Sustainable competitive advantage in maternal and child health institutions: a dynamic capability approach

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Abstract
China’s government has always attached great importance to protecting women and children’s rights and has made a consistent effort to promote their all-round health. The on-going medical reforms in the country have resulted in a falling birth rate and rising demand for increasingly diversified, multi-level healthcare services. Maternal and child health (MCH) institutions have had to implement more extensive changes and deal with greater challenges in order to survive and develop. MCH organizations thus need to find ways to improve their competitiveness. This study integrates qualitative and quantitative business analytics methods by conducting empirical research using varied techniques, namely the Delphi method and analytic hierarchy process (AHP). A panel of experts were consulted in three rounds of surveys, and the results were processed with AHP in order to develop an evaluation indicator model of MCH institutions’ competitive advantages. Ten hospitals were selected to verify the model’s applicability. Sensitivity analysis confirmed that the model has good stability. The proposed model highlights that human resources have the greatest weight as a determinant of competitive advantage. The findings, therefore, concentrate on people as the core resource, suggesting that MCH institutions can acquire and maintain competitive advantages based on three dimensions: department leader development, improved scientific research capacity, and a more flexible hospital culture.

Keywords Maternal and child health institutions · Competitive advantage · Resource · Dynamic capability · Business analytics methods · Operational research
1 Introduction

China’s government has always attached great importance to protecting women and children’s rights and has made a consistent effort to promote their all-round health. The efforts to develop maternal and child health (MCH) programs have produced significant improvements in mothers and infants’ well-being by meeting their diversified healthcare demands and increasing fairness in medical treatment. Overall, the on-going medical reforms in the country have caused the birth rate to fall and fostered a demand for increasingly diversified, multi-level healthcare services. MCH institutions’ survival and development has thus been complicated by multiple changes and challenges, especially at the province level. These institutions need to explore ways to improve their competitiveness in order to cope with this evolving scenario (Singh & Vellakkal, 2021).

In response to its aging population, China began to implement a new policy in November 2013 allowing couples in which either the husband or wife is from a single-child family to have two children (i.e., the two-child fertility policy). This policy was applied across the entire nation as of January 1st, 2016. As a result, the pressure to reduce the birth rate diminished, at least in the short term. This reform was followed by a precipitous drop in fertility. In addition, individual women giving birth to multiple children increased the number of older mothers and high-risk pregnancies, which meant new requirements had to be met to ensure mothers and infants’ safety. For example, the number of pregnant women in the advanced reproductive age category in Xiangtan City, Hunan Province, rose to 11,000 in 2018 (i.e., 43.5% of all mothers—an increase of nearly 10%). The 2019 coronavirus disease’s (COVID-19) outbreak also had an unprecedented impact on the medical and healthcare industry. The number of pediatric consultations for infectious diseases and respiratory diseases began to decline sharply with the implementation of public health measures such as home quarantine, frequent hand washing, and wearing masks. COVID-19 impacts on pediatrics highlight the overall changing pressures put on MCH institutions, with this major public health emergency further exposing the vulnerability of these organizations.

The present study primarily focuses on factors determining MCH institutions’ sustainable competitive advantages. MCH organizations’ cultivation of these advantages is analyzed in order to formulate strategies and define ways to implement them. These institutions’ dynamic capabilities form the theoretical basis, along with the literature on related empirical research. The main questions addressed are as follows:

- What are the resources or capabilities that constitute MCH institutions’ sustainable competitive advantage?
- How should these institutions cultivate their dynamic capabilities and strengthen their competitive advantages?

To answer these questions and achieve the associated research objectives, the development processes and status quo of MCH organizations are analyzed. A detailed literature review was conducted to define the types and connotations of competitive advantages and identify sources of competitiveness. After an examination and analysis of these sources in MCH institutions, an evaluation index of sustainable competitiveness in these organizations was constructed and subjected to empirical testing. Figure 1 presents the research conceptual model.

The remainder of this paper is organized into four sections. Section two presents the research background. Section three describes the theoretical framework, which includes the main theories and sources of competitive advantage and the analytical framework of MCH institutions’ competitive advantages based on dynamic capability. Section four provides the research design and discusses the results. Section five presents ways these organizations can
improve their sustainable competitive advantage, while the final section offers this study’s contributions and suggests directions for future research.

2 Research background

2.1 China’s MCH policies and services

China’s MCH policies have evolved in tandem with its economic and social development. From 1927 to 1937, the Nanjing-based national government set up a health system that required midwives and nurses to attend schools and training classes, urged local governments to help train new midwives, and actively promoted other healthcare measures. This government also strengthened the health administration and enacted women’s health legislation, as well as founding midwifery vocational schools and training individuals in women’s health.

Under the new central government, provinces, cities, and counties across China began to build hospitals and public health centers. In September 1949, the Chinese People’s Political Consultative Conference (CPPCC) took place, at which the Common Program of the CPPCC (People’s Political Consultative Conference of the People’s Republic of China (PRC), 1949) was reviewed and approved. This program clearly states that “attention shall be paid to protecting the health of mothers, infants and children”. At the end of October 1949, the Ministry of Health was established, including the MCH Bureau, and local health departments at all levels set up MCH offices and began to form a top-down MCH administrative management system (Fig. 2).
As the main component of China’s MCH services system, MCH hospitals are unique medical organizations in this country (Zhao et al., 2021). Their name is usually translated into English as “women and children’s hospital” or “maternity hospital”, but these phrases do not reflect the actual functions of MCH institutions. They firstly perform MCH care functions overseen by China’s Center for Disease Control and Prevention and only secondarily offer clinical medical services. Over time, MCH organizations have made outstanding contributions to improving Chinese women and children’s health.

The PRC’s National Health Commission—formerly the Ministry of Health—issued its Guiding Opinions on Further Strengthening the Work of Maternal and Child Health (Ministry of Health, 2006a) and Administrative Measures for Maternal and Child Health Institutions (Ministry of Health, 2006b). These documents specify that MCH institutions are non-profit public welfare institutions organized by the government. By 2018, the MCH services system included 3,080 MCH organizations, 807 maternity hospitals, and 129 children’s hospitals, which together had nearly 640,000 employees. In the same year, outpatient services were provided 400 million times, 13.79 million patients were hospitalized, and the number of beds was 338,000. Overall, the beds available in pediatrics and obstetrics and gynecology departments in all types of institutions have continued to increase (Department of Maternal & Child Health, 2019).

2.2 MCH policies and services outside China

Unlike China’s relatively independent MCH services system, MCH care in other countries is integrated into the primary medical and healthcare system. Yao et al. (2013) examined MCH services in the United States, Australia, Malaysia, and Russia and found that the United States, Australia, and Malaysia do not have independent professional MCH institutions. MCH
services have been fully integrated into the routine work of primary medical and healthcare organizations because the latter institutions were established much earlier and they have strong service provision capabilities. Most other countries similarly provide women with basic healthcare and referral services through their primary healthcare institutions and offer specialized medical services through hospitals, with a clear division of labor.

In terms of talent training, many countries have developed sound talent training mechanisms. For example, the United States and Australia have created standardized general practitioner training programs to enrich and enhance MCH services. Malaysia and Russia have instituted related academic majors. They further have strict requirements obstetrician-gynecologists and pediatricians must fulfill before they can provide these specialized medical services. In addition to receiving medical undergraduate education and professional training, these medical professionals must have clinical practice experience. Standardized training mechanisms and restrictions on access to this profession guarantee the quality of MCH care (Taillieu et al., 2021; Zhao et al., 2021).

As mentioned previously, MCH services are mainly provided by specialized institutions in China. Besides providing clinical treatment to women and children, these organizations are required by the Chinese government to offer public health services such as high-risk pregnancy management and birth defect prevention and treatment. The latter services are not provided by primary healthcare institutions, large general hospitals, or other specialized hospitals. Given China’s different national conditions and institutional mechanisms, its MCH services system cannot fully apply models from other countries, but these institutions can still benefit from these nations’ experience.

### 2.3 Growth assessment of MCH institutions in China

A review was conducted of MCH health services’ development since the founding of the PRC, which revealed that a series of steps have been taken. The first was the promotion of new delivery methods in the early days of the PRC, while the second was the dissemination of treatment options for women’s health issues in the 1960s. The third step was the implementation of family planning in the 1970s, and the last was the strengthening of perinatal care in the 1980s. The Chinese government has, over a long period, assessed the relevant factors and formulated and implemented appropriate MCH management policies, thereby ensuring the long-term, steady development of MCH services nationwide. The core MCH indicators are generally better than average for middle- and high-income countries (Ministry of Health, 2006a and 2006b). Thus, China has achieved good performance in this area. The country’s economic development has also ensured that its government and people have been able to deepen their understanding of healthcare. MCH services have become more important, and the demand for these services has increased. As a result, the current MCH standards do not meet everyone’s expectations, leaving several challenges to be overcome, as discussed in the following subsections.

#### 2.3.1 Deviations in some MCH institutions’ positioning

A variety of MCH institutions have ignored basic healthcare services, thus deviating from the expected positioning within the national health system by emphasizing clinical care and ignoring healthcare, focusing on paid projects, and overlooking unpaid projects. This phenomenon exists mainly for two reasons. First, government funding is currently insufficient to cover all costs. Most MCH institutions seek to ensure a balanced allocation of funds, but
the necessary government financial subsidies are not in place. To guarantee their survival and development, MCH institutions have had to reinforce their clinical services to subsidize public health services. Second, most people are insufficiently interested in actively seeking public health services.

These two reasons have caused MCH organizations to deviate from their government mandate, and their healthcare services have gradually weakened. Basic healthcare for women and children thus cannot always be guaranteed. Other medical institutions’ budgets are supported by basic services such as internal medicine and surgery, and these facilities have also entered the health services market traditionally covered by MCH institutions, making the clinical services supply more diverse. Overall, the latter organizations’ characteristics are becoming less distinctive, their development prospects more blurred, and their competitiveness weaker.

2.3.2 Challenges to MCH institutions’ stable development

The Ministry of Health’s plan stipulates Chinese women and children’s health development goals from 2011 to 2020, including one standardized government-sponsored MCH institution in each province, city, and county. These facilities must have pediatrics and obstetrics and gynecology departments and provide general hospital services—above the second-grade hospital level—that meet government standards. MCH’s facilities, equipment, and staffing are expected to satisfy specific requirements for basic medical and healthcare services (Ministry of Health, 2012).

Because the ministry’s plan specifies that each province, city, and county should set up an MCH institution, these organizations have enjoyed a comparatively stable position in the market for a long time due to the special services they cover. In 2009, China began to implement a new round of medical and healthcare system reforms—commonly referred to as the “new medical reform”. These changes have required medical and healthcare institutions not only to reduce residents’ medical expenses burden but also to facilitate proactively their access to medical treatment. The reforms call for a basic medical and healthcare system covering urban and rural residents that provides people with safe, effective, convenient, and cheap services. This requirement has meant that medical organizations must make strategic choices in how to develop in order to meet people’s growing diversified and multi-level healthcare service demands and to become more demand-oriented. To provide varied healthcare at multiple levels, medical institutions rely heavily on a sound academic system and a complete education chain.

MCH organizations are specialized hospitals that traditionally rely on gynecology, obstetrics, and pediatrics professionals. However, from a long-term perspective, the lower birth rate appears to be an irreversible trend due to the declining number of women of childbearing age. In addition, obstetrics’ development will probably become more limited in the future, and the clinical side of pediatrics currently focuses mainly on infectious diseases, which means this medical field lacks diversity and has become more vulnerable due to its reliance on the risk-resistance adaptation model. From an administrative perspective, MCH institutions’ internal healthcare and clinical referral mechanisms are imperfect, and the medical education chain is still incomplete. These problems urgently require solutions if people are to be provided with diversified, multi-level MCH services.

The Chinese government’s plan further stipulates that MCH institutions and general hospitals above the second grade should set up pediatrics and obstetrics and gynecology departments. In other words, these fields have traditionally been dominated by MCH organizations, but these areas are no longer theirs exclusively since certain hospitals can also offer these services. Large hospitals—especially third-grade class-A hospitals with a sound academic
foundation—can provide more powerful technical support to gynecologists, obstetricians, and pediatricians. These facilities can further provide multi-disciplinary collaborative diagnoses and treatments in order to improve their comprehensive treatment capabilities. This reform has thus intensified the competition faced by MCH institutions.

After more than 70 years of construction and development, China’s MCH organizations still continue to put women and children at the center of their services. These institutions are constantly improving their policies, systems, and services and gradually finding ways to fulfill their main purpose: providing health services and protection from illnesses to individuals still in the womb and onward to the end of their life (Department of Maternal & Child Health, 2019). China’s medical system reforms have combined with the declining birth rate to change the external environment shaping MCH institutions’ development. These organizations, therefore, need to exploit the opportunities and deal with the risks presented by these changes and explore new ways to enhance their competitiveness.

3 Theoretical framework and research gap

3.1 Literature review

The concept of competitive advantage was first put forward by the British economist Chamberlin in 1939 and then introduced to the field of strategic management by Ansoff (1965). In Porter’s (1985) book, *Competitive Strategy*, he observes that overall cost leadership, differentiation, and focus are three generic strategies that help businesses to gain competitive advantages. Low-cost or overall cost leadership’s advantage comprises keeping companies’ total cost of producing specific or similar products at a lower level within other firms in the relevant industry. The former firms can then obtain relatively more benefits or quickly occupy the market by offering lower market prices. Differentiation is when businesses create unique products or services for buyers. The focus strategy refers to companies that focus on specific consumer groups, product categories, or regional markets and implement cost leadership or differentiation strategies to gain competitive advantages.

Competitive advantage fluctuates, and its disappearance and maintenance are two significant aspects of specific advantages’ dynamics. The current understanding of this variability can be summarized as follows. First, these advantages are shaped by constant innovation’s effects. Jiang (2002) argues that firms can gain sustainable competitive advantages by constantly shifting the source of their advantages. Second, endogenous resources and capabilities are crucial to maintaining corporate competitive advantages. Assets and competencies can be described by evaluating the attributes of value, rarity, imitability, and organization (VRIO) (Barney, 1986a). Third, the development of new competitive advantages is restricted by core rigidity, which includes, among others, behaviors and preference habits, significant costs, cognitive path dependence. Last, competitive advantage is relative. Any competitive advantage exists in comparison to competitors at a specific time and in a particular space, so no absolute competitive advantage exists that is divorced from time and space constraints.

Since the 1980s, intensified competition has made corporate competitive advantage’s formation and maintenance more important to companies’ survival and development. Management scholars have thus become increasingly interested in understanding the sources of competitiveness. Competitive advantage theories can be divided into two categories: endogenous and exogenous. Exogenous competitive advantage theory posits that firms’ advantages
mainly originate in their external environment. In other words, corporate competitive advantage is mainly determined by competitive relationships and opportunities in external markets. This view is represented by the theory of industrial organization and strategic conflict theory. The first theory attributes businesses’ competitive advantage to their industry and their competitive position in it, emphasizing market forces’ role and providing an analytical perspective from which to consider what determines firms’ profitability in an industry. The structure-conduct-performance paradigm is a specific expression of this theory (Porter, 1985). Strategic conflict theory, in turn, focuses on analyzing the interactions between competitors’ strategic conduct. The theory examines companies’ strategic actions using mathematical models, which reveals how firms affect their market environment by influencing their competitors’ conduct. According to this theory, managers’ ability to make good decisions is a potential source of corporate competitive advantage. To strike first to gain the initiative is a motto associated with strategic conflict theory. The endogenous theory of competitive advantage was first formulated by Rumelt (1982), who focused primarily on businesses’ internal factors as determinants of competitive advantage. This approach posits that the accumulation of internal resources and competencies—rather than external conditions—is the key to explaining companies’ ability to gain greater profits and maintain competitiveness. This group of theories comprises four main members: resource-based theory (RBT); core capability theory; knowledge-based theory; and dynamic capabilities theory.

RBT sees resource development as the basis for firms’ ability to gain competitive advantages. The root idea of RBT can be traced back to Penrose’s (1959) *The Theory of the Growth of the Firm*, which put forward the idea of business resource growth and formulated the analysis paradigm of “enterprise resource-enterprise capability-enterprise growth”. The author’s proposition that companies’ heterogeneity comes from the characteristics of their resources has become an RBT cornerstone. Wernerfelt (1984), Rumelt (1984), Barney (1986b), Dierickx and Cool (1989), and Peteraf (1993) subsequently contributed to expanding RBT. Barney (1986b) sought to develop a theory that explains firms’ lasting and outstanding performance based on their resources’ attributes. The cited researcher then introduced the concept of strategic factor markets, namely markets in which businesses can acquire or cultivate the resources needed to implement their product marketing strategies. Barney (1986a) suggests that corporate competitive advantages stem from the strategic resources owned by companies. This author asserts that resources have four attributes that can bring competitive advantages to firms, represented by the acronym VRIO mentioned previously. Barney’s (1986a, 1986b) conceptualization of strategic resources marked the formal establishment of the school of resource-based strategy. Strategic management researchers responded by moving their focus from traditional market and external environments to organizations’ internal capabilities and resources. However, RBT does not consider resource formation mechanisms and assets’ dynamic development processes in which resources are constantly changing along with external environments. Organizations must constantly select and integrate the assets they have in order to ensure that these resources evolve with the surrounding environment and remain adaptable. Thus, scholars began to subdivide resources into groups, thereby extracting the concept of capabilities. Companies’ unique, inimitable capabilities acquired through long-term learning processes are regarded as the source of corporate competitive advantage, which gave rise to capability-based theory. The most representative schools of thought are corporations’ core competencies (Prahalad & Hamel, 1990), dynamic capabilities (Teece et al., 1997), and knowledge-based theory (Grant, 1996). Essentially, different endogenous theories are derived from varied perspectives on input factors, which do not change the key role of firms’ internal knowledge, resources, and ability in the obtainment and maintenance of competitive advantage.
Although the concept of dynamic capabilities has been studied for over 20 years, no universally accepted definition has been developed. To date, this conceptualization has gone in two major directions. One view is that companies’ dynamic capabilities are those that facilitate abstract organizational and managerial processes. For example, firms can have the capacity to build, adjust, integrate, and reconstruct internal and external resources or capabilities; perceive and identify opportunities and threats; detach and release resources; and learn (Eisenhardt & Martin, 2000; O’Reilly & Tushman, 2008; Teece & Pisano, 1994; Wang & Ahmed, 2007).

The other view is that dynamic capabilities are competencies shown in specific strategic and organizational processes. For instance, businesses may be able to develop products, form alliances, make strategic decisions, conduct marketing and research and development, create or disrupt markets, develop new products, processes, and services, and implement new business processes. Firms can also create new customer relationships and change business modes (Drnevich & Kriauciunas, 2011; Eisenhardt & Martin, 2000; Helfat & Peteraf, 2003; McKelvie & Davidsson, 2009).

Based on the literature review, the present study adopts Teece et al.’s (1997) approach as a conceptual framework with which to define the concept of dynamic capabilities. That is, dynamic capabilities refer to companies’ capacity to build, integrate, and reorganize their internal and external resources by constantly investigating changes in their environment and exploring business opportunities. These capabilities allow firms to improve their competencies in market operation and practices and to adapt to evolving, complex environments characterized by uncertainty and change. Dynamic capabilities should meet at least two basic criteria, of which the first concerns the capabilities’ roles. Unlike conventional company competencies, dynamic capabilities can change conventional capacities and then determine the direction and speed of businesses’ development. The second criterion is the process of application since dynamic capabilities are repeatable and stylized and they can be identified quite clearly as processes.

3.2 Research gap

Core competency theory is a specific application of competitive advantage theory to research on hospital management. After the core competency theory was introduced into this field, studies of hospitals’ competitiveness became increasingly common. The current consensus on this topic is that the main dimensions of hospitals’ core competency are human resources, technological innovation, strategic and operations management, hospital culture, learning ability, and brand appeal. On a theoretical level, research on the competitiveness of China’s MCH institutions has mainly focused on strategic choices and competitive advantage development. On a practical level, scholars have mainly concentrated on defining evaluation indicators.

Regarding strategy selection, the director of the Ministry of Health’s Department of MCH, proposed in 1992 that MCH service providers should adopt the development strategies that best help them to survive, develop, and succeed (Wang, 1992). MCH institutions’ development strategies have long been a point of controversy in the healthcare and clinical services market. For example, in Shandong Province, before the mid-1980s, MCH organizations at all levels were basically healthcare providers. After 1986, a national MCH services policy was established that focused on preventing illnesses and guiding health practices at a grassroots level. As this approach necessarily combines health and clinical programs, MCH institutions’
development model began to diversify at all levels. General services were predominant for some time, but, since 2000, clinics have become more prominent (Zheng, 2004).

In recent years, the Chinese people’s understanding of prevention and healthcare has improved, and a combination of healthcare and clinical services has gradually become the norm for MCH organizations. According to Long (2019), this combination can be achieved through a process of fully integrating hospital services, technology, and new talent. Hospitals’ medical resources and service providers allow patients to be integrated into more systematic, continuous, efficient, and convenient comprehensive medical services, thereby helping MCH institutions to develop their own characteristic services and focus on improvements.

The present literature review examines the relevant literature on measures to strengthen MCH organizations’ competitiveness and reveals the following main gaps. First, theoretical guidance is still inadequate with regard to strategic management. The existing studies have mostly concentrated on problem analysis and empirical research, providing practical advice but neglecting theoretical support. Second, the literature shows a lack of in-depth international comparison and exploration studies. Prior international research on MCH services has mostly consisted of rudimentary initial examinations of these services in a number of countries. For instance, Zhang (1989) profiled the MCH services being offered in Japan and the Philippines. Both Gu (2018) and Lu et al., (2000a, 2000b) concentrated on these services in Australia, with the latter authors conducting a brief analysis of the state and development trends of MCH. Lesser and Fang (1987), Department of Maternal and Child Health Care in China (1998), and Ji and Duan (2000) reviewed MCH services in the United States. Overall, this field of study needs more international, comprehensive, and horizontal comparisons and vertical in-depth discussions (İlgün et al., 2021; Singh & Vellakkal, 2021). The extant research also lacks in-depth investigations into how to improve China’s MCH service system’s institutions based on lessons learned from other countries’ more evolved programs. Last, the current literature review detects a gap in terms of interdisciplinary research perspectives. Most studies have been carried out from a public health perspective, but more research is needed from the perspective of MCH institution and public health management. These organizations’ strategic choices or quest for greater competitiveness can also be analyzed using strategic management competition theory and comparative advantage theory. Competitive advantage acquisition was selected as the central focus in the present study. Environment, resources, and capabilities are all important factors that affect the formation and development of competitive advantages. Using these results, a realistic model of competitive advantage development was constructed (see Fig. 3).

Fig. 3 Realistic model of corporate competitive advantage development

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First, companies’ external environment is an important factor that affects their ability to cultivate competitive advantages. A challenging, turbulent external environment restricts how firms’ internal resources and capabilities can be applied. To obtain sustainable competitive advantages, businesses must fully understand the complex dynamics of the surrounding environment and strive to adapt their strategies to fit this environment. Second, competitive advantage is the result of how well companies’ environment, resources and capabilities match each other. Resources and capabilities’ value is realized by exploiting the external environment, thereby producing competitive advantage. The surrounding environment affects firms by forcing them to adjust their existing resources and capabilities to match their setting. Key assets and competencies can be deployed to respond to environmental changes and can thus become the source of sustainable competitive advantages. Third, environment, resources and capabilities can be coordinated through dynamic capabilities to produce sustainable competitive advantages. MCH institutions’ competitiveness in this study does not refer to core competency in a general sense but to dynamic capabilities based on evolving environments. Core competencies are temporal and static as original fundamental competencies can be lost due to competitors’ actions, changes in the environment, and new emerging technologies. Dynamic capabilities, in turn, help firms develop and integrate their internal resources and skills, helping companies to adapt more effectively to changes in their external environment. These capabilities form the basis for sustainable competitive advantages generated in response to that environment’s dynamics. Last, dynamic capabilities are critical tools for MCH institutions seeking to obtain competitive advantages. The healthcare field continues to change drastically, but all medical institutions always exist in a shared space. Due to competition, people tend to notice that MCH institutions have a different structure in terms of medical areas and asset size in comparison to general hospitals. However, assets are mobile, academic field structure changes, and governance structure can be adjusted through reform, so these factors cannot be hospitals’ source of sustainable competitive advantages. Only MCH organizations’ ability to reconstruct internal resources and adapt to their environment via a long-term accumulation of competencies can remain a source of sustainable competitive advantage in changing external environments. MCH institutions thus must move away from a mindset of relying on internal resources or the external environment, invest in cultivating dynamic capabilities, and make sure that some form of competitive advantage is always maintained.

4 Study design, results, and discussion

The topic of business competitive advantage has received significant attention from researchers, but few studies have examined medical organizations’ competitive advantages, let alone those of specialized facilities such as MCH institutions. To study these MCH service providers’ competitive advantage from a strategic management perspective, priority needs to be given to determining what these advantages are for healthcare institutions. In other words, researchers must determine which indexes can be used to measure MCH institutions’ core competitiveness and what standards should be met for these organizations to ensure competitiveness. To this end, studies are needed that connect competitive advantage theory to the development of these organizations’ competitive advantages by identifying reasonable and effective evaluation criteria. With these, researchers can construct an evaluation index system that would allow China’s MCH institutions to achieve sustainable development despite
a turbulent market. These organizations also need tools to determine, evaluate, and develop their own competitive advantage.

4.1 Study design

The present study draws on the existing research on competitiveness evaluation to construct an evaluation and analysis model of competitive advantage in MCH institutions. The evaluation indicators are constructed based on relevant principles and these organizations’ resources and capabilities. The overall goal is to explore the most significant strategies fostering MCH institutions’ competitiveness.

4.2 Research methods

Many methods could have been used in the present study context. However, as widely recognized in the literature (cf. Weber & Borcherding, 1993; Belton & Stewart, 2002), each method has strengths and weaknesses, which has led several authors to conclude that there is no such thing as a superior method or technique (cf. Ananda & Herath, 2009; Zhou & Ang, 2009; Brito et al., 2019). This research relies on three methods: free-association enumeration interviews, a questionnaire survey based on the Delphi method (Dalkey & Helmer, 1963), and the AHP (Saaty, 1980). Evaluation indexes of competitiveness advantage in MCH institutions were first developed based on data gathered from free-association enumeration interviews. The final version of the evaluation indicators was subsequently formulated with the questionnaire survey’s data. Each evaluation index’s weight was then determined via the AHP, after which the evaluation model of MCH organization competitiveness advantage could be constructed.

4.3 Evaluation index screening

Experts were selected to participate in this study using accidental sampling—a method often used in exploratory research. Because the research centered around a constructive process, the procedures followed the guidelines provided by Eden and Ackermann (2004), who suggest that 6–10 people is an appropriate number of experts to interview. To ensure a more comprehensive set of indicators, the participants were recruited from MCH institutions in Hunan, Guizhou, and Guangxi, and these experts were senior executives in their organizations. The preliminary selection of 30 experts was based on the following criteria: (1) over 10 years of experience working as a senior executive; (2) work positions in two or more management departments; and (3) participation in MCH institutions’ performance appraisal (see Table 1).

Before the formal interviews took place, an interview guide was drawn up based on MCH organizations’ current situation and the literature review findings. Two senior executives were invited for a preliminary interview. The guide was revised to reflect the interview results, and the final draft was written. Due to conflicting work schedules, only 23 experts were interviewed, while the other 7 participated in the study follow-up phase. Barney (1991) and Barney and Clark’s (2007) classification of resources was used to categorize the determining factors mentioned by the interviewees, namely as financial, human, brand, cultural, material, or organizational resources. The selection criteria incorporated into the evaluation indexes were directly related to the final evaluation model’s credibility. The VRIO framework associated with Barney and Clark’s (2007) RBT were used as screening criteria in the second
round of expert consultations. The list of factors influencing MCH institutions’ competitiveness obtained from the free-association enumeration interviews was limited to the indexes that appeared over 10 times. The questionnaire for the VRIO-based expert consultations was then developed. In this phase, a total of 30 questionnaires were distributed, and 28 were collected, which is a response rate of 93.3%. Of these questionnaires, 25 were valid since 3 invalid questionnaires included repeated answers to resource type items, as well as missing information. Finally, the evaluation indicator system for sustainable competitive advantages in MCH institutions was constructed based on the literature review results, free-association enumeration interviews, and VRIO-based expert consultations.

### 4.4 Evaluation model construction

The evaluation index system contained some indexes that are significantly affected by subjective opinions. Thus, statistical methods could not be easily applied to determine their evaluation values directly. In addition, every evaluation indicator in the same hierarchical structure has a different role. This study’s final phase thus comprised a third round of expert consultations, which used the AHP to determine the evaluation indexes’ specific weights.

Seven experts who had not participated in free-association enumeration interviews and VRIO consultations were selected to determine the different indicators’ weights in the evaluation model. These participants needed to understand fully the indexes included in the final model and to have extensive management expertise and authority as a result of broad experience working in MCH institutions. All the questionnaires distributed were collected and considered valid. The experts’ level of authority was assumed to be consistent, and they were expected to have the same degree of understanding of the parameters reflected by the indexes. Based on this logic, the arithmetic mean of the weights assigned was calculated to integrate all seven participants’ judgements into the final results. After obtaining all the indicators’ average weights as assigned by the seven experts, the relative intensity of importance and judgment matrices were calculated. The judgment matrix for all the indexes passed the consistency test and thus met the requirements for valid judgments. As the final assessment of the model was based on the third-level indexes’ comprehensive weights, these indicators’ final

| Table 1 Basic profile of selected experts |
|------------------------------------------|
| **Basic information** | **Group** | **Number** |
| Age (years) | ≤ 40 | 3 |
| | 41–50 | 17 |
| | > 50 | 10 |
| Gender | Male | 11 |
| | Female | 19 |
| Years of work | 10–15 | 3 |
| | 16–20 | 3 |
| | 21–25 | 8 |
| | > 25 | 16 |
| Title | Physician | 5 |
| | Associate professor | 17 |
| | Professor | 8 |
| Second-level index          | Weight | N  | Third-level index                                                                 | Weight | Comprehensive weight |
|----------------------------|--------|----|-----------------------------------------------------------------------------------|--------|----------------------|
| Financial resources        | 0.096  | 1  | Proportion of funds reserved for scientific research and education                | 0.667  | 0.064032             |
|                            |        |    | Percentage of income from medical services                                        | 0.333  | 0.031968             |
| Human resources            | 0.356  | 1  | Talent development                                                                | 0.136  | 0.048416             |
|                            |        |    | Talent retention rate                                                              | 0.136  | 0.048416             |
|                            |        |    | Department leaders’ regional influence                                            | 0.474  | 0.168744             |
|                            |        |    | Staff title structure                                                              | 0.050  | 0.017800             |
|                            |        |    | Staff academic qualification structure                                            | 0.048  | 0.017088             |
|                            |        |    | Staff training mechanisms                                                          | 0.156  | 0.055536             |
| Brand resources            | 0.185  | 1  | Senior management team’s social influence                                          | 0.048  | 0.008880             |
|                            |        |    | Intra-industry recognition                                                         | 0.149  | 0.027565             |
|                            |        |    | Patient satisfaction                                                               | 0.062  | 0.011470             |
|                            |        |    | Patient loyalty                                                                    | 0.066  | 0.012210             |
|                            |        |    | Brand promotion ability                                                            | 0.037  | 0.006845             |
|                            |        |    | Medical areas’ service chain throughout patients’ life cycle                       | 0.071  | 0.013135             |
|                            |        |    | Number of characteristic medical fields and key specialties                        | 0.218  | 0.040330             |
|                            |        |    | Hospital’s social influence                                                        | 0.144  | 0.026640             |
|                            |        |    | Ability to treat difficult and severe cases                                        | 0.205  | 0.037925             |
| Cultural resources         | 0.056  | 1  | Understanding of MCH policies                                                      | 0.322  | 0.018032             |
|                            |        |    | Hospital’s long-term planning                                                      | 0.256  | 0.014336             |
|                            |        |    | Employee cohesion                                                                  | 0.207  | 0.011592             |
|                            |        |    | Staff’s cultural identity                                                          | 0.126  | 0.007056             |
|                            |        |    | Staff satisfaction                                                                 | 0.089  | 0.004984             |
weights were calculated (see Table 2). The results were used to construct the final evaluation index model of MCH institution competitiveness including the indexes’ respective weights.

### 4.5 Empirical research

To evaluate the assessment system applicability, the model was subjected to empirical analysis (Angelis et al., 2016). Ten Chinese MCH institutions were selected using convenience sampling in order to verify the system’s relevance for practitioners. The 33 indexes integrated into the evaluation model were divided into two categories (i.e., qualitative and quantitative) and included in a questionnaire distributed to the 10 MCH hospitals.

The completed questionnaires were submitted to five experts for further analysis. Specifically, these specialists were invited to evaluate the 10 institutions using the evaluation model. Based on the experts’ scores and indicators’ weights, these hospitals’ overall scores and rankings could then be calculated. Table 3 shows the 10 MCH institutions’ ranking according to their overall scores, which were obtained by applying a simple additive aggregation model (Martins et al., 2015). The results indicate that, in terms of competitive advantage, MCH\textsubscript{10} has the most competitive advantage, while MCH\textsubscript{7} has the least.

To consolidate the results, sensitivity analysis was conducted to evaluate the impact of changes in each indicator’s standard weight in the model as a whole. The third-level index

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**Table 2 (continued)**

| Second-level index | Weight | N | Third-level index | Weight | Comprehensive weight |
|--------------------|--------|---|-------------------|--------|----------------------|
| Material resources | 0.056  | 1 | Special diagnosis and treatment equipment specifically for MCH | 0.667  | 0.037352 |
|                    |        | 2 | Business area     | 0.333  | 0.018648 |
|                    |        | 1 | MCH networks      | 0.276  | 0.069276 |
|                    | 0.251  | 2 | Public health management capabilities | 0.147  | 0.036897 |
|                    |        | 3 | Senior management’s decision-making ability | 0.204  | 0.051204 |
|                    |        | 4 | Performance incentive mechanisms | 0.105  | 0.026355 |
|                    |        | 5 | Market resilience | 0.059  | 0.014809 |
|                    |        | 6 | Information resource utilization | 0.028  | 0.007028 |
|                    |        | 7 | Department structure | 0.101  | 0.025351 |
|                    |        | 8 | Importance attached to healthcare by medical staff | 0.032  | 0.008032 |
|                    |        | 9 | Integrated healthcare services capacity | 0.048  | 0.012048 |

*N number. All consistency indexes lower than 0.10*
Table 3 Overall scores and rankings of MCH institutions

| Hospital | Overall score | Ranking |
|----------|---------------|---------|
| MCH1     | 5.7151        | 8       |
| MCH2     | 6.6846        | 3       |
| MCH3     | 6.1756        | 5       |
| MCH4     | 5.9441        | 7       |
| MCH5     | 5.7038        | 9       |
| MCH6     | 6.0672        | 6       |
| MCH7     | 5.5945        | 10      |
| MCH8     | 6.6407        | 4       |
| MCH9     | 6.8099        | 2       |
| MCH10    | 7.6174        | 1       |

with the second highest weight (i.e., department leaders’ regional influence) was selected to check the outcomes. The results in Table 4 reveal that, when the indicator’s weight falls between 0.08166 and 0.25794, this factor’s effect on the hospital competitiveness ranking becomes more obvious. If the weight is greater than 0.25794, the model stabilizes.

The results of the sensitivity analysis confirm that some third-level indicators with high weights are sensitive components of the model. Therefore, a robustness analysis was carried out to check how simultaneous changes in multiple indicators with significant weights within the model framework affect the evaluation system stability and reliability. The same third-level index (i.e., department leaders’ regional influence) was selected for the second round of analysis. Table 5 shows that, when the chosen indicator’s weight value fluctuates between 0.0000 and 0.3121, the other five indicators’ weights change according to a specific rule. That is, if the third-level indicator’s total weight is 1, the rankings of the evaluation indexes remain stable. When the weight of the former indicator is greater than 0.3121, the rankings change only slightly and then tend to remain stable. These findings indicate that the model can generate evaluation results that meet the expected requirements.

Sensitivity and robustness analyses were subsequently conducted for all the other indexes. The sensitivity analysis results reveal that the overall sensitivity of the second-level indicators is low. When the weights of these indexes change, their impacts on the final results are small. However, some important third-level indicators are highly sensitive such as department leaders’ regional influence, MCH networks, and proportion of funds reserved for scientific research and education. Within a specific weight-change range, these indexes have a strong impact on the final results. Thus, some attention should be paid to these third-level indicators. The robustness analysis confirmed that the proposed evaluation model of MCH institutions’ competitive advantage is well suited for assessing the competitiveness of these organizations even when changes occur in experts’ weight judgments, thereby indicating its applicability is overall quite good.

4.6 Analysis and discussion of results

The model built in this research was designed to evaluate competitiveness. All MCH hospitals that use this assessment tool would thus be applying the same standards. The evaluation results can only be used to compare competitiveness levels among these institutions. In
Table 4  Sensitivity analysis of department leaders’ regional influence index

| Weight | Priority ranking |
|--------|------------------|
|        | MCH1  | MCH2  | MCH3  | MCH4  | MCH5  | MCH6  | MCH7  | MCH8  | MCH9  | MCH 10 |
| 0.00273 | 0.075  | 0.108  | 0.100  | 0.095  | 0.091  | 0.097  | 0.090  | 0.108  | 0.112  | 0.125  |
| 0.04219 | 0.082  | 0.107  | 0.099  | 0.095  | 0.091  | 0.097  | 0.089  | 0.107  | 0.110  | 0.123  |
| 0.08166 | 0.088  | 0.106  | 0.099  | 0.094  | 0.090  | 0.096  | 0.088  | 0.106  | 0.110  | 0.123  |
| 0.08956 | 0.090  | 0.106  | 0.099  | 0.094  | 0.090  | 0.096  | 0.088  | 0.106  | 0.110  | 0.122  |
| 0.11850 | 0.095  | 0.105  | 0.098  | 0.093  | 0.089  | 0.096  | 0.088  | 0.105  | 0.109  | 0.122  |
| 0.12376 | 0.095  | 0.105  | 0.098  | 0.093  | 0.089  | 0.095  | 0.088  | 0.105  | 0.109  | 0.122  |
| 0.13954 | 0.098  | 0.105  | 0.098  | 0.093  | 0.089  | 0.095  | 0.087  | 0.105  | 0.109  | 0.121  |
| 0.17375 | 0.104  | 0.104  | 0.097  | 0.093  | 0.089  | 0.095  | 0.087  | 0.104  | 0.107  | 0.119  |
| 0.17638 | 0.104  | 0.104  | 0.097  | 0.093  | 0.088  | 0.095  | 0.087  | 0.104  | 0.108  | 0.120  |
| 0.19217 | 0.108  | 0.104  | 0.096  | 0.092  | 0.088  | 0.094  | 0.087  | 0.104  | 0.108  | 0.120  |
|        | 2      | 4      | 6      | 8      | 9      | 7      | 10     | 5      | 3      | 1      |
### Table 4 (continued)

| Weight  | MCH1 | MCH2 | MCH3 | MCH4 | MCH5 | MCH6 | MCH7 | MCH8 | MCH9 | MCH10 |
|---------|------|------|------|------|------|------|------|------|------|-------|
| 0.25794 | 0.118| 0.103| 0.095| 0.091| 0.087| 0.093| 0.086| 0.103| 0.106| 0.118 |
| 1       | 4    | 6    | 8    | 9    | 7    | 10   | 5    | 3    | 2    |       |
| 0.51872 | 0.162| 0.098| 0.090| 0.087| 0.083| 0.089| 0.082| 0.097| 0.100| 0.110 |
| 1       | 4    | 6    | 8    | 9    | 7    | 10   | 5    | 3    | 2    |       |
Table 5 Robustness analysis of department leaders’ regional influence index

| Weight | Weight ranking | CTR1 | CTR2 | CTR3 | CTR4 | CTR5 | (MCH1-MCH10) |
|--------|----------------|------|------|------|------|------|--------------|
| 0.0000 |                | 0.2964 | 0.0944 | 0.2586 | 0.0920 | 0.2586 | 9,3,7,5,8,6,10,4,2,1 |
| 0.0512 |                | 0.2812 | 0.0895 | 0.2454 | 0.0873 | 0.2454 | 9,3,7,5,8,6,10,4,2,1 |
| 0.1069 |                | 0.2647 | 0.0843 | 0.2310 | 0.0821 | 0.2310 | 9,3,7,5,8,6,10,4,2,1 |
| 0.1582 |                | 0.2495 | 0.0795 | 0.2177 | 0.0774 | 0.2177 | 9,3,7,5,8,6,10,4,2,1 |
| 0.2094 |                | 0.2343 | 0.0746 | 0.2045 | 0.0727 | 0.2045 | 9,3,7,5,8,6,10,4,2,1 |
| 0.2564 |                | 0.2204 | 0.0702 | 0.1923 | 0.0684 | 0.1923 | 9,3,7,5,8,6,10,4,2,1 |
| 0.3121 |                | 0.2039 | 0.0649 | 0.1779 | 0.0633 | 0.1779 | 9,3,6,5,8,7,10,4,2,1 |
| 0.3674 |                | 0.1875 | 0.0597 | 0.1636 | 0.0582 | 0.1636 | 9,3,6,5,8,7,10,4,2,1 |
| 0.4103 |                | 0.1748 | 0.0557 | 0.1525 | 0.0542 | 0.1525 | 9,3,6,5,8,7,10,4,2,1 |

other words, no matter what the findings are, variations in final evaluation scores indicate that MCH hospitals’ competitive advantages differ. Disparities may include, among others, contrasting third-level indicator scores, second-level indicators’ overall values, or the total scores calculated with the model.

The second- and third-level indicators’ scores were calculated, and the sample of 10 MCH institutions was analyzed with reference to the 4 VRIO attributes and 6 hospital core competencies (see Sect. 3.2). In the financial resources dimension, MCH9 ranks first, and MCH1 comes last. According to the data and relevant information collected, MCH9 invests 2.01% of its funding in scientific research and education, which is the highest figure of the 10 MCH institutions, while a full 37.62% of its income comes from medical services, which falls in the upper middle range for this sample. In contrast, MCH1 spends only 0.03% of its funding on scientific research and education, which is the lowest percentage of the MCH institutions analyzed. In general, the proportion of funding of scientific research and education in MCH organizations with high competitiveness scores in the financial resources dimension puts these hospitals in the top ranking. No significant differences were detected in the percentage of income from medical services among the MCH institutions examined since figures fall between 22.58% and 37.62%, except for those of MCH4 and MCH5 (over 50%). This result indicates that the proportion of funding allocated to scientific research and education greatly influence MCH institutions’ competitiveness regarding financial resources. Therefore, if these organizations want to improve their overall competitiveness, they need to pay attention to their financial resources allocation. MCH hospitals should moderately increase their funding of scientific research and education, intensify their investment in scientific projects, and improve their teaching demonstration sites’ quality in order to strengthen their competitive advantages.

In the human resources dimension, MCH10 comes in first, while MCH5 is ranked last. The data and information gathered indicates that no significant differences exist in the scores for the quantitative indicator of staff title structure. The percentage of senior technicians in the 10 MCH hospitals ranges from 11.5% to 20.8% and that of intermediate-level staff varies between 24.2% and 38.1%. With regard to staff academic qualifications, the proportion of employees with a doctoral degree in the highest ranked hospital (i.e., MCH10) is 1.01%—the highest percentage of all—while MCH6 comes in second with 0.82%. The percentages of
staff with a master’s degree in MCH\textsubscript{10} and MCH\textsubscript{9} are also the top and second highest figures, respectively. Both the proportion of employees with a doctoral and master’s degree contribute to placing MCH\textsubscript{5} at the bottom. The percentage of staff with a bachelor’s degree in the 10 hospitals ranges between 60.2\% and 89.0\%. Thus, this human resources factor has relatively little influence on the final competitiveness ranking. In addition, the results obtained from the 10 hospitals’ self-rating questionnaire reveal that the average scores for the four qualitative indicators regarding MCH\textsubscript{1} through MCH\textsubscript{10}’s human resources are 23, 25, 24, 22, 19, 21, 20, 26, 27, and 32, respectively. These values are consistent with the final ranking in the human resources dimension. Specifically, department leaders’ regional influence has a relatively heavy weight in the evaluation model, so this factor’s 9 points helped MCH\textsubscript{10} place first in the self-evaluations. Field research showed that MCH\textsubscript{10} has high-quality department leaders and teams, as opposed to MCH\textsubscript{7} and MCH\textsubscript{5}, which ranked ninth and tenth, respectively, due to a lack of highly qualified department leaders. Thus, to improve their competitiveness in terms of human resources and secure more competitive advantages in general, MCH hospitals need to enhance their department management methods. These institutions should further accelerate human resources reforms to optimize their professional qualifications structure and staff members’ educational background.

Another key strategy would be to bolster the introduction and training of talent by focusing on recruiting strong field and department leaders in order to promote the hospital staff’s professional development. However, MCH institutions’ competitiveness cannot be improved by blindly introducing new talent. Hospitals must also identify any labor shortages, determine the number of staff needed, and consider the need for professional development to ensure adequate human resources. These organizations additionally should establish a sound system of talent training to foster a healthy environment that employs, welcomes, and nurtures talents. These measures can guarantee high-quality medical services and excellent management at all levels and promote MCH hospitals’ sustainable development and competitive advantages.

MCH\textsubscript{10} comes first and MCH\textsubscript{1} last in the brand resources dimension. According to the data and information collected, MCH\textsubscript{10} has 2 characteristic medical fields, 10 key provincial specialties, and 5 key municipal-level fields, thus generally showing relatively strong competitiveness in the qualitative indicator of number of characteristic medical fields and key specialties. In contrast, MCH\textsubscript{1} is short on either distinctive or key medical fields. Notably, although MCH\textsubscript{7} has 11 characteristic specialties, it does not rank near the top because both distinctive and key medical fields were included in the final evaluation by experts as the definition of characteristic specialties was considered unclear.

Direct comparisons of competitiveness cannot easily be made using data on the indicator of ability to treat difficult and severe cases. Each MCH hospital uses different statistical measures to process data and deals with diverse characteristics among people seeking medical treatment due to these institutions’ varied geographical locations. If this indicator is used to measure MCH organizations’ competitiveness in the brand resources dimension, the data must be based on the same statistical measures. Each hospital’s information management needs to be improved to obtain more reliable and comparable data that accurately profiles the features of people seeking medical treatment.

In the material resources dimension, MCH\textsubscript{10} is in first place, while MCH\textsubscript{5} placed last. Based on the information gathered, MCH\textsubscript{10} far outshines the other nine MCH hospitals in the business area indicator. MCH\textsubscript{2} and MCH\textsubscript{6}’s competitiveness ranking runs contrary to their ranking in business area, but the overall ranking is consistent with that of business area for the remaining hospitals. Quantifying special diagnosis and treatment equipment specifically for MCH is complicated as this indicator cannot be measured based on the specific amount of equipment or percentage of all equipment. Thus, this factor was assessed using the qualitative
method of self-evaluation. The results show that MCH10 has the highest score while MCH5 has the lowest, which is consistent with their overall competitiveness in the material resources dimension.

The findings indicate that business area index is the most accurate reflection of these hospitals’ competitiveness in terms of material resources, but the results do not mean that this area should be expanded without setting limits. MCH hospitals need to conduct local market research in their region so that their business area can be expanded in line with their ability to receive patients for treatment, medical treatment quality, and number of patients. In addition, special diagnosis and treatment equipment specifically for MCH is not an indication that unchecked growth is desirable. Both hardware and software infrastructure must also be improved to help foster these organizations’ sustainable competitiveness and to adapt to new developments in the market. MCH8 comes first and MCH7 last in the cultural resources dimension. The data collected put the quantitative indicator of employee satisfaction in the 10 MCH institutions at between 79.33 and 98.01. The ranking based on this index has little relationship with overall competitiveness in this dimension. The total self-evaluation scores of the qualitative indicators for the 10 hospitals under study are 28, 29, 29, 26, 26, 30, 24, 29, 29, and 28 for MCH1 through MCH10, respectively.

To enhance competitive advantage related to cultural resources, MCH institutions must improve their employees’ satisfaction and sense of happiness and strengthen overall internal cohesion and cultural identity to promote employee loyalty. Concurrently, hospitals can promote culturally peripheral products to increase cultural diversity and employees’ understanding of their organization’s future development and long-term plans. MCH organizations provide specialized medical services. Thus, their overall objectives need to include putting healthcare at the center, promoting reproductive health, and integrating healthcare, clinical treatment, and prevention. These initiatives should reflect a public service orientation at a grassroots level.

This study relied on a small sample, with the overall scores for the 10 MCH hospitals included in the empirical research varying significantly. Furthermore, smaller institutions can be less culturally diverse than larger hospitals. Given these two limitations, further investigations are needed to elucidate the correlations between cultural resources competitiveness and the scores obtained using the proposed evaluation model. MCH10 takes first place, while MCH5 ranks last in the organizational resources dimension. In this context, the definition of organizational resources remains ambiguous as it relies on qualitative indicators the hospitals used in their self-evaluations. MCH1 through MCH10’s total scores for the nine indicators in the organizational resources dimension are 55, 58, 55, 52, 54, 56, 50, 58, 54, and 64, respectively. The self-evaluation results include that MCH10 has the highest score and MCH7 the lowest score, both of which are consistent with the overall ranking of their organizational resources competitiveness. The scores the other MCH institutions gave themselves are generally correlated with the final ranking of their competitiveness in this dimension.

Except for MCH5’s self-evaluation score of less than 5 for organizational resources, the hospitals scored between 5 and 8. MCH1 and MCH3 share the same evaluation score (55 points). However, the experts’ evaluation of the relevant information gave MCH3 higher scores than MCH1 for three indicators with relatively heavy weights: public health management capabilities, department structure, and MCH network. MCH3 thus ranks higher than MCH1 in terms of its final score for organizational resources competitiveness. MCH5 and MCH9 also were given the same evaluation score (54 points), but MCH9 has higher scores than MCH5 for the three aforementioned indicators with relatively significant weights. In general, organizational resources are difficult to evaluate directly. The results indicate, nonetheless
that, to boost their competitiveness in the organizational resources dimension, MCH hospitals should focus on improving their ability to manage public health services for women and children. In addition, these institutions need to facilitate the development of a MCH care network and continuously improve the quality of their MCH services.

Hospitals must concurrently optimize their departmental structure and support or introduce new specializations according to the market’s specific demands, thereby reinforcing advantageous medical fields. These strategies can enhance these institutions’ ability to respond to a changing market and ultimately improve their overall competitiveness. When faced with changes reflecting unique circumstances and times, MCH organizations can still sustain a stable level of development.

Based on these results, MCH1 can be examined more closely as a specific example of the results’ implications. The evaluation gave it the lowest competitiveness scores for human, material, organizational, and brand resources. Thus, this hospital is the least competitive of the 10 MCH institutions under study. To improve its current situation and enhance its competitiveness, management should pay more attention to improving these four dimensions.

5 Conclusion

This study focused on the critical issue of MCH hospital acquisition of greater competitive advantage. According to RBT, the key to translating companies’ surplus profit into—and then maintaining—competitive advantages is the internal accumulation of organizational capabilities, resources, and knowledge (Wernerfelt, 1984). The models developed in previous research have confirmed that human resources have a greater weight than any other factors. People are crucial to creating value for medical institutions because any organizational strategy implementation depends on employees’ support and participation. In addition, each MCH hospital’s unique culture will necessarily permeate the process of obtaining and training human resources. Thus, these institutions must first acquire the key human resources to build and maintain sustainable competitive advantages.

In the present evaluation model of MCH organizations’ competitiveness, department leaders’ regional influence has the heaviest weight among the HR indicators included. The proposed model was validated based on the performance of 10 MCH institutions, whose data also verified that these hospitals’ competitiveness ranking is positively correlated with their score for this specific indicator. In practice, leaders in medical fields are usually the head of their department—a role that incorporates both academic and administrative elements that can generate somewhat conflicting thinking patterns. However, hospitals seeking to hire department leaders do not fully recognize the conflicts generated by these professionals’ dual role. Instead, hiring committees envision positive correlations between academic researchers’ abilities and the required department management skills, thereby blurring the boundary between the two areas of competency when selecting department leaders.

As torchbearers of medical field development, these leaders need to understand their hospital’s strategic goals fully to ensure that the development strategies of their department match the institution’s overall development goals. Department leaders should also be familiar with their field’s status quo and directions for future growth, identifying the field’s current focuses and breakthroughs to obtain or guarantee their hospital department can achieve competitive advantages. As leaders of medical field development, department heads must put scientific research first, expand their academic vision, and ensure that they are always at the forefront of their medical area. These strategies are a necessary part of being a medical
leader and a fundamental way for department leaders to enhance their discourse power and ability to lead others. As the administrative manager of their department, hospital leaders must play a prominent role in actively driving for excellence. In addition, they have to strengthen their team management skills, clarify the division of labor, boost team communication, and establish mutual trust within teams to increase group cohesion and foster more powerful research units.

Department leaders need to employ improved encouragement, incentive, and evaluation mechanisms. First, MCH institutions should cultivate department head’s leadership competencies based on medical specialties, major projects, and learning and academic exchange opportunities. Second, healthy rivalry can be promoted by recruiting new talent through competitions. Guided by their department development needs, MCH organizations can set up specific posts to meet these requirements, recruit talent through competitive hiring processes, and develop flexible hiring mechanisms in order to stimulate their staff’s enthusiasm and creativity. Another strategy is the trial implementation of a post-specific, target-based responsibility system.

As mentioned previously, incentive mechanisms also need to be improved. In practice, MCH hospitals should make the most of material incentives’ guiding role, optimizing performance distributions by piloting the use of incentives to attract talent with higher education qualifications and experience in key positions. Hospital administrators can further explore how to ensure the annual salary system meets the material needs of backbone talent and incentivize these individuals to combine personal goals with organizational performance objectives through significant contributions to their field. Last, evaluation mechanisms must be improved. MCH institutions should develop their own scientific research competency assessment system by quantifying the combination and level of qualities that department leaders need to possess. This assessment model has to identify accurately the necessary core competencies and provide objective evaluations of the individual achievements of hospital leaders who are also responsible for department management. In addition, MCH institutions should match the available talent with job openings, select the most appropriate candidates with regard to work demands, and reduce the number of unsuitable placements in order to mobilize more fully new talent’s enthusiasm, initiative, and creativity.

In addition to appropriately cultivating and managing department leaders, attention must also be paid to improving hospitals’ scientific research capabilities. China’s intensifying medical reforms have made competition among hospitals increasingly fierce. This competition, to all appearances, takes place between medical services, and it has connotations for hospitals’ level of scientific research innovation. First, medical research should be based on the public’s healthcare needs. Before starting any project, the hospital research planning department and related researchers need to understand national and local policies for scientific investigations and public health services in order to conduct research that addresses specific aims and demands. If the existing conditions are favorable, institutions have to strive to develop more ambitious projects, improve their quality and technical level, and use them to ensure these hospitals overall benefit from superior medical research’s outputs. Second, a scientific research capability evaluation system should be established. Objective, comprehensive, and empirically robust indicators can play an important role in promoting hospital scientific research development and improving the quality of clinical study methods. MCH institutions can tap into their current conditions to construct a set of scientific, objective, and comprehensive measures in order to evaluate their scientific research capabilities and clarify their goals to determine which improvements must be made. In addition, highly qualified scientific researchers have to be groomed because of the general shortage of well-educated personnel in MCH institutions, and hospitals need to focus on introducing and training these staff members.
in order to build stable research teams. Last, interdisciplinary and multi-institutional collaborative research should be encouraged. Concurrently, research funding must be secured, and MCH organizations need to supplement the available research funding and provide special funding to support talent team recruitment. Highly qualified health professionals have to be selected, introduced, trained, and motivated to make up for the limitations arising from insufficient funding. Overall, MCH hospitals should promote the overall optimization and improvement of their human resources.

6 Research limitations and prospects

6.1 Research limitations and prospects

The present research has two limitations of which the first is limited theoretical and practical references. The literature on and research results for strategic management mostly concentrate on businesses. Strategic management theory has not been applied to the field of healthcare in recent decades. Thus, little systematic, mature theoretical and practical research is available that fully integrates healthcare institutions’ characteristics. The strategic management literature focused on medical theory and practice is thus still limited. The theoretical and practical results of this strategic business management study can be used as a reference point after the findings are creatively adapted and applied to MCH institutions. The results can be used to construct operational implementation models and generate more specific research results. However, researchers must also take into account that differences still exist between company and hospital management. The theoretical frameworks and operational models used by previous strategic management investigations of MCH institutions still need to achieve further breakthroughs and improvements to reflect the current situation of these hospitals more accurately.

The second limitation is related to the selection of consulting experts. During the process of constructing the evaluation model, the inclusion criteria were strictly applied to ensure the model was appropriate. Three rounds of questionnaire surveys were also conducted to avoid as much as possible introducing errors caused by the experts’ subjective judgment. In general, the indicator system applicability was enhanced by the recruitment of mostly management experts from the medical system who had had many years of practical hospital management experience. Nonetheless, most experts in hospital management in China are clinical care professionals. Thus, their theoretical knowledge of systematic and professional management varies significantly. In addition, few academics specialize in health management research or have an in-depth understanding of MCH institution management, which contributed to limitations in the availability of appropriate consulting experts for this research.

6.2 Future research

This paper focused on analyses and discussion of the internal resources and capabilities that generate MCH institutions’ competitive advantages. However, the development of these assets is the result of internal and external interactions among different factors. While organizations’ resources and competencies are necessary for survival, these often cannot be created internally. MCH hospitals’ exploitation of competitive advantages also depends on resources and capabilities that are affected by how other external factors interact. The present study did not fully analyze external environmental development determinants. In addition, this
research primarily examined the key factors influencing MCH organizations’ competitiveness from the perspective of human resources. In this sense, understanding and applying MCH guidelines are also important, as are shaping and enhancing hospital brand appeal and successfully managing maternal and child public health services. These strategies can contribute significantly to MCH institutions’ competitive advantages, so these tactics should be further strengthened and expanded by future research.

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