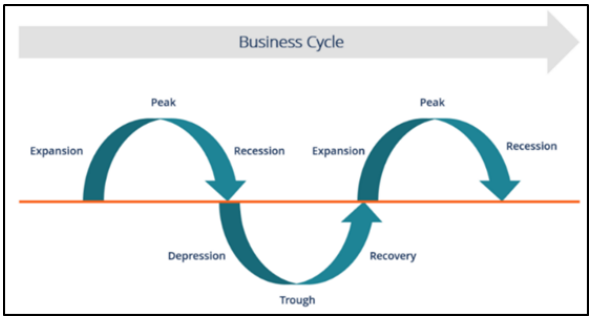


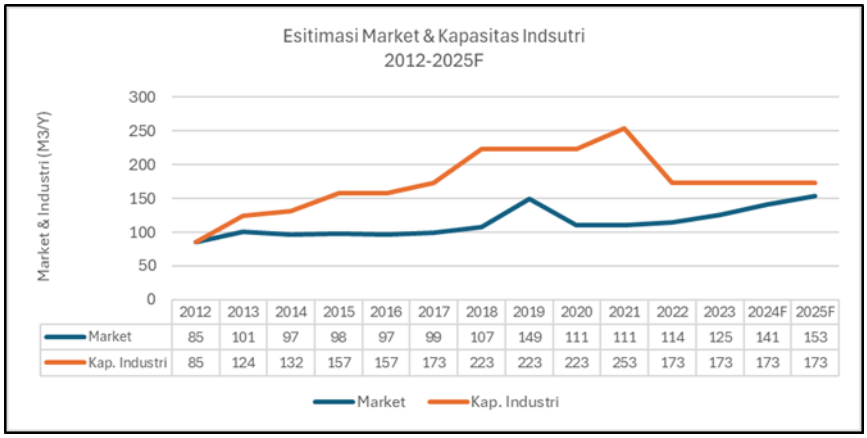
Figure 1. Business Life Cycle
Source: https://corporatefinanceinstitute.com/resources/economics/business-cycle/

In the expansion phase, the economy experiences relatively rapid growth, interest rates tend to be low, production increases, and inflationary pressures increase. The peak of a cycle is reached when growth reaches its maximum level. Peak growth usually creates some imbalances in the economy that need to be corrected. This correction occurs through a period of contraction when growth slows, employment falls, and prices stagnate. The trough of the cycle is reached when the economy reaches its lowest point and growth begins to recover.

According to Önder & Ulaşan (2018), Ibn Khaldun, who is known as one of the leading theorists in 14th-century Islamic political thought, Ibn Khaldun greatly influenced scholars with his thoughts on economics, history, sociology, and philosophy. Thanks to his opinions and findings, Stowasser considers him the father of social science. One of Ibn Khaldun's most impressive ideas is the cycle theory that defines the rise and fall of sovereign powers (dynasties, empires, civilizations, states). The life cycle theory assumes that sovereign powers are like living organisms, they are born, grow, mature, and die. To explain this pattern, Ibn Khaldun uses the concept of Umran and Asabiyya. Umran and Asabiyya are the glue of the cycle theory that explains the birth and death of sovereign power. Ibn Khaldun's cycle theory was then adopted in the world of economics, business, industry, organizations, products, technology and so on. In business there are many life cycles that are set which aim to classify the existence of a business for direction in decision making.

According to Li & Tan (2004) life cycle theory can help companies decide when, how, and whether to invest in a product or service. Furthermore, Li & Tan (2004) in their research see how companies can improve their performance by utilizing life cycle theory. It also focuses on the relationship between product life cycle, technology life cycle, business life cycle, organization life cycle, market life cycle and the company's strategic choices - relationships that are central to the field of strategy (Li & Tan, 2004).

A glimpse of the gypsum board industry in Indonesia. Initially, gypsum board products were present in Indonesia through imports from America, Korea, and Australia. However, since 1994 the first gypsum board company was produced by PT Petrojaya Boral Plasterboard with the Jayaboard brand. Indonesia with the fourth largest population is a very promising market. Since 1996, global companies, joint ventures, and local companies have invested in Indonesia. Competition in the gypsum board industry in Indonesia is very dynamic and tight, with the condition of installed production capacity still above market capacity consumption as shown in Figure 1.4. Market Vs Gypsum Industry Capacity Estimates in Indonesia, where the oversupply condition has occurred since 2012 until the estimated 2025F.



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024F	2025F
Market	85	101	97	98	97	99	107	149	111	111	114	125	141	153
Kap. Industri	85	124	132	157	157	173	223	223	223	253	173	173	173	173

Figure 2. Market Estimates Vs Gypsum Industry Capacity in Indonesia
Source: Prasurvey and internal data

The condition of industrial capacity is greater than the per capita consumption capacity, this causes a very competitive industrial competition condition, one of the companies must close operations (St Gobain) in 2021 in Indonesia and the acquisition of PT Petrojayaboard Plastrboard by PT Knauf Gypsum Indonesia in 2021, so that industrial capacity decreases drastically in Figure 4. This is the first gap research in this dissertation or the problem of oversupply in the Indonesian gypsum board industry, which causes the threat of companies closing operations or being acquired by other companies. The phenomenon of the life cycle of the gypsum board industry in Indonesia is an interesting background for further research. According to Marzieh (2015), every phenomenon has an unlimited life cycle, which can be considered from various aspects and can be classified based on different categories. In the industry there are many established life cycles that aim to classify the existence of the industry to facilitate the direction of decision making. The simplest life cycle in the industry and market area is the product life cycles, which describe the path of a product from the early stages of its birth to the final phase of its death from the insight of sales revenue (Marzieh, et.al., 2015).

The current condition of the gypsum board industry cycle in Indonesia is still in the growth stage, as can be explained in Figure 3.

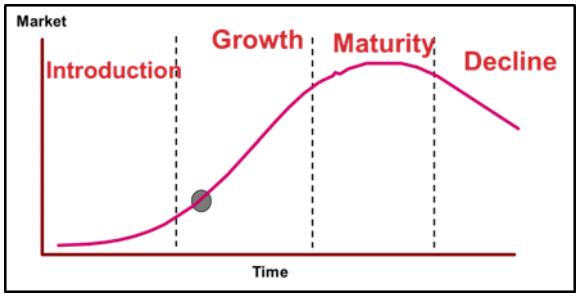


Figure 3. Life Cycle of Gypsum Board Industry

In Indonesia, per capita consumption per year is still very small, if observed in table 1.1. per capita consumption of gypsum board in Indonesia is 0.41m2 in 2020 and the estimated per capita consumption is 0.65m2 in 2025.

Table 1. Estimates of Gypsum Board Consumption in Indonesia

	2020	2021	2022	2023	2024	2025F
Population (million)	270	273	276	279	282	286
Cons.per capita	0,41	0,41	0,41	0,45	0,5	0,65

Source: Internal company

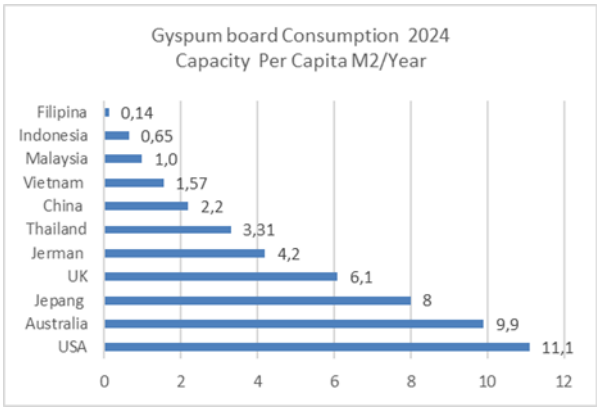


Figure 4. Gypsum Board Consumption in Developed Countries
Source: Global Gypsum

As a comparison, world per capita consumption in developed countries such as in Figure 1.4. such as America can reach 11.1 m2/capita/year, Japan reaches 8 m2/capita/year, European countries represented by England 6.1 m2/capita/year. For ASEAN standards, Thailand is the largest per capita consumption of gypsum board, Thailand as one of the largest gypsum mining reserves in the world.

Referring to Figure 5. about the product life cycle of the gypsum board industry in Indonesia is still in the early stages of introduction and still has a long way to go to continue to grow. We can compare this with the potential per capita consumption of gypsum board in Indonesia which is still relatively small compared to developed countries, as presented in Figure 1.6. about per capita consumption of gypsum board.

Gypsum board was first produced in Indonesia in 1994, under the name Jayaboard®, by PT Petrojaya Boral Plasterboard, which is a joint venture between PT Jaya Readymix Indonesia and BORAL from Australia. Then the gypsum board industry developed in the period from 1996 to 2000, where the Indonesian market was believed to be very promising with the potential of the population and economy that continued to grow. However, in 1997 there was a monetary crisis that started in Thailand which was known as the Tomyang Kung crisis, the fall of the Thai Bath currency, which had a domino effect on all countries in ASEAN. In 1998 in Indonesia there was also a political symptom, namely the fall of the New Order regime, this had an impact on all business worlds, industries, and especially the gypsum board industry. As a result of the political crisis in Indonesia in the period 1996-1999, several gypsum board industry companies were forced to close or be sold because they could not compete, as presented in table 2. Dynamics of Establishment, Merger & Acquisition of Gypsum Board Companies in Indonesia.

Table 2. Dynamics of Establishment, Merger & Acquisition of Gypsum Board Companies in Indonesia

No	Company	Year of Establishment	Investment Country/Group	Production capacity - (million m2/year)	Status	Brand Description
1	PT Petrojaya Boral Plasterboard (USGBORAL Indonesia)	1994	Australia & USA/ USGBORAL	65	April 2021 Merger & Acquisition by Knauf Germany	Knauf, Jayaboard, Indoboard
2	PT. CSR Prima Karya Plasterboard	1996	Australia/ CSR	18	2002, closed operations	CSR
3	PT Thai Gypsum Surya Indonesia	1996	Thailand & Indonesia JV /Thai Gypsum & Batara Surya	15	2003, 100% acquired by Knauf Germany	YG becomes Knauf Brand
4	PT Siam-Indo Gypsum Industry	1996	Indonesia& Thailand JV / SCG&Wings	22	Actively operating	Elephant, Eboard, Star
5	PT Ikad Kedaung Aneka Gypsum	1999	Indonesia/ Kedaung Group	40	2000 went bankrupt	Sky
6	PT Indal Aluminium	1999	Indonesia / Maspion	6	2020 100% acquired by Knauf Germany	Indalboard becomes Knauf
7	PT Aplus Pacific	2000	Indonesia	20	Actively operating	Aplus, Indogyp
8	PT. Saint-Gobain Construction Products Indonesia	2012	France/ Saint Gobain	33	2019 closed operations	Gyproc
9	PT Yoshino Indonesia	2018	Japan	20	Actively operating	Yoshino

Source: Processed from research results

A more detailed review of the development of the gypsum board industry and the profile of gypsum board companies, the dynamics of mergers & acquisitions, the closure of gypsum board factories in Indonesia will be presented more completely in CHAPTER IV. This is the reason for researchers to choose to analyze and study further.

Over the past decade, researchers' interest in the concept of dynamic capability has increased. This interest can be explained by growing awareness of the impact of dynamic capability on competitiveness, business practices, and performance outcomes. (Giniuniene & Jurksiene, 2015). In the scientific literature, researchers (Eisenhardt & Martin, 2000; Porter, 1990; Teece, Pisano, & Shuen,

1997; Zollo & Winter, 2003) recognize dynamic capability as a key factor in organizational innovation and competitiveness. According to Teece, Pisano, & Shuen (1997), dynamic capability functions as an explanatory tool to analyze a company's ability to build competitive advantage in times of uncertainty and change. From the description above, the importance of dynamic capability in building competitive advantage to find sustainable company performance. Given the description of the company's aggressive expansion and acquisitions that show dynamic capability. This may also apply to the gypsum board industry in Indonesia.

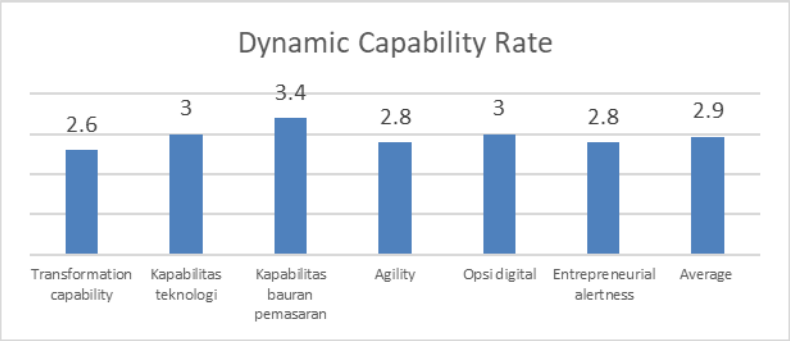


Figure 5. Pre-Survey of Dynamic Capability Implementation
Source: Pre-survey results of Five Gypsum Board Companies in Indonesia

Referring to the results of a pre-survey conducted on 5 gypsum board companies in Indonesia, it can be seen that the level of implementation of dynamic capability is still quite good, because the average score is only 2.9. Transformation capability, technological capability, marketing mix capability, agility, digital options, entrepreneurial alertness. It can be seen that only the marketing mix dimension has a fairly good level of implementation with a score of 3.4.

During an emergency, some companies can quickly reconfigure their innovation and production processes to help support health services and others to address the shortage of needed supplies. Using a dynamic capability perspective, this work aims to understand which capabilities enable companies to have a fast innovation reaction when they are not pursuing competitive advantage but are responding to community needs (Puliga & Ponta, 2021). The ability to reconfigure a company's resources has been widely studied by the dynamic capability framework (Bogers et al., 2019; Teece, 2020). This capability is critical to the success of companies in dynamic markets (Puliga & Ponta, 2021). So far, dynamic capability has always been considered as a determining factor for gaining competitive advantage and gaining economic benefits (Teece et al., 1997). In a stagnation phase situation, companies have a fast innovation response to address societal needs and not market success. Thus, the research gap investigated in this paper is to investigate the importance of dynamic capability to have a fast reaction not to gain competitive advantage but to address societal needs (Puliga & Ponta, 2021).

Figure 6. Pre-survey of Innovation Implementation
Source: Pre-survey results of Five Gypsum Board Companies in Indonesia

Referring to the results of the pre-survey conducted on 5 gypsum board companies in Indonesia, it is seen that the level of innovation implementation is still quite good, because the average score is only 2.9. Risk-taking culture, business intelligence, customer orientation, business planning, It can be seen that only the dimensions of customer orientation and knowledge capability have a fairly good level of implementation with a score of 3.2.

Table 3. Comparison of Gypsum Board Brands in Indonesia in Terms of Business Strategy

Feature	Gypsum Board Brands					
	ELEPHANT	USGBORAL	KNAUF	GYPROC	APLUS	YOSHINO
Product; features and quality	Premium quality	Premium quality & complete product range	Medium quality & complete product range	Medium quality & complete product range, Tour to Europe	Low quality & complete product range	Premium quality
CRM Strategies	Strong relationship & Tour target to Whole seller	Strong relationship at Architect	Strong relationship at Architect & tour to Knauf Germany	Relationship to Wholesale	Barter products with property for Big developers	relationship to distributor & factory tour Japan
R&D strategies	Using machine from Europe	Product technology by USG patent, technical design, installation,	Product technology by KNAUF Germany, technical design, installation	Product by Gyproc England	Using Machine Technology from China	Product Technology by Yoshino Japan

Feature	Gypsum Board Brands					
	ELEPHANT	USGBORAL	KNAUF	GYPROC	APLUS	YOSHINO
Product innovation	Elephant premium, Eboard, Star for fighting brands	Jayaboard® SHEETROCK ® plasterboard which contains Sag-Defying-Strength™ technology, Jayaboard® SHEETROCK ® PROTECH is the first standard gypsum board in Indonesia with Air-Purifying technology, as a form of Jayaboard®'s commitment to consistently provide high-quality products.	Densishield, Knauf Appetura gypsum board with sound absorbing featue	Habito hanging resistant gypsum board	The lightest gypsum board 13.3 kg, Aplus G strength	High clean gypsum board
System innovation	Economical full system product, introducing quickwall	Economical full system product, introducing easy finish walls	Full system product	Full system product	Full system & economical frame products, & gypsum accessories	Full system product

Source: Processed from internal data

Marketing and sales leaders need to operate simultaneously across three distinct states: the current crisis, planning for recovery, and leading the next normal. The elements of speed and agility are particularly important because these once-in-a-generation horizon challenges are likely to have a profound impact on who is left standing when the crisis finally subsides. During a downturn, for

example, consumers and customers tend to "transact down," that is, buy cheaper products, resulting in major shifts at the top and bottom ends of the market. Consumers will reposition themselves and shift to digital channels, products, and services, opening up another front in the battle for new and existing customers (Gregg, Hazan, Kim, & Perre, 2020). According to Gies (2020), modern leadership is moving away from classic top-down management toward a bottom-up management philosophy. Technological advances, dynamic markets, and innovative competition require "dynamically robust" capabilities to act. Agile principles and procedures are becoming indispensable in innovative organizations (Gies, 2020). From the description above, the importance of agile leadership is able to adapt to business cycles that have high volatility and to increase competitive advantage, so as to have sustainable performance. This situation also applies to the gypsum board industry in Indonesia, where there have been changes in top and middle-level leadership.

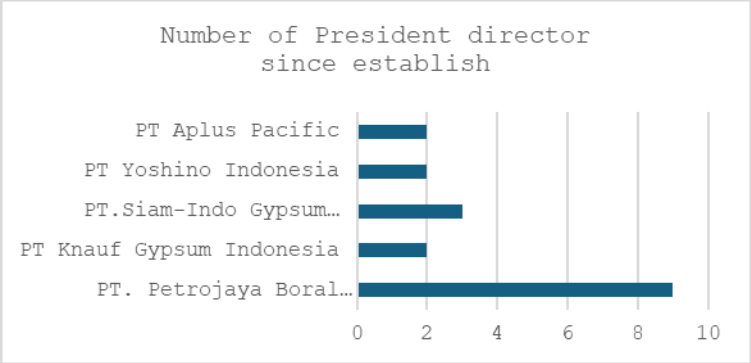


Figure 7. Agile Leader Pre-survey
Source: Pre-survey results of Five Gypsum Board Companies in Indonesia

To survive and thrive today, many organizations are making a fundamental shift from traditional organizational models designed for the industrial economy to agile models designed for today's digital economy. This paradigm shift marks a new form of organization that enables innovation, collaboration, and value creation at unprecedented speed, scale, and impact. Agile organizations can develop products five times faster, make decisions three times faster, and reallocate resources quickly and rapidly (Smet, et.al, 2018).

This new type of agile organization requires a new and fundamentally different type of leadership. Recent research confirms that leadership is more important in agile organizations. Leadership and how leadership shapes culture are the biggest barriers to — and the biggest enablers of — successful agile transformation (Smet, et.al, 2018). From the description above, the importance of agile leadership, the dynamic capabilities of the organization in sustainable business growth. This may also apply to the gypsum board industry in Indonesia.

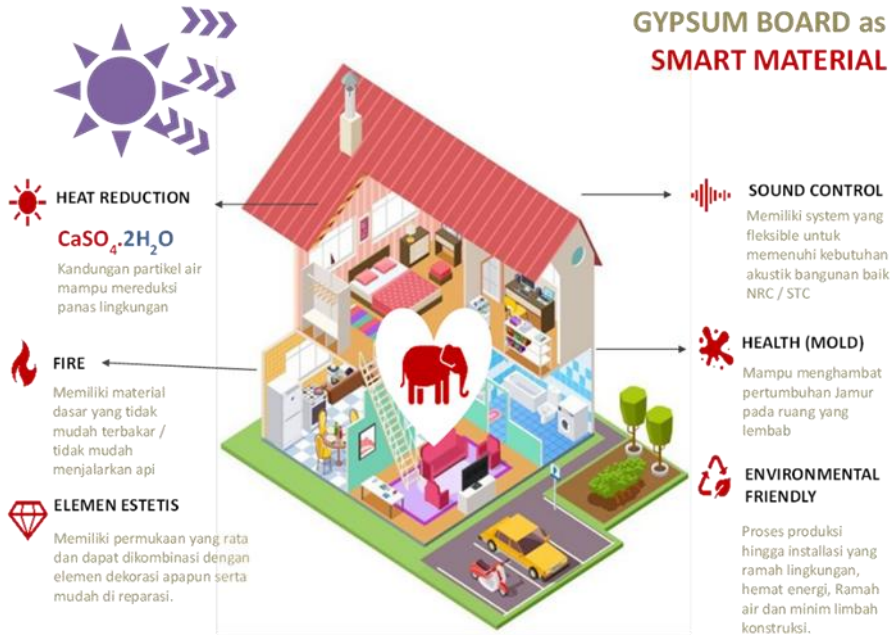


Figure 8. Advantages of Gypsum Board in Buildings
Source: Elephant® Gypsum

A glance at the application of gypsum board, gypsum board is basically an interior material used in residential and commercial buildings as a ceiling layer, or as a wall divider. The advantages of gypsum board material are that it is lightweight, easy to work with, easy to decorate, more heat resistant, more fire resistant, and environmentally friendly, as illustrated in figure 1.10. The application of gypsum board as a room divider or partition provides different properties such as reducing sound transmission between rooms, and moisture accumulation in bathrooms and kitchens, depending on the various additives added to the final gypsum board product. Depending on the application, gypsum board is also available in various sheet sizes and thicknesses. For example, acoustic gypsum board limits sound while thermal gypsum board helps reduce energy loss from buildings. With rapid urbanization across the world, especially in developing countries, leading to an exponential rise in the construction industry, the global market for gypsum board is projected to grow at a healthy rate during the forecast period 2016 to 2023. (transparencymarketresearch, 2020).

From the description of the application of gypsum board as an interior material, the advantages of gypsum board, and the types of gypsum board products according to the needs of the application. In increasing competitive advantage, gypsum board manufacturers need to innovate products and applications, with the aim of achieving sustainable performance. Innovation has become a universal characteristic of corporate resilience. Almost no company can survive without innovation. Although innovation can refer to products, processes, systems, administrative procedures, or technology, managers need to think holistically. According to Prange & Schlegelmilch, (2017) to adopt this holistic perspective, namely by using three dimensions: change impact, strategic impact, and market impact (Prange & Schlegelmilch, 2017). The results of this study explain that it is necessary to apply an innovation strategy in competitive advantage in the gypsum board industry in Indonesia as described above. This is the basis for a study related to sustainable performance influenced by innovation and competitive advantage.

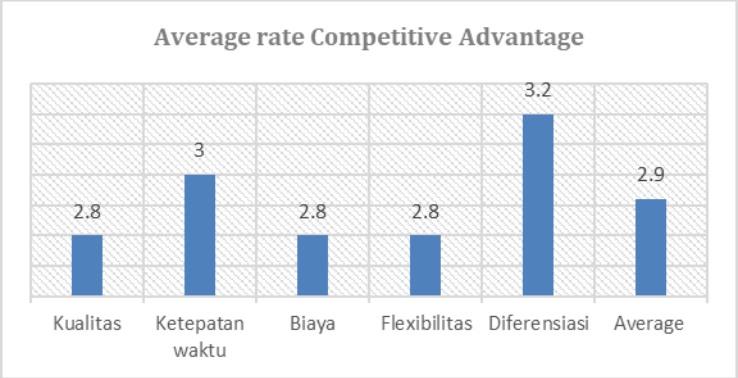


Figure 9. Pre-survey of Competitive Advantage Implementation
Source: Pre-survey results of five gypsum board companies in Indonesia

Referring to the results of the pre-survey conducted on 5 gypsum board companies in Indonesia, it can be seen that the level of implementation of competitive advantage is still quite good, because the average score is only 2.9. Quality, cost, and flexibility, only the dimensions of differentiation and timeliness are seen to have a fairly good level of implementation with a score of 3.2.

Competitive advantage is a management concept that has long been a literature in research (Ansoff, 1965; Porter, 1980, 1985; Barney, 1991, 2002; Peteraf, 1993; Besanko, Dranove and Shanley, 2000; Ghemawat and Rivkin, 1999; Grant, 2005; Barney and Hesterly, 2006) and is becoming popular again today. In addition, the newer concept of Sustainable Competitive Advantage has also become a major area of research, especially in theoretical and empirical studies based on the resource-based view of the firm (Barney, 1991; Wiggins and Ruefli, 2002; Foss and Knudsen, 2003; Peteraf and Barney, 2003) and is currently popular. (Chaoren & Thawatthatree, 2011).

Gypsum board manufacturers in Indonesia are also experiencing growth and intense competition, this is because the supply conditions are greater than the available market capacity. One of the multinational companies, namely Saint Gobain with the Gyproc gypsum board brand in 2020, has temporarily closed its business. At the global level in 2019, there was also a 100% acquisition of USG, the largest gypsum board producer in America by Knauf from Germany, this had an impact on the USG Boral joint venture in Asia Pacific, of course in Indonesia. In 2021, there was a merger between the pioneer and largest player in Indonesia, namely PT Petrojaya Boral Plasterboard with PT Knauf Gypsum Indonesia. From the description above, competitive advantages also apply to the gypsum board industry in Indonesia.

Table 4. Companies Operating in Indonesia 2021-present

Daftar Pwerusahan Papan Gypsum Yang Beroperasi di Indonesia sejak 2021 - sekarang

No	Perusahaan	Tahun Berdiri	Investment Country/ Group	Kapasitas produksi - (juta m2/tahun)	Status	Keterangan
1	PT Siam-Indo Gypsum Industry	1996	Indonesia& Thailand JV / SCG&Wings	30	Aktif beroperasi	Elephant, Eboard, Star
2	PT Aplus Pacific	2000	Indonesia	28	Aktif beroperasi	Aplus, Indogyp
3	PT Yoshino Indonesia	2018	Jepang	50	Aktif beroperasi	Yoshino
4	PT Knauf Gypsum Indonesia	2003	Jerman	0	Aktif beroperasi	Knauf
	PT Knauf Plasterboard Indonesia (Formely PT Petrojaya Boral Plasterboard)	2021	Jerman	65	Aktif beroperasi	Knauf, Jayaboard, Indoboard
			Total	173		

Note. PT Knauf Plasterborad Indonesia is a new company name entity after the acquisition and merger between PT Petrojaya Boral Plasterboard and PT Knauf Gypsum Indonesa)
Source: Processed from internal data

The global gypsum board market capitalization is expected to reach USD 30.77 Billion by 2026, according to a new report by Report and Data. The booming construction and infrastructure industry will drive the market growth. Rising disposable income, attributed to the growing population globally, will drive the market growth. Moreover, increasing investment in smart cities in developing countries will also boost the demand for gypsum board across the globe. Furthermore, innovation and advancement due to increasing investment in R&D in the construction sector are other factors responsible for the market growth. Development of eco-friendly and sustainable construction methods will impact the demand for gypsum board in the coming years (Report and Data, 2019).

Rising employment opportunities and availability of skilled labor due to the growing population across the globe are also impacting the market growth. This is also boosting commercial and residential construction projects across the globe. Gypsum board is primarily made up of gypsum. Countries such as China, the US, and Iran are the major producers of gypsum. The increasing demand for gypsum is due to large-scale industrialization that creates a need for rapid infrastructure improvements. This, in turn, drives the market for boards. In addition, increasing government investments and booming private real estate sector, due to increasing urban migration in developing countries, are also expected to contribute to the market growth in the future (Report and Data, 2019).

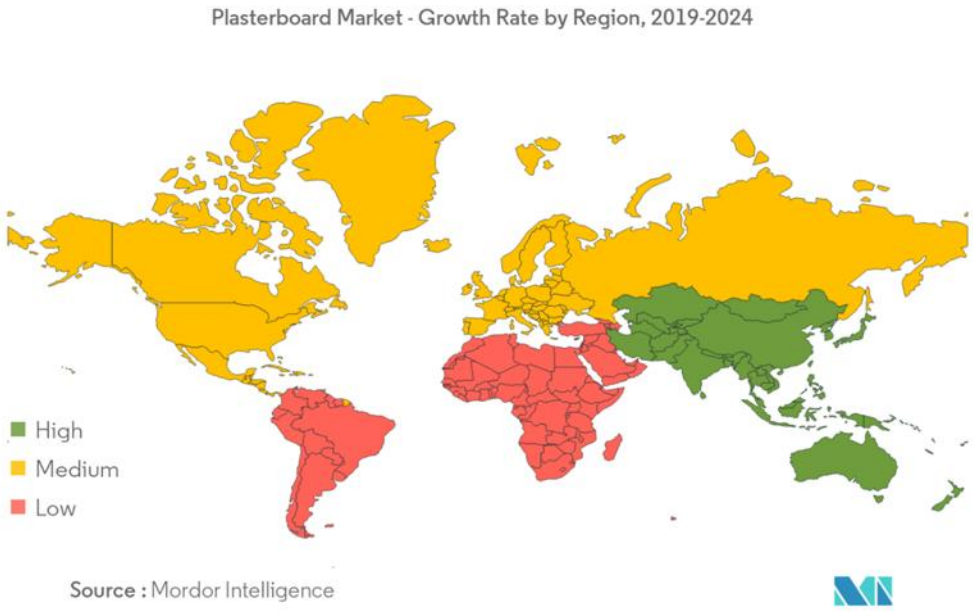


Figure 10. Plasterboard Market

The global gypsum board market is projected to grow by US$ 8.9 Billion, driven by a compound growth of 5.5%. Standard, one of the segments analyzed and measured in the study, shows the potential to grow by over 5.9%. The shifting dynamics supporting this growth make it imperative for businesses in this space to stay abreast of the market changes. Poised to reach over US$ 8.3 Billion by 2025, it will bring in healthy profits adding significant momentum to global growth (Reportlinker, 2019).

Based on data from the July 2020 edition of the Global Gypsum report, the gypsum board industry records a map of the gypsum board industry in twenty-five countries in the world, with production capacity, market share percentage, per capita consumption and number of factories as in table 1.5. map of production capacity and per capita consumption of the world gypsum board industry. Currently, Indonesia is ranked fifteenth in the world, still below Thailand at thirteenth.

In terms of producers in the gypsum board industry in the world. According to a survey in the report in Global Gypsum magazine, the ten largest Gypsum board producers in the world in 2020 (Global Gypsum July 2020). Currently, Knauf is listed as the largest producer in the world, this position was achieved after Knauf acquired USG in America, where USD is the largest producer in the United States in 2019. The business strategy that is widely used by large producers in the world is to expand to other countries such as developed countries in Asia. Another strategy is to carry out mergers and acquisitions and also mergers or joint ventures between gypsum board producers. The gypsum board industry in the world is dominated by ten of the world's top 10 players who control 81% of the world's market share.

Table 5. Capacity and Consumption of Gypsum Industry in the World

No	Negara	Kapasitas (Mm2/th)	%Kapasitas Global	Kapita/Populasi	Jumlah Pabrik
1	USA	3.632	26,6%	11,1	63
2	China	3.014	22,1%	2,2	85
3	Jepang	790	5,8%	6,2	21
4	Rusia	483	3,5%	3,3	16
5	Korea	413	3,0%	8	5
6	Inggris	405	3,0%	6,1	8
7	Kanada	394	2,9%	10,5	12
8	Perancis	368	2,7%	5,5	8
9	Jerman	348	2,5%	9,9	11
10	Australia	248	1,8%	4,2	11
11	Turki	240	1,8%	2,9	14
12	Spanyol	233	1,7%	5	7
13	Thailand	210	1,5%	3	9
14	Polandia	199	1,5%	5,2	5
15	Indonesia	180	1,3%	0,7	9
16	Meksiko	178	1,3%	1,4	7
17	Italy	148	1,1%	2,5	6
18	Arab Saudi	146	1,1%	4,3	9
19	Brasil	137	1,0%	0,7	7
20	Uni Emerates	93	0,7%	0,7	4
21	India	92	0,7%	0,1	8
22	Belgia	79	0,6%	6,9	2
23	Romania	77	0,6%	4	3
24	Ukraina	77	0,6%	1,8	3
25	Kolombia	74	0,5%	1,6	3
Top 25 dunia		**12.258**	**89,7%**		**336**
Top 26-50 dunia		1.157	8,5%		66
Top 51-72 dunia		243	1,8%		28
TOTAL		**13.658**	**100,0%**		**430**

Source: Globa; Gypsum July, 2020

According to Global Gypsum, the two most aggressive manufacturers expanding their business worldwide are Knauf and Saint Gobain from Europe, namely, the names and estimated production capacity of the ten largest manufacturers in the world can be seen in Figure 11.

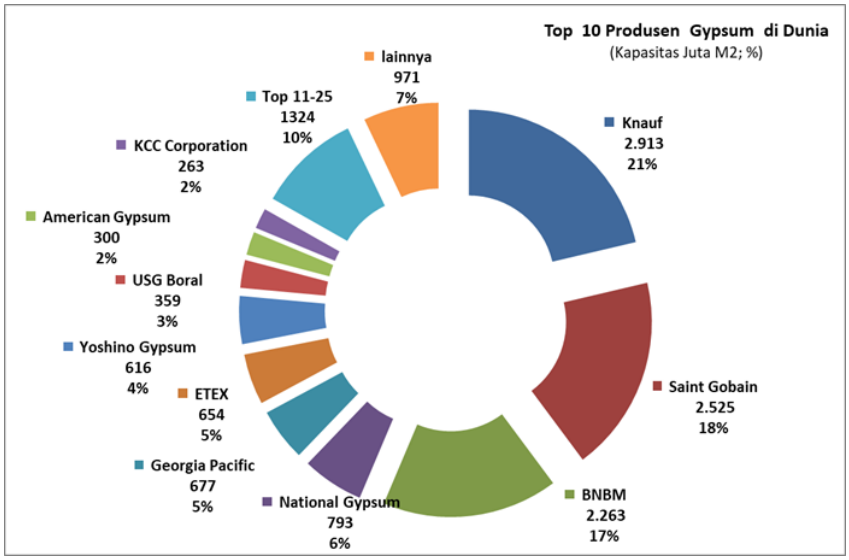


Figure 11. The 10 largest Gypsum Board Companies in the World
Source: Global Gypsum

Table 6 shows the annual production capacity data, global percentage, and number of factories of twenty-five gypsum board manufacturers in the world. The three largest manufacturers in the world with a production capacity of more than two thousand two hundred million square meters per year are Knauf, Saint Gabain from Europe, and BNBM from China. For the fourth place is National Gypsum from America which before being occupied by USG Corp., USG disappeared as a company but remained as a brand in the American market, this was due to the acquisition made by Knauf. Merger and acquisition strategies often occur in the gypsum board industry in the world.

Table 6. Global Top 25 Capacity

No	Produsen	Kapasitas (Mm2/th)	%Kapasitas Global	Jumlah Pabrik
1	Knauf	2.913	21,3%	84
2	Saint Gobain	2.525	18,5%	69
3	BNBM	2.263	16,6%	60
4	National Gypsum	793	5,8%	18
5	Georgia Pacific	677	5,0%	16
6	ETEX	654	4,8%	23
7	Yoshino Gypsum	616	4,5%	16
8	USG Boral	359	2,6%	10
9	American Gypsum	300	2,2%	4
10	KCC Corporation	263	1,9%	2
11	Boral	205	1,5%	8
12	Chiyoda-Ute	194	1,4%	6
13	Pabco Gypsum	147	1,1%	2
14	Jason Plasterboard	135	1,0%	4
15	Panel Ray	86	0,6%	3
16	Vona Corporation	85	0,6%	3
17	CSR Gyprock	80	0,6%	4
18	Shandong Taihe Dongda	70	0,5%	1
19	Anhui Wanja New Built Mats	65	0,5%	2
20	Daisan	51	0,4%	2
21	Shandong Baief Built Mats	50	0,4%	1
22	Irving Wallboard	46	0,3%	1
23	Mada Gypsum	42	0,3%	1
24	Gypsema	34	0,2%	1
25	Winstone Wallboards	34	0,2%	2
Top 25 dunia		**12.687**	**92,9%**	**343**
Top 26-50 dunia		557	4,1%	66
Top 51-75 dunia		300	2,2%	28
Top 76-107 dunia		114	0,8%	31
TOTAL		**13.658**	**100,0%**	**468**

Source: Global Gypsum

Companies that grow and develop well, historically exceeding the specified targets, are an indication that the company is trusted by the market because it has a good reputation (Kiousis, et. al., 2007). A good reputation has the potential to increase the company's performance targets because the market trusts the company (Keh & Xie, 2009). The growth of good company performance is certainly inseparable from the human resources within it, achieving a company's reputation as an initial step in achieving competitive advantage is seen as important to be created by human resources within it, this certainly has an ultimate goal, namely sustainable company performance. If referring to the survey conducted, gypsum board companies in Indonesia such as USG Boral, Knauf, Saint Gobain, Yoshino are multinational companies that have a good reputation and besides other companies such as Siam-Indo are also subsidiaries of SCG and Wings Group. From the description above, the importance of competitive advantage in finding sustainable company performance. This may also apply to the gypsum board industry in Indonesia.

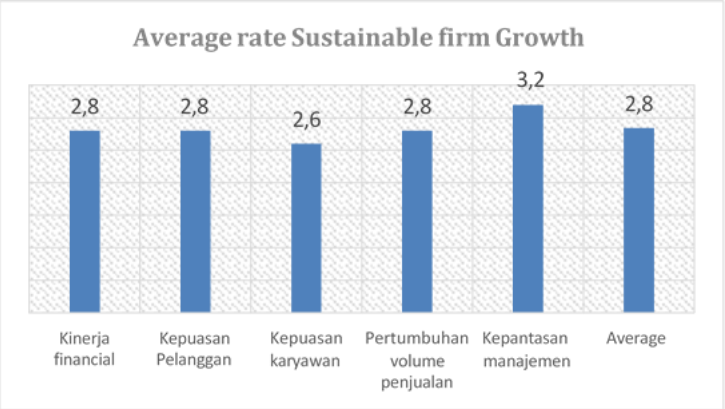


Figure 12. Presurvey Sustainable Firm Growth
Source: Pre-survey results of Five Gypsum Board Companies in Indonesia

Referring to the results of a pre-survey conducted on 5 gypsum board companies in Indonesia, it can be seen that the level of implementation of sustainable firm growth is still quite good, because the average score is only 2.8. Financial performance. Employee satisfaction, sales volume growth. It can be seen that only the dimensions and appropriateness of management have a fairly good level of implementation with a score of 3.2

The gypsum board industry competition is also experiencing a very tight and dynamic level of competition, this occurs both at the global level and at the regional level and also at the national level in Indonesia. Companies have adopted various strategies, including mergers, acquisitions, and partnerships to achieve the company's sustainable goals and new developments have emerged in the market (Report and Data, 2019). The second gap research is the existence of gypsum board companies that are growing and there are gypsum board companies that are declining in performance or closing their operations.

Based on the observed problem symptoms, it is clear that sustainable business growth is closely tied to agile leadership, dynamic capabilities, and continuous innovation to maintain competitive advantage. This is ultimately the goal of sustainable business performance. The preliminary findings also apply to the gypsum board industry in Indonesia, where a presurvey and industry data indicate low sustainable business growth, marked by industry players failing to survive competition or undergoing mergers and acquisitions. This also applies to the global parent companies of the gypsum board industry, especially following the April 2021 acquisition of USGBORAL by Knauf, a family business. As a result of this acquisition, in January 2022, PT Petrojaya Boral Plasterboard, a pioneer in the Indonesian gypsum industry with the Jayaboard brand, officially merged with PT Knauf Gypsum Indonesia, forming a new entity under PT Knauf Plasterboard Indonesia, while maintaining both Jayaboard and Knauf brands in Indonesia.

Currently, there are only four gypsum board manufacturers left in Indonesia: two global players, one joint venture with a local company, and one local investment company. The growth prospects for the gypsum board industry in Indonesia are still in the early stages, with per capita consumption at a low 0.41 m^2/year in 2020. With an economic growth rate of 5.3% in 2020 and a population of approximately 264.1 million, the estimated total market size is around 145 million m^2. However, with installed production capacity at 178 million m^2, the industry faces an oversupply condition.

The research background has highlighted the connection between sustainable company growth, sustained competitive advantage, and product life cycle. Sustainable business growth can be achieved through continuous innovation, dynamic organizational capabilities, and agile leadership. Thus, the focus of this research is on "Sustainable Growth Strategies Through Competitive Advantage in the Gypsum Board Industry in Indonesia."

This study makes a novel contribution to strategic management and sustainable firm growth, particularly within the under-researched building materials manufacturing industry in Indonesia. It empirically demonstrates the significant role of competitive advantage as a mediator between innovation, dynamic capabilities, and agile leadership in driving sustainable growth. The research also challenges the relevance of the product life cycle (PLC) as a moderator in industries with stable product life cycles, enriching the theoretical literature. Additionally, the study introduces cluster analysis to categorize companies based on product life cycle characteristics, offering a new analytical approach in industry strategy research. Focusing on the gypsum board industry in Indonesia, a field previously underexplored in sustainability and strategy literature, the study provides valuable contextual insights. By combining quantitative methods with qualitative interviews, the research offers a comprehensive view of growth strategies that are both theoretically and practically relevant.

This study aims to analyze and enhance the strategic understanding of sustainable growth strategies in the gypsum board industry in Indonesia. It focuses on the roles of innovation, dynamic capabilities, agile leadership, competitive advantage, product life cycle, and sustainable performance. The research examines how innovation, dynamic capability, and agile leadership influence competitive advantage and sustainable firm growth, and investigates the moderating role of the product life cycle in these relationships. Additionally, it formulates strategies for sustainable firm growth based on these variables.

Practically, the findings offer valuable insights for gypsum board companies and industry leaders in Indonesia, helping them make informed decisions about life cycle theory, innovation, product development, and competitive advantage to support sustainable performance. Academically, the research contributes new knowledge to the education sector regarding these strategies and serves as a reference for future studies on sustainable growth in the industry.

METHOD

The research method is a framework outlining the procedures to obtain information. This scientific research aims to reveal phenomena in a systematic, controlled, empirical, and critical manner. The study uses a descriptive approach to understand the position or perception of research variables and an associative approach to examine the relationships between variables through hypotheses. It focuses on strategic management, specifically studying the impact of innovation, dynamic capability, agile leadership on competitive advantage, and their implications for sustainable firm growth, moderated by the product life cycle.

A mixed-method research approach is used, combining both qualitative and quantitative data to provide a comprehensive explanation. Explanatory sequential research is employed to test hypotheses using inferential statistics for generalization. Data will be collected through a census of all gypsum board companies in Indonesia, with random sampling for employee perceptions and customer feedback regarding gypsum board usage.

This study uses a cross-sectional time horizon, with data collected between January and March 2025. Descriptive research aims to understand the implementation of management practices

related to innovation, dynamic capability, agile leadership, competitive advantage, and sustainable firm growth. Associative research seeks to examine relationships between variables. Data on the impact of innovation, dynamic capability, and agile leadership on competitive advantage and sustainable firm growth, moderated by the product life cycle, will be collected and operationalized.

Data Source

This study uses two types of data sources: primary and secondary data. Primary data is collected through a census of gypsum board industry business unit leaders (directors or managers) in Indonesia, as they are most knowledgeable about innovation, dynamic capabilities, agile leadership, competitive advantage, and sustainable firm growth, moderated by the product life cycle. Secondary data, collected from gypsum board companies, supports the research by providing relevant information on these variables. The research is correlational and cross-sectional, aiming to test the relationships between the variables at a specific point in time.

The data sources are summarized in the following table:

Table 7. Data Source

Data Type	Description	Source Data
Primary	Innovation, Dynamic Capability, Agile Leadership, Competitive Advantage, Sustainable Firm Growth, Product Life Cycle	Business unit directors or managers of gypsum board companies in Indonesia
Secondary	Company data related to the gypsum board industry in Indonesia	Relevant gypsum board companies in Indonesia

Population and Sample

This study uses a population-based approach, targeting all active gypsum board companies in Indonesia with publicly available information. The four companies selected are PT Siam-Indo Gypsum Industry, PT Aplus Pacific, PT Knauf Gypsum Indonesia, and PT Yoshino Gypsum Indonesia. A census method was applied, and data was collected through questionnaires from 52 respondents, consisting of Assistant Managers to Directors. After validation, 27 complete responses were used for analysis. Although the sample size is relatively small, it is deemed sufficient for analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM), as the sample size meets the requirements for regression analysis based on power analysis (G*Power).

To complement the quantitative data, in-depth interviews were conducted with two key informants from different companies at different product life cycle stages (growth and decline). These informants, a President Director and a Senior Marketing Manager, provided strategic insights on managerial practices and product life cycles. The combination of quantitative and qualitative approaches allows for a comprehensive understanding of sustainable growth strategies in Indonesia's gypsum board industry.

Data Collection Methods

This study employs a combination of data collection methods, including questionnaires, in-depth interviews, focus group discussions (FGD), and observations, to gather both quantitative and qualitative data. The questionnaires, structured with closed-ended questions, are used for both

descriptive and explanatory surveys to assess the relationship between various variables such as innovation, dynamic capability, agile leadership, and competitive advantage. The respondents are business unit directors and managers from gypsum board companies in Indonesia.

In-depth interviews and FGDs are conducted to complement the quantitative data, involving key informants such as company leaders and customers. These qualitative methods help confirm and refine the quantitative findings. The qualitative data is analyzed through data reduction and presentation, using techniques like the Delphi Method to reach consensus among experts.

The research follows a mixed-methods approach, with quantitative data collected first, followed by qualitative analysis to confirm and deepen the understanding of the findings. The data analysis includes descriptive and associative analyses, particularly through Structural Equation Modeling (SEM), to test hypotheses. The results from both quantitative and qualitative methods are then integrated to provide a comprehensive understanding of sustainable firm growth strategies in the gypsum board industry in Indonesia.

Research Findings Application Techniques

The application of research findings will be based on descriptive analysis and statistical verification, showing significant relationships between variables. The application in the gypsum board industry involves adapting innovation, enhancing dynamic capabilities, agile leadership, achieving competitive advantage, and fostering sustainable growth moderated by the product life cycle.

To formulate strategies, identified solution variables are used to create strategic plans, as shown in the strategy mapping diagram. This strategy serves as a foundation for developing strategies in the industry, especially in product and service sectors. The strategies include maximizing innovation, dynamic capabilities, and agile leadership for improved competitive advantage and sustainable growth.

Strategy implementation focuses on key operational aspects, such as product and process innovation, technological capabilities, marketing mix, agility, digital options, and entrepreneurial awareness. For dynamic capabilities, attention is given to transformation, technology, marketing, agility, and digital options. Agile leadership emphasizes vision, creativity, leadership agility, and humility. Competitive advantage focuses on quality, timing, cost, flexibility, and differentiation. Sustainable firm growth is measured through customer and employee satisfaction and sales volume growth. Product life cycle considerations include pricing adjustments, rebranding, product strategy, efficiency, and R&D.

Monitoring and evaluation of the strategy will follow a structured plan, with clear responsibilities, necessary resources, and concrete recommendations for effective implementation and continuous improvement in the gypsum board industry in Indonesia.

RESULT AND DISCUSSION

Gypsum Board Company Profile in Indonesia

This study examines the gypsum board industry in Indonesia, focusing on key companies such as PT Knauf Plasterboard Indonesia, PT Siam-Indo Gypsum Industry, PT Yoshino Indonesia, PT Aplus Pacific, and PT Saint-Gobain. These companies dominate the market and have undergone various mergers and acquisitions, such as the acquisition of PT Petrojaya Boral Plasterboard by Knauf in 2021. The study uses both quantitative and qualitative methods, with surveys distributed to 52

respondents, including directors, managers, and assistant managers from the active gypsum companies in Indonesia. A total of 32 questionnaires were returned, and 27 valid responses were analyzed.

For qualitative data, in-depth interviews were conducted with key informants, including a President Director and a Senior Manager from companies in different stages of their product life cycle. The respondents were mostly male (77.8%) with significant work experience (over 10 years for 77.8% of quantitative respondents). The majority of respondents had an educational background of S1 (70.4%), and they were mostly from the Sales & Marketing (37%) and Production departments (25.9%).

The study also included demographic analysis, showing that most respondents were aged above 45 years, and the majority had over 10 years of experience in the industry. The findings suggest that the respondents are highly experienced and loyal to their respective companies, which strengthens the data's reliability.

Descriptive Hypothesis Analysis (H1a-H1f)

This study examines various factors influencing sustainable growth in Indonesia's gypsum board industry, focusing on innovation, dynamic capability, agile leadership, competitive advantage, product life cycle, and sustainable firm growth.

Innovation

Innovation in the gypsum board industry is critical for maintaining competitive advantage and supporting sustainable growth. Hypothesis testing for innovation showed a significant positive result with a mean score of 3.99 (p-value = 0.001), indicating that companies in the industry are performing well in terms of innovation. Qualitative findings align with these results, showing strong customer orientation and business planning.

Dimension	Key Indicators	Qualitative Findings (Depth Interview)	Qual Score	Quan Score
Risk-Taking Culture	Innovative, adaptive, risk-taking	Supports innovation, but with careful risk considerations	74	72
Business Intelligence	Competitor monitoring, market intelligence	Following market trends to develop business strategies	82	81
Customer Orientation	Customer solutions, value-added, needs evaluation	Intensive focus on customer needs	84	83

The findings highlight that while innovation is well-established, areas such as risk-taking and digitalization require further improvement.

Dynamic Capability

Dynamic capabilities are essential for adapting to market changes and enhancing competitiveness. The t-test for dynamic capability resulted in a mean score of 3.648 (p-value = 0.001), suggesting that companies are performing well in this aspect. Triangulation with qualitative data supports this, particularly in marketing capabilities.

Dimension	Key Indicators	Qualitative Findings (Depth Interview)	Qual Score	Quan Score
Transformation Capacity	Creating, accessing, leveraging	Long-term vision & commitment to change	73	72
Technology Capability	R&D, design, production	R&D division supports product development	74	77
Marketing Mix Capability	Sales, distribution, promotion	Strengthening distribution and promotion	78	78

The highest score is in marketing capabilities, while digital options and entrepreneurial alertness require improvement.

Agile Leadership

Agile leadership is assessed in terms of vision, creativity, and adaptability. The hypothesis test for agile leadership yielded a mean score of 3.73 (p-value = 0.001), indicating that leadership is generally effective. However, areas such as leadership agility and creativity need strengthening.

Dimension	Key Indicators	Qualitative Findings	Qual Score	Quan Score
Visionary	Long-term vision, short-term uncertainty	Leaders have clear vision and strategic goals	76	75
Context Setting	Reading environment, anticipating change	Leaders understand and respond to changes	78	78

The highest score is in context setting, while leadership agility needs further development.

Competitive Advantage

Competitive advantage is assessed through dimensions like quality, cost, and flexibility. The hypothesis test showed a mean score of 4.074 (p-value = 0.001), indicating that companies have a strong competitive advantage. Key factors include product quality and timely delivery.

Dimension	Indicators	Qualitative Findings (Company A & B)	Qual Score	Quan Score
Quality	Product & service standards, warranty	Focus on high-quality raw materials, high production standards, and certifications	91	91
Timeliness	Delivery time, consistency, supply chain	Optimizing the supply chain for consistent delivery	87	87

Companies perform well in quality and timing, but differentiation remains weak.

Product Life Cycle

Product life cycle (PLC) is crucial for adapting strategies based on market changes. The t-test showed a mean score of 3.817 (p-value = 0.001), indicating good implementation of PLC strategies.

Dimension	Key Indicators	Qualitative Findings (Company A & B)	Qual Score	Quan Score
Price Adjustment	Discount, Geographical, Dynamic Pricing	Discount strategy applied, dynamic pricing still manual	77	77
Rebranding Strategy	Line extension, Brand extension	Line extension successful, no co-branding yet	70	74
Product Strategy	Quality, price, value, image, service	Focus on improving product performance and service quality	79	78

Price adjustment and efficiency are strengths, but R&D and rebranding need improvement.

Sustainable Growth

Sustainable firm growth (SFG) is essential for long-term competitiveness. The t-test showed a mean score of 3.548 (p-value = 0.013), indicating that firms in the gypsum industry generally experience sustainable growth.

Dimension	Key Indicators	Qualitative Findings (Company A & B)	Qual Score	Quan Score
Financial Performance	Profitability, growth, efficiency	Stable, but needs optimization in efficiency and risk management	75	80
Customer Satisfaction	Loyalty, retention, general satisfaction	High loyalty supported by innovation and consistent service	88	87
Employee Satisfaction	Turnover, wages, career development	Need improvement in welfare and employee loyalty	60	65

Customer satisfaction and sales growth are key drivers, while employee satisfaction needs improvement.

Overall, the gypsum board industry in Indonesia shows strong foundations in innovation, dynamic capabilities, agile leadership, competitive advantage, and product life cycle management, but there are areas for improvement, particularly in differentiation, digitalization, and employee satisfaction.

Analysis of Associative Hypotheses (H2-H9)

This study examines the relationships between innovation, dynamic capability, and agile leadership with competitive advantage and sustainable firm growth, as well as the moderating role of the product life cycle.

Table 15. Results of Hypothesis Testing (H2–H9)

Code	Path Hypothesis	Coefficient	T Statistic	P-Value	Significant
H2	Innovation → Competitive Advantage	0.313	2.232	0.026	Yes
H3	Dynamic Capability → Competitive Advantage	0.369	2.593	0.010	Yes
H4	Agile Leadership → Competitive Advantage	0.507	4.193	0.000	Yes
H5	Innovation → Sustainable Firm Growth	0.213	1.578	0.115	No
H6	Dynamic Capability → Sustainable Firm Growth	0.110	1.893	0.059	No
H7	Agile Leadership → Sustainable Firm Growth	0.406	2.679	0.008	Yes
H8	Moderation PLC (CA × PLC → SFG)	0.096	0.722	0.471	No
H9	Competitive Advantage → Sustainable Firm Growth	0.321	2.414	0.016	Yes

Impact of Innovation on Competitive Advantage (H2)

The test results show that innovation has a positive and significant impact on competitive advantage with a coefficient of 0.313 and a p-value of 0.026.

Impact of Dynamic Capability on Competitive Advantage (H3)

Dynamic capability has a significant effect on competitive advantage with a coefficient of 0.369 and a p-value of 0.010.

Impact of Agile Leadership on Competitive Advantage (H4)

Agile leadership has a strong positive impact on competitive advantage with a coefficient of 0.507 and a p-value of 0.000.

Impact of Innovation on Sustainable Firm Growth (H5)

Innovation does not have a significant impact on sustainable firm growth with a p-value of 0.115, indicating that innovation does not directly contribute to sustainable growth.

Impact of Dynamic Capability on Sustainable Firm Growth (H6)

Dynamic capability also does not significantly affect sustainable firm growth with a p-value of 0.059.

Impact of Agile Leadership on Sustainable Firm Growth (H7)

Agile leadership significantly impacts sustainable firm growth with a coefficient of 0.406 and a p-value of 0.008.

Moderation of Product Life Cycle on the Relationship Between Competitive Advantage and Sustainable Firm Growth (H8)

Product life cycle does not significantly moderate the relationship between competitive advantage and sustainable firm growth with a p-value of 0.471.

Impact of Competitive Advantage on Sustainable Firm Growth (H9)

Competitive advantage has a significant impact on sustainable firm growth with a coefficient of 0.321 and a p-value of 0.016.

The findings show that innovation, dynamic capability, and agile leadership influence competitive advantage, with agile leadership and competitive advantage directly contributing to sustainable firm growth. However, the direct impacts of innovation and dynamic capability on sustainable growth, as well as the moderating role of product life cycle, are not significant.

Table 16. Summary of Hypothesis Test Results

No	Hypothesis Code	Path Relationship	Test Type	Coefficient / Average / T-Stat / P-Value	Significance	Remarks
1	H1a	Innovation (Descriptive)	One-sample t-test	Mean = 3.76; T = 5.146; p = 0.000	Significant	Innovation rated high
2	H1b	Dynamic Capability (Descriptive)	One-sample t-test	Mean = 3.68; T = 4.982; p = 0.000	Significant	High dynamic capability
3	H1c	Agile Leadership (Descriptive)	One-sample t-test	Mean = 3.85; T = 6.012; p = 0.000	Significant	High agile leadership
4	H1d	Competitive Advantage (Descriptive)	One-sample t-test	Mean = 3.80; T = 5.723; p = 0.000	Significant	High competitive advantage
5	H1e	Product Life Cycle (Descriptive)	One-sample t-test	Mean = 3.42; T = 2.986; p = 0.005	Significant	Product life cycle is dynamic
6	H1f	Sustainable Firm Growth (Descriptive)	One-sample t-test	Mean = 3.74; T = 4.895; p = 0.000	Significant	High sustainable growth
7	H2	Innovation → Competitive Advantage	SEM-PLS	β = 0.313; T = 2.232; p = 0.026	Significant	Supported

8	H3	Dynamic Capability → Competitive Advantage	SEM-PLS	β = 0.369; T = 2.593; p = 0.010	Significant	Supported
9	H4	Agile Leadership → Competitive Advantage	SEM-PLS	β = 0.507; T = 4.193; p = 0.000	Significant	Supported
10	H5	Innovation → Sustainable Firm Growth	SEM-PLS	β = 0.213; T = 1.578; p = 0.115	Not Significant	Rejected
11	H6	Dynamic Capability → Sustainable Firm Growth	SEM-PLS	β = 0.110; T = 1.893; p = 0.059	Not Significant	Rejected
12	H7	Agile Leadership → Sustainable Firm Growth	SEM-PLS	β = 0.406; T = 2.679; p = 0.008	Significant	Supported
13	H8	Competitive Advantage x Product Life Cycle → Sustainable Firm Growth (Moderation)	SEM-PLS	β = 0.040; T = 0.387; p = 0.699	Not Significant	Rejected
14	H9	Competitive Advantage → Sustainable Firm Growth	SEM-PLS	β = 0.399; T = 2.668; p = 0.008	Significant	Supported

Based on the hypothesis tests, both descriptive (H1a–H1f) and associative statistics (H2–H9), most of the relationships between variables in the model are significant and support the proposed theoretical framework. Innovation, dynamic capability, and agile leadership play essential roles in shaping competitive advantage. This competitive advantage, in turn, significantly contributes to sustainable firm growth. However, some relationships, such as the direct effects of innovation and dynamic capability on sustainable firm growth and the moderating role of product life cycle, were not significant. These findings provide valuable insights for further development of both the theoretical model and practical applications.

Research Findings

Based on the conceptual framework, quantitative analysis, and in-depth interviews, several key findings were identified:

Innovation → Competitive Advantage

Innovation was found to have a significant impact on the competitive advantage of companies. This emphasizes that efforts to develop innovative products and processes are primary drivers of competitiveness in the gypsum board industry.

Dynamic Capability → Competitive Advantage and Sustainable Firm Growth

Dynamic capability directly influences both competitive advantage and sustainable firm growth. However, its role as a moderator between innovation/agile leadership and competitive advantage was found to be insignificant, suggesting that dynamic capability is more appropriately considered as an independent variable rather than a moderating one.

Agile Leadership → Competitive Advantage and Sustainable Firm Growth

Agile leadership significantly contributes to competitive advantage and sustainable firm growth. Its effectiveness is enhanced when supported by innovation and dynamic capabilities, indicating that leadership flexibility plays a crucial role in fostering long-term growth.

Competitive Advantage as a Mediator

Competitive advantage was shown to mediate the influence of innovation, dynamic capability, and agile leadership on sustainable firm growth. This reinforces its critical role as a pathway to long-term growth and stability within the industry.

Product Life Cycle as a Moderator

The product life cycle did not significantly moderate the relationship between competitive advantage and sustainable firm growth. This lack of significance could be attributed to the homogeneity of the product life cycle stages in the sample (with most companies in the growth and maturity phases) or the stronger direct influence of competitive advantage.

Although it was not significant as a moderator, the product life cycle remains strategically relevant. In the gypsum board industry, product life cycles are non-linear and can be extended through continuous innovation. Therefore, it is recommended to develop a new model where the product life cycle is treated as an independent variable influencing innovation, dynamic capability, and agile leadership, with competitive advantage continuing to serve as the main mediator for sustainable firm growth.

Theoretical Implications:

1. Supporting the Resource-Based View (RBV): Competitive advantage is a core element of sustainable growth. This aligns with the RBV, which emphasizes that a firm's unique resources and capabilities are central to achieving long-term success and sustaining competitive advantage.
2. Supporting the Dynamic Capability Theory (Teece, 1997): Dynamic capability plays a crucial role in the formation of competitive advantage. It underscores the importance of a firm's ability to adapt, integrate, and reconfigure internal and external competencies to address rapidly changing environments and maintain a competitive edge.
3. Supporting Agile Leadership Theory: Agile leadership directly drives competitive advantage and long-term growth. This theory highlights the importance of flexible, adaptive, and innovative leadership in responding to market changes and leading organizations toward sustained success.

Application of Research Findings

The results of this study provide descriptive and verificatory analyses of six key variables: innovation, dynamic capability, agile leadership, competitive advantage, product life cycle, and sustainable firm growth. Based on the statistical testing of causal relationships between these variables, significant relationships were found that support the conceptual model developed in this research.

The findings have practical implications for industries, especially the gypsum board industry in Indonesia, which is facing intense global competition. This section presents suggestions for applying the research findings as a contribution to companies developing sustainable growth strategies based on competitive advantage.

Proposed Application in the Indonesian Gypsum Industry

The Indonesian gypsum industry is facing increasing competition. Based on the findings, applying strategies based on the product life cycle, innovation, dynamic capability, and agile leadership can strengthen competitiveness and drive sustainable growth. The proposed strategies include:

1. Enhancing Product and Process Innovation
   Industry still relies on conventional technology.
   Invest in R&D for lighter, eco-friendly, and easier-to-install products.
2. Strengthening Dynamic Capability for Market Adaptation
   Companies must quickly detect market changes, respond with appropriate strategies, and continuously transform.
3. Strengthening Agile Leadership
   Leadership should be responsive, collaborative, and adaptable to technological changes and market trends.
4. Optimizing Competitive Advantage
   Achieve competitive advantage through product differentiation, cost efficiency, and enhanced after-sales service.
5. Managing Product Life Cycle
   Strategically manage the product life cycle, adjusting strategies at each stage (growth, maturity, decline).

These strategies aim to help the industry build a competitive and sustainable growth strategy in the long term.

Strategy Formulation Proposal

Based on descriptive and verificatory analyses, two main strategies can be proposed to enhance competitiveness and support sustainable growth in the gypsum industry:

1. Optimizing the Role of Product Life Cycle in Strategic Planning

   Product life cycle (PLC) remains relevant for strategic decision-making, despite not being significant as a moderator.

   Companies should align innovation, marketing, and investment strategies with each phase of the PLC.
2. Synergy between Innovation, Dynamic Capability, and Agile Leadership

Innovation culture needs to be supported by agile leadership to create organizational flexibility and responsiveness.

Proposed Strategic Framework

The research suggests the following framework for strategic sustainable firm growth:

Table 17. Sustainable Firm Growth Strategy Structure

Component	Strategic Stages	Variables
Input	Situational Analysis	Product Life Cycle (PLC)
Process	Strategy Formulation	Innovation, Dynamic Capability, Agile Leadership
Process	Strategy Implementation	Competitive Advantage
Output	Strategy Evaluation	Sustainable Firm Growth

Developing Sustainable Performance Strategy

To generalize the research findings and guide future research, a model modification is necessary. From the research findings, it is apparent that three relationships were not significant: the impact of innovation on sustainable firm growth, the impact of dynamic capability on sustainable firm growth, and the moderating role of the product life cycle on competitive advantage and sustainable firm growth. These areas require improvement to maximize R2.

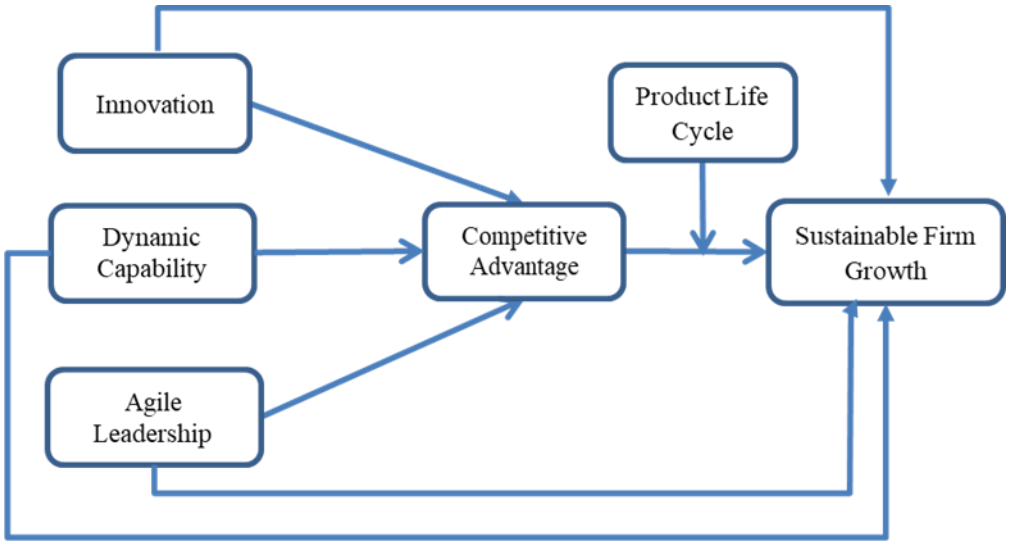


Figure 13. Strategy Development in Research

The analysis indicates that innovation and dynamic capability do not directly contribute to sustainable firm growth, suggesting that competitive advantage serves as a mediator. Additionally, the role of the product life cycle as a moderator is not significant, implying that PLC is not crucial in strengthening the relationship between competitive advantage and sustainable firm growth.

Table 18. Product Life Cycle Stages and Company Strategies

Company Stage	Company Strategy
Growth	Focus on innovation and market expansion.

Maturity	Product or service diversification, cost optimization.
Decline	Business transformation or strategic alliances.

Although product life cycle does not significantly affect moderation, it remains relevant in business strategy. Companies in the gypsum industry should utilize dynamic capabilities and agile leadership to extend the growth phase and avoid decline. Strategies can be applied based on each product life cycle stage, ensuring adaptability and sustainability. Further research could consider cluster analysis to group companies by their life cycle stages, tailoring strategies accordingly.

Proposed Monitoring and Evaluation Implementation

This study outlines a monitoring and evaluation framework to assess the effectiveness of strategies based on Product Life Cycle (PLC), Innovation, Dynamic Capability, Agile Leadership, and Competitive Advantage in achieving Sustainable Firm Growth. The framework involves identifying key variables, dimensions, and specific indicators, supported by both statistical results and interviews with respondents from the Indonesian gypsum industry.

Key performance indicators (KPIs) for each variable were selected based on statistical findings and qualitative interviews, with the most significant indicators for Sustainable Firm Growth identified as:

1. Innovation's Contribution to Sales Growth – Innovation significantly impacts company competitiveness, directly affecting long-term growth.
2. Strategy Implementation Speed – Dynamic Capability is essential for rapid market adaptation and decision-making.
3. Product Uniqueness Recognized by the Market – Product differentiation plays a crucial role in maintaining competitive advantage.
4. Organizational Flexibility in Response to External Changes – Agile Leadership is critical for companies to survive and thrive.

Short-Term (0-2 Years), Medium-Term (3-5 Years), and Long-Term (5+ Years) Plans

The monitoring and evaluation plan is structured into three phases:

1. Short-Term (Action Plan)
   Focus on immediate implementation of innovation, adaptation, and agile leadership.
   Target product innovation and increasing R&D investment.
2. Medium-Term (Mid-Term Plan)
   Expand and reinforce the strategies, including digital transformation and strategic partnerships.
   Strengthen the organizational capabilities for market adaptation and agile leadership.
3. Long-Term (Strategic Plan)
   Ensure business sustainability through technological innovation, global expansion, and environmental, social, and governance (ESG) compliance.

Monitoring and Evaluation Framework

The following table summarizes the KPIs, targets, and strategic focus for each phase:

Table 19. Monitoring and Evaluation Plan for Product Life Cycle, Innovation, Dynamic Capability, Agile Leadership, Competitive Advantage, and Sustainable Firm Growth

Category	Variable	KPI Indicator	Target (Measurable)	Short-Term (0-2 Years)	Medium-Term (3-5 Years)	Long-Term (5+ Years)
Input	Product Life Cycle	Average product life cycle	Speed up innovation within 12 months	Innovate based on PLC strategy	Sustainable R&D with green materials	
Process	Innovation	Number of new products launched	Minimum 2 products per year	Green technology-based products	AI and IoT-based innovations	
Process	Dynamic Capability	Speed of market response	< 6 months	AI-based market prediction	Global strategic partnerships	
Process	Agile Leadership	Decision-making speed	< 14 days	Implement agile management	Leadership training programs	
Process	Competitive Advantage	Cost efficiency	10% reduction in 2 years	Automate production and supply chain	Expansion with smart factories	
Output	Sustainable Growth	Revenue growth	8-10% annual CAGR	Optimize product portfolio	Net-zero emission target	

This framework serves as a strategic guide for the Indonesian gypsum industry to evaluate and optimize their long-term growth strategies. By focusing on innovation, dynamic capability, agile leadership, and competitive advantage, companies can ensure sustainable growth. The framework encourages digital transformation, strategic partnerships, and adherence to ESG standards, positioning companies for success in a competitive global market.

Proposed Strategy Implementation

Based on the research findings, two main strategies are recommended to enhance competitiveness and sustainable growth in the gypsum board industry:

Strategy 1: Strengthen the Role of Product Life Cycle (PLC) in Strategic Planning
Although PLC is not significant as a moderator, its role in strategic planning remains crucial. Companies should align their innovation, marketing, and investment strategies with the product life cycle stages. For example, during the growth stage, the focus should be on market expansion and product innovation, while in the maturity stage, the emphasis should shift to cost efficiency and service differentiation.

Strategy 2: Build Synergy Between Innovation, Dynamic Capability, and Agile Leadership
Fostering a culture of innovation supported by agile leadership will enhance a company's competitiveness. Businesses should focus on building dynamic capabilities by increasing operational flexibility, accelerating the adoption of new technologies, and strengthening strategic partnerships

with suppliers and distributors. This synergy will create a more sustainable competitive advantage and contribute to long-term company growth.

CONCLUSION

The gypsum board industry in Indonesia has adopted innovation, dynamic capability, and agile leadership to build competitive advantage, manage the product life cycle, and foster sustainable firm growth. To maintain competitiveness, there is a need to strengthen data-driven innovation, digitalize business processes, adapt marketing strategies, and employ visionary leadership. Customer loyalty and employee satisfaction are essential pillars for business sustainability. Innovation has contributed to competitive advantage but needs more structured investment and consistent organizational culture. Dynamic capability plays a crucial role in supporting competitive advantage but requires mediation through competitive advantage to influence sustainable growth. Agile leadership is directly linked to sustainable growth by enhancing decision-making speed, collaboration, and adaptability. However, product life cycle did not significantly moderate the relationship between competitive advantage and sustainable growth, indicating its limited relevance in industries with stable product life cycles. Competitive advantage remains critical for ensuring long-term growth.

Limitations

The study has several limitations, including a restricted respondent scope due to time and access constraints, the focus on companies actively involved in product life cycle stages, and the exploratory nature of the research that limits generalizability. These limitations offer avenues for further research with broader scope and a more diverse sample.

Novelty

The study contributes novel insights, including the significant mediating role of competitive advantage in the relationship between innovation, dynamic capability, agile leadership, and sustainable firm growth. It also finds that product life cycle is not a significant moderator in the gypsum industry, suggesting that it may not always be relevant for industries with stable product cycles. Additionally, the use of cluster analysis provides new contextual insights into product life cycle stages.

Implications

Theoretical Implications:

This research supports the Resource-Based View (RBV) and Dynamic Capability theories, highlighting the importance of internal resources in building competitive advantage. However, it challenges the conventional view of innovation's direct impact on sustainable growth, emphasizing the need for further research on the timing and implementation of innovation strategies.

Practical Implications for Industry and Companies:

The findings emphasize the need for agile leadership programs and dynamic capabilities that enable faster adaptation to market changes. Companies should not only focus on the product life cycle but also diversify, optimize supply chains, and strengthen customer loyalty to stay competitive.

Policy Implications for the Government:

Government support for R&D, policies to promote sustainable building materials, and a focus on local resource development could boost the gypsum industry's competitiveness. Strengthening regulations and reducing dependency on imported raw materials is also essential.

Recommendations

Academic Recommendations:

1. Future research should explore the role of innovation, dynamic capability, and agile leadership in building competitive advantage and sustaining growth.
2. Studies should also investigate the role of product life cycle in different industries, especially in sectors with stable product cycles like gypsum.

Research Recommendations:

1. Mixed-methods approaches and broader respondent populations should be used to deepen understanding of growth dynamics and competitiveness.
2. Future research should explore the role of digital transformation and operational efficiency in driving sustainable growth.

Practical Recommendations for Companies:

1. Invest in agile leadership and digital transformation to foster responsiveness and innovation.
2. Focus on diversifying and strengthening competitive advantage beyond the product life cycle.

Recommendations for Industry:

1. Collaboration among gypsum companies for collective innovation and efficiency improvements.
2. Embrace product standardization and certification to compete globally.

Recommendations for Government:

1. Provide fiscal incentives for R&D in the gypsum industry.
2. Promote policies that encourage the use of sustainable materials and support local resource development to reduce dependency on imports.

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