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ANALYSIS INFLUENCE OF TOTAL QUALITY MANAGEMENT ON COMPETITIVE ADVANTAGES WITH TECHNOLOGICAL INNOVATION AND KNOWLEDGE MANAGEMENT AS MODERATING VARIABLES

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ABSTRACT

Purpose: This study aims to analyse the effect of total quality management on competitive advantage at PT Bank Pembangunan Dearah Tbk. with technological innovation and knowledge management as moderating variables.

Methodology/approach: Primary data were collected from 373 Bank Jatim employees through questionnaire distribution. Data were analysed using Partial Least Square (PLS) statistical technique to test the relationship between variables.

Findings: Total quality management is proven to be a factor that can affect competitive advantage. Technological innovation is able to strengthen the influence of total quality management on competitive advantage, but knowledge management is unable to strengthen or weaken the influence of total quality management on competitive advantage.

Practical implications: This research is expected to be a consideration for the management of banking companies in integrating technological innovation and knowledge management through the application of total quality management, so that companies can achieve competitive advantage in facing the industrial revolution 4.0.

Originality/value: This study adds moderating variables of technological innovation and knowledge management, which are thought to have a combined influence in the relationship of total quality management to competitive advantage which aims to answer the inconsistency of

previous research findings. This study also uses the distribution of questionnaires to Bank Jatim employees, thus providing research results that are relevant to current conditions.

Keywords: Competitive Advantages; Knowledge Management; Technological Innovation; Total Quality Management.

ABSTRAK

Tujuan penelitian: Penelitian ini bertujuan untuk menganalisis pengaruh total quality management terhadap keunggulan bersaing pada PT. Bank Pembangunan Dearah Tbk. dengan inovasi teknologi dan manajemen pengetahuan sebagai variabel moderasi.

Metode/pendekatan: Data primer dikumpulkan dari 373 pegawai Bank Jatim melalui penyebaran kuesioner. Data dianalisis menggunakan teknik statistika Partial Least Square (PLS) untuk menguji hubungan antarvariabel.

Hasil: total quality management terbukti menjadi faktor yang dapat memengaruhi keunggulan bersaing. Inovasi teknologi mampu memperkuat pengaruh total total quality management terhadap keunggulan bersaing, namun manajemen pengetahuan tidak mampu memperkuat maupun memperlemah pengaruh dari total quality management terhadap keunggulan bersaing.

Implikasi praktik: Penelitian ini diharapkan dapat menjadi pertimbangan manajemen perusahaan perbankan dalam mengintegrasikan inovasi teknologi dan manajemen pengetahuan melalui penerapan total quality management, sehingga perusahaan dapat mencapai keuanggulan bersaing dalam menghadapi revolusi industri 4.0.

Orisinalitas/kebaharuan: Penelitian ini menambahkan variabel moderasi inovasi teknologi dan manajemen pengetahuan, yang diduga memiliki pengaruh gabungan dalam hubungan total quality management terhadap keunggulan bersaing yang bertujuan untuk menjawab inkonsistensi temuan penelitian terdahulu. Penelitian ini juga menggunakan penyebaran kuesioner pada pegawai Bank Jatim, sehingga memberikan hasil penelitian yang relevan dengan kondisi saat ini.

Kata kunci: Inovasi Teknologi; Keunggulan Bersaing; Manajemen Pengetahuan; Total Quality Management.

INTRODUCTION

Competitive advantage is the company ability to produce better performance than competitors in similar industries, which is obtained through optimal utilization of internal resources (Farida & Setiawan, 2022). This advantage includes market dominance, creation of greater value for consumers, and sustainable competitiveness (Othman, 2020). With effective and innovative business strategies, companies can take advantage of opportunities to improve performance, strengthen their competitive position, and deal with dynamic market pressures and changes (Alalie *et al*., 2019; Elhawi, 2022).

Competitive advantage is a business strategy that allows companies to take advantage of market opportunities to survive in competition, both in the same and different industries (Donnellan and Rutledge, 2019). Competitive advantage can also have a significant effect on company performance, where a strong defensive position reflects the firm value to investors and stakeholders. In an increasingly complex competitive environment, especially in the era of the industrial revolution 4.0 and technological disruption, the financial and banking sectors face great pressure to transform towards a digital ecosystem (Ahinful *et al*., 2024). These changes encourage companies to adopt strategies that are responsive to market dynamics, government regulations, and technological turbulence, as described in management change theory, where external conditions can trigger strategic transformation to maintain competitive advantage.

According to OJK data, digital transactions rose 30.50% (yoy) to 1.8 billion on 2024, with the largest increase in QRIS at 207.55% and electronic money at 22.46%. This increase was driven by digital banks, fintech, and the rules of POJK Number 21 of 2023 concerning digital services by Commercial Banks. Although digital transactions increased, the number of bank offices decreased due to the emergence of digital banks, mergers, and acquisitions as a result of digitalization. Bank Jatim, owned by the East Java Provincial Government, has the second largest assets in Indonesia and is tasked with driving the regional economy through the management of funds and credit in various business segments. As a regional financial manager, Bank Jatim is expected to contribute more to local revenue. However, intense competition in the East Java banking sector has made Bank Jatim not optimal in market share, both in lending and funding. The emergence of digital banks, fintech, and P2P lending has also reduced Bank Jatim deposits, loans, and LDR ratio, resulting in a decrease in profits and local revenue. To face competition, a strategy is needed to improve performance and competitive advantage.

To deal with competition, Bank Jatim needs to carry out a holistic transformation that includes aspects of business, risk, human resources, and technology in order to achieve competitive advantage and support regional economic equity. The main focus of Bank Jatim is to increase competitiveness amidst intense competition and drastic changes in the business environment. one strategy that can be adopted is total quality management (TQM), which is an innovative method in business management. TQM, as a holistic management approach, helps companies deal with market changes and competition by focusing on improving the quality of products and services. The gradual and planned transformation is highly dependent on the managerial role and trust in the management concept applied.

Total quality management (TQM) emphasized continuous improvement to increase customer satisfaction, reduce rework, involve employees, improve teamwork, redesign processes, and ensure accurate measurement, information and data analysis. TQM also helps companies save time in improving the quality of failed products and services. Bank Jatim has adopted TQM based on the Malcolm Baldrige National Quality Award (MBNQA) which

includes 7 international indicators. This implementation aims to improve the quality of services and products to be able to compete in the market, with direct initiation the management of Bank Jatim.

Research of Al-Shammari and Isa, (2023), Alalie *et al.*, (2019), and Othman, (2020) show that TQM has a significant positive effect on competitive advantage. All indicators in TQM strongly support the achievement of competitive advantage by encouraging accurate innovation. However, research of Pussella and Yapa (2021); Cho and Linderman, (2019) showed a negative effect of TQM on competitive advantage. This happens if one of the TQM indicators is not working well or the leadership role in the team is less than optimal. Research of Baidoun *et al.*, (2018); Dilawo and Salimi, (2019) concluded that TQM has no effect on competitive advantage. Although TQM is well implemented, companies may need other approaches such as balanced scorecard, SWOT analysis, or other indicators to achieve competitive advantage.

The inconsistencies in the results of the above studies are thought to be caused of differences in measurements, years of observation, research objects, and variables used (Miles, 2017). In addition, according to Pokhariyal (2019), inconsistencies may also be influenced of moderating or mediating variables, such as technological innovation and knowledge management. The use of technological innovation variables refers to the very rapid process of banking digitalization, innovation means changes or transformations in the banking technology system as a means of competition in the banking sector. Attributed to banking practices, OJK also encourages banking transformation, especially regional development banks through the 2024-2027 BPD Strengthening Roadmap program through technological and human resource development and POJK No.11/POJK.03/2022: This POJK regulates the implementation of information technology of commercial Banks. Attributed to the resource-based view theory, unique resource management originating from internal bank factors, namely the management of human resources and the use of technology. (Wernerfelt, 1984). Internal resources, including physical, monetary, and human resources, are the key to competitive advantage. The combination of these resources creates a core competence that is rare, valuable, difficult to imitate, and cannot be replaced of competitors (Elya Dasuki, 2021).

Competitive advantage is achieved if the company is able to optimize core resources effectively. Resource-Based View (RBV) theory emphasizes the importance of strategies for managing, developing, and using key resources, such as technology, human resources, and organizational systems, to maximize firm value (Farida and Setiawan, 2022). In the digital era, mastery of technology and human resources equipped with knowledge, creativity, and high motivation are the keys to competitive advantage. Technology that is continuously developed and integrated with IT infrastructure and human resources will create sustainable advantages (Elya Dasuki, 2021; Ananga *et al.*, 2024). Technology also simplifies operations, encourages innovation, and reduces costs, thereby increasing company efficiency (Tasleem *et al.*, 2019; Rhee and Stephens, 2020). RBV also considers Knowledge Management (KM) as a strategic asset, especially in competitive environments. KM supports the development of innovation and triggers competitive advantage (Qandah *et al.*, 2020; Nasution *et al.*, 2021). Migdadi's research (2022), states that KM mediates the relationship between TQM and competitive advantage, where TQM supported of KM can increase company excellence.

This research refers to Othman (2020), Ahinful *et al.* (2024), Tasleem et al. (2019), and Migdadi (2022), who examined the effect of Total Quality Management (TQM) on competitive advantage in the banking sector. The results showed that TQM is the main key

in creating competitive advantage. Tasleem *et al.* (2019), found that technological innovation triggers TQM, which in turn increases competitive advantage. Meanwhile, Migdadi (2022) showed that knowledge management mediates the relationship between TQM and competitive advantage of triggering innovations that support competitive advantage. This research tries to explore what factors are most influential on the bank's competitive advantage, the selected factors have been adjusted to the bank crop plan to transform in the field of human resources and technological innovation. Discussion related to competition is very important because BUMD is one of the contributors in provincial government revenue so that the achievement of regionally owned enterprises bank performance is in the spotlight. And associated with competition, Bank Jatim only holds 30.25% market share in the eastern Java province, so exploring factors to trigger competitive advantage is important. This study extends the literature on the effect of TQM on competitive advantage by adding moderating variables of technological innovation and knowledge management. This study also updates the model, measurement, population, period, and research location to test the consistency of previous research results. This study uses Bank Jatim as the research object.

H_1: TQM has a positive effect on competitive advantages.

In dealing with market changes and increasingly complex competition, company management needs to adjust resources through identifying and evaluating relevant strengths, and developing alternative solutions to solve problems in a planned manner. The concept of Total Quality Management (TQM) was chosen because it can improve business processes, mitigate operational risks, create transparency, and identify critical points in processes, especially in the banking sector. With integrated customer-focused procedures, TQM is able to reduce rework, increase efficiency, and foster customer satisfaction and loyalty, so its application is considered appropriate in service sectors such as banking (Testa *et al.*, 2024; Al-Jarrah *et al.*, 2023).

Total Quality Management (TQM) is a strategy used of companies to create innovations that add value to consumers and stakeholders, and create a competitive advantage that is difficult for competitors to imitate. TQM focuses on improving product quality, reducing production costs, and increasing productivity, which has a positive impact on production costs and company revenue. Research shows that high TQM implementation has a positive effect on competitive advantage, as found in the studies of Asada and Kumar (2021), Ahinful *et al.* (2024), and Permana *et al.* (2021) TQM, as a comprehensive system, helps identify problems in services and products, and improves efficiency with feedback mechanisms. This is in line with research of Othman (2020), Alalie *et al.* (2019), Al-Shammari and Isa (2023), and Testa et al. (2024), in the banking sector.

H_2: Technological innovation strengthens the positive influence of TQM on competitive advantages.

The Resource Based View (RBV) theory states that competitive advantage comes from developing and utilizing unique, valuable, and irreplaceable resources, which must be aligned with the company strategic goals to achieve above-normal profits. RBV also emphasizes the importance of Information Technology (IT) capabilities in creating sustainable competitive advantage, through the integration of IT infrastructure, IT human resources, and IT-enabled intangible resources. In the era of digitalization, information technology, such as modern Internet-connected databases, plays an important role in supporting business processes and innovation. Technological transformation is key in retaining consumers and improving company performance in a sustainable manner (Tasleem et al., 2019; Ananga *et al.* 2024).

In service-based companies such as the banking and finance sector, technological innovation plays an important role in accelerating and simplifying the service transaction process, as well as adding features to the products and services offered. Research of Tasleem *et al.*, (2019) shows that technology has a significant effect on all dimensions of corporate performance sustainability, except environmental and social sustainability, but has an effect on financial performance. Similar results were also found in the research of Ananga *et al.* (2024) and Hidayah *et al.* (2020), which confirmed that technology directly improves company performance. Changes and improvements in technology in companies, especially in the banking sector, have a positive impact on competitive advantage, by facilitating operations and encouraging innovation that affects company performance (Othman, 2020).

H_3: Knowledge management strengthens the positive influence of TQM on competitive advantages.

Knowledge Management (KM) is an organization ability to create, capture, apply, develop, and disseminate knowledge throughout the organization to achieve goals. KM ensures employees have the right information at the right time in the appropriate format (Abbas, 2020). In a competitive environment, KM becomes a strategic asset that helps organizations manage and acquire knowledge in a more effective way (Qandah *et al.*, 2020). In addition, TQM, which focuses on employee development and increasing staff motivation, requires good knowledge management so that learning in the organization can run effectively. TQM aligns human resource quality and learning activities to support organizational success (Pussella and Yapa, 2021).

Knowledge is an important element in dealing with market changes and company dynamics, as it enables innovation in operations and supports the long-term sustainability of management (Mellita and Elpanso, 2020). In Resource Based View (RBV) theory, effective management manages resources, including knowledge, to achieve a competitive advantage that is difficult to replicate (Khurshid *et al.*, 2018). TQM plays a role in facilitating the spread of knowledge in the company, reducing tacit knowledge, and encouraging efficiency and creativity. Research by Jiménez *et al.* (2020), shows that Knowledge Management (KM) strengthened of TQM increases competitive advantage by encouraging innovation and better communication between companies and consumers. Migdadi's research (2022), also shows that KM affects innovation and firm performance, which is in line with RBV theory, where effective knowledge creates unique capabilities that support firm innovation (Permana *et al.*, 2021; Irannejad *et al.*, 2023; Lehyani *et al.*, 2022).

METHOD

This research is a quantitative study using primary data processing. The population in this study consisted of all employees from 42 conventional and sharia branches with a total of 4295 employees. This research uses a probability sampling approach, which means random sampling so that each respondent in the population has the possibility of being sampled by researchers, and determining the number of samples taken using the Slovin formula. Based on this formula, a minimum number of 363 respondents is required which can be used as a research sample. However, in this study, researchers managed to obtain 373 Respondent.

Competitive Advantages

Competitive advantages in this case the dependent variable is the company ability to survive and compete with its competitors. Competitive advantages variables are determined from

the results of the questionnaire. According to Sekaran and Bougie (2017:7), states that the dependent variable or Dependent Variable is the variable that is the main concern for researchers. Competitive Advantages variables are measured by indicators adopted from Garg *et al*., (2023); Shahadat *et al*., (2023) and adapted to the subject under study. The research instrument includes 5 indicators, namely; price (4 question items), quality (4 question items), delivery dependability 3 question items), product innovation (3 question items), and time to market (4 question items) with the following explanation:

Total Quality Management

Total quality management is a technique or method used by company management to gain a competitive advantage which is implemented with various indicators The research instrument in measuring this variable refers to research (Ahinful *et al*., 2024; Asada & Kumar, 2021). The research instrument includes 7 indicators, namely; Leadership (3 question items), Quality assurance (3 question items), benchmarking (3 question items), service design (4 question items), human resource management (3 question items), continuous improvement (4 question items), and information and analysis (3 question items) (Aquilani *et al*., 2017; Dilawo & Salimi, 2019).

Technological Innovations

The first moderating variable construct is technological innovation. The usefulness of technology and the use of technology in all types of corporate sectors have been widely and massively used. Even the retail sector has also tried to adopt technology, as well as in the application of total quality management in banks, many companies have shifted their business through E-business by adopting technology in operations. This study uses indicators in measuring technology, this study uses measurements of technological innovation in accordance with previous research (Tasleem *et al*., 2019). Which consists of research instruments including 3 indicators, namely product technology (3 statement items), technological processes (3 statement items), and information technology (3 statement items).

Knowledge Management

The second construct is knowledge management , which is the company ability to manage, receive, and utilize internal and external data and information into knowledge that can be learned. This framework includes the process of capturing, acquiring, organizing and communicating tacit and explicit knowledge to employees. Thus, employees can understand the information, improve efficiency and productivity, and maximize the company knowledge in the long run. This research instrument refers to research (Qandah *et al*., 2020; Jiménez *et al*., 2020). Which consists of 4 steps: Knowledge creation, knowledge sharing, knowledge storage, and knowledge application.

Respondents answered each questionnaire statement using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Not 7/9 because it is easier for respondents to choose answers that are close to the subjectivity of the respondent and have a clear neutral value response. Because the more scales used, the respondent will find it difficult to distinguish the purpose of the assessment of each scale. The researcher also assured the respondents that the information provided would be kept confidential and only used for academic purposes.

This study uses the Partial Least Squares (PLS) statistical method with the support of SmartPLS software version 3.2.9. PLS is a variance-based statistical method from Structural Equation Models (SEM). The PLS technique was chosen because this study uses a predictive model that tests the significance of the relationship between variables. The use of PLS makes it possible to analyze indicators that measure latent variables. PLS uses all indicator variances to estimate the model relationship, focusing on predicting the dependent variable (Hair *et al.*, 2020).

This study tests two models: Model I tests the direct relationship between the independent and dependent variables without any moderating variables, while Model II tests the interaction effect between moderating and independent variables that affect the dependent variable. The tests carried out include measurement model evaluation, structural model evaluation, direct hypothesis testing, and moderation effect hypothesis testing.

The regression question is as follows:

$$CA = \gamma_1 TQM + \varepsilon \quad (1)$$

The moderation regression analysis question is as follows:

$$CA = \gamma_2 TQM + \gamma_3 IT + \gamma_4 KM + \gamma_5 TQM*IT + \gamma_6 TQM*KM + \varepsilon \quad (2)$$

RESULT AND DISCUSSION

Table 1. Descriptive Statistics

Variable	Theoretic Range	Actual Range	Mean	Standard Deviation
Competitive Advantages (CA)	1-5	1-5	3,77	0,82
Knowledge Management (KM)	1-5	1-5	3,96	0,65
Technological Innovation (TI)	1-5	1-5	3,95	0,68
Total Quality Management (TQM)	1-5	1-5	4,08	0,63

Source: primary data, processed (2024)

Table 2. Discriminant Validity Test Results

Variable	CA	KM	TI	TQM
CA				
KM	0,818			
TI	0,825	0,666		
TQM	0,787	0,835	0,613	

Source: primary data, processed (2024)

Table 3. Reliability Test Results

Variable	*Cronbach's Alpha*	*Composite Reliability*
CA	0,880	0,917
KM	0,909	0,942
TI	0,912	0,944
TQM	0,872	0,921

Source: primary data, processed (2024)

Table 4. Direct Hypothesis Test Results

Hypothesis	Hypothesis Direction	Path Coefficient	t-statistics	p-values	Conclusion
H1: TQM	+	0,275	4.656	0,000	Supported

Source: primary data, processed (2024)

Table 5. Moderation Effect Test Results

Hypothesis	Hypothesis Direction	Path Coefficient	*t*- t-statistics	p-values	Conclusion
TQM * TI	CA	0,079	2.118	0,035	Supported
TQM * KM	CA	-0,061	1.744	0,082	Not Supported

Source: primary data, processed (2024)

Descriptive Statistics

The mean value and standard deviation of each variable in the descriptive statistics of Table 1 show that respondents tend to agree with each statement presented, and the respondents answers do not show significant differences. Most respondents agree that the criteria for competitive advantage have been met. Most respondents feel that total quality management has been implemented. Most respondents also agree that there are technological innovations and knowledge management that are forcing management to achieve competitive advantage.

Measurement models show how indicators represent latent variables. Evaluation includes validity and reliability tests. Validity testing shows whether the research instrument accurately measures what it is supposed to measure. Validity testing consists of convergent validity test and discriminant validity test.

Convergent validity is related to the concept that indicators measuring constructs must have a high correlation. Convergent validity is fulfilled if the outer loading value is> 0.7 and Average Variance Extracted (AVE)> 0.5. The test findings show that the minimum outer loading value is 0,635 and the maximum is 0,933, with the AVE value of each variable exceeding 0.5. Hair *et al*., (2020) state that indicators with outer loading between 0.4-0.7 can be maintained if the AVE value for each variable exceeds 0.5. Based on this, convergent validity has been fulfilled.

Discriminant validity relates to the concept that indicators assessing different constructs should not show strong correlations. Hair *et al*., (2020) mentioned that the Heterotrait Monotrait Ratio (HTMT) value provides a more precise assessment of discriminant validity. For discriminant validity to be achieved, the HTMT value must be less than 0.90. The results from Table 2 show that the HTMT values between variables are below 0.90, thus confirming the achievement of discriminant validity.

Reliability testing shows the consistency of research instruments in measuring a construct. At the advanced research stage, a construct is considered reliable if the Cronbach's alpha and composite reliability values exceed 0.7 (Hair *et al*., 2020). The examination findings presented in Table 3 show that the Cronbach's alpha and composite reliability values for each variable exceed 0.7, which confirms the satisfaction of the reliability test. Based on the validity and reliability tests, all variables and their indicators can be declared valid and reliable for hypothesis testing.

The coefficient of determination (R^2) is used to determine the extent of variability in the independent variable that affects the dependent variable. This study tested two models: Model I tests the direct relationship between the independent and dependent variables in the absence of moderating variables, while Model II tests the interaction effect between the variables between moderating variables and independent variables that affect the dependent variable. The R^2 value for Model I, 0.758, indicates that 75.8% of the variation in competitive

advantage can be explained by the total quality management variable, while the remaining 24.2% is due to other variables not considered in the research framework.

The R^2 value for Model II, 0.778, indicates that 77.8% of the variation in competitive advantage can be explained by the variables of total quality management, technological innovation, and knowledge management, while the remaining 22.2% is due to other variables not considered in the research framework.

This study uses a one-sided hypothesis test at 5% significance level. The hypothesis is supported if the t-statistic > 1.65 and the p-value < 0.05 (Hair *et al.*, 2020). The findings from direct hypothesis testing in Table 4 show that the t-statistic value for H1 exceeds 1.65, with a p-value below 0.05. The path coefficient also shows a positive value consistent with the hypothesized direction of the relationship. These findings suggest that total quality management has a positive and significant impact on competitive advantage. Based on these findings, this study successfully supports H1.

The moderating variable successfully moderates the effect of the independent variable on the dependent variable if the t-statistic value for the interaction between the moderating variable and the independent variable> 1.65 and the p-value <0.05. The results of testing the moderation effect in Table 5 show that the t-statistic value for H2 shows that the t-statistic value exceeds 1.65, with a p-value below 0.05, which indicates a positive path coefficient. These results indicate that technological innovation variables can strengthen the effect of total quality management on competitive advantage. With this finding, this study successfully supports H2. Meanwhile, testing H3 shows that the t-statistic value exceeds 1.65 and the p-value is greater than 0.05, which indicates a negative path coefficient. These results indicate that knowledge management cannot strengthen or weaken the effect of total quality management on competitive advantage. Based on these findings, this study does not support H3.

Effect total quality management on competitive advantages

Based on the research results, there are several indicators of the total quality management variable that have interactions and contribute to the competitive advantage variable, namely the Service design indicator which has a loading factor value of 0.888. This explains that if it is associated with banking that does sell services, service design is the most important part where this variable contributes to how banks manage employee competencies, gather and collaborate ideas and company resources to develop the best services that can be added value and have uniqueness compared to competing banks. The statement item of this variable that is proven to contribute the highest is the statement that Bank Jatim applies SOPs and standards in the services provided, not only improving services but management also considers the existence of SOP and standards in the services provided not to deviate from the company's vision and mission. This is what hopefully can make the best contribution to the creation of competitive advantage.

The research results prove that total quality management allows to make the processes in the company more transparent, identifying critical points in the banking process (Testa *et al.*, 2024). In addition, total quality management which includes integrated procedures, customer-focused procedures reduce rework making the company more efficient. Especially in the service sector such as banking and finance where quality management is seen as comprehensive, total quality management is considered a customer-oriented concept that is applied with the aim of fostering high satisfaction and loyalty from because satisfaction is the main goal of total quality management. So, it can be concluded that the application of total

quality management in the service sector such as banking is a very appropriate method (Jarrah *et al.*, 2023). Total quality management is an approach that today's companies should take to improve product quality, reduce production costs and increase productivity. Total quality management implementation also has a positive impact on production costs and company revenues.

Technological innovation on the relationship between total quality management and competitive advantages

Based on the results of the study, there are indicators of technological innovation that provide the highest interaction value on the relationship between quality management and competitive advantage, namely technological process indicators. The influence of the use of technology applied to the company is proven to make the highest contribution in the creation of the quality management relationship to competitive advantage. The change in the process from semi-manual to the maximum utilization of technology has an efficient effect on bank performance. The trial and error process in every use of technology for products and company operations, as well as strengthening the security system on technology used in products and services, has proven to be able to have a positive effect on increasing the bank's competitive advantage. This results in more secure products and services that meet customer needs.

Technological changes and improvements in the company have a direct effect on competitive advantage, both in banks and companies, technology facilitates company operations that can be used in a dynamic environment. Technology is also able to provide a significant increase in innovation to company performance, where this innovation has an effect on competitive advantage.

Based on the resource-based view theory, competitive advantage comes from developing and utilizing resources that are unique, valuable, irreplaceable, and difficult to imitate. By identifying and acquiring strategic resources and aligning them with corporate goals, organizations can achieve above-average competitive advantage. Such strategic resources are considered critical to creating a sustainable competitive advantage. The resource-based view has proven to be a valuable framework in explaining the influence of information technology on firm performance and the achievement of competitive advantage (Barney, 1991; Wernerfelt, 1984). This theory also emphasizes that companies need to develop information technology capabilities through the integration of information technology infrastructure, human resources in the field of information technology, and intangible resources supported by information technology. These efforts aim to support the achievement of sustainable competitive advantage. (Ananga et al., 2024).

In service-based companies such as the banking and finance sector, organizational processes run so fast to accommodate the need for fast and precise service transactions. Technological innovation in banking helps business processes while providing additional features to the products and services offered to consumers (Tasleem *et al.*, 2019). Technological innovation also allows banks to identify and take advantage of opportunities to bridge the gap between the bank's business strategy and the need for timely and relevant decision making. So that technological innovation is one of the factors considered in analyzing the factors that influence competitive advantage in accordance with the resource-based view theory.

Knowledge management on the relationship between total quality management and competitive advantages

This study did not succeed in finding the moderating effect of knowledge management, this is thought to be due to the influence of the bureaucratic system and the still rigid organizational structure caused by the strong influence of politics in government companies, one of which is in regional banks (Shraah, 2021). In this organization, the process of sharing and transforming knowledge is difficult and limited, even though knowledge sharing facilities are available at the bank. This is also in accordance with social exchange theory, which explains that in companies with a rigid bureaucratic system, individuals tend to want to share information and knowledge in exchange for either rewards in the form of rewards or social relationships.

This finding is also in accordance with the preliminary statistical description which explains that from the results of respondents' answers to the indicator with the lowest average on the knowledge management moderation variable is the knowledge sharing indicator, especially in the statement of conducting a culture of sharing information in the form of a talk series (KM 2.3), this indicates that according to respondents the process of distributing knowledge within the company is still not optimal, and it is considered that there is no awareness of the importance of knowledge sharing, so it can be explained that the knowledge that exists in the internal environment of Bank Jatim is still limited or tacit knowledge.

In addition, the inability of knowledge management to moderate the relationship between total quality management and competitive advantage can be explained by several factors. First, the implementation of knowledge management at Bank Jatim has not been optimal in supporting the company's work culture, which is reflected in the low understanding of employees of the benefits and use of knowledge management in the work environment. Second, the implementation of knowledge management is still at an early stage and was only introduced in 2023, so some employees have not considered it an important priority. Third, the high prevalence of tacit knowledge in Bank Jatim hinders the spread of knowledge evenly within the organization, because employees tend to be reluctant to share the knowledge, they have with the assumption that it is not relevant to other functions or sections. Fourth, the lack of socialization carried out by management regarding the importance of knowledge management and its effect on company performance, which results in a lack of understanding of the strategic role of knowledge management in supporting the company's competitive advantage.

CONCLUSION

This study aims to examine the effect of technological innovation and knowledge management on the relationship between total quality management and competitive advantage at Bank Jatim. The results showed that quality management significantly drives the achievement of competitive advantage, where technological innovation is proven to strengthen the influence of quality management on competitive advantage. The use of technology improves quality management indicators, encourages innovation in Bank Jatim, creates uniqueness, and produces high competitive advantage. However, knowledge management did not succeed in moderating the relationship between quality management and competitive advantage, due to the lack of a work culture that realizes the importance of knowledge management and the low role of change agents in building corporate culture. Overall, Bank Jatim's competitive advantage can be improved through the optimization of quality management adopted from the MBNQA framework, supported by the transformation of technology and human resources as stated in the corporate plan 2024-2028. The technology adopted of Bank Jatim to face digitalization and meet the demands of

digital transactions has proven to increase competitive advantage. However, the lack of innovation in human resource management through knowledge management is an obstacle, whereas in the increasingly fierce competition, good knowledge management can increase innovation, create uniqueness, and strengthen the bank's position in the eyes of customers and investors.

There are limitations to this research. First, the variables of technological innovation and knowledge management as moderating variables are measured using subjective statement items that refer to practices in the Bank and the Bank Corporate Plan so that the research data is limited. Second, this study can only explain the tax avoidance variable of 75.8%, while the remaining 24.2% is explained by other variables outside the study.

Suggestions for future research. First, further research can use other measurements of other factors used of banks in dealing with banking transformation originating from outside the bank such as: competitive factors within BPD itself, marketing management and bank investment, as well as corporate actions that are thought to be able to increase the competitive advantage of banks so that research data is not limited. Second, further research can add respondents such as parties or bank customers in assessing the bank competitive advantage more broadly.

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