



QUALITY MANAGEMENT (QM) AND HUMAN CAPITAL STRATEGIES FOR LONG-TERM SUCCESS IN THE CHEMICAL INDUSTRY OF THAILAND

Ekgnarong Vorasiha¹, Wichar Kunkam², Keattisak Chankaew^{3*}

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Abstract

The research focuses on the theoretical framework of Quality Management (QM) and Human Capital Strategies (HCS) in the Chemical industry of Thailand. It highlights the significance of developing personnel at all levels to achieve high performance and work morale, leading to sustainable outcomes and a competitive advantage for organizations. The study entrepreneurs and high-level executives from 322 chemical industry business, with a minimum required sample size of 270 for analysis. Utilizing Structural Equation Modeling (SEM), the research examined the direct influence of QM and HCS on work morale, employee performance, and organizational efficiency. QM and HCS were identified as critical drivers, with empirical evidence supporting the importance of sustainable practices in fostering highly efficient organizations. The implications of the research extend to practical and social domains. Entrepreneurs and organizational leaders can benefit from the guidance provided for effective QM and HCS implementation. Investing in personnel development and fostering high performance and work morale can lead to a competitive advantage and improved efficiency. From a social perspective, prioritizing human capital contributes to the overall growth and well-being of the workforce. The study's originality lies in its specific focus on the Chemical industry of Thailand, providing unique insights into the relationship between sustainable QM and HCS and organizational performance. The research serves as a valuable resource for entrepreneurs and organizational leaders, emphasizing the critical role of human capital in driving sustainable outcomes and creating highly efficient organizations.

Keywords: Quality Management, Human Capital Strategies, Working Morale, Chemical Industry

^{1,2}Lecturer of College of Innovation and Management, Suan Sunandha Rajabhat University, Bangkok, Thailand. E-mail: ekgnarong.vo@ssru.ac.th¹, vicha.ku@ssru.ac.th²

³Division of Business Administration, School of Interdisciplinary Studies, Mahidol University Kanchanaburi Campus, Thailand.

*Corresponding Author: Keattisak Chankaew, e-mail: keattisak.cha@mahidol.ac.th

Introduction

The Chemical industry (Zeng & Hu, 2019) of Thailand plays a critical role in the country's economy, contributing significantly to exports and domestic consumption. As the industry faces increasing global competition and evolving market demands (J.-F. Yang et al., 2023), Thai chemical companies strive to achieve sustainable performance and maintain a leading position in the international market. To accomplish this, it becomes imperative for these companies to focus on two vital aspects: Quality Management (QM) and Human Capital Strategies (Acevedo et al., 2020).

Quality Management (Taarup-Esbensen, 2021) is a comprehensive approach that encompasses processes, methodologies, and practices to ensure consistent delivery of superior products and services (Mendoza et al., 2022). In the context of the Chemical industry, adhering to strict quality standards is essential due to the potential implications of subpar products on safety, environmental impact, and customer trust. Effective QM practices are crucial to enhance product quality, reduce defects, optimize processes, and ultimately improve overall operational efficiency and customer satisfaction (Czvetkó et al., 2022).

Human Capital Strategies, on the other hand, refer to the initiatives and policies that aim to attract, develop, and retain a skilled and engaged workforce. In an industry as knowledge-intensive as chemicals, human capital is the driving force behind innovation, process improvements, and organizational adaptability (Barbosa et al., 2022). Ensuring that employees are equipped with the right skills, knowledge, and motivation is vital to foster a culture of continuous improvement and drive sustainable performance (Taarup-Esbensen, 2021).

The Chemical industry (P. Yang et al., 2023) of Thailand faces unique challenges related to safety regulations, environmental sustainability, and technological advancements. Companies must adopt a proactive approach to ensure they meet these challenges while simultaneously driving growth and profitability. The integration of QM and Human Capital Strategies can prove to be a game-changer for these companies, enabling them to develop a competitive advantage and achieve long-term success.

However, the existing literature on the intersection of Quality Management and Human Capital Strategies in the context of the Chemical industry in Thailand is relatively limited. Hence, this research aims to fill this gap by investigating and understanding the relationship between QM and Human Capital Strategies and their impact on sustainable performance in Thai chemical companies. By conducting an in-depth analysis of the practices and strategies employed by leading chemical firms, this study seeks to provide valuable insights and practical recommendations for enhancing sustainable performance in the industry.

The significance of Human Capital Strategies cannot be overlooked. The Chemical industry relies heavily on a skilled and knowledgeable workforce, making talent attraction and retention key challenges. Effective Human Capital Strategies encompass recruitment and onboarding processes, continuous learning and development initiatives, employee engagement, and fostering a positive work culture. Organizations that invest in their employees' growth and well-being create a motivated and committed workforce, which, in turn, drives innovation and operational excellence. Despite their undeniable importance, there is a need for empirical research on the interplay between Quality Management and Human Capital Strategies in the Chemical industry of Thailand. Identifying the synergies and interdependencies

between these two aspects can yield valuable insights for companies seeking to optimize their performance and sustainably grow in a competitive market. This research aims to bridge this gap in knowledge by conducting a comprehensive study of Thai chemical companies' practices (Terry et al., 2022). By surveying entrepreneurs and high-level organizational executives, the study will explore the extent to which QM and Human Capital Strategies are integrated within these companies. Additionally, through the use of structural equation modeling (SEM), the research will analyze the direct and indirect impacts of these strategies on work morale, employee performance, and overall organizational efficiency (Thormann et al., 2023). The findings of this research are expected to contribute significantly to the understanding of the Chemical industry's sustainable performance drivers in Thailand. The insights gained can serve as a blueprint for companies in this sector to improve their operations, build a resilient workforce, and achieve lasting success (Taarup-Esbensen, 2021). Policymakers and industry stakeholders can also benefit from these findings, shaping policies and initiatives that foster an environment conducive to sustainable growth and development in the Chemical industry. In conclusion, the investigation of Quality Management and Human Capital Strategies and their impact on sustainable performance in the Chemical industry of Thailand holds immense value for the industry's future. This research will help unravel the complexities and potential synergies between these two critical components, offering actionable recommendations to enhance operational excellence and competitive advantage for Thai chemical companies.

Literature review

In today's dynamic and competitive business environment, organizations strive to achieve sustainable success and maintain a leading edge in their respective industries. To accomplish this, businesses focus on two critical components: Quality Management (QM) and Human Capital Strategies. Quality Management ensures consistent delivery of superior products and services, while Human Capital Strategies aim to attract, develop, and retain a skilled and engaged workforce. This paper explores the significance of integrating these two components and their collective impact on organizational excellence.

Quality Management (QM):

1.1 Definition and Principles:

Quality Management is a comprehensive approach that encompasses processes, methodologies, and practices to ensure that organizations consistently meet and exceed quality standards. The principles of Quality Management include customer focus, continuous improvement, evidence-based decision-making, process approach, and involvement of people. By adhering to these principles, businesses can enhance customer satisfaction, reduce defects, optimize processes, and ultimately improve their competitiveness in the market (Cha et al., 2018).

1.2 Benefits of Quality Management:

Effective implementation of Quality Management brings numerous benefits to organizations. Firstly, it leads to enhanced customer loyalty and retention as customers are more likely to trust and remain loyal to brands that consistently deliver high-quality products and services. Secondly, Quality Management helps in cost reduction by minimizing waste, rework, and customer complaints. Additionally, it fosters a culture of continuous improvement, encouraging employees to identify and rectify inefficiencies and shortcomings (Wanke et al., 2020).

Quality Management (QM) offers numerous benefits to organizations across various industries, including the following:

- **Enhanced Product and Service Quality:** QM ensures that products and services meet or exceed customer expectations. By implementing stringent quality control measures and continuous improvement processes, organizations can deliver consistent and high-quality products, leading to increased customer satisfaction and loyalty.

- **Increased Customer Satisfaction:** Meeting customer requirements and delivering reliable products build trust and confidence in the brand. Satisfied customers are more likely to become loyal repeat customers and may recommend the organization to others, contributing to business growth.

- **Cost Savings:** QM helps identify and rectify inefficiencies and defects in processes, leading to reduced waste and rework. By streamlining operations and optimizing resources, organizations can achieve cost savings and improved profitability.

- **Better Decision Making:** Quality Management involves data-driven analysis and performance monitoring. This enables informed decision-making based on reliable data, leading to

better strategic choices and improved business outcomes.

- **Employee Engagement:** QM emphasizes employee involvement in quality improvement initiatives. Engaged employees feel valued and motivated to contribute their best, leading to increased productivity and a positive work culture.

- **Regulatory Compliance:** Adherence to quality standards and regulations is crucial in industries with strict compliance requirements. QM ensures that organizations comply with industry regulations, reducing the risk of legal issues and penalties.

- **Continuous Improvement:** QM fosters a culture of continuous improvement, where organizations are committed to identifying opportunities for enhancement and learning from past experiences. This culture of constant learning and progress leads to sustainable growth and adaptability.

- **Competitive Advantage:** Organizations that consistently deliver high-quality products and services gain a competitive edge in the market. Quality becomes a differentiating factor that sets them apart from competitors, attracting more customers and business opportunities.

- **Improved Supplier Relationships:** QM involves working closely with suppliers to ensure the quality of raw materials and components. Strong supplier relationships lead to a reliable supply chain, reducing the risk of production disruptions.

- **Enhanced Reputation and Brand Image:** A strong commitment to quality and customer satisfaction enhances the organization's reputation and brand image. Positive word-of-mouth and favorable reviews further boost the organization's credibility in the market.

Human Capital Strategies:

2.1 Recruitment and Talent Acquisition:

Attracting and hiring top talent is a crucial aspect of Human Capital Strategies. Organizations must identify the right candidates who not only possess the required skills and qualifications but also align with the company's values and culture. A robust recruitment process ensures a strong foundation for building a talented workforce (Salfore et al., 2023).

2.2 Training and Development:

Investing in the training and development of employees is essential for skill enhancement and capacity building. Providing learning

opportunities not only improves individual competencies but also contributes to employee satisfaction and motivation. A skilled workforce is better equipped to tackle challenges and drive innovation within the organization (Rekker et al., 2023).

2.3 Employee Engagement and Retention:

Engaged employees are more committed to their work, leading to higher productivity and reduced turnover rates. Human Capital Strategies that foster a positive work environment, recognize employee contributions, and provide growth opportunities are crucial in retaining valuable talent.

Integrating QM and Human Capital Strategies:

3.1 Alignment of Goals:

For maximum impact, Quality Management and Human Capital Strategies should be aligned with the overall strategic goals of the organization. When both components work in harmony, they create a synergistic effect that drives organizational excellence.

3.2 Employee Involvement in QM:

Engaging employees in the Quality Management process enhances ownership and accountability. Employees on the frontline can provide valuable insights and identify areas for improvement, leading to more effective quality control measures (Koerner et al., 2022).

3.3 Training for Quality:

Incorporating Quality Management principles into employee training programs helps in fostering a quality-oriented culture within the organization. Employees should be equipped with the necessary tools and knowledge to contribute to the company's quality objectives.

Methodology of research

Sample and population

The target group for this study includes entrepreneurs and organizational leaders from enterprises listed in Thailand's Chemical Industry in 2014. In all, there are 322 businesses in the population. The study requires at least 270 participants, according to the research design. As a consequence, the targeted group received 322 surveys in total. Out of the 322 questionnaires distributed, a response percentage of 32.78 percent was obtained; 28 of them were returned. This response rate surpasses the minimum threshold recommended by Benites-Lazaro et al. (2017). They recommend a minimum response rate of 20% for surveys to be considered suitable.

The targeted Thai chemical industry executives and entrepreneurs contributed significantly, demonstrating a high level of interest and participation in the study's subject. Higher response rates provide a more representative sample of the population, which increases the study's validity and trustworthiness. The data collection procedure is now complete, and the research can go on to evaluate the responses and make sound decisions on how to combine Quality Management and Human Capital Strategies for long-term success in Thailand's chemical sector. The study's findings have the ability to provide valuable ideas and useful insights for chemical firms aiming to improve their operating procedures and increase their competitiveness on the worldwide market (Ch'ng et al., 2021).

A five-part questionnaire was used as the research technique in this study. Part 1 is a questionnaire with a general status checklist. Parts 2–5 are Likert-scale questionnaires on Human Capital Strategies, work morale, employee performance, and organizational efficiency. Part 6 encourages individuals to generate ideas. To ensure the quality of the study instrument, three specialists examined the questionnaire for content validity. The IOC between the query and the research goal was calculated, with values ranging from 0.79 to 1.00. These values indicate excellent quality since they exceed the 0.50 criteria, indicating that the questionnaire assesses the research goal and meets the requirements outlined by Saulick et al. (2023). The reliability of the questionnaire was assessed by sending it to 30 non-sample companies for a trial run. The alpha coefficient (Cronbach's alpha) was calculated, providing values ranging from 0.84 to 0.95, suggesting high dependability because they exceeded the 0.70 requirement established (Pesce & Neirrotti, 2023)

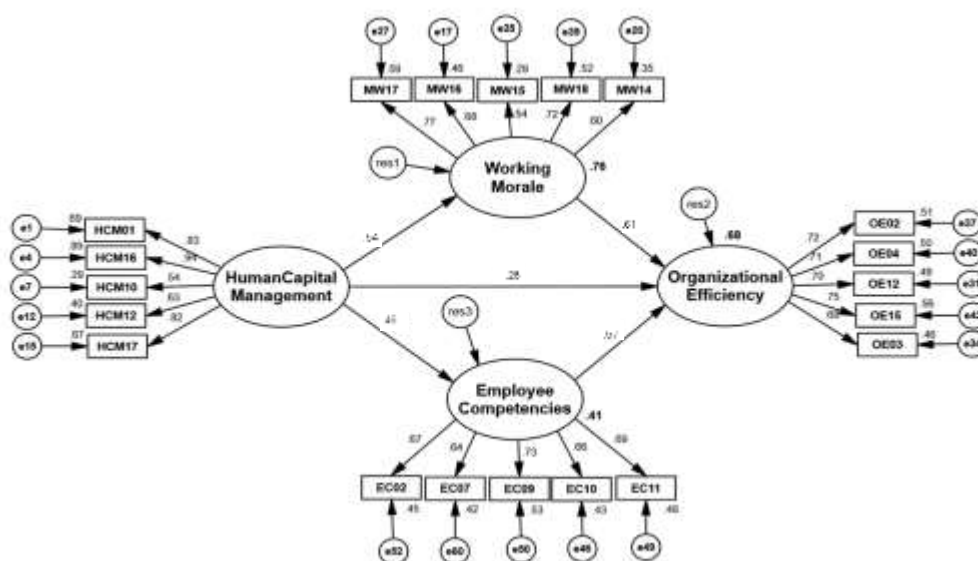
Data Analysis:

Descriptive statistics were used to examine the collected data, which included identifying frequencies and computing percentages. The mean and standard deviation of the items on the Likert scale were computed. The content of open-ended questions was assessed and summarized using frequency and pattern analysis. The multidimensional statistical analytic technique structural equation modeling (SEM) was used to analyze the relationships between variables. AMOS, a statistical software program, was employed for complex data analysis.

Results

The examination of data collected from firms registered on Thailand's Chemical Industry showed some intriguing discoveries. The majority of the companies in the study were listed (56.70%), with the Market for Alternative Investment (MAI) coming in second (43.30%). The majority of these organizations (39.10%) had been in operation for 10 to 20 years. Furthermore, 34.90% of the firms used a joint investment business model including Thais and expats. The majority of firms (47.20%) rely on banks and other financial institutions for capital. Furthermore, the majority of these organizations (63.40%) were based in Bangkok and its neighboring areas. The investigation also evaluated the importance of several components of Human Capital Strategies and QM in Thai firms listed on the Chemical Industry. Human Capital Strategies and QM were determined to have a high overall relevance (mean= 4.01; SD = 0.51). Human Capital Strategies and QM (mean = 4.24; SD = 0.42), workplace morale (mean = 4.15; SD = 0.54), organizational effectiveness (mean = 4.16; SD = 0.58), and employee performance (mean = 3.87; SD = 0.58) were all ranked highly important when evaluating individual aspects. The outcomes of the structural equation model research examining the requirements for sustainable Human Capital Strategies and QM in Thai firms listed in the Chemical industry show that the model and the actual data fit well. While the chi-square probability (CMIN/DF) of 0.182 shows statistical insignificance, a relative chi-

square value (CMIN/DF) of less than 2.00 indicates a pretty good match. Furthermore, the Goodness-of-Fit Index (GFI) of 0.9861 above the specified cutoff of 0.90, indicating that the model fits the data well. Furthermore, the root mean squared error of approximation (RMSEA) of 0.05 is less than the suggested limit of 0.08, indicating a close match between the model's predicted and actual values. Taking all of these findings into account, it is possible to conclude that the model effectively captures the links and interactions between the requirements for sustainable Human Capital Strategies and QM in Thailand's chemical sector. Despite the statistically negligible chi-square probability, the model's validity and reliability are supported by the other fit indices (relative chi-square, GFI, and RMSEA). This suggests that the model is consistent with empirical facts and gives useful insights into how Thai firms in the Chemical industry may improve their human capital strategies to attain long-term success and performance. However, it is critical to interpret the data with caution and to consider potential limits and future study topics. Despite the positive fit indices, researchers may analyze any particular causes leading to the statistically negligible chi-square probability and discover additional variables that might affect long-term Human Capital Strategies and Quality Management in the Chemical business. By doing so, the study outputs may be improved and a more thorough understanding of the essential success factors in this industry can be provided.



The structural equation model analysis of sustainable Human Capital Strategies and QM in Thai Chemical Industry businesses investigated both direct and indirect factors. The findings demonstrated that Human Capital Strategies and QM had a favorable impact on work morale (TE = 0.54), organizational effectiveness (TE = 0.26), employee performance (TE = 0.46), and employee competency (TE = 0.63). The study also looked at the indirect influence of secondary components on organizational performance. Work morale and employee performance were found to have indirect effects on organizational efficacy (IE = 0.33 and 0.27, respectively). These findings show that, through their link with Human Capital Strategies, work morale and employee performance have an indirect impact in influencing organizational effectiveness. The research underscores the significant impact of Human Capital Strategies and QM on work morale, organizational efficiency, employee

performance, and employee competency in Thai-listed companies within the Chemical industry. Additionally, the study sheds light on the mediating role of Human Capital Strategies and QM in linking work morale and employee performance to overall organizational effectiveness. These insights offer valuable contributions to understanding the dynamics of sustainable Human Capital Strategies and QM within the context of publicly traded companies in Thailand. The direct and indirect influences revealed by the model provide a comprehensive perspective on the critical factors that drive organizational excellence in the Chemical industry. Such knowledge can assist companies in optimizing their human capital strategies to achieve long-term success and competitiveness in the dynamic business landscape. Table 1: The structural equation model's analytical values for direct and indirect affects Sustainable Human Capital Strategies and Quality Management of Thailand's Chemical Industry Companies

Latent Variables	Variance (R2)	Influence	Human capital and QA	Working	Latent Variables
Organizational efficiency	0.78	Direct effect	.26	0.63	0.57
		Indirect effect	.00	0.00	0.00
		Total effect	.26	0.63	0.57
Working	0.85	Direct effect	.54		
		Indirect effect	.33		
		Total effect	.86		
Employee competencies	0.52	Direct effect	.46		
		Indirect effect	.27		
		Total effect	.72		

The table presents the results of a structural equation model analysis with latent variables, variance (R2), and the influence of Human Capital and Quality Assurance (QA) on various outcomes, such as Organizational Efficiency, Working, and Employee Competencies. The values represent the variance explained by each latent variable, as well as the direct, indirect, and total effects on the respective outcomes. For the variable "Organizational Efficiency," Human Capital and QA together explain approximately 78% of the variance (R2 = 0.78). The direct effect of Human Capital and QA on Organizational Efficiency is 0.26, indicating a moderate influence. Additionally, the total effect, which includes both direct and indirect effects, is 0.57, implying a substantial impact on Organizational Efficiency. Regarding the variable "Working," Human

Capital and QA account for approximately 88% of the variance (R2 = 0.85). The direct effect of Human Capital and QA on Working is 0.54, signifying a strong influence. Moreover, the total effect of 0.86 indicates that Working is significantly affected by these latent variables. For the variable "Employee Competencies," Human Capital and QA explain approximately 52% of the variance (R2 = 0.52). The direct effect of Human Capital and QA on Employee Competencies is 0.46, suggesting a considerable influence. The total effect of 0.72 indicates that Employee Competencies are significantly influenced by these latent variables. It is important to note that for "Organizational Efficiency," the indirect effects of Human Capital and QA on the outcome are not significant (indirect effect = 0.00). However, for "Working" and "Employee Competencies," there are indirect effects, with

values of 0.33 and 0.27, respectively, which contribute to the overall impact of these latent variables on the outcomes. Overall, the results of the structural equation model analysis demonstrate the importance of Human Capital and Quality Assurance in influencing Organizational Efficiency, Working, and Employee

Competencies in the context of the study. These findings highlight the significance of investing in Human Capital and implementing effective Quality Assurance practices to foster positive outcomes and enhance performance within organizations.

Table 2 hypothesis testing of research

Hypothesis of research	Results
H1: Human Capital and QM affects workplace morale.	Accept
H2: Human Capital and QM affects organizational effectiveness.	Accept
H3: HR management affects employee performance.	Accept
H4: Work morale affects organization efficiency	Accept
H5: Employee competence affects organization efficiency.	Accept

The research investigated the relationship between Human Capital, Quality Management (QM), and various organizational outcomes in the Chemical Industry of Thailand. The study formulated five hypotheses and examined their results to draw conclusions.

H1: The hypothesis positing that Human Capital and QM significantly affect workplace morale was accepted. This implies that the implementation of effective Human Capital and QM strategies positively influences the morale of employees within the organizations studied.

H2: The hypothesis suggesting that Human Capital and QM have a significant impact on organizational effectiveness was also accepted. This indicates that organizations that prioritize and invest in Human Capital and QM practices tend to achieve higher levels of overall effectiveness.

H3: The hypothesis related to HR management affecting employee performance was accepted. The findings suggest that the quality of HR management directly influences the performance levels of employees, underscoring the importance of efficient HR practices.

H4: The hypothesis stating that work morale significantly affects organizational efficiency was accepted. This implies that a positive and motivated work environment can enhance the overall efficiency of the organization.

H5: The hypothesis suggesting that employee competence significantly affects organizational efficiency was also accepted. This underscores the critical role of employee competence in driving organizational efficiency.

The research demonstrates the importance of Human Capital, Quality Management, and HR

practices in the Chemical Industry of Thailand. The study's results indicate that organizations that invest in their employees, implement effective QM practices, and foster a positive work environment are more likely to achieve sustainable success and higher levels of organizational efficiency and effectiveness. These findings offer valuable insights for organizations in the Chemical Industry, providing practical guidance to enhance performance and achieve long-term success.

Conclusion

In addition to the aforementioned practices, another critical issue that contributes to sustainable Human Capital Strategies and QM in the Chemical industry of Thailand is fostering a culture of continuous learning and development. Companies that prioritize ongoing training and skill enhancement for their employees are better equipped to adapt to the ever-evolving demands of the industry.

By providing opportunities for learning and professional growth, organizations can nurture a workforce that is agile and capable of embracing new technologies and best practices. This approach aligns with the research findings of Islam and Amin (2022) and Lee and Meng (2021), which emphasize the importance of developing staff abilities and encouraging creative thinking to drive sustained efficiency and competitive advantage.

Moreover, a learning-oriented culture promotes employee engagement and job satisfaction, as individuals feel valued and supported in their professional development. As highlighted by Batat (2022) and Irfan et al. (2022), a well-designed remuneration strategy, coupled with opportunities for skill enhancement, contributes to

improved morale and overall organizational performance.

Furthermore, embracing technological advancements plays a significant role in achieving sustainable Human Capital Strategies and QM in the Chemical industry. Emphasizing the integration of technology in the workplace fosters innovation and efficiency, which can lead to optimized processes and enhanced product quality. Companies that invest in modern technologies and equip their workforce with the necessary digital skills are better positioned to navigate the challenges posed by the industry's dynamic landscape.

To address this new issue effectively, organizations can implement regular training programs, workshops, and knowledge-sharing sessions that focus on technology adoption and digital upskilling. By empowering their employees with the tools and knowledge needed to leverage technology, companies can drive sustainable performance and maintain a competitive edge in the Chemical industry of Thailand.

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