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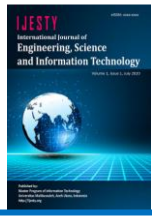

Multi Agent Model Analysis in Identifying the Relationship Between Productivity Level, Production Cost and Product Selling Price

Kushariyadi[1]*, Dina Agnesia Sihombing[2], Husaini[3], Ito Turyadi[4], Muhammad Zakaria[5]

[1]PEM AKAMIGAS, Indonesia
[2]Institut Bisnis dan Multimedia Asmi, Indonesia
[3]Universitas Jabal Ghafur, Aceh, Indonesia
[4]Universitas Al Ghifari, Indonesia
[5]Department of Industrial Engineering, Faculty of Engineering, Universitas Malikussaleh, Aceh, Indonesia

**Corresponding author Email: hariyadikus@gmail.com*

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Abstract

This study aims to analyze the remuneration strategy and the dynamics of a highly competitive market that affect employee productivity and satisfaction. This research method uses a quantitative approach combined with comparative statistics. Companies often choose a per-piece pay strategy to encourage efficiency and productivity while managing labor costs. However, companies may shift to a profit-sharing system to increase employee engagement and loyalty. Differentiation of payment schemes, such as performance-based incentives, plays an important role in attracting and retaining talent and aligning strategies with business goals, which in turn helps manage labor costs and reduce competitive pressures. Productivity and price sensitivity of demand also influence company strategy in markets with high productivity and low demand sensitivity, companies tend to adopt more innovative strategies, while in markets with low productivity and high costs, they often implement more homogeneous and conservative strategies. Further studies are necessary to explore additional factors such as differences in recruitment strategies, industry characteristics, and other variables that influence company decisions in remuneration strategies and labor distribution. Understanding these findings enables companies to design more effective remuneration strategies based on market conditions and their workforce requirements.

Keywords: *Productivity, Labor Costs, Business Goals, Performance.*

1. Introduction

Companies strategically direct their remuneration systems based on the goals they want to achieve, reinforcing the premise that strategic competition between companies can influence the choice in designing a remuneration system. By adjusting the remuneration structure to strategic goals, companies can create a work environment that supports the achievement of these goals and motivates employees to contribute optimally [1]. One important aspect of designing a remuneration system is determining the optimal incentives that can motivate employees to achieve the expected performance. Companies must be able to design the right incentives to maximize employee contributions to company goals. Well-designed incentives can encourage employees to innovate, increase productivity, and achieve better results, which in turn will have a positive impact on the company's overall performance. In addition, choosing the right remuneration system can also affect the company's competitiveness in the market. Companies must consider how their remuneration system can provide competitive benefits in the market [2]. In a competitive business environment, companies need to highlight a remuneration system that can attract and retain the best talent. By offering attractive remuneration packages, companies can enhance their reputation as a desirable workplace and reduce employee turnover rates. Ultimately, strategic competition is an important element in understanding why companies choose different remuneration systems. Factors such as corporate culture, industry, and market dynamics can influence a company's decision to design the right remuneration system. By understanding the unique context and needs of each company, management can design a remuneration system that is not only effective in achieving short-term goals but also supports long-term success [3].
Companies are increasingly implementing decentralization as an organizational strategy to navigate complex and diverse market dynamics. Decentralization arises not only from the need to adapt to local phenomena, but also from the demand to increase the company's responsiveness and flexibility in facing changes in the business environment. In this context, decentralization enables companies to respond

more quickly to customer needs, technological changes, and market shifts, allowing them to maintain their competitiveness. In addition, decentralization of production decisions can provide strategic advantages in competition. Decentralization allows companies to obtain a greater surplus compared to centralization [4]. By delegating decisions to units closer to day-to-day operations, companies can improve operational efficiency and reduce the time required to make critical decisions. This not only increases productivity but also allows companies to optimize resource use and lower operating costs. In some cases, the delegation of production decisions also serves as a strategic commitment mechanism between companies. In competitive markets, companies can use decentralization to influence interactions with their competitors and create win-win situations [5]. By delegating decisions to local managers or operational units, companies can demonstrate their commitment to a particular strategy, which in turn can influence competitors' choices and facilitate better cooperation or coexistence in the market. A company's ability to innovate and adapt quickly underscores the importance of decentralization in a competitive context. Companies can identify new opportunities and react to emerging threats more effectively when they can make decisions closer to the source of information and action [6]. This can create a sustainable competitive advantage, as companies are able to not only follow market trends but also lead change in their industry. Overall, decentralization is a powerful tool in a modern company's strategic arsenal. Companies can increase their flexibility, efficiency, and responsiveness by harnessing the power of decentralization, making them better prepared to face the challenges and opportunities in a dynamic global marketplace. Decentralization, when implemented correctly, can be a key driver of a company’s long-term growth and success [7].

Decisions about product placement in the market, including quantity and price, not only determine competition between companies in a competitive business world, but also shape their contracts and relationships with their workers. Product placement decisions, including pricing and product quantity settings, are fundamental elements of a marketing strategy that focuses on attracting customers and increasing market share. However, in a complex and dynamic business environment, these decisions alone are not enough to guarantee a company's long-term success [8]. In addition to product placement, the contracts that companies establish with their workers play a crucial role in determining competitive advantage. A positive relationship between a company and its employees can increase productivity, innovation, and job satisfaction, all of which have a direct impact on the company's performance. In addition, contracts that include training and career development add value to employees and enhance the company's capabilities. Skilled and knowledgeable employees can contribute to innovation and improve business processes [9]. The contractual relationship with workers is not just about salary and benefits, it encompasses a variety of aspects that can affect the company's competitive position. Fair contracts and favorable working conditions can increase employee satisfaction and reduce turnover. High job satisfaction can increase productivity and service quality, which ultimately improves a company’s competitiveness [10].

A positive company culture and inspiring leadership, reflected in employment contracts, play a crucial role in creating an innovative and collaborative work environment. When companies establish employment contracts that reflect these values, they not only build a work atmosphere that supports creativity and collaboration but also attract talent who wants to thrive in a dynamic and positive environment. Flexible working hours or work location gives employees the opportunity to better balance their professional and personal lives. This, in turn, can increase job satisfaction and productivity, as employees feel valued and empowered to work in the way that works best for them. In an ever-changing business environment, the ability to adapt to employee needs and preferences is a valuable competitive advantage [11]. Furthermore, it's crucial to prioritize compliance with employment laws and ethical standards when drafting employment contracts. Ensuring that contracts comply with applicable rules and regulations not only helps companies avoid legal issues but also strengthens their reputation in the eyes of the public. A positive reputation attracts customers and business partners who value social responsibility and ethics, which can open up new opportunities and strengthen business relationships. Employee loyalty also increases when they feel they are working for a fair and ethical company, creating a more dedicated and engaged team. As a result, a well-designed contract strategy not only influences a company's internal relationships, but also plays a significant role in the company's competitiveness and market sustainability [12].

While companies seek to sign contracts that will encourage the highest level of effort from employees at the lowest possible cost, there are often other considerations that influence their decisions. One of the main considerations is the balance between employee motivation and the costs of retaining a qualified workforce. Companies need to ensure that the contracts they offer are not only cost-effective but also attractive enough to motivate employees to give their best. This is important to ensure that productivity and operational efficiency remain high. In addition to considering costs and motivation, companies may also choose to implement a remuneration system that reduces strategic competition among them [12]. This may occur when companies operate in industries where competition on price and product quality is intense. By establishing a uniform wage and incentive structure, companies can avoid excessive competition that can damage profits and market stability. In addition, reducing strategic competition through a remuneration system can create a more harmonious and collaborative work environment. Avoiding excessive competition among employees and between companies fosters healthier working relationships, leading to increased employee satisfaction and loyalty [13]. Companies that are able to create a positive work environment tend to have a more stable and committed workforce, which is an important asset in achieving their long-term goals. Overall, while reducing labor costs remains a priority, companies need to consider the long-term impact of their remuneration strategy. By choosing an approach that reduces strategic competition, companies can create conditions that are more conducive to growth and sustainability. This strategy is not just about managing costs but also about building a sustainable competitive advantage through a motivated workforce and a stable business environment [11].

The number of workers a company employs often determines its level of strategic competence. The number of workers it has can influence a company's strategic decisions, including in terms of determining remuneration. The size of a company's workforce often influences the remuneration it chooses. When a company has a small number of workers, competition in the market tends to be less intense. This is due to the high cost of expanding production levels, leading both companies to opt for payment based on the number of units produced. In this context, when a company has a limited number of workers, the cost of increasing production becomes a major limiting factor. With the higher cost of increasing production levels, companies often prefer to link remuneration to worker output. Paying workers based on the number of products they produce can enhance production efficiency and mitigate the risk of unnecessary expenses. However, when companies start hiring more workers, the market dynamics change. A larger workforce can increase production capacity, but it can also intensify strategic competition among companies. With a large workforce, companies have the ability to increase production more easily, which can lead to more intense price and quality competition. This competition can lead to reduced profit margins and additional pressure for companies to find new ways to differentiate themselves from competitors. To address these challenges, companies often look for alternatives in their remuneration strategies [12].

One effective way to reduce the intensity of strategic competition is to differentiate the contracts and incentives offered to employees. Companies can create a competitive advantage by providing various forms of contracts tailored to the needs and aspirations of their workforce. Furthermore, additional benefits such as health insurance, educational benefits, and work flexibility can increase the company's attractiveness as a desirable place to work. Career development opportunities also play an important role in compensation strategies. By providing clear training programs and promotion paths, companies not only improve employees' skills and knowledge but also strengthen their loyalty and motivation [13]. These programs can include training in technical skills, leadership, and project management that are relevant to industry developments and company needs. In this context, the size of a company's workforce greatly influences the compensation strategy implemented. Companies with large workforces can take advantage of economies of scale to offer a variety of incentives and benefits that smaller companies may not be able to. Flexibility in remuneration strategies allows companies to tailor their offerings to market dynamics and diverse workforce needs, thereby increasing their competitiveness in the labor market [14]. In conclusion, strategic adaptation to employee needs and market conditions is key to achieving sustainable competitive advantage. By developing and implementing flexible and diverse remuneration strategies, companies can be more effective in attracting, retaining, and motivating the best talent. This approach enables companies to better face competitive challenges, achieve their business goals, and continue to thrive in a dynamic and competitive environment.

2. Research Method

This research method combines a quantitative approach with comparative statistics to conduct a thorough data analysis. This study, adopting a single model, explores a theoretical framework through three main stages. In the first stage, the company must strategically choose between two main remuneration schemes a payment per unit produced or a participation in the company's income, which is dependent on the worker's effort. This choice reflects a critical decision on how to design a remuneration system that can affect the motivation and productivity of the workforce. After selecting a remuneration system, the company sets prices or commissions independently but simultaneously with other companies in the market. This decision has an impact on how the company positions itself in price competition and product offerings, as well as how the prices set interact with the remuneration strategy. The company's chosen payment scheme influences workers' decisions about the level of effort they will exert. Workers will adjust their efforts according to the incentives received, which has a direct impact on the company's productivity and performance. We designed this model to explore and understand how the integration of strategic decisions in the remuneration system, pricing, and worker effort affects the final outcome and competitive dynamics in the market. As a result, this study not only provides insights into individual decisions taken by firms, but also into how these decisions influence each other and shape the overall competitive environment.

3. Result And Discussions

The strategy of paying workers per unit produced is often the dominant choice when a company is in its early stages of development or is relatively small in scale. In this context, per-unit payments allow the company to link wages directly to output, thereby encouraging efficiency and productivity among workers. This strategy also helps the company manage labor costs, as they only pay based on the number of products produced. However, when a company reaches a certain point in terms of size and scale of operations, the dynamics of remuneration strategy become more complex. In one scenario, a company may offer a remuneration system based on profit-sharing in proportion to effort. This strategy focuses on incentivizing workers based on their contribution to the company's overall success, with the hope that this will increase employee engagement and loyalty. On the other hand, another company may choose to stick with the per-unit-produced payment strategy. In this scenario, the company continues to link remuneration to the amount of output produced by workers, which can encourage competition among employees to increase individual productivity. However, this approach can also present challenges in terms of coordination and collaboration between teams, as it focuses more on individual output than on the success of the team or organization as a whole. Both strategies have their advantages and disadvantages, and the decision about which remuneration system to use often depends on a variety of factors, including company culture, the nature of the industry, and long-term goals. Ultimately, the choice between these remuneration systems reflects complex strategic considerations and requires a thorough analysis of how each option will impact company performance and employee satisfaction. By understanding these trade-offs, companies can more effectively design remuneration strategies that align with their business objectives and the market dynamics they face.

Despite the sensitivity of equilibrium in remuneration strategy models to parameter changes, the conclusions hold true for all explored model specifications. This suggests that differentiation in pay schemes is a key mechanism by which companies attempt to dampen strategic competition in the marketplace. In practice, differences in pay schemes can help companies create competitive advantages and reduce the intensity of competition. This differentiation allows companies to manage labor costs more effectively and create a work environment that encourages productivity and innovation. Companies can reduce competitive pressures caused by uniform pricing or production strategies. Varied remuneration strategies help companies build better working relationships, increase employee satisfaction, and achieve more optimal results in the long run. In addition, differentiation in pay schemes also reflects the company's adaptation to changing market conditions and the specific needs of their workforce. By designing flexible and diverse pay schemes, companies can be more responsive to changes in the business environment and market demands. This not only helps to dampen competition, but also to improve the company's overall competitiveness. Overall, although changes in parameters may affect the model's equilibrium, the fundamental principle that pay scheme differentiation is an important mechanism for managing strategic competition remains valid. This approach allows companies to optimize their strategies and navigate market challenges more effectively.

There are some main factors that determine the differentiation of remuneration systems, especially when the number of employees is large and strategic competition is intense. The difference in average production costs between different remuneration systems can be relatively small and even disappear when the number of employees is large. In this context, cost differences are no longer the main factor in choosing a remuneration system, and companies tend to choose arrangements that offer additional strategic benefits, such as increasing employee motivation and productivity. Companies often become more aggressive in their remuneration strategies by implementing schemes that differentiate themselves from competitors. By using unique or more profitable remuneration systems, companies can attract and retain quality employees, as well as increase their market share. When companies are the only ones using a particular payment scheme, they can leverage this position to control a larger proportion of the market and gain a competitive advantage. The threat of a higher level of strategic competition may arise if competitors adopt similar remuneration systems. In this situation, differentiation of remuneration systems becomes important to maintain competitive advantage, and companies need to continuously innovate their remuneration strategies to overcome this threat and ensure employee attraction and loyalty. Companies can make more informed decisions about their remuneration systems by considering these factors, which include not only costs but also their strategic impact in terms of market attractiveness, employee motivation, and responsiveness to competition. Differentiating remuneration systems becomes a key strategy for managing competitive dynamics and ensuring long-term success in competitive markets.

Comparative statistical analysis allows us to draw in-depth conclusions about the dynamics of highly competitive markets and how factors such as productivity affect company strategy. In markets where productivity is high and demand sensitivity to price or marginal production costs is low, companies often find conditions more favorable for implementing certain strategies, allowing them to exploit existing competitive advantages. In this situation, companies can more effectively use strategies designed for less price-sensitive market conditions, thus opening up opportunities for innovation and differentiation in the remuneration approach. Conversely, in low-productivity markets, where demand is less sensitive to price changes and marginal production costs are high, companies tend to choose conservative or similar strategies more often. In these conditions, high production costs and the lack of demand responsiveness to price make companies more inclined to adopt a safe and uniform approach. This often leads to strategy consolidation among firms in a market, reducing differences in remuneration approaches and market strategies adopted. Overall, differences in demand sensitivity, productivity, and marginal production costs significantly influence how firms formulate and implement their strategies. In highly competitive markets with high productivity and low demand sensitivity, firms may have the opportunity to capitalize on their advantages with more diversified and innovative strategies. Conversely, in markets with low productivity and high production costs, firms are more likely to choose a homogeneous strategy to reduce risk and address existing market challenges. By understanding the interactions between these factors, firms can develop strategies that are more effective and tailored to their market conditions.

In addition, the results of this study appear to be limited to cases where the workforce must be distributed evenly among firms competing for employee recruitment. In this context, the need to attract and retain workers in a highly competitive labor market may influence firms' remuneration and incentive strategies and decisions. However, to gain a more comprehensive understanding of the dynamics involved, it is important to conduct a deeper exploration. Other factors to consider include differences in recruitment strategies across firms, the level of competition in the labor market, and the specific characteristics of a particular industry or sector. Further research could include an analysis of how differences in remuneration approaches affect employee satisfaction, retention, and firm performance under different market conditions. In addition, case studies or in-depth empirical analyses could help identify additional variables that may influence firms' decisions on workforce distribution and remuneration strategies.

4. Conclusion

An in-depth analysis of remuneration strategies and the dynamics of a highly competitive market reveals several key findings on how companies manage competition and influence employee productivity and satisfaction. Companies often choose a per-unit-produced pay strategy in their early stages of development or on a small scale. This strategy directly links wages to output, which drives efficiency and productivity while also helping companies manage labor costs. However, as companies grow and reach a certain scale, the dynamics of remuneration strategies become more complex. Companies can choose between a profit-sharing remuneration system, which focuses on employees' contribution to the overall success of the company, or a per-piece pay system, which motivates individual output increases but may discourage team collaboration. Differentiation of pay schemes plays a key role in dampening strategic competition. Companies can use different forms of remuneration, such as performance-based incentives or per-piece pay, to attract and retain talent and align incentives with their strategic objectives. This approach allows companies to effectively manage labor costs, increase productivity, and reduce competitive pressures. This differentiation also helps companies adapt to changing market conditions and specific labor needs. A comparative statistical analysis reveals that productivity and demand price sensitivity influence corporate strategy. In markets with high productivity and low demand sensitivity, firms can adopt innovative and diversified strategies. In contrast, in markets with low productivity and high production costs, firms tend to choose more homogeneous strategies to reduce risks and cope with market challenges. Although the results of this study provide important insights, there are limitations in terms of workforce distribution among competing firms. To gain a more comprehensive understanding, it is important to further explore additional factors such as differences in recruitment strategies, industry characteristics, and macroeconomic factors. Future research can include more in-depth empirical analysis and case studies to identify additional variables that influence firms' decisions in remuneration strategies and workforce distribution. As a result, firms can be more effective in designing and implementing remuneration strategies that align with market dynamics and their workforce needs.

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