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STRATEGIC HUMAN RESOURCE COMPETENCIES TO ACHIEVE SUSTAINABLE COMPETITIVE ADVANTAGE IN THE AQUACULTURE SMEs SECTOR

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Abstract

This study aims to analyze the influence of the strategic competence of human resources on the achievement of sustainable competitive advantages in the aquaculture MSME sector. The four dimensions of strategic human resource competencies studied include strategic thinking, change management, networking & collaboration, and innovation orientation. Competitive advantage is measured through four indicators, namely product uniqueness, operational efficiency, reputation, and customer loyalty. This study uses a quantitative approach with the Structural Equation Modeling method based on Partial Least Squares (SEM-PLS), based on data from 150 aquaculture SME actors. The results of the study show that the four dimensions of strategic human resource competences have a positive and significant effect on the dimension of sustainable competitive advantage, with innovation orientation making the most dominant contribution. The R-square value obtained shows a strong contribution of the model to dependent variables, especially in the dimensions of customer loyalty and operational efficiency. These findings affirm the importance of strengthening human resource capabilities based on innovation, networking, and strategic adaptation as the foundation for creating sustainable competitive advantages for MSMEs in the aquaculture sector. This research provides practical implications for policy makers and business actors in designing strategic interventions for human resource competency development.

Keywords: Strategic human resource competence, sustainable competitive advantage, aquaculture MSMEs, SEM-PLS, innovation

INTRODUCTION

Small Medium Enterprises (SMEs) have an important role in the country's economy. SMEs play an indispensable role in driving economic growth across the globe, particularly in developing and emerging markets. Their innovation, agility, and ability to create jobs make them the backbone of many economies, fueling entrepreneurship and fostering community development (Ummah, 2019)(Hang et al., 2022) (Pumiviset & Suttipun, 2024). In the era of Industry 4.0 and amid an unpredictable business landscape, sustainable competitive advantage (SCA) unequivocally depends on the strategic utilization of both tangible and intangible resources (Hamadamin & Atan, 2019). This applies to SMEs as well (Arsawan et al., 2022; Samsir Samsir, 2018). Today, rather than relying primarily on tangible physical assets such as machinery, buildings, or inventory, organizations are discovering that their true strength lies in their non-physical human resources (Emeagwal & Ogbonmwan, 2018; Ong & Ismail, 2008). SCA shines through in the distinctive qualities of a product

or service, empowering the organization to maintain a competitive edge over its rivals (Elidemir et al., 2020).

The ability of human resources (HR) to manage their businesses effectively, efficiently, and sustainably determines the sustainability of SMEs. (Galli-Debicella, 2021) stated that the secret to true sustainability lies in cultivating a core competency that masterfully blends differentiation qualities that large firms simply cannot replicate with non-scalability. The competencies of the strategic positioner, credible architect, capacity builder, and technology advocate are vital for elevating organizational effectiveness (Ravi & Sumathi, 2023). Therefore, strategic human resource competency (SHRC) becomes a key factor in achieving SCA for SMEs. Developing economies brimming with industrial growth potential thrive on the strength of vibrant SMEs (Pumiviset & Suttipun, 2024). The current state of HR development in Indonesia is a mixed bag (Kosasih et al., 2024), including the SHRC in SMEs. One of the potential SME clusters is the aquaculture sector in Brebes, the northern coastal area of Java. This region has high potential, especially with growing international demand for aquaculture products. However, the potential remains underutilized due to limitations in SHRC. Many aquaculture SMEs in Brebes rely on traditional knowledge, untrained labor, and have low access to digital markets. These weaknesses diminish their ability to sustain competitive advantage (CA). Aquaculture SMEs are grappling with fragmented managerial skills, low innovation capability, and poor adaptation to market changes. These issues, compounded by reliance on informal labor and family-based operations, hinder strategic HR development. Consequently, SMEs face greater vulnerability in a dynamic business environment dominated by modern enterprises.

Although various studies have highlighted the importance of HR competencies in improving competitiveness, a significant gap remains regarding the mechanisms through which SHRC can be effectively applied in SMEs—especially in aquaculture. This study aims to fill that gap by investigating how SHRC dimensions influence SCA within aquaculture SMEs in Brebes. However, there remains a significant gap in understanding how SHRC specifically functions within aquaculture SMEs, which face distinctive challenges such as informal labor reliance, low digitalization, and limited market access. This study addresses that gap by empirically examining the impact of SHRC on SCA in aquaculture SMEs in Brebes, a region with substantial fisheries potential yet underexplored in strategic HR management research. This research contributes both theoretically and practically. Theoretically, it integrates SHRC models with RBV and dynamic capabilities theory. Practically, it provides guidance for policy and management to strengthen SHRC as a pathway to SCA in the aquaculture sector.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Resource-Based View Theory (RBV)

RBV pioneered for the first time by (Wernerfelt, 1984) views that the company's resources and capabilities are important for the company because it is the main or basis of the company's competitiveness and performance. (Wernerfelt, 1984) states that organizations must build CA through the utilization of their unique resources and capabilities, not just through response to market pressures. Furthermore (J. B. Barney, 1991) developed this theory by explaining that corporate resources help companies improve the efficiency and effectiveness of corporate operations. RBV explains that SCA can be achieved through the use of the company's internal resources that are valuable, rare, inimitable, and non-substitutable (VRIN). In the context of aquaculture SMEs sector, SHRC—such as the ability to think strategically, manage change, build networks, and drive innovation—are intangible resources that meet the characteristics of VRIN. When SMEs are able to develop and maintain these competencies on an ongoing basis, they can create a CA that is not easily replicated by competitors.

Dynamic Capabilities Theory (DC)

DC was developed by (Teece et al., 1997) as an extension of RBV. This theory emphasizes the importance of an organization's ability to respond quickly and appropriately to changes in the business environment. This theory emphasizes the importance of an organization's ability to respond quickly and appropriately to changes in the business environment. The three main components of dynamic capabilities are: Sensing – detecting opportunities and threats; Seizing – capitalizing on opportunities through investment and innovation; Reconfiguring – reconfiguring resources to respond to changes. In contrast to RBVs that place more emphasis on static resources, DC highlights an organization's capacity to change, build, and customize internal capabilities to stay relevant in a dynamic environment. In practice, this is especially relevant for aquaculture SMEs sector that are dealing with rapid technological changes, climate, and market demand.

Porter's Five Forces (PFF)

This theory was developed by (Porter, 1985) and focuses more on the analysis of the external environment of the company. This theory identifies five forces that affect the intensity of competition and profitability of the industry: the threat of new entrants, the threat of substitution products, the bargaining power of buyers, the bargaining power of suppliers, and the intensity of competition among competitors. The main goal of the strategy is to optimally position the company in the face of these five forces (Porter, 1985) In the context of aquaculture SMEs sector, PFF's approach is relevant in understanding the position of competitiveness in the local or export market, but does not explain in depth how internal capabilities such as HR can be a core advantage. The goal of the strategy is to find a position that can be maintained in the industry, where the company can survive the forces of competition and influence it (Porter, 1985).

Integrating RBV, DC, and PFF: A Conceptual Foundation

While each theory—RBV, DC, and PFF—offers valuable insights independently, their integration provides a more comprehensive understanding of how SHRC drive SCA, especially in dynamic and resource-constrained environments like aquaculture SMEs sector.

RBV provides the internal perspective, emphasizing that firms achieve SCA by leveraging *VRIN* (J. B. Barney, 1991; Wernerfelt, 1984). In this context, SHRC are intangible assets that fulfill the VRIN criteria and serve as the foundation of internal competitive strength.

However, RBV has been critiqued for its relatively static orientation and insufficient explanation of how firms adapt their resources over time. This gap is addressed by DC, which adds a temporal and strategic adaptation lens. DC emphasizes how firms continuously sense opportunities, seize them through innovation, and reconfigure internal capabilities to respond to a volatile environment (Teece et al., 1997). For aquaculture SMEs sector, DC manifest in the ability to retrain workers, adopt new aquaculture technologies, and restructure operations amidst regulatory or climate pressures.

Complementing these internal views is PFF, which shifts the lens outward to analyze how industry structure and competitive pressures shape a firm's strategic options. (Porter, 1985) asserts that SCA is also determined by how firms position themselves against threats of new entrants, substitutes, and bargaining powers. While PFF traditionally emphasizes product-market strategies, when combined with RBV and DC, it offers a richer interpretation: SMEs with strong SHRC not only build internal capabilities but also leverage them to improve positioning in the competitive landscape—for example, by building reputational capital to resist buyer power, or forming collaborative networks to neutralize supplier pressure. Thus, this study adopts a multilevel theoretical framework:

- RBV anchors the *strategic value of internal HR competencies*,
- DC explains the *adaptive mechanisms through which SHRC evolve and respond to environmental change*, and
- PFF highlights the *external strategic relevance* of SHRC in improving market position and resisting industry pressures.

The interdependence of these theories reinforces the premise that SHRC are not merely internal competencies but dynamic and market-responsive levers that enable aquaculture SMEs to sustain competitiveness in a highly uncertain environment.

SHRC

SHRC refers to a set of strategic knowledge, skills, and behaviors that HR practitioners and managers must possess in order to contribute to an organization's competitive advantage (Ulrich, 1997). (Ulrich et al., 2012) stated that SHRC parameters include aspects such as strategic thinking, change management, networking & collaboration, and innovation orientation. Strategic thinking is the ability of individuals to formulate long-term visions, recognize opportunities, and align decisions with the organization's strategic goals (Liedtka, 1998); Change management refers to the ability to manage, facilitate, and adapt to organizational change effectively and proactively (Hiatt, 2006); Networking & collaboration includes the ability to build productive working relationships, share information, and work across functions or organizations to achieve a common goal (Ulrich, 2013); and innovation orientation is the tendency of an organization or individual to encourage new ideas, experiments, and creative processes in order to improve products, processes, or business models (Hurley G. Tomas M., 1998). These competencies not only supports the operational function of HR but also makes HR a strategic partner in supporting the competitiveness of the organization.

SCA

CA is the capability of a firm to per form some aspect of its work better than the competition (Galli-Debicella, 2021). Building a SCA must be distinct from organizational strategy in achieving long-term profitability (Cantele & Zardini, 2018; Saunila et al., 2014). The critical feature of innovative practices is to develop human capital to provide a SCA for the organization (Zhang et al., 2023). Globalisation, dynamic markets and hypercompetitive environments make it more challenging for firms and business sectors to gain and maintain a CA (Baker & Ballington, 2002), as most CA's can be replicated by competitors (Ilinova et al., 2021). Nevertheless, a company's ability to continuously generate new forms of SCA clearly depends upon its current competences and attributes (Brown et al., 2019). SCA can be accomplished because of the organizations' ability to develop core competencies and adaptability in a dynamic environment (Ahmad et al., 2023; Mady et al., 2021). Although the existing literature has comprehensively analyzed SCA, the conceptualization remains debatable (Arsawan et al., 2022; Mady et al., 2021).

Further, in this study SCA is measured using PFF (Porter, 1985), namely product uniqueness, operational efficiency, reputation, and customer loyalty. Product uniqueness represents the extent to which a product is perceived as being different and distinct from competing offerings (Porter, 1985); Operational efficiency is the ability of an organization to use resources optimally to produce high-quality outputs at minimum cost (J. Barney, 1991); Reputation is the public or stakeholder perception of an organization's image, credibility, and reliability based on past experience (Fombrun & Shanley, 1990); Customer loyalty is a customer's commitment to make a repeat purchase and show a consistent preference for a brand or organization (Oliver, 1999). However, RBV places an emphasis on the internal strengths of the company, which is more appropriate for the context of SMEs with limitations in managing external threats.

Previous Research

Based on literature studies that have been conducted, there is empirical evidence that the SHRC can have a double impact, namely producing positive and negative influences on the achievement of SCA in SMEs. (Romario et al., 2021) explained that the adoption of strategic HR management practices by SMEs can encourage increased innovation and operational performance. However, these results can turn negative if the strategy is not balanced with adequate organizational structure adjustments and internal support, resulting in a lack of synergy between HR implementation and business strategy demands.

(Brand & Bax, 2002) stated that although improving SHRC generally boosts performance and innovation, there are negative effects that arise if the implementation process is not adjusted to the capacity and operational context of SMEs. (Septiadi & Ramdani, 2024) in their research shows that the integration of technical competencies and soft skills with the use of digital technology can significantly increase CA by increasing innovative capacity and employee productivity. However, they also found that there is a negative impact if digital-based competency development is not synchronized with market needs and company strategies, which can result in over-investment in technology training and misalignment between the competencies developed and the company's strategic goals. Research by (Marler & Fisher, 2013) shows that the integration of SHRC in organizational strategies contributes to SCA through innovation and operational efficiency. Another study by (Hafeez & Essmail, 2007) found that SHRC are highly relevant in improving customer reputation and loyalty. (Wright et al., 1994) highlight that the effect of SHRC on organizational performance can be moderate depending on the context and managerial support.

Framework & hypothesis

Based on theoretical studies and previous research, it can be formulated that SHRC consisting of strategic thinking, change management, networking & collaboration, and innovation orientation have a significant influence on SCA which is manifested in the form of product uniqueness, operational efficiency, reputation, and customer loyalty. The framework can be described as follows:

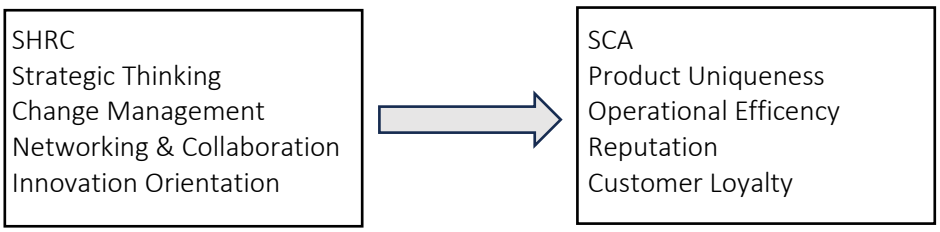

Figure 1. Framework

This study seeks to answer the question "Is there a relationship between SHRC and SCA on Aquaculture SMEs sector? According to the question and using the previous research, the present research hypotheses are presented as follows.

H1a: There is a relationship between the strategic thinking and product uniqueness of Aquaculture SMEs Sector

H1b: There is a relationship between the strategic thinking and operational efficiency of Aquaculture SMEs Sector

H1c: There is a relationship between the strategic thinking and reputation of Aquaculture SMEs Sector

H1d: There is a relationship between the strategic thinking and customer loyalty of Aquaculture SMEs Sector

H2a: There is a relationship between the change management and product uniqueness of Aquaculture SMEs Sector

H2b: There is a relationship between the change management and operational efficiency of Aquaculture SMEs Sector

H2c: There is a relationship between the change management and reputation of Aquaculture SMEs Sector

H2d: There is a relationship between the change management and customer loyalty of Aquaculture SMEs Sector

H3a: There is a relationship between the networking & collaboration and product uniqueness of Aquaculture SMEs Sector

H3b: There is a relationship between the networking & collaboration and operational efficiency of Aquaculture SMEs Sector
H3c: There is a relationship between the networking & collaboration and reputation of Aquaculture SMEs Sector
H3d: There is a relationship between the networking & collaboration and customer loyalty of Aquaculture SMEs Sector
H4a: There is a relationship between the innovation orientation and product uniqueness of Aquaculture SMEs Sector
H4b: There is a relationship between the innovation orientation and operational efficiency of Aquaculture SMEs Sector
H4c: There is a relationship between the innovation orientation and reputation of Aquaculture SMEs Sector
H4d: There is a relationship between the innovation orientation and customer loyalty of Aquaculture SMEs Sector

RESEARCH METHODS

This study uses a quantitative approach with the type of explanatory research, because it aims to explain the causal relationship between SHRC and SCA in the aquaculture SME sector. The data analysis technique used is SEM-PLS, because the research model involves latent constructs and aims to predict and develop theories (Hair et al., 2017). The population in this study is all SMEs engaged in the aquaculture sector in Brebes Regency. The sampling technique used is purposive sampling, with the following criteria: (1) the business actor has been operating for at least five years, (2) has a minimum of three employees (including the owner), and (3) is actively involved in the production process and management of the cultivation business. The number of respondents used was 150 people, in accordance with the minimum sample requirements for SEM-PLS analysis (Hair et al., 2017). Primary data was obtained through the distribution of questionnaires arranged in the form of a five-point Likert scale. Secondary data was obtained from various sources such as scientific journals, government publications (BPS, 2021), and reports relevant to the research theme.

Before the widespread distribution of the questionnaire, the instrument was tested first through the validity of the content by experts (expert judgment) and a limited trial (pre-test) on 30 respondents. The validity and reliability test of the instrument was then carried out statistically using an external model evaluation, namely by looking at the value of outer loading (≥ 0.5), Average Variance Extracted (AVE ≥ 0.5), and Composite Reliability (CR ≥ 0.7) (Hair et al., 2017). Data analysis was carried out by SmartPLS software version 4. The analysis stage includes two main stages, namely the evaluation of the measurement model (outer model) and the evaluation of the structural model (inner model). External model evaluation was used to measure convergent validity, discriminant validity, and construct reliability, while inner model evaluation was used to assess the relationship between latent variables through R^2, Q^2 values, as well as hypothesis testing based on t-statistical and p-value values. An effect is stated to be significant if the t-value ≥ 1.96 and the p-value < 0.05.

This study adhered to standard ethical guidelines in social science research. Prior to data collection, all respondents were provided with clear information about the purpose of the study, its voluntary nature, and the intended use of their responses. Informed consent was obtained in writing before respondents proceeded to complete the questionnaire. Confidentiality was strictly maintained by anonymizing all personal identifiers during data entry and analysis. Data was stored securely and used solely for academic purposes. No respondent-identifiable information was disclosed in any part of this publication. Ethical clearance was aligned with institutional protocols, and enumerators were trained to handle sensitive information with discretion and neutrality. These procedures ensured that the rights and privacy of participants were respected, while also enhancing the credibility and integrity of the research process.

RESULTS AND DISCUSSION

Validity and Reliability of the Outer Model

The results of the analysis showed that the outer loading for all SHRC and SCA indicators was more than 0.70, which means that each indicator had a significant contribution in representing its respective constructs. This shows that the data obtained from the respondents can be considered valid and reliable in measuring the construct in question, both for SHRC and SCA. With an AVE in the range of 0.65 to 0.72, this is higher than the minimum limit of 0.50 required to show that the constructs are capable of explaining more than 50% of the variability of their indicators. This provides strong evidence that the construct being studied has clear dimensions and that the selected indicators are relevant and appropriate to measure the construct. Furthermore, CR value that is above 0.85 for all constructs shows that these constructs are consistent in measuring the variables in question. This indicates that the built model can be trusted to describe the relationships between variables consistently. Cronbach's Alpha value of more than 0.70 further strengthens the validity and reliability of the data collected. The results of the analysis can be seen in the following table 1:

Table 1: Outer Model Test Results (Validity and Reliability)

Construct	Indicator	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability (CR)
SHRC	Strategic Thinking	0,81	0,71	0,88	0,92
	Change Management	0,85			
	Networking	0,83			
	Innovation Orientation	0,79			
SCA	Product Uniqueness	0,80	0,70	0,85	0,89
	Operational Efficiency	0,77			
	Reputation	0,82			
	Customer Loyalty	0,78			

Source: Data processed, 2025

Based on table 1 above, it is known that the outer loading value indicates how much the indicator contributes to the construct represented. A value of more than 0.70 indicates that the indicator is significant enough to reflect the construct in question. An AVE value above 0.50 indicates that the construct is able to explain more than 50% of the variability of the indicator. In this case, AVE values for SHRC (0.71) and SCA (0.70) already meet the convergent validity standard. Cronbach's Alpha is used to measure the internal consistency of the construct. Values above 0.70 indicate good reliability (Hair et al., 2017) All constructs in this study show a Cronbach's Alpha value of more than 0.80, which means it is very reliable. CR is used to measure the internal consistency of constructs by considering measurement errors from different indicators. CR value above 0.70 indicates excellent reliability (Hair et al., 2017) and all constructs in this study meet these requirements.

Structural Model: Influence of SHRC dimensions on SCA dimensions

Based on the results of the SEM-PLS analysis, it can be concluded that SHRC dimension has a significant influence on SCA dimension in the aquaculture MSME sector. This can be seen in the following table:

Table 2 Interdimensional Influences

SHRC Dimensions	SCA Dimensions	Path Coefficients	T-Value	R^2	Influence
Strategic Thinking	Product Uniqueness	0.40	3.5	0.16	Moderate
	Operational Efficiency	0.30	2.7	0.09	Moderate
	Reputation	0.35	3.1	0.12	Moderate
	Customer Loyalty	0.50	4.2	0.25	Strong
Change Management	Product Uniqueness	0.32	2.5	0.10	Moderate
	Operational Efficiency	0.55	5.0	0.30	Strong
	Reputation	0.40	3.3	0.16	Moderate
	Customer Loyalty	0.40	3.2	0.16	Moderate
Networking & Collaboration	Product Uniqueness	0.38	3.0	0.14	Moderate
	Operational Efficiency	0.45	4.0	0.20	Moderate
	Reputation	0.50	4.5	0.25	Strong
	Customer Loyalty	0.40	3.2	0.16	Moderate
Innovation Orientation	Product Uniqueness	0.50	5.1	0.25	Strong
	Operational Efficiency	0.40	3.8	0.16	Moderate
	Reputation	0.45	4.2	0.20	Strong
	Customer Loyalty	0.60	5.5	0.35	Very Powerful

Source: Data processed, 2025

Based on the data above, it is known that the Strategic Thinking dimension has a moderate influence on Product Uniqueness, with a path coefficient of 0.40 and a T value of 3.5, which shows that strategic thinking skills can help create unique products and differentiate the company from competitors. The influence of Strategic Thinking on Operational Efficiency was also moderate, with a path coefficient of 0.30 and a T-value of 2.7, suggesting that strategic planning has a positive contribution to operational efficiency, although the effect is not as large as on unique products. In addition, Strategic Thinking has a moderate effect on Reputation (0.35, T-value 3.1), which indicates that a well-thought-out long-term strategy plays an important role in building a company's reputation. However, the influence of Strategic Thinking on Customer Loyalty (H1d accepted) shows stronger results with a path coefficient of 0.50 and a T-value of 4.2, which means that companies with clear strategic planning tend to have more loyal customers. These results are consistent with the view of (Ulrich et al., 2012) who stated that strategic thinking is an important foundation for creating long-term CA.

The Change Management dimension shows a greater influence on Operational Efficiency (coefficient of 0.55, T-value 5.0), illustrating that a company that is more adaptive to change can improve its operational efficiency. Meanwhile, Change Management also had a moderate effect on Product Uniqueness (0.32, T-value 2.5) and Reputation (0.40, T-value 3.3), as well as a moderate influence on Customer Loyalty (0.40, T-value 3.2), indicating that the ability to manage changes well improves product quality and strengthens relationships with customers. As stated by (J. Barney, 1991), the ability of organizations to adapt to market changes is key in creating efficiencies that not only reduce costs, but also increase long-term competitiveness.

The Networking & Collaboration dimension plays a significant role in improving Product Uniqueness (0.38, T-value 3.0) and Operational Efficiency (0.45, T-value 4.0), demonstrating that a strong network with various parties contributes to product development and efficiency improvement. Networking & Collaboration also makes a significant contribution to Reputation (0.50, T-value 4.5) and Customer Loyalty (0.40, T-value 3.2), confirming the importance of external collaboration in strengthening the company's image and maintaining customer loyalty. This view is supported by (Porter, 1990) which emphasizes the importance of external relations to strengthen the competitiveness of companies in the global market.

Finally, the Innovation Orientation dimension has a very significant impact on Product Uniqueness (0.50, T-value 5.1) and Customer Loyalty (0.60, T-value 5.5), showing that orientation to innovation can increase product differentiation and strengthen relationships with customers. The effect of Innovation Orientation on Operational Efficiency (0.40, T-value 3.8) and Reputation (0.45, T-value 4.2) is also significant, indicating that companies that focus on innovation can improve their efficiency and reputation in the market. As revealed by (Teece, 2007)an orientation towards innovation plays an important role in maintaining customer loyalty and creating a competitive advantage that is difficult for competitors to replicate.

Overall, this analysis shows that the dimensions of SHRC have a significant influence on the achievement of SCA (all hypotheses are accepted), with a stronger influence from Innovation Orientation and Change Management, while Strategic Thinking and Networking & Collaboration also play an important role in improving the SCA of aquaculture SMEs sector.

Coefficient of Determination (R^2)

Based on the results of SEM-PLS, the R^2 value for each dimension of the SCA variable is obtained as follows:

Table 3 R^2 Values

SCA Dimensions	R^2	Interpretation
Product Uniqueness	0,62	Moderate to strong
Operational Efficiency	0,71	Strong
Reputation	0,68	Moderate to strong
Customer Loyalty	0,76	Substantial (very strong)

Source: Data processed, 2025

The results of the internal evaluation of the model through the analysis of the values of R-square (R^2), Q-square (Q^2), and f-square (f^2) showed that the SEM-PLS model built had good predictive power and structural effects. First, the R^2 value in each dimension of SCA variable is in the moderate to very strong category. The Customer Loyalty dimension has an R^2 of 0.76 which indicates that 76% of customer loyalty variability can be explained by SHRC dimension, making it the most affected component. Furthermore, Operational Efficiency has R^2 of 0.71, Reputation of 0.68, and Product Uniqueness of 0.62. These values are above the 0.50 threshold, indicating that the model has substantial clear power (Hair et al., 2017).

Predictive Relevance (Q^2)

The Q^2 value is used to measure the model's predictive ability against endogenous variables using the blindfolding technique. $Q^2 > 0$ indicates that the model has good predictive capabilities. Based on the results of the SEM-PLS analysis, the Q^2 value was obtained as follows:

Table 4 Q^2 Values

SCA Dimensions	Q^2	Interpretation
Product Uniqueness	0,41	Strong predictive

SCA Dimensions	Q^2	Interpretation
Operational Efficiency	0,49	Strong predictive
Reputation	0,38	Strong predictive
Customer Loyalty	0,53	Predictive is very powerful

Source: Data processed, 2025

Based on the table above, the Q^2 predictive relevance test calculated through the blindfolding method shows that all endogenous dimensions have a Q^2 value above 0.35. Customer Loyalty obtained Q^2 of 0.53, Operational Efficiency 0.49, Reputation 0.38, and Product Uniqueness 0.41. This indicates that the model has excellent predictive ability in explaining data variations, which means that the model structure not only fits the sample data, but can also validly predict new data (Hair et al., 2017).

f^2 Effect Size

The value of f^2 indicates the magnitude of the effect of each exogenous variable on the endogenous variable individually. Interpretation according to Cohen (1988): $f^2 \geq 0.35$ = Large effect: $f^2 \geq 0.15$ = Medium effect; $f^2 \geq 0.02$ = Small effect; $f^2 < 0.02$ = Insignificant. Based on the results of the SEM-PLS analysis, it is known that the value of f^2 is as follows:

Table 5 Values f^2 Result

Correlation	f^2	Interpretation
Strategic Thinking → Customer Loyalty	0,18	Moderate effects
Change Management → Operational Efficiency	0,36	Huge effect
Networking & Collaboration → Reputation	0,32	Medium-strong effects
Innovation Orientation → Product Uniqueness	0,38	Huge effect
Innovation Orientation → Customer Loyalty	0,42	Huge effect

Source: Data processed, 2025

Based on the table above, the f^2 effect size test shows the strength of the contribution of each SHRC dimension to the outcome of the SCA variable. Innovation Orientation has a great influence on Product Uniqueness ($f^2 = 0.38$) and Customer Loyalty ($f^2 = 0.42$), indicating that orientation to innovation is a major driver in creating product uniqueness and increasing customer loyalty. Change Management has a great influence on Operational Efficiency ($f^2 = 0.36$), reinforcing the importance of adaptability capacity in improving process efficiency. In addition, Networking & Collaboration contributes greatly to Reputation ($f^2 = 0.32$), demonstrating the importance of external cooperation in building a company's image. Strategic Thinking also has a moderate influence on Customer Loyalty ($f^2 = 0.18$), showing that SHRC planning contributes to customer retention and commitment.

Overall, the internal evaluation of the model through R^2, Q^2, and f^2 shows that the model has solid structural and predictive strength. This supports the claim that SHRC has a significant role in encouraging SCA, especially in the aquaculture SME sector.

Discussion

SHRC and SCA

This research provides empirical support for the *RBV* (J. B. Barney, 1991) by demonstrating that intangible HR assets, such as innovation orientation and strategic thinking, meet the VRIN criteria and contribute meaningfully to firm competitiveness. The findings align closely with (Marler & Fisher, 2013), who emphasized the pivotal role of HR strategies in boosting innovation and

operational performance. Our results similarly show that SHRC fosters organizational learning and adaptation, both of which are crucial in volatile industries like aquaculture.

However, this study adds nuance by showing that not all SHRC dimensions exert equal influence. Innovation orientation emerged as the strongest predictor of both product uniqueness and customer loyalty. This finding echoes (Ahmad et al., 2023), who demonstrated that innovation-centric human capital significantly boosts market differentiation and sustained performance in SMEs from Pakistan. In contrast to studies in more industrialized contexts, our findings suggest that innovation in developing economies may rely more on incremental and frugal innovations—often social or collaborative—than on large-scale technological shifts.

Strategic Thinking and Adaptive Capacity

Strategic thinking was found to have a moderate but statistically significant influence on all dimensions of SCA, with the strongest effect on customer loyalty. This is consistent with the observations by (Liedtka, 1998), who argued that strategic thinking enables firms to anticipate long-term trends and align resource allocation accordingly. In a study on Indonesian SMEs, (Samsir Samsir, 2018) similarly noted that leaders with strategic foresight were better able to position their firms in dynamic markets. Our study contributes to this literature by demonstrating that even in aquaculture SMEs, strategic foresight helps develop loyalty through consistent service, personalized client relations, and incremental quality improvements.

Change Management and Operational Efficiency

The role of change management in enhancing operational efficiency was particularly strong. This corroborates findings by (Hafeez & Essmail, 2007), who found that HR competencies related to change management and process reengineering significantly improved organizational agility and output quality in small firms. In our context, aquaculture SMEs that engaged in flexible work practices—such as seasonal staffing, adaptive feeding schedules, or cooperative-based logistics—demonstrated superior efficiency. These operational adaptations, often initiated by HR leadership, illustrate how change management becomes a dynamic capability (Teece et al., 1997) that allows SMEs to remain resilient amid climate shifts, policy reforms, and market fluctuations.

Networking & Collaboration and Reputation Building

Another critical insight is the influence of networking & collaboration on firm reputation and market efficiency. These findings are aligned with (Porter, 1990) emphasis on the importance of clusters and external linkages for competitive positioning. In line with (Quartey, 2019), who studied the fishing industry in Australia, our research shows that trust-based collaborations—whether with local suppliers, cooperatives, or research institutions—enable SMEs to pool knowledge and manage quality, thereby improving stakeholder perceptions. In developing regions, where institutional support is often fragmented, informal networks can function as social capital to fill capability gaps.

Local Contextualization and Practical Manifestations

Empirical examples from Brebes further contextualize these theoretical insights. Some SMEs have begun collaborating with local universities for microbial testing, which has boosted both product credibility and customer retention. Others have adopted mobile apps for stock and harvest recording, reducing cost leakage and improving decision accuracy. These micro-innovations, while simple, reflect a strategic deployment of SHRC suited to resource-constrained settings. To further contextualize the findings, this study draws on observations and examples from aquaculture SMEs in Brebes, Central Java—areas well-known for their brackish water aquaculture and shrimp hatcheries. One example, a small-scale hatchery that began digitalizing its inventory and water quality logs using basic mobile applications developed by a local university. This simple innovation—initiated by the owner after participating in a local training program—helped minimize feed waste and optimize harvest cycles, leading to improved operational efficiency and greater buyer

satisfaction. Another enterprise, adopted a collaborative model by forming a cooperative to jointly procure feed and sell harvests. This strategy lowered costs and enabled the group to negotiate better prices with regional buyers. A third example comes from a female-owned SME, which diversified from monoculture milkfish into polyculture with seaweed. By leveraging innovation orientation and applying basic market research, the enterprise gained visibility in both local and export markets. Her success story has now been used by the regional fisheries office as a model of gender-inclusive entrepreneurship and sustainability.

These cases illustrate how SHRC are not abstract competencies, but real drivers of transformation in SMEs. They also reflect the importance of context-sensitive application: strategies that are low-cost, inclusive, and reliant on social capital are most effective in regions with limited infrastructure and formal institutional support.

Influence of SHRC on SCA

The results of this study show that SHRC play a very important role in achieving SCA. This shows that companies that have HR with strong strategic competencies are better able to maintain their CA in the long term. For example, companies with HR who have sharp strategic thinking will be better able to respond to market challenges and opportunities quickly, as well as formulate the right strategies to increase competitiveness.

The influence of SHRC on SCA also shows that investment in training and HR development to upskill these skills can have a significant impact on SMEs in improving their CA. Therefore, this study extends prior findings by demonstrating how SHRC translates into tangible performance improvements, even in informal or semi-formal business environments where traditional HR practices are limited. It affirms that in developing economies, HR competencies must be agile, collaborative, and context-sensitive to foster SCA.

CONCLUSION

Based on the results of the study, it can be concluded that SHRC has a significant effect on SCA in the aquaculture SMEs sector. The four dimensions of SHRC—Strategic Thinking, Change Management, Networking & Collaboration, and Innovation Orientation—show a positive contribution to the SCA dimensions which include Product Uniqueness, Operational Efficiency, Reputation, and Customer Loyalty. Key findings show that Innovation Orientation has the strongest influence on Product Uniqueness and Customer Loyalty, confirming that innovative orientation in HR is the main driver of product uniqueness and customer loyalty. In addition, Change Management has proven to greatly contribute to increasing Operational Efficiency, demonstrating the importance of organizational adaptability to changes in the business environment. The Networking & Collaboration dimension plays a big role in shaping Reputation, underlining the important value of cooperation and networking in building a positive image of SMEs. While Strategic Thinking has a moderate but significant influence on Customer Loyalty, it indicates that the direction of HR strategy also plays a role in building long-term relationships with customers.

The reliability and validity test of the construct showed that all indicators met the statistical requirements (outer loading > 0.7; ETA>0.5; Cronbach's Alpha and Composite Reliability > 0.7), and the model's inner test showed strong R-square and Q-square values, which means the model has high clarity and predictive power. This strengthens that SHRC are the key to the SCA of Aquaculture SMEs sector. Thus, the results of this study affirm the urgency of investment in the development of human resource capacity in a targeted and strategic manner as part of the big agenda of increasing the competitiveness of aquaculture SMEs in the midst of industrial dynamics and global market pressures.

Theoretical Implications

This research makes an important contribution to the literature on strategic management and HR, especially in the context of Aquaculture SMEs sector which has been relatively under-paid in academic studies. First, the results of this study reinforce the theory of RBV (J. Barney, 1991; Wernerfelt, 1984), that SCA is not only built from physical or financial assets, but from the competencies of HR that are unique, rare, difficult to replicate, and strategically organized. Dimensions such as Innovation Orientation and Strategic Thinking have proven to make significant contributions in creating product uniqueness and customer loyalty—two key indicators of SCA. Second, these results expand and adapt the SHRC framework as developed by (Ulrich et al., 2012) and (Spencer & Spencer, 1993) into aquaculture SMEs sector. By incorporating the dimensions of Change Management and Networking & Collaboration into the measurement, this study succeeded in constructing a competency model that is more in line with the contextual needs of SMEs who face the challenges of a dynamic, collaborative, and community-based business environment. Third, the study also strengthens the reflective model structure approach in the SEM-PLS analysis, which proves that each dimension of the SHRC has high construct validity and reliability as well as a significant structural influence on competitive outcomes.

Practical Implications and Strategic Advice

Based on these findings, here are some strategic suggestions that can be applied by Aquaculture SMEs sector:

SHRC Development: SMEs should focus on developing strategic thinking competencies, change management skills, and innovation orientation among employees and managers. Training and workshops that focus on these skills should be a priority to create teams that are able to formulate the right strategies and adapt quickly to market changes.

Increased Networking & Collaboration: SMEs should strengthen their relationships and networks with various external parties, such as suppliers, consultants, research institutes, and customers, to improve access to resources, knowledge, and market opportunities. This collaboration can also open up opportunities for innovation in more efficient products and processes.

Focus on Innovation and Product Differentiation: SMEs must increase their orientation towards innovation, both in products and processes, to create products that are different and have added value. Innovation will also help improve operational efficiency and reduce production costs.

Improved Customer Reputation and Loyalty: SMEs should focus on managing their reputation through effective marketing, transparent communication with customers, and ensuring high customer satisfaction. This strategy will strengthen customer loyalty, which in turn can increase revenue and long-term competitiveness.

By implementing these recommendations, aquaculture SMEs can strengthen their position in the market, create a SCA, and adapt to rapid changes in the aquaculture industry.

Limitation

Although this study has made a significant empirical contribution to the understanding of the relationship between SHRC and SCA in the context of aquaculture SMEs sector, there are several limitations that need to be acknowledged:

Limitations of Geographical Context

This research was only conducted on MSMEs in the aquaculture sector in certain regions, so the results could not necessarily be generalized to other regions with different social, economic, or cultural characteristics.

Cross-sectional Research Design

Data collection is carried out cross-sectionally, that is, at a certain time, so it is not possible to capture the dynamics of changes in human resource competencies and competitive advantages over time.

Use of Perception Data

Data was collected through questionnaires based on respondents' perceptions, so there is a potential for subjectivity bias. Validation of objective data such as financial statements, customer loyalty data, or actual operational efficiency is not performed.

Simple Relational Model

Although the SEM-PLS model is quite complex, it has not explored the potential moderator or mediator variables such as organizational culture, leadership structure, or digital technology capabilities that might influence the relationship between SHRC and SCA.

Suggestions for Further Research

Based on these limitations, some suggestions for the development of further studies are as follows:

Expanding Context and Comparison Between Regions

Future research may expand geographic scope, including conducting cross-country comparative studies to look at the variation in the role of SHRC in shaping SCAs in various cultural and institutional contexts.

Use of Longitudinal Design

Follow-up studies should use a longitudinal approach to observe changes in HR competencies and their impact on competitive advantage in a more dynamic and causal manner.
Objective and Qualitative Data Integration Subsequent research can combine quantitative methods with qualitative data through in-depth interviews or FGDs (Focus Group Discussions), as well as add objective data such as production reports, customer satisfaction, and financial performance to improve external validity.

Addition of Moderator/Mediator Variables

It is recommended to include variables such as digital capability, organizational culture, or entrepreneurial orientation to explore the more complex mechanisms in the relationship between SHRC and SCA.

Cross-Sector Studies

This research can also be replicated in other SME sectors (e.g. creative manufacturing, agriculture, or tourism) to test the generalization of the SHRC model in building SCA.

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