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DIGITAL TRANSFORMATION, COOPERATION AND GLOBAL INTEGRATION IN THE NEW NORMAL

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Abstract

This article studies Knowledge, Technology, and Future Readiness as elements that affect a country's digital Competitiveness. The data used for analysis from the IMD World Digital Competitiveness Ranking 2022 of 63 countries. We use the neural network Regotion method in Machine Learning, and we analyze data by JASP software version 0.17.3.0; the analysis results show that the optimal network has four Hidden Layers. Evaluation Metrics, we use MSE, RMSE, MAE/MAP, MAPE, and R² in this paper. The results show that the model proposed by the software has good forecast quality. The Future Readiness element has the most significant influence on Competitiveness, the second is Technology, and the third is Knowledge.

Keywords: *Digital competitiveness, knowledge, technology.*

1. Introduction

World digital competitiveness is the capacity of a country, organization, or individual to use and take advantage of digital and digital technologies to achieve a competitive advantage in the global business environment. Digital competitiveness includes applying, developing, and creating digital technologies to create value for customers, optimize business processes and enhance operational efficiency.

The crucial factors in digital competitiveness include:

Technology infrastructure: A country or organization requires appropriate technological infrastructure to use and develop digital technologies. This element comprises the Internet, telecommunications systems, servers and data storage, software, and information technology applications.

Skills and human resources: To exploit the potential of digital technology, workers need appropriate knowledge and skills. Training and developing human resources with the ability to work with digital technology, data analysis, and digital and creative project management is essential.

Digital business strategy: An effective digital business strategy is essential to take advantage of digital technologies. This element includes determining business goals, market analysis, creating customer value through digital products and services, and optimizing the business process using technology.

Security and risk management: With the increase of digital technology, information security and risk management become an important factor in digital competitiveness. Organizations must ensure information security, customer data protection and prevent cyber attacks.

Cooperation and linkage: To improve digital competitiveness, collaboration and association with industry and digital community partners is crucial. Sharing knowledge, experience, and resources between parties can create significant benefits.

Technology policy: Smart and flexible technology policy can create favorable conditions for developing digital competitiveness. This element includes building a technologically friendly business

environment, encouraging investment in research and development of technology, and ensuring privacy and data protection.

Digital competitiveness affects businesses and organizations and significantly impacts a country's economic and social development. Governments and organizations understand the vital role of digital competitiveness and are investing more in developing and enhancing this capacity.

2. Theoretical Framwork And Methods

2.1. Related concepts

The IMD World Digital Competitiveness

The IMD (International Institute for Management Development Rankings) World Digital Competitiveness Ranking presents the 2022 overall rankings for the 63 economies covered by the World Competitiveness Yearbook (WCY). The rankings are calculated based on the 54 ranked criteria: 34 Hard and 20 Survey data. The countries ranking from the most to the least digitally competitive, and each country's index value or "score" is also indicated. (imd.org, 2023).

The Knowledge factor

The Knowledge factor refers to intangible infrastructure that enables the discovery, understanding, and learning of new technologies, leading to digital transformation. These aspects capturing by indicators that measure the quality of human capital available in a country, as well as the level of investments in education and research and their outcomes (e.g., registered patent grants in high-tech fields and employment in the scientific and technological sectors) (imd.org, 2023).

The Technology factor

The Technology factor assesses the overall context facilitating the development of digital technologies. This element includes criteria that determine the impact of regulation in encouraging innovation in the private sector, the availability of capital for investments, and the quality of the technological infrastructure (imd.org, 2023).

The Future Readiness

The Future Readiness factor examines how governments, businesses, and society adopt technology. This factor includes indicators such as the diffusion of e-commerce, industrial robots, data analytics tools in the private sector, and the strength of those cyber-security measures in place (imd.org, 2023) (imd.org, 2023).

In this study, the factors are measured by scores.

2.2. Data

The data used for analysis synthesize from the IMD World Digital Competitiveness Ranking 2022 (imd.org, 2023). Analysis data includes Competitiveness, Knowledge, Technology, and Future Readiness of 63 countries in reports.

2.3. Analysis method

To assess the influence of factors on digital competitiveness, we use the Neural Network Regression method in Machine Learning and analyze it with JASP software version 0.17.3.0. With the analysis form, we divide 20% of all data for Holdout Test and Training and Validation. The training parameters set up with the Activation Function: Linear; Algorithm: grip op-sag; Stop Criteria Loss Function: 1; Optimized with population size: 20, Generals: 10, Parent Selection: Roulette Wheel, Crossover Method: Uniform, Survival Method: Fitness-based.

2.4. Previous studies

With keywords in Vietnamese and English, "Digital competitiveness," we searched on Google Schoolar's database, resulting in very few articles related to the content to explore. Here are some typical papers:

Laitsou et al. (2020) discuss the importance of digital competitiveness in the fast-changing world and how it has become a crucial operational component for individuals, businesses, and national economies. The paper highlights the complexity of measuring an economy's digital development and competitiveness and the need for various indexes to compare and rank national digital economies.

The paper uses the Digital Economy and Society Index (DESI index) and its five dimensions (namely Connectivity, Human Capital, Use of Internet Services, Integration of Digital Technology, and Digital Public Services) as a tool for recognizing the current state and forecasting progress under the Greek economic environment.

The variables used in the research include: The Connectivity dimension measures the deployment of broadband infrastructure and its quality as a necessary condition for competitiveness; The Human Capital dimension measures the skills needed to take advantage of the possibilities offered by digital; The Use of Internet Services measurement accounts for a variety of online activities, such as the consumption of online content (videos, music, games, etc.) and video calls as well as online shopping and banking; The Integration of Digital Technology dimension measures the digitization of businesses and e-commerce; The final size is Digital Public Services, which measures the digitization of public services, focusing on e-Government and e-Health.

The results indicate that Greece is facing significant challenges due to the low state of digitization, coming from both the demand side (businesses that consume internet services) and the offer side (institutional and governmental constraints). The proposed results use to readjust existing policies and spot aspects where further improvement is needed to achieve high standards of digital competitiveness.

Stankovic et al. (2021) focus on digital competitiveness, which is a multidimensional structure that encompasses various factors of the process of digital transformation through the ability to learn and application of new technologies, technology factors that enable digital transformation, and digital readiness factors that assess the preparedness of an economy and citizens to assume digital transformation. The paper proposes a methodology for measuring digital competitiveness using a composite index approach, including various indicators. The sample includes thirty European countries, and the research is based on thirteen indicators provided in the Eurostat Digital Economy and Society database.

Digital Competitiveness evaluate through variables: ICT usage in households and by individuals: Internet use, Connection to the Internet and computer use, E-government, E-commerce (online purchase in the last three months), and ICT usage at work. ICT usage in enterprises: Websites and use of social media, E-business, E-commerce (enterprises with e-commerce sales), Connection to the Internet (enterprises with internet access), ICT security (security measure used). Digital skills: ICT users, ICT specialists in employment, ICT training.

The results indicate that Nordic countries have achieved the highest digital competitiveness, while most Eastern European countries still lag. ICT usage in enterprises has the highest relative importance in assessing the achieved level of digital competitiveness. Regarding sub-criteria, the most crucial sub-criteria in determining countries' digital competitiveness relate to ICT security and E-business. This element means that the digital performance of the country is most significantly affected by the level of development of the ICT sector in enterprises. In contrast, the usage of ICT in households is not crucial. Also, the level of digital

skills is less important than the importance of ICT usage in enterprises. Finally, conduct a cluster analysis to examine relations between digital competitiveness and several economic performances, such as GDP per capita, labor productivity, and employment rates.

Miethlich et al. (2020) discuss the concept of the digital economy and its impact on the competitiveness of countries and regions. It defines the digital economy from various perspectives and conducts a SWOT analysis to identify its strengths, weaknesses, opportunities, and threats. The paper also provides an interpretation of national competitiveness and analyzes the digital infrastructure of Switzerland, Russia, and Azerbaijan. Additionally, it determines the competitive positions of the top 30 countries exporting telecommunications, computer, and information services and identifies strategies for competitive exporters. This paper uses qualitative and quantitative methods to analyze the digital economy and its impact on national competitiveness. Based on the analysis results, the authors conclude:

The strengths of the digital economy are:

The incorporation of innovations.

The emergence of new markets.

Growth in labor productivity.

Reduction of production and selling expenses.

The production of higher-quality goods and services.

The weaknesses include:

Low trust in the digital environment.

An increase in the share of part-time employment.

An increase in the risk of incapacity for work due to (mental) illnesses.

A decrease in social security.

The digital economy opens up new opportunities for consumers (i.e., a broader range of goods; new jobs; meeting preferences of individual consumers; higher standard of living) but also carries threats (i.e., growth of cybercrime; weak regulatory framework for digitalization; violation of consumer rights related to online trade; development of technological unemployment).

Investing in digitalization allows countries to boost national competitiveness, which characterizes the country's ability to produce high-quality, on-demand goods and services in the existing social, economic, and political conditions, meeting the internal and external demand.

Those seeking to occupy a leading position in the TCI service market to undertake a range of specific actions:

Investment in the digital industry

Improving the digital literacy of the population

Developing digital culture

Improving the legal foundations of e-commerce and cybersecurity.

In short, only a few papers about Digital Competitiveness exist. Most of them refer to the digital economy or information and communication technology factors. The authors have yet to find studies on improving the competitiveness of the number from a country. Even have yet to see studies on Digital Competitiveness, including the use of Knowledge, Technology, Future Readiness, and Competitiveness, as in this study. That also why we conduct this study.

3. Result And Discussion

3.1. Assess the quality of the research model

To evaluate the quality of the research model, we use Evaluation Metrics. In this paper, we use MSE, RMSE, MAE/MAD, MAPE, and R^2.

Table 1. Evaluation Metrics

Evaluation Metrics	Value
MSE	0.007
RMSE	0.084
MAE/MAD	0.067
MAPE	19.24%
R^2	0.984

(Source: Results from data processing software Jasp, 2023)

MSE (Mean Squared Error) is a metric used to measure the average squared difference between predicted and actual values in regression models. It emphasizes accurate predictions and penalizes more significant errors more heavily. Its properties of non-negativity, sensitivity to outliers, and differentiability make it a popular choice for evaluating model performance. Analysis for SME results is 0.007. Therefore, the deviation between the predictable and actual values is relatively small.

RMSE is a widely used statistical measure that quantifies the accuracy of prediction or forecast models. Calculating the square root of the average squared differences between predicted and actual values provides a single value that summarizes the model's overall performance. RMSE of analytical results is equal to 0.007. Therefore, the deviation between the predictable and actual values is relatively small.

The MAE/MAD, also known as the mean absolute error to mean total deviation ratio, is a statistical measure used to assess the accuracy of a forecasting model or method. It is calculated by dividing the mean absolute error (MAE) by the mean absolute deviation (MAD). The MAE measures the average magnitude of errors in a set of predictions, while the mad measures the average dispersion of data points around their mean. The MAE/MAD ratio combines these two measures to assess accuracy relative to variability. A higher mae/mad percentage suggests more error relative to variability in the dataset, indicating poorer accuracy. Conversely, a lower MAE/MAD ratio indicates better accuracy as there is less error relative to variability. The result of MAE/MAD in this study was 0.067, which is relatively small. This element shows The Analysis Results have high accuracy.

MAPE is a widely used metric for evaluating forecast accuracy. It provides a simple and intuitive measure of the average absolute percentage difference between actual and predicted values. A MAPE under 10% shows high accuracy, 10% to 20% shows good forecast results, 20% to 50% shows reasonable forecast results, and is greater than 50% showing the result, forecast results are incorrect (Blasco et al., 2013). The result of MAPE in this Study was 19.24%, Quite Small. This element shows that the Average Percentage Difference Between The Predicted Values and the Actual Values is relatively small, and the accuracy of the forecast results is good.

R^2 is a statistical measure that quantifies the proportion of variance in the dependent variable explained by the independent variable(s) in a regression model. It helps evaluate the goodness of fit and predictive power of the model. However, it should be used with other statistical measures to draw

meaningful conclusions about the regression analysis. In this study, R^2 is valid for 0.984, meaning that independent variables in the model explain 98.4% of variance fluctuations of digital competition.

3.2. Neural Network Regression

The analysis results from the software proposed the optimal network model has four hidden layers. Hidden Layer 1 has one node, hidden Layer 2 has ten nodes, hidden Layer 3 has six nodes, the hidden Layer 4 has ten nodes (Figure 1).
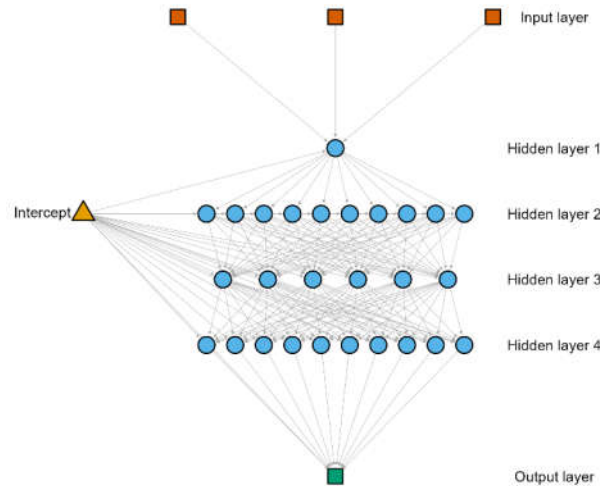
Figure 1. Neural Network

(Source: Results from data processing software Jasp, 2023)

From the network weights regression results, the author's group is the following regression equation as follows:

COMPETITIVENESS = 0.26 + 0.693*KNOWLEDGE +0.889*TECHNOLOGY + 1.858*FUTURE READINESS (1)

Based on the separate regression coefficient of dependent variables, the Future Readiness element has the most significant influence on Competitiveness, the second is Technology, and the third is Knowledge.

4. Conclusion And Recommendations

4.1. Conclusion

This paper studies Knowledge, Technology, and Future Readiness as elements that affect a country's digital Competitiveness. We use the neural network Regotion method in Machine Learning and analyze it with JASP software version 0.17.3.0; the analysis results show that the optimal network has four Hidden Layers. Evaluation Metrics, we use MSE, RMSE, MAE/MAP, MAPE, and R^2 in this paper. The results show that the model proposed by the software has good forecast quality. Based on the separate regression coefficient of dependent variables, the Future Readiness element has the most significant influence on Competitiveness, the second is Technology, and the third is Knowledge.

4.2. Recommendations

To improve the ability to compete in numbers, according to the research results, countries should focus on enhancing the order of the influential factors:

Future readiness

The country's digital competitiveness improves through future readiness; it is crucial to focus on various aspects such as infrastructure development, digital skills and literacy, innovation and research, policy frameworks, and collaboration between the public and private sectors. By addressing these key areas, countries can position themselves at the forefront of the digital revolution and ensure sustainable economic growth in the digital age.

Infrastructure Development:

A robust digital infrastructure is the backbone of a digitally competitive nation. This element includes high-speed internet connectivity, reliable telecommunications networks, and advanced data centers. Investing in developing and expanding broadband networks, particularly in rural and remote areas, is essential to bridge the digital divide. Additionally, governments should encourage private sector investments in infrastructure projects to ensure widespread access to digital services.

Digital Skills and Literacy:

Promoting digital skills and literacy is crucial for future readiness. Governments should prioritize education and training programs that equip citizens with the skills to thrive in a digital economy. This element includes basic computer literacy, coding skills, data analytics, cybersecurity awareness, and critical thinking abilities. Collaborations between educational institutions, industry stakeholders, and government agencies can help design comprehensive programs that address the evolving needs of the job market.

Innovation and Research:

Fostering a culture of innovation is vital for future readiness. Governments should create an enabling environment that encourages research and development (R&D) activities in emerging technologies such as artificial intelligence (AI), blockchain, Internet of Things (IoT), and 5G networks. Establishing innovation hubs, incubators, and accelerators can provide a platform for startups and entrepreneurs to develop disruptive technologies. Furthermore, governments should incentivize private sector investments in R&D through tax breaks or grants.

Policy Frameworks:

Clear and forward-thinking policy frameworks are essential to support future readiness. Governments should develop comprehensive digital strategies that outline their vision for a digitally competitive nation. These strategies should address issues such as data protection, privacy regulations, cybersecurity, intellectual property rights, and digital governance. Additionally, governments should foster an environment that encourages entrepreneurship and removes barriers to entry for startups and small businesses.

Collaboration between Public and Private Sectors:

Collaboration between the public and private sectors is crucial for enhancing a country's digital competitiveness. Governments should engage with industry stakeholders to understand their needs and challenges. Public-private partnerships can be formed to jointly invest in infrastructure projects, develop training programs, and promote innovation. Governments and the private sector can leverage each other's strengths to drive digital transformation by working together.

In conclusion, enhancing a country's digital competitiveness through future readiness requires a holistic approach encompassing infrastructure development, digital skills, literacy, innovation and research, policy frameworks, and collaboration between the public and private sectors. By prioritizing these areas, countries can position themselves as leaders in the digital economy and ensure sustainable growth in the long run.

Technology

Several key areas must be addressed to enhance a country's digital competitiveness through technology. These include infrastructure development, digital literacy, skills training, fostering innovation and entrepreneurship, promoting digital inclusion, and ensuring strong cybersecurity measures. By focusing on these aspects, countries can create an environment that encourages the adoption and utilization of technology, leading to increased digital competitiveness.

Infrastructure Development:

One of the fundamental requirements for enhancing a country's digital competitiveness is the development of robust and reliable digital infrastructure. This element includes high-speed internet connectivity, widespread access to broadband services, and the deployment of advanced telecommunications networks. Investing in infrastructure development enables businesses and individuals to leverage technology effectively, facilitating the growth of digital industries and enabling seamless communication and collaboration.

Digital Literacy and Skills Training:

Promoting digital literacy and providing skills training is crucial for enhancing a country's digital competitiveness. This element involves equipping individuals with the necessary knowledge and skills to use technology in their personal and professional lives effectively. Digital literacy programs should focus on teaching basic computer skills, internet usage, online safety, and critical thinking in the digital age. Additionally, specialized training programs should be offered to develop advanced technical skills for emerging technologies such as artificial intelligence (AI), blockchain, data analytics, and cybersecurity.

Fostering Innovation and Entrepreneurship:

Countries must foster a culture of innovation and entrepreneurship to enhance digital competitiveness. Countries can achieve this by creating supportive ecosystems encouraging research and development activities, collaborating between academia and industry, and establishing startup incubators and accelerators. Governments can provide incentives such as tax breaks or grants to attract tech companies and startups. Encouraging innovation leads to the creation of new technologies, products, and services that drive economic growth and increase a country's competitive advantage in the global digital economy.

Promoting Digital Inclusion:

Digital inclusion is essential for ensuring that all segments of society have equal access to technology resources. This element bridges the digital divide by providing affordable and accessible internet connectivity, devices, and digital services to underserved communities. Governments can implement policies to promote digital inclusion, such as subsidizing internet access for low-income households, establishing public Wi-Fi hotspots, and supporting initiatives that provide technology resources to schools and community centers. By promoting digital inclusion, countries can empower individuals and communities to participate fully in the digital economy.

Ensuring Strong Cybersecurity Measures:

Enhancing a country's digital competitiveness requires robust cybersecurity measures to protect critical infrastructure, businesses, and individuals from cyber threats. Governments should establish comprehensive cybersecurity frameworks that include legislation, regulations, and standards to protect data privacy, secure online transactions, and prevent cyber attacks. Collaboration between government agencies, private sector entities, and international organizations is crucial for sharing threat intelligence and implementing effective cybersecurity strategies.

In conclusion, enhancing a country's digital competitiveness through technology requires a multi-faceted approach. Infrastructure development, digital literacy, and skills training, fostering innovation and entrepreneurship, promoting digital inclusion, and ensuring strong cybersecurity measures are all essential components of this process. By prioritizing these areas, countries can create an enabling environment that harnesses the power of technology to drive economic growth, improve social well-being, and increase their competitive advantage in the global digital economy.

Knowledge

Focusing on various aspects such as education, infrastructure, innovation, and policy frameworks is crucial to enhance a country's digital competitiveness through knowledge. By leveraging knowledge effectively, governments can foster a thriving digital ecosystem that drives economic growth, innovation, and societal development. This comprehensive response will delve into the key areas that contribute to enhancing a country's digital competitiveness through knowledge.

Education and Skill Development:

Education plays a fundamental role in building a digitally competitive nation. Equipping individuals with the necessary skills and knowledge to thrive in the digital era is essential. This element includes promoting STEM (Science, Technology, Engineering, and Mathematics) education early, integrating digital literacy into the curriculum at all levels, and providing teachers with continuous professional development opportunities.

Countries should prioritize investments in educational institutions, ensuring access to state-of-the-art technology infrastructure and resources to enhance digital competitiveness through knowledge. Also, fostering partnerships between academia and industry can facilitate knowledge transfer and ensure educational programs align with industry needs.

Infrastructure and Connectivity:

A robust digital infrastructure is vital for a country's digital competitiveness. This element includes reliable high-speed internet connectivity, widespread broadband access, and advanced telecommunications networks. Governments should invest in expanding broadband coverage to rural areas and underserved communities to bridge the digital divide.

Furthermore, promoting the deployment of emerging technologies like 5G networks can significantly enhance a country's digital capabilities. These technologies enable faster data transmission speeds, lower latency, and support for many connected devices – all essential for driving innovation and competitiveness.

Innovation Ecosystem:

Creating an environment that fosters innovation is crucial for enhancing digital competitiveness. Governments should establish policies that encourage entrepreneurship, research and development (R&D), and collaboration between academia, industry, and startups. This can be achieved through tax incentives for R&D investments, streamlined regulations for startups, and the establishment of innovation hubs and technology parks.

Promoting knowledge sharing and collaboration is also essential. Governments can facilitate the creation of platforms, such as innovation networks or digital marketplaces, where individuals and organizations can exchange ideas, collaborate on projects, and access resources. Encouraging open data initiatives and supporting research institutions can further stimulate innovation and knowledge creation.

Policy Frameworks:

Effective policy frameworks are crucial for enhancing a country's digital competitiveness through knowledge. Governments should develop comprehensive strategies that address various aspects of the digital ecosystem, including data protection, cybersecurity, intellectual property rights, and privacy regulations. These policies should balance fostering innovation and protecting citizens' rights.

Additionally, governments should promote digital inclusion by ensuring that all citizens have equal access to digital services and opportunities. This element includes addressing affordability, digital literacy, and accessibility for people with disabilities.

Collaboration and International Cooperation:

Collaboration and international cooperation play a significant role in enhancing a country's digital competitiveness through knowledge. Governments should actively engage in partnerships with other countries, international organizations, and industry leaders to share best practices, exchange knowledge, and foster innovation on a global scale.

Participating in international forums and initiatives focused on digital transformation can provide valuable insights into emerging trends, technologies, and policies. Countries can leverage shared knowledge to accelerate their digital competitiveness by collaborating with other nations.

In conclusion, enhancing a country's digital competitiveness through knowledge requires a multi-faceted approach encompassing education, infrastructure development, innovation ecosystems, policy frameworks, and international collaboration. Countries can position themselves at the forefront of the digital revolution by investing in these areas and leveraging knowledge effectively.

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ASSESSING PATIENT SATISFACTION (BRAND) AFTER THE COVID-19 PANDEMIC AT THU DUC CITY HOSPITAL

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Abstract:

The COVID-19 pandemic has disrupted healthcare systems worldwide, necessitating changes in hospital operations and patient care delivery (World Health Organization, 2020). Studying patient satisfaction after COVID-19 provides important insights to improve service quality and rebuild trust (Pham et al., 2021). This study examined patient satisfaction at a hospital in Vietnam following the pandemic, hypothesizing a relationship between patient characteristics and their level of satisfaction. The results showed overall moderately high patient satisfaction (average score of 4.26 out of 5) with the highest ratings for staff competence, interpersonal skills, and clarity of information but lower scores for physical facilities and equipment. This indicates that interactions with clinicians are strengths, while infrastructure upgrades may further increase patient experiences. No associations were found between satisfaction and demographics or insurance coverage, suggesting insurance did not notably influence satisfaction.

Keywords: *Patient satisfaction, hospital, COVID-19 pandemic*

1. Introduction:

The COVID-19 pandemic has created unprecedented challenges for hospitals across the globe. Many have had to temporarily halt elective procedures and reduce patient capacity to mitigate virus transmission risks. Shortages of critical supplies and overburdened staff have also impacted hospital operations. These disruptions have negatively affected the patient experience, causing distress for families and complications for hospital leadership and medical teams. (Kaye et al., 2021)

Maintaining patient satisfaction remains vital, even amid such turmoil. Satisfaction encompasses more than just medical outcomes; it reflects perceptions of care quality and meeting patient needs. Various studies have explored how satisfied patients are with hospital treatment during the pandemic. However, there is limited research on this issue in Vietnam. Contributing factors may include constrained resources, lack of cooperation, or inadequate data. Investigating patient satisfaction post-COVID is essential for evaluating pandemic impacts on healthcare delivery, improving the patient experience, and restoring trust.(Sabetkish & Rahmani, 2021)

Therefore, we performed an in-depth examination of patient satisfaction levels post-pandemic. We hypothesized significant pre-versus post-pandemic differences. Specifically, this study assessed patient satisfaction with hospital services at Thu Duc Hospital following COVID-19.

This research is especially meaningful given the complex pandemic environment. Evaluating post-treatment satisfaction offers insight into medical service quality and areas needing improvement. It assists

healthcare providers in understanding how the pandemic affected satisfaction and how they can enhance services to better meet patient needs.

2. Theoretical Framework and Methods

2.1. Research subjects:

Inpatients reside in all clinical departments within the hospital.

Outpatients visit the outpatient department, Department of Medical Examination according to requests and examination areas of clinical departments.

2.2. Sample Size: 228 patients.

2.3. Data collection tools: Prepared questionnaires ensure validity and reliability.

2.4. Research description:

Research design: This study used a cross-sectional descriptive design to assess the satisfaction of inpatients at the hospital.

Data collection methods:

Tools: The research team prepared questionnaires to collect data from the respondents.

Method: The interviewer directly interviewed the inpatients and their relatives who participated in the research at the hospital based on the interview questionnaire.

Sample selection process:

Step 1: Select inpatients who were discharged during the time of survey.

Step 2: Choose an interviewer who interviewed either the inpatient or the primary caregiver.

Implementation time: 2 months

Data analysis:

The research team used STATA 17.0 software to test the relationship between variables by statistical analysis from the data obtained.

Implementation time: 1 month.

3. Results and Discussion

Among the 228 subjects participating in the survey, the proportion of women (56.14%) was higher than that of men (43.86%). The age distribution of survey participants was the highest in the group from 31 to 60 years old (44.74%), this is the age group with many disease risk factors and the ability to actively seek medical care. Next is the group over 61 years old (30.7%), the lowest is the group under 30 years old (24.56%).

3.1. Characteristics of the study population

Table 1. Characteristics of survey subjects

Variables		n	%
Gender	Male	100	43.86
	Female	128	56.14
Age (Years)	From before 30 years old	56	24.56

Variables		n	%
	From 31 to 60 years old	102	44.74
	Over 61 years old	70	30.7
Academic level	Elementory school	56	24.56
	Secondary school	59	25.88
	High school	55	24.12
	College	21	9.21
	University	34	14.91
	Graduate	3	1.32
Ethnic	Kinh	222	97.37
	Other	6	2.63
Religion	None	169	74.12
	Buddhism	34	14.91
	Christian	13	5.7
	Other	12	5.26
Current place of residence	Urban	207	90.79
	Rural	21	9.21
Occupation	Farmer / fisherman / salt farmer	7	3.07
	Working as a salaried employee of the State sector	12	5.26
	Salaried employees in private/foreign enterprises	37	16.23
	Business owners/traders/service providers/lessors	28	12.28
	Self-employed/temporary workers	55	24.12
	Unemployment/no income/dependency (students, students)	49	21.49
	Other	40	17.54
Form of treatment	Self-referred	198	86.84
	Non-compliant with follow-up	11	4.82

Variables		n	%
	Follow-up appointment	2	0.88
	Referred from another facility	16	7.02
	Other	1	0.44
Health insurance	Yes	207	90.79
	No	11	9.21

Regarding education level, over 24.12% of patients in this survey completed high school education and continued studying at college level, university level and postgraduate level at rates of 9.21%, 14.91% and 1.32%, respectively. Regarding ethnicity, the vast majority (97.27%) of respondents were Kinh whereas only 6 patients (2.63%) belonged to ethnic minorities. In terms of religion, most patients were non-religious (74.12%), while 14.91% were Buddhist and 5.7% were Catholic.

The data indicated that 90.79% of patients lived in urban areas, while 9.21% resided in rural areas. Self-employed/temporary workers represented the largest occupational group at 24.12%. Salaried employees in private/foreign companies and business owners/traders/service providers/lessors each constituted 12.28%.

The hospital admission was directly sought by most patients (86.84%), while referrals accounted for 7.02% of cases. The results showed that 90.79% of patients had health insurance coverage whereas 0.21% did not. The mean length of hospital stay per admission was days 4.04 ± 2.76 days, with a minimum of 1 day and a maximum of 20 days.

3.2. Satisfaction level:

Regarding "Accessibility", the highest level of satisfaction is in "The building blocks, staircases and patient rooms are clearly numbered, easy to locate" at 4.34 points. In particular, the lowest level of satisfaction is 4.27 points for the item "The pathways within the hospital and corridors are level and easy to walk through".

In the assessment of "Information Transparency and medical examination and treatment procedures", the survey respondents rated the factor "The admission procedures and processes are clear, transparent, and convenient" as the highest with 4.36 points. Patients were least satisfied with the factor "Clear and comprehensive information is provided about hospital regulations and necessary details upon admission" with a satisfaction level of 4.28 points. The maximum difference between the satisfaction for the factors was 0.08, indicating uniformity in the levels of satisfaction for the factors within this category.

Patients expressed the lowest satisfaction with material facilities and equipment compared to other aspects. The highest satisfaction was with safety, security, and order which ensured theft prevention and peace of mind (4.24 points). The lowest satisfaction was with restroom and bathroom accessibility, cleanliness, and functionality (3.51 points).

Patients highly rated staff attitude and professional competence on two factors: "Medical staff provide respect, equal treatment, care, and assistance" (4.48 points); "Medical staff do not hint for tips/bribes" (4.48 points) and "Doctors and nurses collaborate well and handle work skillfully and promptly" (4.49 points).

Regarding results of service provision, patients were most satisfied with "Medicines are adequately provided with quality and proper instructions" (4.38 points).

Table 2. The level of patient satisfaction with accessibility; information transparency and procedural clarity for examination and treatment; material facilities and means to serve patients ; attitudes and professional competence of medical staff and results of service provision (n=228)

	Aspects of Evaluation	Mean	SD
	A. Accessibility		
A1.	The maps, signs indicating directions to departments and rooms in the hospital are clear, easy to understand and easy to find.	4.25	0.77
A2.	The visiting time for patients is clearly announced	4.29	0.73
A3.	The building blocks, staircases and patient rooms are clearly numbered, easy to locate	4.34	0.75
A4.	The pathways within the hospital and corridors are level and easy to walk through	4.27	0.76
A5.	Patients can ask and call for medical staff when necessary	4.32	0.81
	B. Information transparency and procedural clarity for examination and treatment		
B1.	The admission procedures and processes are clear, transparent, and convenient	4.36	0.73
B2.	Clear and comprehensive information is provided about hospital regulations and necessary details upon admission	4.28	0.76
B3.	Clear and full explanations are given about medical condition, expected methods of treatment, and duration	4.32	0.79
B4.	Clear and complete counseling is provided before requesting advanced testing, examinations, or procedures	4.33	0.79
B5.	Information about medication usage and treatment costs is made openly available and updated	4.34	0.77
	C. Material facilities and means to serve patients		
C1.	Hospital rooms for treatment are neat, clean, and equipped with proper temperature control devices like fans, heaters, or air conditioning	4.15	0.89
C2.	Hospital beds, sheets, pillows are adequate with one per patient, safe, sturdy, and functional	4.20	0.87
C3.	Restrooms and bathrooms are accessible, clean, and fully operational	3.51	1.26
C4.	Safety, security, order are ensured to prevent theft and allow peace of mind during hospitalization	4.24	0.85
C5.	Adequate clean clothes are provided	3.87	0.98
C6.	Ample provision of hot and cold drinking water	3.76	1.13
C7.	Privacy is ensured during hospitalization for changing clothes, medical examinations, bedside toileting, etc. with curtains, partitions, or private rooms	3.91	1.03
C8.	The hospital canteen provides adequate food, drinks, and basic necessities with good quality	3.76	0.89
C9.	The environment in the hospital campus is green, clean and beautiful.	3.90	0.84
	D. Attitudes and professional competence of medical staff		
D1.	Doctors, nurses use proper speech, attitude, and interaction	4.46	0.70
D2.	Support staff (orderlies, guards, accountants, etc.) use proper speech, attitude, and interaction	4.44	0.68

D3.	Medical staff provide respect, equal treatment, care, and assistance	4.48	0.72
D4.	Doctors and nurses collaborate well and handle work skillfully and promptly	4.49	0.71
D5.	Doctors provide examinations and encouragement at treatment rooms	4.46	0.72
D6.	Advice is provided on diet, exercise, monitoring, and preventing complications	4.40	0.78
D7.	Medical staff do not hint for tips/bribes	4.48	0.75
	E. Results of service provision		
E1.	Medicines are adequately provided with quality and proper instructions	4.38	0.66
E2.	Medical equipment and supplies are adequate, modern, and meet expectations	4.26	0.81
E3.	Treatment outcomes meet expectations	4.32	0.75
E4.	Level of trust in the quality of healthcare services	4.25	0.82
E5.	Level of satisfaction with the costs of healthcare services	4.22	0.81

The hospital achieved an average satisfaction rate of 82.19% ± 13.85% among patients and their families, indicating that expectations were largely met. The majority of patients were satisfied with the examination, treatment and services, as evidenced by 53.51% responding "Might return" and 42.11% stating they would "Definitely return or recommend". However, a small yet substantial proportion of patients selected "Definitely not returning" and "Want to transfer to another hospital". (Figure 1)
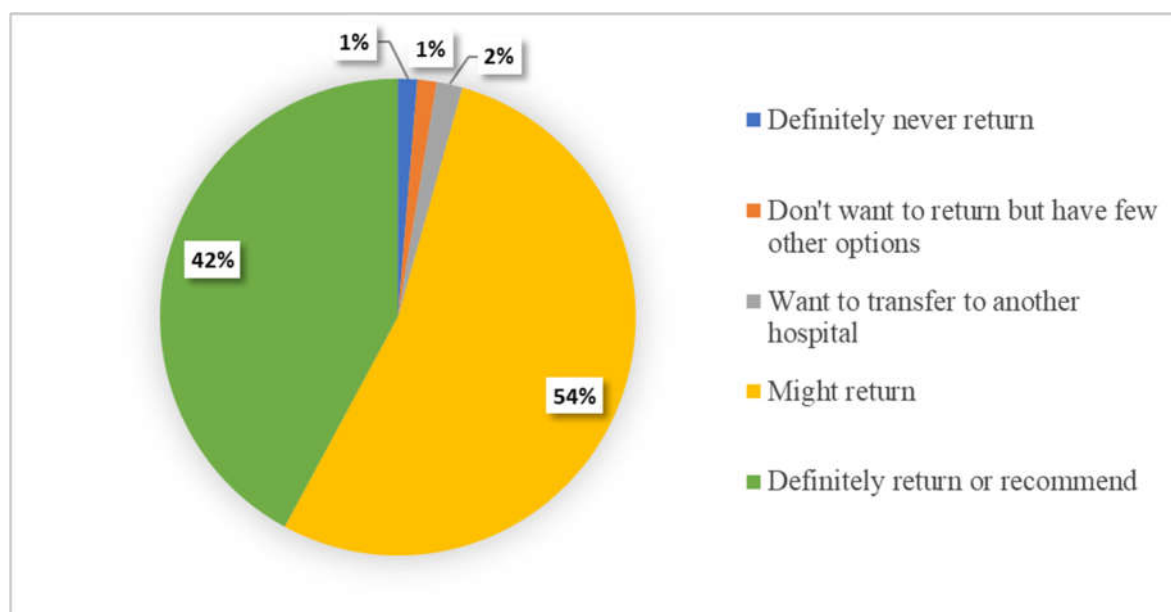
Figure 1. Level of readiness to return and recommend to others

3.3. Average Satisfaction Score

The patient satisfaction survey revealed moderately high levels of satisfaction, with an average score of 4.26 out of 5 points. Patients were most satisfied with the attitudes and professional competence of the medical staff (4.45 points). The clarity of information and procedures for examination and treatment also received high ratings (4.43 points). However, satisfaction was lowest for the physical facilities and resources available to serve patients (3.92 points). These results indicate strengths in interpersonal care and communication, but highlight an opportunity to improve the infrastructure and environment of care

delivery. Targeted investments in upgraded facilities and patient support services may further enhance patient experiences and perceptions of care quality.

Table 3. Average score of satisfaction by each aspect and average score of overall satisfaction

	Evaluation aspect	Mean	SD
A	Accessibility	4.29	0.61
B	Information transparency and procedural clarity for examination and treatment	4.32	0.65
C	Physical facilities and means to serve patients	3.92	0.70
D	Attitudes and professional competence of medical staff	4.45	0.59
E	Results of service provision	4.29	0.62
Average overall satisfaction score		**4.26**	**0.51**

3.4. Relationship Between Average Satisfaction Scores and Respondent Characteristics

The results showed no association between overall satisfaction scores and respondent characteristics. In particular, having health insurance coverage or not was not related to patient and family satisfaction with the clinical encounter at the hospital.

Table 4. The relationship between the average score of general satisfaction with the characteristics of the survey subjects

Element		Mean	SD	P . value
Gender	Male	4.24	0.49	0.4583*
	Female	4.27	0.52	
Age (Years)	From before 30 years old	4.22	0.52	0.2674**
	From 31 to 60 years old	4.21	0.55	
	Over 61 years old	4.35	0.43	
Academic level	Primary school	4.31	0.47	0.4699**
	Secondary school	4.33	0.48	
	High school	4.19	0.50	
	Intermediate/College	4.09	0.65	
	University	4.23	0.52	
	Graduate	4.46	0.65	
Occupation	Farmer / fisherman / salt farmer	4.16	0.71	0.2357**
	Working as a salaried employee	4.32	0.52	
	salaried employees in	4.02	0.58	
	Business/sales/services/rental	4.27	0.44	

	Freelance/employment by the	4.30	0.53	
	Unemployment/no	4.30	0.48	
	Other	4.35	0.41	
Form of treatment	Self-referred	4.25	0.52	0.4604**
	Non-compliant with follow-up	4.44	0.31	
	Follow-up appointment	4.11	0.82	
	Referred from another facility	4.24	0.39	
	Other	3.53	-	
Health insurance	Yes	4.27	0.51	0.3335*
	No	4.16	0.52	

*Two-sample Wilcoxon rank-sum (Mann–Whitney) test **Kruskal–Wallis equality-of-populations rank test

4. Conclusions and Recommendations:

Results indicate that patient satisfaction was moderate to high, with an average score of 4.26 out of 5. Respondents were most satisfied with the professional competence and interpersonal skills of medical staff as well as clarity of information regarding procedures. However, satisfaction with physical facilities and equipment was lower. These findings suggest that while clinician-patient interactions and communication are strengths, upgrading hospital infrastructure and the care environment may further improve patient experiences.

No significant associations were found between overall satisfaction and respondent demographic characteristics or insurance coverage, suggesting that having insurance did not markedly influence satisfaction levels.

Based on these results, the following recommendations are proposed:

1. Provide ongoing training for medical staff to maintain and strengthen interpersonal skills and patient-centered care. Effective communication and empathy appear highly valued by patients.
2. Improve physical facilities, particularly restrooms, patient rooms and medical equipment. Enhancing the hospital environment has potential to positively impact patient satisfaction.
3. Regularly conduct patient satisfaction surveys to monitor trends over time and evaluate the impact of improvement initiatives. This allows for timely adjustments and targeting of low-scoring areas.
4. Benchmark satisfaction results against other hospitals to identify and implement best practices. International guidelines can also inform strategies. Engage patients and families in determining priorities for facility upgrades and infrastructure enhancements. Involving patients in the planning process may maximize benefits and satisfaction.

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