

HOSPITAL LOCATION SELECTION TARGETING INDONESIAN NHI PATIENTS FOR A SUSTAINABLE BUSINESS

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Abstract - Finding an optimal location is a strategic decision, and an error of location judgment causes problems in the process and directly affects cost and profitability. Currently, Indonesian National Health Insurance (BPJS) program has high coverage growth in Indonesia; however, building hospitals targeting BPJS patients have faced some challenges and may lead to an unprofitable business. Therefore, location selection is a crucial aspect of a hospital's operation, highly relates to profitability, and impacts business performance. Moreover, being profitable is not enough for businesses to survive in the long run; they must be sustainable. The purpose of this study is to develop a reference for a location selection for healthcare management when building hospitals targeting BPJS patients. This paper utilizes the EGSEE framework for a sustainable business to evaluate comprehensive hospital location selection sub-factors. The study employs a systematic literature review and a modified Delphi method to examine the experts' judgment. Finally, the Analytic Hierarchy Process is applied to develop the evaluation method. The result shows that the social factor has the highest priority with a total weight of 42%, followed by the economic factor (38%) and the environment factor (20%).

Keywords - BPJS, hospital location selection, JKN, national health insurance, sustainable business

INTRODUCTION

Good health and well-being are among the United Nations' sustainable development goals. Realizing universal health coverage (UHC) is essential to determine good health and well-being. However, UHC continues to be a challenge for nations worldwide. According to WHO and the World Bank[1], more than half of the global population does not access necessary health care.

Indonesia's response to provide universal health coverage was establishing National Health Insurance (NHI) for all residents in 2014. The deployment of NHI has intensified competition in the local healthcare industry. Consumer health awareness and demand for medical services are increasing, therefore encouraging new hospital establishments. However, running hospitals is sophisticated work. Hospital is considered a business since it produces something in exchange for payment to obtain profit.

Successful businesses are those with profitable business models. Nevertheless, being profitable is not enough for businesses to survive in the long run; they

have to be sustainable. Businesses are said to be sustainable when profitability is achieved and deliver enduring performance that adds value to shareholders[2]. Therefore, hospitals must also be sustainable as businesses.

Both sustainable hospital businesses along with NHI jointly create a sustainable national healthcare ecosystem. Citizens of a country can have necessary health services without economic difficulties. Accordingly, good health and well-being can be attained, and to a great extent assisting people to maximize capabilities for fulfilling their goals [1]. This condition is crucial to United Nations' sustainable development goals as other aspects such as economic growth will also automatically be accomplished.

According to the agglomeration literature[3], the business location would impact a company's performance. Locating an excellent location is a tactical choice, and an error of judgment causes issues with the procedure and straightforwardly affects cost and profitability[4]. In such circumstances, it is of priority concern to select the optimal location of hospitals to be built. Studies in the past have attempted to find the best hospital location by using traditional mathematical or statistical approaches, and linear programming was used in its early stage to address location-selection-related problems [5]. When deciding where to choose a location, business groups also consider that finding the appropriate location during the decision-making process could potentially impact the company's performance[6].

Considering high healthcare services demand and still low supply side, we intend to establish an assessment method to evaluate the best business location for hospitals. This work will get into details on location selection factors influencing the sustainability of hospital businesses targeting BPJS patients. Consequently, hospital management can utilize this work to enable hospitals to adopt strategies to enhance their capabilities running business aiming at BPJS patients. This research will utilize the modified Delphi method and the analytic hierarchy process (AHP). The result of this research is in the hope of helping hospital management serving as guidelines for hospital location selection targeting BPJS patients.

LITERATURE REVIEW

Periodically, United Nations (UN) sets development goals to be followed globally as prioritized common

goals[7]. UN established the development goals by first investigating current problems to be tackled and share them globally to engage everyone in finding the solutions for a better future. In 2000, the UN had set Millennium Development Goals (MDG) to be achieved in the future. Among them are: Reducing child mortality; improving maternal health; combating HIV/AIDS, malaria, and other diseases. Three out of eight MDG are strongly related to the healthcare ecosystem. Subsequently, in 2015 UN intervened and set another development goal as the new shared goal for everyone to pursue by the Sustainable Development Goals (SDG) label. A better and more sustainable future goals consist of seventeen points, including good health and well-being. One of the newly established SDG is also directly associated with the healthcare ecosystem, which suggests the UN has extensive attention to the healthcare sector. Two of the main drivers are healthcare facilities and National Health Insurance.

A. Hospitals as Healthcare Facilities

According to WHO, hospitals as healthcare facilities are crucial to providing UHC to comply with the population's health needs. Morgan, Mays, & Holland [8] also supported the idea that hospitals are population needs. Moreover, as one of the most critical infrastructures, demand for hospitals is proportional to population; a surge in population will urge demand for hospitals [4].

Conventionally, the description of a hospital is an establishment for unhealthy individuals that seek refuge to get treatments and attention from medical professionals[9]. However, the modern function of hospitals is much more than that. Nowadays, a hospital is considered a complete set of healthcare providers. Each set is called a department as an administrative body, and within or between departments, functional entities are named units. For example, the cardiovascular medicine department utilizes the catheterization laboratory (cathlab) unit to treat its patient; yet, the department of neuroscience can treat its patient using the cathlab unit as well. Some of the most well-known hospital departments are Accident & Emergency (A&E) department; Ear, Nose, & Throat (ENT) department; the radiology department; the oncology department; the pharmacy department, and many more. Furthermore, generally known hospital units are Different types of Intensive Care Units (ICUs) such as Neonatal Intensive Care Unit (NICU), Pediatric Intensive Care Unit (PICU), Coronary Care & Cardiothoracic Unit (CCU/CTU); medical records unit; Computed Tomography (CT) scan unit; blood bank unit; Operating Theatre (OT) unit; and the rest.

Hospital also offers various kinds of treatment to patients from disease prevention, rehabilitation, curative health services, and health palliative services depending on its size. Those are almost every function of healthcare facilities. This service further reflects the importance of a hospital in communities because of its

comprehensiveness. Nonetheless, hospital management should note that studies showed that primary care providers are sufficient to increase the quality of life [10] and even reduce hospital admissions [11, 12]. This fact infers that demand for hospitals might be lower with the presence of primary care providers.

B. National Health Insurance (NHI)

Besides healthcare facilities, medical care such as health insurance is usually associated with health. Levy & Meltzer [13] found an interesting association from observing hundreds of literature which concludes people with insurance have a higher quality of health. Despite that, the researchers pointed out there is no causal interconnection between health insurance on the quality of health in the same study. However, a further observational study involving several papers suggested that health insurance enhances health by promoting particular health measures for susceptible low-paid subpopulations [14].

Levy & Meltzer[14] also justified that health insurance increases the total spending of healthcare consumption because of more medical treatments. Fisher [15] argued the more medical practice is not always good, and the conservative one is better. This argument indicates that the rise of healthcare consumption doesnot consistently mean health quality is getting better clinically; health service facilities are benefited since more expenditure goes to them. This situation would significantly have direct effects on hospitals' profitability as major health service facilities. Hospitals can then reinvest the funds to provide even more advanced services and facilities.

In addition, it is essential to understand the contribution of health insurance to UHC. Studies showed that the more health coverage, the more positive the impacts on health [16, 17]. NHI plays an integral role as vast areas are covered, and citizens are mandated to participate. Taiwan is an excellent example of NHI increasing hospital competition and providing better care/incentives to patients[18].

Indonesia launched BPJS in 2014 as the nation's NHI. Considering health expenses as a significant barrier to accessing healthcare[19], BPJS is expected to ease Indonesian citizens accessing healthcare. Even so, the Indonesian government supports the premium payment of the low-income to facilitate access to healthcare further. For the future, the government is targeting to obtain coverage of at least 95%.

C. Business Sustainability and EGSEE Framework

Sustainability is a topic for finding the right move to bring us forward in terms of shaping the future[20]. The term sustainability mainly talks about the development that not only for the present but the future[21]. Accordingly, in a business context, sustainability implies the ability to perform exceptionally both in the short and long run[22, 23].

Even more, Griffiths [20] suggests a sustainable business must be developed to last indefinitely.

The history of sustainability was dated back to the early twentieth century when the conservation movement was perceived as sustainability[24]. Subsequently, the environmental movement became popular in the 1960s and early 1970s[24]. At the same time, in 1953, Howard Bowen issued a book highlighting the significance of moral values in a company's actions for the community and the relevance of ethics to stakeholders through the concept of Corporate Social Responsibility (CSR)[25]. Then in 1970, CSR became well-known as corporate or business sustainability[26]. In 1979, Carroll contributed by creating a famous CSR framework centered on four attributes of business performance: economic, legal, ethical, and discretionary (philanthropic)[27]. Not until 1994, the definition of business sustainability started to transform by introducing the concept of Triple Bottom Line (TBL) by John Elkington[26]. Elkington's[28] interpretation of business sustainability is about the advancement of economic growth, environmental condition, and social justice all at the same time.

Nonetheless, TBL has constraints of being too diverse, difficult to measure, and portrayed as disengaged performance elements instead of the outcome of an integrated method[26]. In the early 2000s, the modern definition of business sustainability called Environmental, Social, and Governance (ESG) concepts emerged as the outcome of numerous ideas[26]. The development of sustainability also urged global standardization for its measurement; therefore, organizations developing worldwide sustainability guidelines began to emerge. Including in 1997, The Global Reporting Initiative (GRI) was founded and had issued "Sustainability Reporting Guidelines" several times since its first publication in 2000[2]. Not to mention the Securities and Exchange Commission (SEC) published guidance in February 2010 that mandates publicly traded entities to disclose reports related to climate change as part of sustainability reporting[29].

Additionally, The International Integrated Reporting Committee (IIRC) was established in 2010 to promote a consolidated reporting framework by concentrating on the interaction among all elements of business sustainability[2]. Finally, in November 2010, The International Organization for Standardization (ISO) established ISO 26000, which contributes to the development of the most comprehensive sustainability performance indicator yet since it considers Multiple Bottom Line (MBL) of five sustainability dimensions also known as EGSEE[2]. EGSEE refers to Economic, Governance, Social, Ethical, and Environmental.

The success of firm value creation is determined by the combination of all EGSEE dimensions[23]. Brockett & Rezaee[2] explained aspects of sustainability performance using the EGSEE framework, (a)

Economic: Organizations can only succeed and deliver long-term results if they remain profitable and add value to shareholders. Profitability is maintained through economic performance and was reported in financial statements. (b) Governance: Compliance with all applicable laws, rules, regulations, and standards. (c) Social: Concern for the society wherein a business exists. It is empowering a business to benefit society by raising positive effects and lowering negative effects. (d) Ethical: Moral principles to determine right or wrong. Regulations and ethics are different; ethical issues might not be addressed in the regulation and vice versa. (e) Environment: Environmental quality and its effort to prepare for future generations.

D. Location Theory

Burdurlu & Ejder[30] described the importance of a business location as a proper spot to operate, such as basic material supply, stockpile, fabrication, and delivery for economic purposes. Appropriate location selection can allow businesses to cut expenses, maximize earnings, and improve the capabilities for prospective growth[6]. This benefit is also true in the healthcare field.

Early research into location theory concentrated on factory location selection by considering transportation expenses [6]. Although early research considered quantitative factors such as cost and distance, the issue now includes qualitative factors, making it far more complex[4].

Kobu[31] suggests considering four fundamental aspects for industrial location, (1) the business's priorities must be investigated carefully and without bias, (2) the investigations must be done systematically, using a variety of reliable resources, (3) location selection process must be carried out bit by bit with no phase being blended, (4) experts and organizations must contribute in the process.

Different goals can be determined depending on the characteristics of the issue for location selection [4]. According to Farahani, SteadieSeifi, & Asgari[32], examples of common goals are (1) reducing the overall expense of the setup, (2) reducing the maximum distance from new facilities, (3) reducing fixed costs, (4) reducing the annual average cost of activities, (5) operation optimizing, (6) reducing the average travel time/distance, (7) reducing the amount of location, (8) optimizing a reaction. In addition to these issues, ecological and social priorities focused on energy costs, land use and building costs, traffic, sound pollution, the standard of living, emissions, the fossil fuel crisis, and tourist activities have recently become influential. Accordingly, determining a way to calculate these parameters is amongst the most significant challenges in solving the issues[32]. In this study, the location selection goal is to establish a sustainable business by utilizing the EGSEE framework. The EGSEE framework also makes measurements more convenient

since there are guidelines for sustainability performance reporting using five dimensions of EGSEE[2].

Moreover, to achieve the established goal, criteria related to it should be determined. According to Liang & Wang [33], the criteria can be classified into (1) objective, like investment cost, and (2) subjective: qualitative, like seasonal circumstances, and staff quality. In most cases, the best result for location selection needs multiple criteria for consideration[4].

METHODOLOGY

A. Systematic Literature Review

The role of a literature review is vital to academic work[34]. It resolves critical questions by learning the subject based on previous works, exploring existing works on a particular subject, and providing a conceptual foundation for future study[35]. Fink [36] highlights that the characteristics of a literature review should be systematic, explicit, comprehensive, and reproducible. Such a review can be produced using a structured literature review with the help of instructions like Fink's[36] book. Rousseau, Manning, & Denyer[37] also support the idea of the structured literature review by calling it a systematic literature review. According to Rousseau, Manning, & Denyer[37], systematic indicates extensive collection, precise evaluation, and can picture the perception of entire works related to a particular topic.

B. Modified Delphi Method

Delphi has three main characteristics that set it apart from other group interaction techniques, like the Nominal Group Technique[38]. They have to be maintained during all the processes; the three features are (1) anonymous panel communication, and answer, (2) several rounds of data accumulation with review under the supervision of researchers, (3) deliver panel answers using statistical reports.

According to Murry & Hammons [38], Delphi started with the panel selection consists of experts in a particular field. After experts are selected, the first round of the questionnaire is given. Then, when the first-round questionnaires are submitted, the researchers observe, evaluate, and assemble the panel's responses. If consensus is not made in the panel's answer, the subsequent questionnaire round is needed. The researchers then give an additional questionnaire to the panel that includes feedback about the prior round and ask to consider, modify, and comment on their opinion. The round continues until consensus is created, and eventually, the Delphi technique is finished.

The difference between traditional Delphi and modified Delphi is in the first-round questionnaire[38]. The first-round questionnaire of traditional Delphi comprises unsystematic questions. In modified Delphi, systematic questions have been established to reduce time and cost and enable experts to concentrate on the problems right away[38]. The workflow of the modified Delphi comprises several stages (1) initial

questionnaire, (2) panel selection, (3) invitations to panelists, (4) previous questionnaire analysis for the next round questionnaire, (5) following round questionnaire, (6) consensus/stability, and (7) conclusion.

C. AHP Method

Decision-making and its assessment had existed for a long time and are an integral aspect of management science [32]. A complex analysis for decision-making consists of multiple goals or factors to be considered before determining any decision[32]. Researchers usually resolve the decision-making issue using the multi-objective decision-making (MODM) method or a multi-attribute decision-making (MADM) method[32]. The combination of MODM and MADM methods is multicriteria decision-making (MCDM) methods[32].

Various types of MCDM methods can be used for hospital location analysis. For the record, simple additive weighted[39], geographic information system (GIS)[40, 41, 42, 43], belief rule-based inference[44], vise kriterijumska optimizacija i kompromisno rešenje (VIKOR)[45], additive ratio assessment with gray values (ARAS-G)[46], extended elimination and choice expressing reality (ELECTRE)[47, 39], evidential reasoning (ER) [48], grey relational analysis (GRA)[49], primitive cognitive network process (P-CNP) [50], TOPSIS [39], analytic hierarchy process (AHP) [6], analytic network process (ANP) [51] have been used for hospital location selection problems.

Not only using stand-alone MCDM methods, but scholars also have attempted to utilize integrations of MCDM methods for hospital location selection problems. Several examples are (1) using AHP and GIS[52, 53, 54, 55, 56], (2) combining criteria importance through inter-criteria correlation (CRITIC) with TOPSIS, evaluation based on distance from average solution (EDAS), and combinative distance-based assessment (CODAS)[57], (3) using CRITIC and combined compromise solution (CoCoSo)[58], (4) using ANP and TOPSIS [59, 60], (5) using belief-desire-intention (BDI) and GIS [61], (6) using GRA and AHP [4], (7) using a kind of multi-criteria decision analysis (MCDA) and GIS [62].

Although there are many options out there, this research will utilize stand-alone AHP. Besides being widely used for hospital location selection researches [63, 39, 64, 6, 65, 66, 67, 68], AHP has the following features as well, (a) one of the most comprehensive for evaluating multiple criteria[63, 39], (b) a solid and versatile method for quantitative and qualitative analysis[69, 39], (c) simple and easy to use [64], (d) availability of consistency test for minimizing errors[64].

AHP also can be used with its fuzzy extension [70, 71]. AHP and its fuzzy extension are not used against each other[72]. When the users are sure of the data, the AHP can be utilized; alternatively, fuzzy AHP is more favorable[72]. In this research, the research subjects are

experts who know the theory, practice, and nature of the selected topic; therefore, their justification for the opinions is substantial[73]. Consequently, AHP is preferred since, according to Helmer & Rescher[74], experts are capable of making precise predictions in the long run. Eventually, the information given by the experts is credible and can be considered certain.

AHP breaks down a complex multicriteria decision issue into a hierarchy [75]. The method employs prioritization and consistency tests of the collected data for measurement[6]. AHP can combine all decision-maker assessments into an ultimate judgment without the need to draw out any part on the parameters[6].

The process of the AHP consists of multiple steps, (1) establish a hierarchical structure, (2) data collection using a nine-point scale, (3) utilizing paired comparisons as ratios, (4) consistency tests, (5) establishing local and global weights.

RESULTS

A. Preliminary Factors and Sub-Factors

Papers selected from the systematic literature review are analyzed one at a time and extract the hospital location criteria highlighted by each paper and labeled under sub-factors. The evaluation of 41 papers contributed to the establishment of 21 sub-factors. The twenty-one sub-factors are (1) investment cost, (2) operating cost, (3) competition, (4) supply chain, (5) regulations, (6) urban planning, (7) policymakers attitude, (8) tax/incentives, (9) population, (10) demography, (11) distance to the target area, (12) social inconvenience, (13) land specifications, (14) organization strategy, (15) safety & security, (16) area size, (17) pollution, (18) network infrastructure, (19) public transport, (20) main road, (21) climate.

B. Determining Factors and Sub-Factors for Hospital Targeting Indonesian NHI Patients

Using the modified Delphi method, questionnaires are used to obtain the experts' opinions. The members of the panel comprise 11 experts from the hospital industry of various hospitals. The details of the experts can be seen in Table I.

TABLE I MEMBERS OF THE PANEL

Name	Position	Experience in Hospital Industry
Expert 1	Hospital Manager	15 years
Expert 2	President Director	26 years
Expert 3	President Director	16 years
Expert 4	Strategic Team Director	10 years
Expert 5	Commissioner	36 years
Expert 6	Internal Auditor	13 years
Expert 7	Finance Director	20 years
Expert 8	Project Director	3 years
Expert 9	Medical Specialist	15 years
Expert 10	Medical Specialist	4 years
Expert 11	Vice President	20 years

Two rounds of the questionnaire were conducted. The first stage of the questionnaire is to question which sub-factors among the preliminary sub-factors are considered for selecting hospital locations targeting BPJS patients. The description of each sub-factor is defined in Table II.

TABLE II SUB-FACTORS DESCRIPTION

Investment cost	The amount of money needed to start a business.
Operating cost	The expenses needed to keep a business operates.
Competition	Organizations offering similar services that one's gain is the other's loss.
Supply chain	Quality and quantity of a network between a company and its suppliers to produce and distribute a specific product to the final buyer.
Regulations	Rules to comply.
Urban planning	Current and future developments of the region by the government.
Policymakers' attitude	Government's attitude towards the medical industry.
Tax/incentives	A compulsory financial charge or some other type of levy imposed on a taxpayer by a governmental organization or financial support (funds) from government and independent organizations
Population	Hospital is a key factor of good health & well-being; therefore, people need hospitals.
Demography	Statistical study of populations.
Distance to the Target Area	Physical access to medical centers as patient convenience in obtaining medical treatment.
Social inconvenience	The opinion from people living nearby about the hospital establishment.
Land specifications	The specifications of the land for hospital establishment.
Safety & security	The aspect of being secure against unintended threats and protection against deliberate threats for hospitals.
Organization strategy	Compliance with the management vision, mission, and values.
Area Size	The size of the land for hospital establishment.
Pollution	Contamination of harmful materials in the environment.
Network infrastructure	The availability of utilities for hospital operation.
Public transport	Enable patients & hospital staffs to visit the hospital with ease.
Main road	Enable delivery to be made quick and efficient.
Climate	The long-term average of weather affecting the hospital construction & its operation.

The experts were asked to respond to each sub-factor by giving a score out of the four-point scale, namely (1) *strongly disagree*, (2) *moderately disagree*, (3) *moderately agree*, and (4) *strongly agree*. Additionally, experts were also asked whether the

categorization into the EGSEE framework is relevant or not. If any disagreement persists, experts are suggested to give arguments and recommendations.

Twelve sub-factors are eliminated using the 70 percent APMO cut-off rate and considered irrelevant for hospital location selection targeting BPJS patients. The remaining nine subfactors are presented in Figure 1. Furthermore, several experts chose to put one of the chosen sub-factors into a different factor category; particularly, area size was moved from the environment category to the economic category.

The second stage questionnaire is conducted further to confirm the result of the first stage questionnaire. The experts were asked for confirmation on each chosen sub-factor and its categorization using a four-point scale. Through the questionnaire, a consensus is reached when at least 70 percent agreement by the panel members is achieved.

The response rate for the second stage questionnaire was 100%, and a consensus was reached with the nine sub-factors. Their category classification obtained more than 70 percent vote of the panel members. The result and the final hierarchical structure of factors and sub-factors influencing hospital location selection targeting BPJS patients can be shown in Figure 2.

C. AHP Process

As the panel members in the previous stage, experts were also the respondents for the AHP Process. Experts were asked to rate the importance of each sub-factors through pair-wise comparison using a nine-point scale, namely (1) *equal importance*, (3) *moderate importance of one over another*, (5) *essential or strong importance*, (7) *very strong importance*, and (9) *extreme importance*. A total of thirty-six pair-wise comparisons are presented to be evaluated. The response rate of the respondents is 90.91% (10 out of 11 experts).

Each response of the experts was evaluated to test its consistency before aggregating them. If any of the results is not consistent ($CR > 1$), further examination of the specific result is necessary, and if needed, a reassessment by the particular expert. The calculation of the consistency test based on the questionnaire result can be seen in Table III.

Since the consistency ratios of all respondents are below 0.1, no further examination is needed and therefore can proceed to aggregate the results. The pair-wise comparisons are aggregated using the geometric mean, and a further consistency test for the aggregated pair-wise comparison is computed. The detail of the aggregate pair-wise comparison matrix for the sub-factors is displayed in Table IV. Since the consistency ratio of the aggregate pair-wise comparison is below 0.1, hence it is consistent and can be used for the next stage.

Figure 1 Result from the First Stage Questionnaire

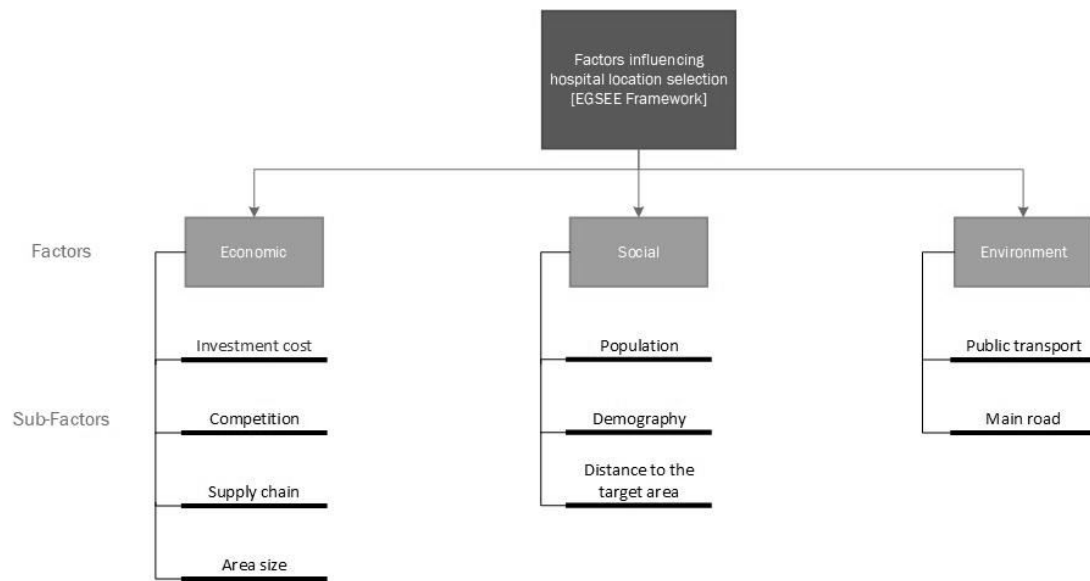


Figure 1 Result from the First Stage Questionnaire

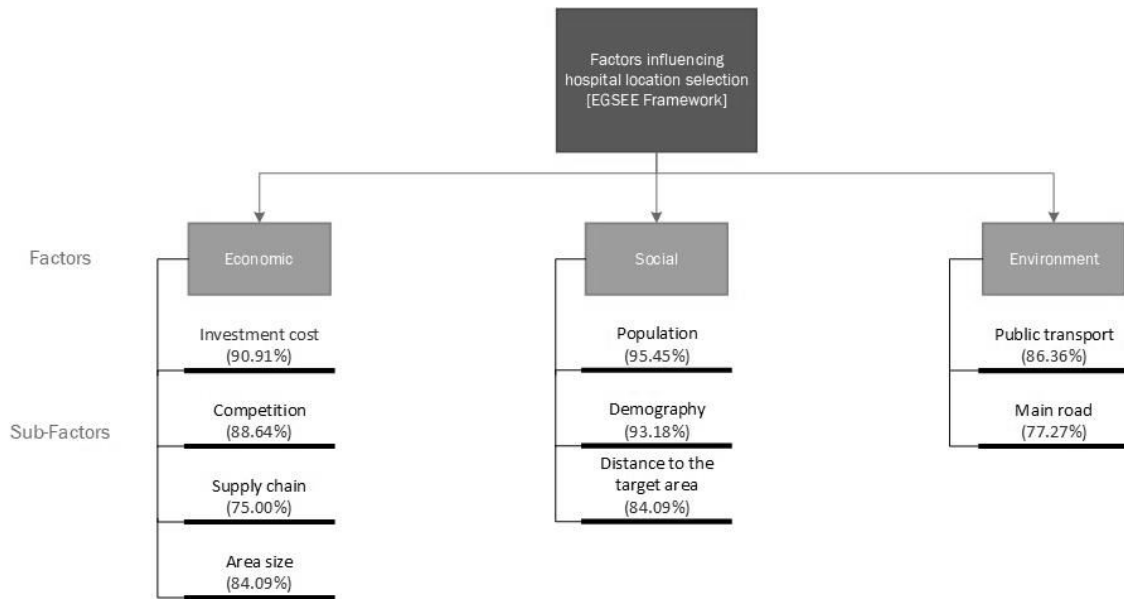


Figure 2 Result from the Second Stage Questionnaire

Table III Respondents Consistency Test

Name	$\lambda_{\max}$	Consistency Index (CI)	Consistency Ratio (CR≤0.1) RI = 1.45
Expert 1	9.004969	0.000621115	0.000428355
Expert 2	9.028165951	0.003520744	0.002428099
Expert 3	9.276488333	0.034561042	0.023835201
Expert 4	9.309106409	0.038638301	0.026647104
Expert 5	9.269133426	0.033641678	0.023201157
Expert 6	9.156805219	0.019600652	0.013517691
Expert 7	9.037310029	0.004663754	0.003216382
Expert 8	9.131707578	0.016463447	0.011354102
Expert 9	9	0	0
Expert 10	9.004626722	0.00057834	0.000398855

Table IV Aggregate Pair-Wise Comparison Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	1	1.7504	2.1663	0.664	1.0537	1.2904	1.3741	1.1822	1.6438
(2)	0.5713	1	1.2821	0.4152	0.664	0.8762	0.9124	0.7538	1.0414
(3)	0.4616	0.78	1	0.3321	0.5531	0.5653	0.6497	0.5781	0.749
(4)	1.506	2.4082	3.0109	1	1.5337	1.8131	2.2206	1.6438	2.2855
(5)	0.949	1.506	1.808	0.652	1	1.0718	1.2311	1	1.3741
(6)	0.775	1.1413	1.7689	0.5515	0.933	1	1.1044	0.9779	1.3057
(7)	0.7277	1.096	1.5393	0.4503	0.8123	0.9054	1	0.8414	1.1352
(8)	0.8459	1.3266	1.7299	0.6084	1	1.0226	1.1885	1	1.2457
(9)	0.6084	0.9603	1.3351	0.4375	0.7277	0.7659	0.8809	0.8027	1

$$\lambda_{\max} = 9.007745711; CI = 0.000968214; CR = 0.000667734 \leq 0.1$$

To compute the criteria weights, the normalized pair-wise comparison matrix must be established first. A normalized pair-wise comparison matrix can be solved using the aggregate pair-wise comparison matrix by applying the AHP formula. The calculation result is shown in Table V. Finally, the criteria weight can be found by taking the arithmetic average of each row on the normalized pair-wise comparison matrix for each criterion/sub-factor. Each sub-factor weight can be seen in Table VI.

DISCUSSION

Based on the result in Table VI, the population has the highest priority when considering hospital location for BPJS. This result is followed by investment cost, demography, public transport, distance to the target area, area size, main road, competition, and supply chain.

In terms of the factor categorization, the social factor has the highest priority with a total weight of 42%, followed by the economic factor (38%) and environment factor (20%).

This result implies that hospitals targeting BPJS patients can build a sustainable business even when hospitals are concerned about social factors. Hospitals can focus on the area where the population is large and/or dense[75, 62, 63]. With the demography such that people in the environment are BPJS holders and have a high ratio of old age population[6]. Ultimately, the distance to the target market is also fundamental when considering the social aspect of hospital location selection.

CONCLUSION AND RECOMMENDATIONS

Through this research, the main factor that contributes to sustainable hospital business is the social factor. The result explains that even if hospital management is becoming social by building a hospital where BPJS patients have difficulties accessing a facility before, the hospital business will also follow to be sustainable. Difficulties in accessing hospitals in this term donot always mean that there is less to no hospital in the area, an area with a high investment cost and the presence of competitors but having sufficient population size and density, along with the correct demography as mentioned in Chapter V is still preferable. When putting into numbers, assuming the other sub-factors are similar, an area with five times more expensive investment cost and five times more competitors, but having population size and density and demography score just higher by 2.8 times, the referred location is preferable over the other alternative.

Moreover, hospitals targeting BPJS patients have a sustainable business; by being social, hospitals also contribute to increasing the welfare of people living near the facility. Therefore, BPJS and hospitals are significant contributors to UHC.

Furthermore, hospitals as businesses can go hand in hand with Indonesian Health Insurance Program to accomplish universal health coverage since the priority

of hospital location selection for BPJS patients is in line with the BPJS mission of expanding the participation to cover the entire population of Indonesia[76]. They share a similar most crucial concern that does not conflict; this explains why even by being social, a hospital can also be a sustainable business.

The result also opens room for further research, such as (1) a more comprehensive study on each sub-factors. The elements and details of population, demography, distance to the target area, investment cost, competition, supply chain, area size, public transport, main road; (2) using real-world alternatives and asking the experts' opinion to give the score for area comparison to have better insight on the preferred location for hospital establishment targeting BPJS patients; (3) using another multicriteria decision-making method to determine the criteria weights and priorities such as ANP.

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