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Human capital, competitive advantage, and business performance: A study of Indonesian hospitals

Hery Winoto Tj [a,*], Joshi Maharani Wibowo [b,c], Bernard T. Widjaja [a]

[a] Universitas Kristen Krida Wacana, Jl. Tanjung Duren Raya No. 4, Jakarta Barat 11470, Indonesia
[b] Economics Department Universitas Surabaya, Surabaya Jl., Raya Kalirungkut, Kali Rungkut, Kec. Rungkut, Surabaya, Jawa Timur 60293, Indonesia
[c] Global Development Studies, University of Helsinki, Unionkatu 35 00170, Finland

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ABSTRACT

This study intends to prove and analyze three causal relationships in Indonesian hospitals. The first is the impact of human capital (HC) and competitive advantage (COMAD) on business performance. The second is the influence of HC on COMAD. The last is the mediating effect of COMAD on the association between HC and business performance. Furthermore, to implement this intention, this study uses medical doctors as the managers of hospitals in several locations in Indonesia with a quantitative approach based on statistical hypothesis testing. Because of the unidentified population, this study employs the snowball sampling technique, where the required theory verification determines the total samples. Providentially, this study can obtain 250 samples based on the survey; therefore, the covariance-based structural equation model is used to prove the formulated hypotheses, and the results demonstrate that Human Capital (HC) and Competitive Advantage (COMAD) positively affect Business Performance (BP). Also, HC positively influences COMAD. COMAD is proven to be a mediating variable based on the Sobel testing outcome. Based on these proofs, this study suggests that the related persons, especially medical doctors in hospitals, must be updated with new illness knowledge, supported by contemporary facilities, and how to cure related patients. By doing these, it bring an everlasting value to construct hospital business and strategy which unique solely for Indonesia hospital and sought by consumers.

1. Introduction

Health is one of the basic human needs. Without health, people cannot productively act. Therefore, the state must provide healthcare services for its citizens with health problems by giving related social insurance (Jamal et al., 2022) and associated institutions such as clinical laboratories (Kaoje et al., 2017), clinics (Alim et al., 2023), public health centers (Arsyad et al., 2022; Marampa et al., 2022), as well as public and private hospitals (Alharbi, 2023). Numerous hospitals must be available in the industry, which makes them compete to serve the consumers (Rahmantya et al., 2019). To ensure the medical facilities and services is delivered with carefulness, the standard must be set to ensure service quality to society. It may be in form of accreditation for clinical laboratories (Alain et al., 2021), clinics (Rushe et al., 2024), public health centers (Amin and Prasetyo, 2023), and hospitals (Hussein et al., 2021; Sulistyo et al., 2019).

Among countries, Indonesia's hospital industry faces challenges and has yet to capture a larger market share both domestically and worldwide. Empirical evidence by Rachmawati et al. (2024) describes the increase of hospital growth in Indonesia by 80 % in the past 10 years. However, the growth is not followed by hospital performance. The biggest challenge face by Indonesia hospital is Health institutions lack of updated facilities and knowledge to accommodate the needs of their community, despite the growth. In addition most of capable hospital in hospital is located on urban area, and leaving the rural area with the lack of health infrastructure along with the human resources (Rachmawati et al., 2024). The literature evidence to support this statement come from Asa et al., (2024); Md Zain et al., (2022); Purwatiningsih et al., (2022), most Indonesians have proved this by flocking to Malaysia or Singapore due to their disappointment with Indonesian hospitals' medical practice, inadequate expertise, and less competitive prices (Asa et al., 2024; Md Zain et al., 2022; Purwatiningsih et al., 2022). An empirical study by Ikatan Dokter Indonesia (Indonesia Doctor Organization) revealed that about 1 million people in Indonesia prefer to obtain

* Corresponding author.
E-mail addresses: hery.winoto@ukrida.ac.id (H.W. Tj), joshiwibowo@staff.ubaya.ac.id, joshi.wibowo@helsinki.fi (J.M. Wibowo), bernard.widjaja@ukrida.ac.id (B.T. Widjaja).

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medical treatment in Malaysia, followed by another 750.000 million people in Singapore, and others seeking treatment in Germany, South Korea, Japan, and other countries for the same reason (Ulya and Setuningsih, 2023). Due to this issue, studies on hospital business performance in Indonesia have been scarce over the past decade (except for Fahlevi et al., 2022; Handayani et al., 2015).

A study by AlQershi et al. (2022), state a hospital must have competent human resources, such as medical doctors (Chmielewska et al., 2020), dentists (Sinaga et al., 2022), physicians, nurses, therapists, midwives (Aveni et al., 2016), and nutritionists (Crovettoa et al., 2024). The same ambition also applies to many developing countries' hospitals. However, most hospital performance studies from Indonesia, is revolve around examining market structure (Rachmawati et al., 2024), service performance (Handayani et al., 2015; Purwatiningsih et al., 2022), or comparative studies of patient preferences between Indonesian and foreign hospitals (Asa et al., 2024; Md Zain et al., 2022). It creates a gap in knowledge of hospital management between medical needs and business needs.

While it may be easier to adopt practical and theoretical knowledge from other countries Hospitals such as Singapore and Malaysia, there are unique differences between hospitals in Indonesia and those in other countries, so the previously existing knowledge cannot be applied for Indonesian hospitals' practices (Asa et al., 2024; Md Zain et al., 2022). One of the unique aspects highlighted in this study is the utilization of medical doctors for administrative and marketing roles instead of business experts to boost the hospital business performance (Asian Pacific Observation on Health Systems and Policies, 2017). Medical doctors' involvement in hospital business management cannot be avoided. For efficiency purposes, putting medical doctors in the hospital is common in Indonesian hospitals. However, this long-term practice hinders business performance by issuing a new financial, human capital, and services problem (Wulandari et al., 2023). For example, the administration becomes slow, doctor skills may deteriorate, and hospital facilities fail to keep up the latest advancements. In opposite, update and deliberating human capital and hospital uniqueness as competitive advantage are bound to drive the institution business performance (Becker, 1993; Porter, 1980), which also apllied on hospital industry. In summaries, doing a study to lead the Indonesia hospital towards the first-rate business performance is needed to win this rivalry.

Despite the theoretical possibility, in fact, hospital business performance is understudied in Indonesia. The closest research is all about market performance and competitiveness (see for example, Devers et al., 2003; Rachmawati et al., 2024). A study of Indonesia hospitals is able to elevate by reaffirming human resource theory along with competitive advantage and business performance. First by including competitive advantages, it bring out a better comprehensive analysis that determines the competitive advantage of a business's performance is needed. Second by including competitiveness, Indonesia hospital is able to delivering the unique value of experience, services, or administration by utilizing medical doctors and hospital staff (Ratnadi et al., 2020; Wulandari et al., 2023). Reaffirming an intricate relationship between business performance, competitive advantage, and hospital human capital represents a critical strategic nexus driving organizational success in contemporary healthcare. It will drive to construct a suitable permonance that produce a stable and profitable hospital business in Indonesia.

By considering this fact, **this study aims to examine and analyze the impact of human capital and competitive advantage on business performance, the effect of human capital on competitive advantage, and the mediating impact of this advantage by utilizing medical doctors as the managers of hospitals in several regions in Indonesia.** The results of this study are expected to highlight the need of Indonesian hospitals performances outside of medical experts, in this case, business. In addition, it also targeted to fill the literacy gap of Hospital business performance studies in Indonesia.

The following sections will discuss the literature review on human capital, business performance, and competitive advantage, as well as hypothesis development that mainly proposed model using SEM (Structural Equation Model) algorithm based on primary data, empirical results, and discussion on both theoretical and managerial contributions related to the Indonesian hospitals business performance.

2. Literature review and hypothesis development

This article underpins human capital and competitive advantage theory to escalate hospital business performance. A firm demonstrates a competitive advantage by generating more economic value than others (Pratono and Han, 2022). For example, banks (Arabiyat and Hasoneh, 2019; Patrisia et al., 2022; Rahman and Akhter, 2021), hotels and tourism (Aman-Ullah et al., 2022; Kerdpitak et al., 2022), pharmaceutical firms (Hendrayanti and Junaidi, 2022; Niwash et al., 2022), manufacturing companies (Shebeshe and Sharma, 2024; Sultan et al., 2021), and telecommunication firms (Obeidat et al., 2021), is heavily aimed at making a profit. However, the hospital business is heavily affected by social influence, not every business principle is applied to the hospital business. One of the most affected business principles that affect hospital business is human resources theory.

The human resource theory represents the collective skills, knowledge, and abilities that individuals bring to an organization, contributing significantly to economic productivity and organizational performance (Becker, 1993). The control of human capital can be measured through some characteristics. Akankunda et al. (2024) investigated human capital effectiveness through technical knowledge, competency, and expertise. First technical knowledge is a measure of understanding a specific skill in the professional domain (Nonaka and Takeuchi, 1995). To bring the most of technical knowledge, practical competency is needed to ensure the effectiveness of professional performance in the health sector (Capainolo and Chase, 2022). By doing this activity or obtaining more knowledge from education and training, individual expertise can be formed, as argued by Becker (1993); Bucci et al. (2019); Yilmazer and Çinar, (2015). However, this activity must be continuous to ensure professional competency. In this case, medical doctors must stay up to date and remain capable of accessing and resolving emerging issues or treating new pathogens to prevent potential casualties (Bucci et al., 2019; World Economic Forum, 2023).

Nonetheless, depending only on superior human capital is insufficient to drive optimal hospital business performance, as argued by Devers et al. (2003); Rivers and Glover, (2008). Following Singh et al. (2020), this study measures hospital competitive advantage based on change and adaptation, clinical excellence, and unique value creation criteria. Change and adaptation are needed in healthcare organizations to build adaptive and flexible organization mechanisms that respond to transformational changes (Austin et al., 2016). Competitive advantage can be achieved through service acts namely clinical excellence, by continuously providing the consumer or patient quality-driven performance (Murtagh Kurowski et al., 2015).

Figure 1 is constructed by following Ghozali (2017b) study. The lines of ——— and — describe the mediating and partial effect, respectively. As the study is done to test the relationship between human capital, business performance, and competitive advantage, the framework presented in Figure 1 may not fully capture the nuances of healthcare management in Indonesia. A critical appraisal of existing frameworks is necessary to illuminate presuppositions of the Indonesian healthcare management landscape, by acknowledging the unique contextual, cultural, and structural nuances of mentioned variable.

2.1. Human capital and business performance

Human capital is the knowledge and aptitudes of the employees in the organization forming the experience (AlQershi et al., 2022). Their competence and skills are essential for organizational success (Rahman and Akhter, 2021). Moreover, the resource-based view highlights that

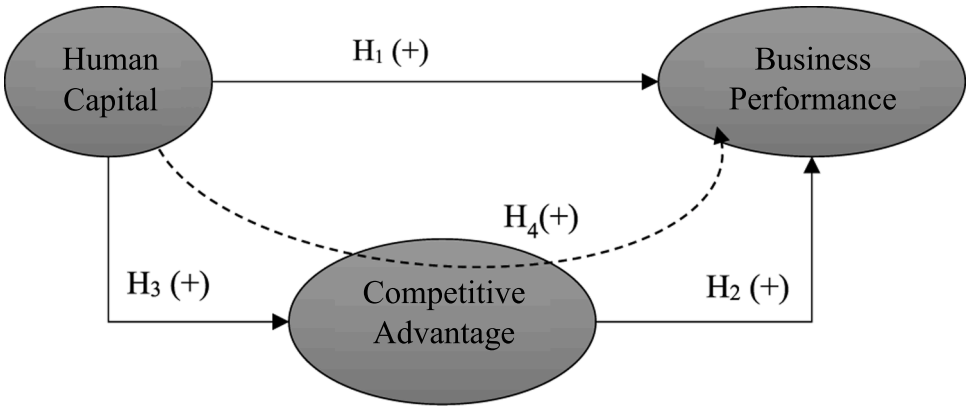

Fig. 1. Research Model. Source: Research Hypothesis.

non-human resources must be integrated with employees to achieve performance under administrative coordination and authoritative communication (Pitelis, 2009). In their study using 261 employees of Janata Bank Limited, Rahman and Akhter (2021) found that three aspects of human capital investment positively affect bank performance, i.e., training, knowledge, and skills. Unfortunately, education does not influence this attainment.

Furthermore, AlQershi et al. (2022) confirm the positive tendency of human capital toward sustainable business performance of hospitals in Malaysia. This tendency is affirmed by Aman-Ullah et al. (2022) based on the perspective of 356 managers working in small and middle-level hotels in four districts of Saudi Arabia and Kim (2023) investigates the companies belonging to business people in South Korea. After utilizing the actors of micro, small, and medium companies in East Java and Manokwari Regency (Indonesia), Rokhman et al. (2023) and Yertas et al. (2024) affirm this positive association between human capital and business performance, one-to-one. Additionally, Veselinović et al. (2022) the study provides a similar fact when researching the impact of human capital on business performance measured by sales revenue based on the secondary data of the selected Serbian firms between 2012 and 2019. By referring to these proofs, the first hypothesis is described in H_1.

H_1: Human capital positively affects business performance.

2.2. Competitive advantage and business performance

Functionally, the hospital has three roles: promotive for prevention, curative, and rehabilitative (Purwanti et al., 2024). Firstly, this health promotion educates people to have a healthy lifestyle (Liao and Bercea, 2021); for example, smoking prohibition can create a healthy body (Nurdianna, 2018). Secondly, the curative intends to heal illness, such as antibiotic utilization to overcome bacterial infection in the body (Uddin et al., 2021) and chemotherapy to destroy harmful cancer cells to prevent their spread (Anand et al., 2023). Finally, medical rehabilitation intends to improve body functions, such as treating post-stroke patients (Olyverdi, 2024) and narcotic addicts (Dewi, 2022).

The competitive advantage occur for hospital business when its not only able to fullfill the main purposes of the activity, but also able to deliver a unique and imitable resources from its competitors. Basically it help to develops company value which exceeds the company's costs paid by consumers Hendrayanti and Junaidi (2022). Consequently, the value created for the customers will exceed the production costs (Porter, 1985). Ultimately, if the company can compete well, its market share and profits will increase (Porter, 1980). In their study, Kaur et al. (2019) utilize research and development investment (RDI) and employee compensation (EC) to quantify the competitive advantage. They also use financial gain from export and foreign investment (FG), sales, and net profit after tax (NPAT) to quantify business performance. After testing the associated data, they demonstrate an unexpected situation: RDI and EC negatively affect FG, sales, and NPAT, indicating the negative relationship between competitive advantage and business performance.

Fortunately, from the perspective of Vietnamese businesspeople, Nguyen et al. (2021) find a positive correlation between competitive advantage (COMAD) and the financial performance of small and medium corporations. Kerdpitak et al.(2022) affirm this positive relationship between COMAD and tourism business performance in Thailand. From Indonesia, Hendrayanti and Junaidi (2022), Patrisia et al. (2022), and Yuwanda et al. (2023) demonstrate a positive influence of COMAD on the business performance of pharmaceutical companies, banks, and small and medium enterprises, respectively. Using the businesspeople of micro, small, and medium companies, Rokhman et al. (2023) and Yertas et al. (2024) show a similar fact. This evidence is confirmed by Shebeshe and Sharma (2024) after studying the viewpoint of 221 managers and supervisors in the Ethiopian manufacturing industry. By referring to these positive facts, the second hypothesis in H_2.

H_2: Competitive advantage positively affects business performance.

2.3. Human capital and competitive advantage

The academic interest in strategic human capital as a firm's competitive advantage source has grown consistently over the last decade. It capable to explain perfomence excellence evidence of firm resources, capabilities, and competencies. Its contribution to innovation and business performance has raised controversy which directly affects operational efficiency, which in turn, affects supply chain effectiveness and firm performance as a result (Santa et al., 2022).The resource-based view explains that the utilization of resources by managers can create products that serve customers better than their rivals in the marketplace (Pitelis, 2009). In their research, Arabiyat and Hasoneh (2019) prove a positive propensity of human capital toward the competitive advantage of 13 Jordanian commercial banks based on 281 responsive managers. This sign is confirmed by Al-Dahhan et al. (2020), exhibiting this tendency after researching 110 lecturers in Baghdad (Iran), and Sultan et al. (2021), describing this strong relationship in the textile industry in Pakistan based on the investigation of 50 related persons. Moreover, Obeidat et al. (2021) affirm this tendency after surveying 342 employees from three Jordanian telecommunication companies: Orange, Zain, and Umniah. Also, Niwash et al. (2022) confirm this inclination after investigating the standpoint of 569 participants from Jordanian pharmaceutical and medical supplies companies. Finally, Rokhman et al. (2023) and Yertas et al. (2024) affirm the same evidence from Indonesia. By mentioning this evidence, the third hypothesis is expressed in H_3.

H_3: Human capital positively affects competitive advantage.

2.4. The mediating effect of competitive advantage on the relationship between human capital and business performance

In their investigation, Rokhman et al. (2023) prove that the indirect effect of human capital on business performance through competitive advantage is greater than the direct impact of human capital on business performance; therefore, the competitive advantage acts as the mediation. Similarly, Yertas et al. (2024) demonstrate that for indirect relationships, financial aspects and human capital significantly affect business performance through competitive advantage, but innovation capability does not when investigating the businesspeople. By referring to these verifications, the fourth hypothesis is stated as follows.

H_4: Competitive advantage mediates the association between human capital and business performance.

3. Research method

The study is done in quantitative way with the help of AMOS program for processing and data modelling. Further, this research incorporates two types of variables. The first is exogenous, namely human capital (HC). Furthermore, to quantify this variable, this research utilizes the dimensions and items proposed by Akankunda et al. (2024) (see Table 1).

The second variable type is endogenous: competitive advantage (COMAD) and business performance (BP). Moreover, the five themes of COMAD in a hospital and their indicator built by Singh et al. (2020) are used in this study as the dimensions, i.e., (1) changing and adapting, (2) clinical excellence, (3) unique value creation, (4) unpredictable situation management, and (5) patient-centric approach (see Table 2). Also, this study uses the indicators to measure BP by denoting Santa et al. (2022) (see Table 3).

Moreover, by distributing the questionnaire, this study utilizes the survey to collect the responses related to indicators. Mentioning Ghozali (2021a), this study uses a five-point Likert scale, from one to five, to measure disagreement to agreement. Therefore, validity and reliability testing are essential. The loading factors and average variance extracted are also employed to detect the accurate answer. If they are above 0.5, the accurate answer exists for indicators and their dimensions (Ghozali, 2017b). Additionally, this study uses a composite reliability coefficient to detect reliable responses for indicators and dimensions. If this coefficient is more significant than 0.7, a reliable answer exists.

Because of theory verification, this study analyzes the accurate and reliable responses to hypothesis testing based on a structural equation model (SEM) based on covariance, as Ghozali (2021b) advises, where equations one and two are as follows.

$$BP = \gamma_1 HC + \beta_1 COMAD + \xi_1 \quad (1)$$

$$COMAD = \gamma_1 HC + \xi_2 \quad (2)$$

The SEM based on covariance requires a sample size of at least 200 people (Ghozali, 2021b). Hence, this study employs the snowball sampling technique, as Pandjaitan et al. (2021), Hadianto et al. (2023), Sahabuddin and Hadianto (2023), and Margaretha et al. (2024) carried out. This technique identifies, searches for, selects, and takes samples in the network (2019), where the researcher contacts one respondent in the network and asks him to share the questionnaire with his colleague (Pandjaitan et al., 2021). Employ snowballing sampling is always bound with bias risk. To mitigate those risks, the questionnaire is distributed to individuals who vary in terms of demographics, such as gender or age. In addition, doing this also helps to monitor the referrals of questionnaire

Table 2
The dimensions of competitive advantage and their indicator.

Dimension	Indicator	Source
Change and adaption (CA)	Our hospitals highly emphasize the following: a) advanced medical treatments (CA1), b) reducing clinical errors (CA2), c) effective material management (CA3), d) improving operational efficiencies (CA4), e) hosting and participating in international medical conferences (CA5)	Singh et al. (2020)
Clinical excellence (CE)	Our hospital can a) create clinically beneficial results for society (CE1); b) adopt the best clinical practices (CE2); c) win several prestigious clinical excellence awards nationally and internationally (CE3); d) implement rare techniques for successful surgeries (CE4);	
Unique value creation (UVC)	Our hospital can: a) serve patients differentially from the other hospital (UVC1); b) engaging consultants and medical staff (UVC2); c) gain the trust of the patients (UVC3).	
Unpredictable situation management (USM)	Our hospital can resolve a) unobservable medical errors (USM1); b) time-critical emergencies (USM2); c) unexpected increase in non-communicable diseases (USM3).	
Patient-centric approach (PCA)	Our hospital provides a) safe and comfortable healthcare services for patients (PCA1); b) smooth scheduling appointments for patients (PCA2).	

Table 1
The dimensions of human capital and their items.

Variable	Dimension	Indicator	Source
Human Capital	Technical knowledge (TC)	Our primary and supportive employees in this hospital, i.e., nurses and medical doctors, have specific technical skills (TC1) Our hospital's primary and supportive employees are highly compensated (TC2). Our hospital trains primary and supportive employees recurrently (TC3).	Adopted and adjusted from Akankunda et al. (2024)
	Competency (COM)	This hospital hires the qualified primary employees (COM1) This hospital rewards the primary and supportive employees with creative ways to handle their patients (COM2).	
	Expertise (EXP)	This hospital has the primary employees to solve the critical health problems of the patients (EXP1). This hospital recruits and retains employees, collaborating with professionals from different fields (EXP2). This hospital has primary employees with the essential expertise required for their position (EXP3).	

Table 3
The indicators of business performance.

Variable	Indicator	Source
Business performance	The profit margin of this hospital increases (BP1). This hospital has sustainable and competitive prices for its services (BP2). The number of patients visiting our hospital has increased (BP3). The return on assets of our hospital has elevated (BP4) The market share has augmented (BP5).	Santa et al. (2022)

distribution, which also helps to mitigate bias.

The respondents of this study are medical doctors affiliated with Ikatan Dokter Indonesia (Indonesia Doctor Organization). The main reason why medical doctoral is choosen, because they also double as managers and administrators, which is a unique constraint that only happens in Indonesia hospitals. Nonetheless, this study still successfully obtained 250 respondents as the sample.

The model should pass and fulfill the goodness of fit detection before estimating the path coefficient in the first and second equations. The detection is based on a Chi-Square divided degree of freedom (CMIN/DF), parsimonious goodness of fit, normed of fit, and comparative fit indexes (PGFI, PNFI, and PCFI). The data support the model if CDMIN/DF is between three and five. Furthermore, PGFI, PNFI, and PCFI should be more than 0.5 to reach this condition (Dash and Paul, 2021).

For testing hypotheses one, two, and three, this study compares the probability of critical ratio with the 5 % significance level (α). Each hypothesis is acceptable if the probability (1-tailed) is less than 5 % (Hadianto et al., 2023). Furthermore, it utilizes the Sobel method to examine the mediating effect. This effect exists if the probability (2-tailed) of the Z-statistic of Sobel is below 5 % (Sahabuddin and Hadianto, 2023).

4. Results

4.1. Respondent profiles

Table 4 exhibits the profiles of 250 respondents by mentioning their gender, age, and region based on the survey from July 10th to September 15th, 2024. Moreover, the leading respondents, based on gender and age, are female (51.60 %) and between 41 and 50 years old (39.60 %), one-to-one. Finally, the majority of respondents come from Jakarta City (62.40 %), and the smallest is from Bekasi, Gunung Mas, Indramayu, Karawang, Tegal (Regency), as well as Kupang, Malang, Mojokerto, and Pontianak (City) (0.80 %).

4.2. Validity and reliability testing result

Table 5 presents human capital for validity and reliability output of dimensions and their indicator. The study observed Composite Reliability (CR), Loading Factor, and Average Variance Extracted (AVE) were addressed to determine the internal consistency. Value greater than 0.5 is considered acceptable for AVE and the loading factor (Ghozali, 2017a), while 0,7 is considered accepted for CR (Satria et al., 2023).

Every indicator to each dimension is measured to ensure its valid and reliable to construct HC. From loading factor value, every dimension value is higher than 0.5. For TC1, TC2, and TC3: 0.719, 0.688, 0.759; for COM1 and COM2: 0.826 and 0.599; EXP1, EXP2, and EXP3: 0.676, 0.697, and 0.911. Therefore, loading factors for all indicator is accepted. The validity is measured from AVE and CR value, sequentially the AVE value of TC, COM, and EXP is 0.522, 0.521, and 0.591 (higher than 0.5). The composite reliability is higher than 0.7 for TC, COM, and EXP: 0.766, 0.679, and 0.810, the value demonstrate robust internal consistency. The slighty lower CR (0.679) is indicate the Human Capital need to be seen and construct through the synchronization of multidimensional indicator. Nonetheless, every dimension is suitable to construct the HC indicator.

The HC reliability and validity testing showed exceptional values across each dimension. The loading factors for TC, COM, and EXP are significantly higher than 0.5 (0.938, 0.948, and 0.826 respectively), supported by an AVE higher than 0.5 (0.820) and a CR value higher than 0.7. These results suggest that HC is strengthened by TC, COM, and EXP. Enhanced skills related to each dimension will beneficially affect human capital and hospital business performance in Indonesia. This result aligns with Wijaya and Suhariadi (2024) study, which found that the integration of technical competency and experiential knowledge acquired through human capital can improve healthcare delivery. It

Table 5
Loading factor, AVE, and composite reliability for indicators of dimensions of human capital.

Dimension	Indicator	Loading factor	AVE	Composite Reliability
Technical Knowledge	TC1	0.719	0.522	0.766
	TC2	0.688		
	TC3	0.759		
Competency	COM1	0.826	0.521	0.679
	COM2	0.599		
Expertise	EXP1	0.676	0.591	0.810
	EXP2	0.697		
	EXP3	0.911		
Construct	Dimension	Loading factor	AVE	Composite Reliability
Human Capital	TC	0.938	0.820	0.932
	COM	0.948		
	EXP	0.826		

Table 4
Respondent Profiles.

Profile	Description	Total	%	Profile	Description	Total	%
Gender	Male	121	48.40	Region	Sidoarjo Regency	4	1.60 %
	Female	129	51.60		South Tangerang City	4	1.60 %
Age	From 22–30	23	9.20		Timika Regency	4	1.60 %
	From 31–40	97	38.80		Bekasi Regency	2	0.80 %
	From 41–50	99	39.60		Gunung Mas Regency	2	0.80 %
	From 51–60	31	12.40		Indramayu Regency	2	0.80 %
Region	Jakarta City	156	62.40 %		Karawang Regency	2	0.80 %
	Tangerang City	21	8.40 %		Kotabumi Regency	2	0.80 %
	Bekasi City	13	5.20 %		Kupang City	2	0.80 %
	Tangerang Regency	10	4.00 %		Malang City	2	0.80 %
	Teluk Bintuni Regency	6	2.40 %		Mojokerto City	2	0.80 %
	Cilegon City	4	1.60 %		Pontianak City	2	0.80 %
	Demak Regency	4	1.60 %		Tegal Regency	2	0.80 %
	Lampung City	4	1.60 %				

emphasizes that balance in human capital within knowledge-intensive healthcare sectors requires multi-dimensional development, both for medical expertise and other hospital staff.

Table 6 describes the competitive advantage for validity and reliability output of dimensions and their indicator to construct Competitive Advantage. Based on the loading factor value, each indicator has a score higher than 0.5, therefore is considered reliable to construct the dimension. The AVE score of all dimensions above 0.5; together with the CR score of each is higher than 0.7, resulting CA, CE, USM, UVC, and PCA is fitting to construct Competitive Advantage variable.

The results of reliability and validity of Competitive Advantage meet the requirements of each measurement, suggesting a strong theoretical foundation for competitive advantage based on multidimensional indicators. It suggest that the organizational indicators of CA, CE, USM, UVC, and PCA are core to boosting the competitive advantage of Indonesian hospitals. Each indicator is emphasized as playing a critical role in ensuring the hospital organization's adaptability and excellence in core services of healthcare management.

Table 7 describes the business performance for the validity and reliability of its indicators. The loading factors for BP1, BP2, BP3, BP4, and BP5 are 0.688, 0.840, 0.709, 0.910, and 0.854, respectively. These values, all above the 0.5 threshold, indicate that each indicator is reliable in contributing to the business performance construct. Additionally, the Average Variance Extracted (AVE) for business performance is 0.648, further supporting the model's validity and reliability criteria for both Table 5 and Table 6. However, there is a clear indicator between BP4 (0.910) and BP5 (0.854) with BP1 (0.688). It suggest some of business performance are more effectively in context of healthcare and Indonesia Hospital business. It highlights which indicators are most critical in assessing business performance within healthcare settings (BP4 and BP5).

Comparing all three variable, competitive advantage demonstrated the highest overall construct reliability, indicating that its measurement model is particularly robust. This high reliability is shown that five indicator used to construct the variable is well-specified for the healthcare context. The strong reliability and validity of this variable imply that these dimensions are effectively captured and are critical for enhancing the competitive edge of Indonesia hospital.

Table 6
Loading factor, AVE, and composite reliability for indicators of dimensions of competitive advantage.

Dimension	Indicator	Loading factor	AVE	Composite Reliability
Change and adaption	CA1	0.715	0.536	0.850
	CA2	0.738		
	CA3	0.593		
	CA4	0.677		
	CA5	0.903		
Clinical excellence	CE1	0.862	0.698	0.902
	CE2	0.797		
	CE3	0.863		
	CE4	0.818		
Unique value creation	UVC1	0.763	0.647	0.846
	UVC2	0.781		
	UVC3	0.865		
Unpredictable situation management	USM1	0.849	0.713	0.881
	USM2	0.820		
	USM3	0.863		
Patient-centric approach	PCA1	0.800	0.628	0.772
	PCA2	0.785		
Construct	Dimension	Loading factor	AVE	Composite Reliability
Competitive Advantage	CA	0.975	0.921	0.983
	CE	0.975		
	USM	0.957		
	UVC	0.955		
	PCA	0.936		

Table 7
Loading factor, AVE, and composite reliability for indicators of business performance.

Indicator	Loading factor	AVE	Composite Reliability
BP1	0.688	0.648	0.901
BP2	0.840		
BP3	0.709		
BP4	0.910		
BP5	0.854		

4.3. The goodness of fit identification results

Table 8 exhibits the goodness of fit identification output. In this table, CMIN/DF is 3.834, which lies between two and five, as required by Dash and Paul (2021); PGFI, PNFI, and PCFI are 0.610, 0.700, and 0.743, more significant than 0.5, as Dash and Paul (2021) demand. Because of this situation, the data are appropriate for the model.

4.4. The estimated research model

Table 9 informs the estimated structural equation model based on covariance with the one-tailed probability of the first, second, and third hypotheses of 0.008, 0.000, and 0.000, where the positive coefficients exist.

Table 10 depicts the Sobel testing result, i.e., the Z-statistical probability (2-tailed) for the COMAD indirect effect is significant of 0.000. This value is lower than $\alpha = 5\,\%$; hence, the fourth hypothesis of mediating the impact of competitive advantage on the association between human capital and business performance is accepted. Additionally, this mediating effect type is partial because of the significant indirect effect mediated by COMAD is 0.000 ($p < 0.05$) (see Table 10) and the meaningful direct impact of HC on BP is 0.008 ($p < 0.05$) (see Table 9).

Accepting the first hypothesis indicates a positive tendency of human capital and business performance. Therefore, this positive evidence confirms AlQershi et al. (2022) studying general managers of the Malaysian hospital. Despite using different objects, this positive result affirms Aman-Ullah et al. (2022), Kim (2023), and Veselinović et al. (2022) utilizing hotel managers and businesspeople in Saudi Arabia and South Korea, as well as secondary data from Serbian firms, one-to-one. From the perspective of the Indonesian entrepreneurs study, the result also affirms Rokhman et al. (2023) and Yertas et al. (2024) work.

Accepting the second hypothesis demonstrates a positive inclination of competitive advantage toward business performance. Although using medical doctors as the managers of hospitals as the object, this positive propensity confirms other studies with the positive relationship between human capital and competitive advantage by utilizing the perspective of Vietnamese businesspersons (Nguyen et al., 2021), tourism managers in Thailand (Kerdpitak et al., 2022), Indonesian pharmaceutical managers (Hendrayanti and Junaidi, 2022), Indonesian banking managers (Patrisia et al., 2022), Indonesian entrepreneurs (Rokhman et al., 2023; Yertas et al., 2024; Yuwanda et al., 2023), and Ethiopian manufacturing supervisors and managers (Shebeshe and Sharma, 2024).

Receiving the third hypothesis indicates that human capital is one of

Table 8
The goodness-of-fit detection output.

Measurement	Value	Required range	Interpretation
CMIN/DF	3.834	Between three and five (Dash and Paul, 2021)	The data are suitable for the model.
PGFI	0.610	Above 0.5 (Dash and Paul, 2021)	
PNFI	0.700	Above 0.5 (Dash and Paul, 2021)	
PCFI	0.743	Above 0.5 (Dash and Paul, 2021)	

Table 9
The estimated structural equation model based on covariance: The impact of HC and COMAD on BP and the influence of HC on COMAD.

Hypothesis	Causal Relationship	Coefficient	Standard Error	Critical Ratio	Probability	
					2-tailed	1-tailed
1	HC → BP	0.185	0.076	2.420	0.016	0.008
2	COMAD → BP	0.633	0.090	7.074	0.000	0.000
3	HC → COMAD	0.738	0.094	7.813	0.000	0.000

Table 10
The Sobel testing to test the mediating effect of COMAD.

Hypothesis	Causal Relationship	Indirect coefficient	Standard Error	Z-statistic	Probability (2-tailed)
4	HC → COMAD → BP	0.467	0.090	5.215	0.000

the sources of gainful competition in the marketplace, as Sultan et al. (2021) declare. Although using medical doctors as the managers of hospitals, this positive propensity confirms other studies with the positive relationship between human capital and competitive advantage by utilizing Jordanian banking managers (Arabiyat and Hasoneh, 2019), Iranian lecturers (Al-Dahhan et al., 2020), Pakistani textile managers (2021), the managers of Jordanian pharmaceutical and telecommunication industries (Niwash et al., 2022; Obeidat et al., 2021), and Indonesian entrepreneurs (Rokhman et al., 2023; Yertas et al., 2024).

Recognizing the fourth hypothesis shows that competitive advantage mediates the relationship between human capital and business performance. Therefore, this study result confirms Rokhman et al. (2023) when investigating the perspective of business owners in the micro, small, and medium enterprises (SMEs) producing Batik in East Java and Yertas et al. (2024) when studying SMEs in Manokwari Regency.

5. Findings

The study explores how human capital and competitive advantage affect business performance in the case of Indonesian hospitals. The result of this study confirms that human capital, competitive advantage, and business performance have a positive relationship. Specifically, this study reveals the significant effect of human capital on competitive advantage and the mediating impact of hospital business performance by utilizing medical doctors as the managers of hospitals across several regions in Indonesia.

Initially, when discussing the relationship between human capital and business performance, it is evident that most medical doctors do not possess expertise outside of medical practice. Stereotypically, a medical doctor serving as a hospital manager must be supported by other employees with specialized skills. However, not every hospital in Indonesia can afford to hire additional staff with the necessary technical skills, competencies, and expertise for non-medical assignments (Fahlevi et al., 2022). In some cases, medical doctors are forced to take on administrative tasks, which can lead to delays and inefficiencies. This results in greater losses compared to the cost of hiring competent employees or implementing reward systems. Firstly, medical doctors lose valuable time that could be spent learning new skills, competencies, and expertise to treat emerging pathogens or perform more advanced medical procedures. Secondly, the inefficiency of non-medical processes, such as administration handled by unqualified staff, leads patients to seek better medical care abroad, except in emergencies. This phenomenon aligns with Akankunda et al. (2024) but in the opposite direction.

The first hypothesis, which highlights the decline in the quality of human capital, while the third hypothesis shows that the lack of high-quality human capital negatively affects a hospital's competitive advantage. This issue can besolve through enhancement of knowledge capabilities and intellectual capital owned by human capital (Mohammad Shafiee et al., 2024). To achieve this, several strategies can be implemented as follows: (1) Adopting advanced methods to treat patients, reducing clinical errors, lowering operational costs, and actively participating in international medical conferences; (2) Prioritizing clinical excellence by delivering accurate diagnoses, adopting best practice principles, earning recognition from reputable international and national institutions, and employing innovative surgical techniques; (3) Creating unique value by offering superior patient care compared to other hospitals and providing medical consultations, thereby fostering trust; (4) Managing technical errors by addressing unobservable medical errors, time-critical emergencies, and unexpected increases in non-communicable diseases. Improvements can be achieved by ensuring continuous, up-to-date training for hospital staff, hiring non-medical professionals for non-medical tasks, and regularly updating hospital facilities. Achieving these goals requires investments in education and adequate funding for medical doctors.

Based on the second and fourth hypotheses, competitive advantage has significant affect on business performance; while human capital mitigated by competitive advantage has a significant effect to business performance. The result study uncovers an unsurprising truth, the busy many medical doctors in managerial roles along with the lack knowledge of financial management at the firm level affects the profit generation and business performance of Indonesia hospitals. Indonesia hospital management tend to maximize the use of outdated facilities while hoping to generate more revenue from medical practice to update hospital facilities. This is particularly challenging given that newest of most medical instruments are expensive, lack of the proper human capital may cause the lack of maintance and uses of those instrument itself. It aligns with the study by Putra et al. (2024) and underscores the need for open innovation dynamics focused on training and guidance (Shin et al., 2024) of medical and hospital staff. In addition, medical doctors and staff also need exposure to financial and technological skills in business models (Castillo-Vergara et al., 2024). This knowlegde is beneficial to help the hospital make rational decisions aimed on long-terms hospital business performance and profit generation in Indonesia. In vice-verse by generating profit more profit in Indonesia hospitals, it enable the management to invest in its human capital, meet patients' needs, and create a unique competitive advantage to provide the best service and medical care, as highlighted in Rivers and Glover (2008).

The study also uncovers an unsurprising truth: many medical doctors in managerial roles in Indonesia lack knowledge of financial management at the firm level. They tend to maximize the use of outdated facilities while hoping to generate more revenue from medical practice to update hospital facilities. This is particularly challenging, given that most medical instruments are expensive. This aligns with the study by Putra et al. (2024) and underscores the need for open innovation dynamics focused on training and guidance (Shin et al., 2024). While medical and technical skills are essential, medical doctors and staff also need exposure to financial and technological skills in business models (Castillo-Vergara et al., 2024). It will help them make rational decisions based on social and medical ethics and maintain the hospital long-term business sustainability. Generating profit is necessary to enable the hospital to invest in its human capital, and to create a unique competitive advantage to provide the best service and medical care, as highlighted in Rivers and Glover (2008) study.

5.1. Policy relevance

Based on the knowledge presented in the findings section, this study proposes policy relevance to be implemented, allowing Indonesian hospitals to achieve a competitive position in both global and domestic markets. In the short term, this study suggests that Indonesian hospitals consider enhancing human capital, including medical doctors, in accordance with previous patient data to meet the needs of new patients in general, encompassing not only medical needs but also financial and administrative needs. Additionally, improving administrative processes to ensure a transparent administrative flow by utilizing technology can create unique value through open innovation and digital market concepts. For example, hospitals can utilize websites for online booking, offer digital medical education through social media, and update the Standard Operating Procedures (SOP) based on the management of unpredictable situations and current health trends.

For the long-term, it is recommended to hire new staff specifically for the administrative task force and updating hospital infrastructure. This recommendation is particularly essential to prevent possible new pathogen outbreaks and ensure that existing medical personnel can operate advanced medical equipment.

6. Conclusion

A hospital's success in recovering people's health is essential to promote itself both domestically and globally. Using a sample of 250 medical doctors serving as hospital managers in Indonesia, this study calculated the competitive advantage (COMAD) to mediate the association between human capital (HC) and business performance (BP). Indeed, the partial impacts were also investigated. This study found, the more qualified the human capital, the greater the success in achieving a competitive advantage, and the more the hospital accomplishes. However, hospitals in Indonesia face some obstacles to boost business performance. Furthermore, business performance is positively correlated with the quality of human capital.

Some problems need to be addressed to ensure that Indonesian hospitals are competing advantageously in the market: medical doctors often have non-medical expertise and need to support employees with technical skills; there are still many hospitals at risk of administrative inefficiencies; the need to change and adapt medical practice based on trends and patient-centred services. To overcome such problems, this research suggests some policy relevance to be considered as follows: update the knowledge and skill of medical and non-medical staff through regular training and provide opportunities to pursue higher level education in medical and non-medical studies (i.e., financial, management, and technology); hiring specialized individuals based on hospital needs; creating a unique short-term and long-term competitive value by leveraging the available resources, such as social media, updating the medical and non-medical procedures based on patient needs; equipping medical staff with advanced devices based on the latest knowledge of illness and pathogens. These strategies aim to foster everlasting unique value and build trust sought by consumers.

Lastly, this study addresses several limitations. First, the study is done in a limited area of Java Island. Future studies are suggested to explore broader regions where medical doctors as hospital managers exist, including major cities in Indonesia such as Jakarta, Surabaya, Bandung, Medan, Semarang, Makassar, Palembang, Batam, Balikpapan, and Samarinda. Second, the variables used in this study are relatively limited. Future studies are encouraged to explore other determinants, such as innovation, supply chain management, and business intelligence. Third, the study focused on a cross-section survey, on short term. The study may ignore the institutional context that was not examined in this study, along with the longitudinal effect of human capital training and education on hospital business performance or competitiveness advantages. Fourth, this study's sampling technique is snowballing sampling, which is always bounded by bias risk. Future research is suggested to deploy other sampling methods such as purposive or employ other techniques to reduce the bias risk for snowballing sampling as low as possible.

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