DEVELOPING A SYSTEM OF INDICATORS TO ASSESS THE UNIVERSITY AUTONOMY COMPETENCE AT THE INSTITUTIONAL LEVEL: A CASE IN DEVELOPING COUNTRIES

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ABSTRACT

Promoting the transformation and effective implementation of the university autonomy model at higher educational institutions (HEIs) in developing countries as Vietnam is a very important task today. In order to contribute to this task, the study proposes a system of indicators to assess HEIs' university autonomy competence. By using the system, a certain HEI can conduct self-assessment to get its clear and coherent definition of capability and resources in matters of autonomy and ac-countability. Based on this result, they can establish a strategic plan for effectively transforming the higher autonomy model in accordance with the law. Additionally, state management agencies can use this tool to assess the general and more reliable picture of the national higher education system; so that they can make appropriate policies, plans, programs to effectively promote, manage, and monitor the transformation of university autonomy model in HEIs nationwide.

Keywords: University Autonomy, Accountability, University Autonomy Competence, Indicator, Assessment

INTRODUCTION

Higher education plays a nuclear role in achieving both economic growth and social progress (Pais, Dias, & Benício, 2022; Vidal, 2013). Higher education institutions (HEIs) have three interrelated and inseparable missions, including teaching, research and the direct connection between university research activities and the external economic and social worlds (García-Aracil & Palomares-Montero, 2010). There are many challenges facing university governance and manage-mint in finding an appropriate balance between these roles and responsibilities. Institutional autonomy is widely considered as an important prerequisite for HEIs to be able to develop institutional profiles and to deliver efficiently on their missions (Pruvot & Estermann, 2017; Vidal, 2013). It can be said that university autonomy is an indispensable trend and an objective necessity in the process of higher education development (John, 2008). In the world, there are now many different models of the university autonomy (John, 2008); and the role of the state on higher education system is also gradually shifting from a state-controlled model to a state-supervised model (Nguyen, Pham, & Tran, 2018). In Vietnam, the amended and supplemented Law on higher education No.34/2018/QH14 (hereinafter referred to the Law 34) stated that university autonomy is a conditional right (hội, 2018). Accordingly, a public HEI which wants to be granted an autonomy power by the government must meet the crucial prescribed ability requirements in terms of institutional council, quality accreditation, internal regulations and quality assurance policies, decentralizing autonomy and accountability, and implementing social accountability responsibility (hội, 2018). To cope with these changes, HEIs needs to implement strategies to improve their efficiency and ensure optimal utilization of resources. However, it is presently lacking of practical guidelines on how the HEIs can get an appropriate organizational readiness and meet such requirements (TIEN, 2019; T. T. Tran, 2014; Võ & Laking, 2020). University autonomy is a progressive process; and it is very necessary that every institution needs to conduct self-assessment of its ability as well as establish its comprehensive practical plan for effectively implementing the university autonomy mechanism under the convenient, safe and breakthrough way that at the same time not separate from the state supervision (Hạnh, 2016; Thi & Hải, 2020). Furthermore, upon the viewpoint of state management, the government should only provide a grant of an appropriate autonomy level for each institution that is proportional to its current readiness (Hạnh, 2016; Thi & Hải, 2020). The state needs to conduct assessment, grouping and ranking of HEIs according to the level of competence to exercise autonomy and accountability. Based on these results, the state can provide appropriate and effective mechanisms, policies and tools to promote the implementation of university autonomy as well as ensure the role of inspection and supervision of the state and the community on the development and quality of higher education institutions.

Many countries use systems of indicators in higher education for exercising more rigorous monitoring as well as establishing a more direct and observable link between funding and performance. Using a system of indicators is to make the autonomy and diversification of HEIs compatible with accountability and their effective management. Therefore, indicators provide a means of both external and internal monitoring of HEIs (Martin, Sauvageot, & Tchatchoua, 2011). Within the institution, indicators provide information on which parts are most effective and productive, and which parts or activities need additional resources and/or need to be improved. Outside the institutions, performance indicators also provide data for accountability to external stakeholders (Lewis, Hendel, & Kallsen, 2007). Moreover, in Vietnam, there exist a number of policies and programs on university autonomy and accountability; it is necessary to assess and monitor how effects these tools influence the movement, readiness, preparedness of HEIs.

Therefore, in order to promote the university autonomy, this study has two-fold: (1) establishing a systematical set of indicators of university autonomy competence (UAC) of HEIs; (2) validating the set of indicators at a Vietnamese university and providing practical recommendations in building a master plan of its autonomy mechanism. The findings are very useful not only for macro-level pol-icy-makers and Vietnamese universities' managers but also for those in the similar organizational context.

The Context of University Autonomy in Vietnam

According to statistics of the Ministry of Education and Training (MOET) in 2021, Vietnam has 237 HEIs with about 72.6% of public ones and about 27.4% of non-public ones (C.-D. Tran & R. A. Villano, 2017). Characteristic of the Vietnam higher education system is the state-controlled model with a powerful national government and a centralized administrative system. Vietnam is now implementing Resolution No. 77/NQ-CP on piloting of autonomy mechanism for 23 public HEIs. Accordingly, these HEIs have been permitted to increase their tuition fee levels beyond the ceiling set, and they are being expected to manage their own expenditure, with no funds available from the State. Until now, there have been several considerable achievements recorded (Võ & Laking, 2020); especially, there already have been seven universities ranked in the world's university quality ranking systems in 2022.

Recently, the Law 34 and the Degrees under this Law created a quite comprehensive legal framework for governing the university autonomy mechanism. This speeds up a shift toward the state-supervised model through granting HEIs more autonomy and more accountability responsibility. At the same it enhances the monitoring role of the society and professional associations on the quality of higher education. It also encourages capable institutions to have a higher autonomy level in terms of financial, organizational, personnel, academic and research activities. It can be said that there has been a quite strong diffusion of university autonomy mechanism across the country (TIEN, 2019; Võ & Laking, 2020). However, there are still many perceived challenges and difficulties facing HEIs in implementing autonomy mechanism (Năng, 2020; TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran, Kuo, Lu, & Kweh, 2020; Võ & Laking, 2020) (see Table 1).

Table 1

Challenges and Difficulties in Implementing Autonomy Mechanism in Vietnam

Aspects	Challenges, difficulties	Resources
General	Due to the lack of specific guidance on the State's regulatory documents, public universities are currently quite "embarrassed" in implementing the autonomous model	(TIEN, 2019; Võ & Laking, 2020)
	Most HEIs have not yet developed a medium- and long-term strategic plan for a synchronous and effective development of autonomy mechanism	(T. T. Tran, 2014; Võ & Laking, 2020)
	The autonomous culture has not been fully and extensively developed within HEIs nationwide	(Hayden & Thiep, 2007; Salmi, 2019; TIEN, 2019; T. T. Tran, 2014)
Financial and property issues	Many HEIs' managers are not yet fully aware of autonomy mechanism and they have a low capacity of change management	(TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020; T. T. Tran, 2014)
	Lack of financial resources, limited diversification of income sources, poor structure of revenue sources, low revenue from scientific research activities and results	(TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020; T. T. Tran, 2014)
	Lacking effective solutions in exploiting existing physical and intellectual assets by the institutions	(TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020; T. T. Tran, 2014)
Personnel and organizational issues	Passivity and lacking of flexibility and little dare to take responsibility by HEIs' managers in personnel and organizational management	(TIEN, 2019; T. T. Tran, 2014; Võ & Laking, 2020)
	Accounting, auditing and monitoring and internal control activities are not yet complete; especially in public HEIs	(Salmi, 2019; TIEN, 2019; T. T. Tran, 2014)

	More difficulty in renovating the internal organizational system and governance model	(Năng, 2020; Salmi, 2019; TIEN, 2019; T. T. Tran, 2014)
	Less effective recruitment and talent attraction	(TIEN, 2019; T. T. Tran, 2014; Võ & Laking, 2020)
Academic and different professional issues	The quality of the training program has not met the requirements of the society	(C.-D. Tran & R. A. Villano, 2017; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020; Võ & Laking, 2020)
	The quality of lecturers and researchers has not yet met the practical needs of training quality, scientific research and international cooperation.	(C.-D. Tran & R. A. Villano, 2017; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020)
	Facilities do not meet requirements	(Năng, 2020; C.-D. Tran & R. A. Villano, 2017; C. D. T. Tran & R. A. Villano, 2017; P. P. Tran et al., 2020)
	Lacking effective solutions to exploit the institution - enterprise - learner collaboration model	(Salmi, 2019; P. P. Tran et al., 2020; Võ & Laking, 2020)
Accountable issues	Information and communications infrastructure are not synchronized	(Năng, 2020; TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; T. T. Tran, 2014)
	E-database is not complete	(TIEN, 2019; C. D. T. Tran & R. A. Villano, 2017; T. T. Tran, 2014)
	Organizational system in charge of accountability is still overlapping and incomplete	(Salmi, 2019; T. T. Tran, 2014; Võ & Laking, 2020)
	Legal documents on accountability are not synchronized and strict	(TIEN, 2019; Võ & Laking, 2020)

LITERATURE REVIEW

Conceptualization of University Autonomy Competence (UAC)

Competence of an organization is process-based, cumulative in terms of operational quality, organizational capacity, governance, human resources, finance, facilities, leadership commitment, incentive policies, organizational culture…and supports from the external environment to perform a certain activity (Thi & Hải, 2020; Toản, 2016).

There are different definitions of university autonomy; however, in general university autonomy can be considered under key dimensions, such as organizational autonomy, financial autonomy, property autonomy, personnel autonomy, and academic autonomy (hội, 2018; Pruvot & Estermann, 2017). There are different requirements for public HEIs in order to be granted autonomy power with various autonomy levels from country to country. In Vietnam, according to The Law 34, these requirements include (1) HEI's council has been established, (2) HEI has been accredited by a lawful educational quality accreditation organization, (3) HEI has issued and organized the implementation of internal regulations and quality assurance policies which meet the standards prescribed by the State, (4) HEI has decentralized autonomy and accountability to each lower unit and individual, (5) HEI has publicized quality assurance conditions, inspection results, employment rate and other information as prescribed by the Law (hội, 2018). Thus, in Vietnam, university autonomy should be considered as a conditional right but also a natural right in several activities; and the development of institutional autonomy is an evolutionary process at institutional level. Accordingly, if a certain HEI is allowed to implement autonomy model, it must meet key requirements of strategic competence in terms of organization, academic, finance, property, human, and accountability. University autonomy issues must always be seen and practiced as dynamic projects, changing over time, being responsive to new demands, and depending on contextual specificities (Noorda, 2013).

In Indonesia, public HEIs are granted different degrees of autonomy by the State based on their operational efficiency and development capacity. Accordingly, each HEI will be evaluated in five main aspects including: (1)

quality of training and scientific research, (2) effective governance, (3) sustainable finance, (4) social responsibility, and (5) contributions to national economic development. Accordingly, the education and research quality condition is assessed in the following aspects, including (a) number of education programs accredited, (b) suitability of HEI's vision, mission and goals as compared to national higher education standards; (c) results of scientific publications and/or intellectual property rights; (d) student academic achievement; (e) achievements of a HEI when participating in central and regional government activities; and (f) achievements of a HEI when participating in business activities and industrial production. The performance of institutional governance is assessed through aspects, including (a) institutional management responsibilities; (b) transparency, efficiency and effectiveness in institutional management; (c) non-profit in institutional management; (d) comply with legal regulations in institutional management; and (e) periodically, accurately, and on time in submitting the institution's academic and non-academic reports. The HEI's sustainable finance is assessed from (a) the accordance of financial and asset management with the law, (b) sustainable financial statements; and (c) the ability to raise funds beyond student tuition and government resources. The HEI's social responsibility is assessed from (a) proportion of economically disadvantaged students; (b) proportion of students from border, island, and underdeveloped areas; and (c) contribution in community service. The HEI's role in economic development is assess throughout (a) developing small and medium enterprises; (b) solving industrial production problems; and (c) fostering and developing entrepreneurship and entrepreneurship.

In India, the Law states that the autonomy mechanism is classified for educational institutions based on their performance. That is, essentially, very well-run organizations will be completely free of government control, and those that do poorly will be subject to more regulation and control. Public and private universities will be divided into 3 Grades to be granted autonomy, and according to those ranks, each institute will be granted different degrees of autonomy. Accordingly, an institution is in Grade I if it is recognized by the National Assessment and Accreditation Council (NAAC) with a score of at least 3.5 or is ranked in the top 50 institutions for two years. For Grade II, institutions are accredited by NAAC with a score of 3.01 to 3.49 or a rating of 51 to 100. Grade III will include the remaining universities that are subject to be the most regulated by the government. In Thailand, since the 2000s in order to supervise the operation of public HEIs under autonomy mechanism, the Higher Education Commission has developed an evaluation system based on academic freedom and outstanding individual achievement, which emphasizes enhancing performance through better governance structures, efficient financial instruments, and performance standards.
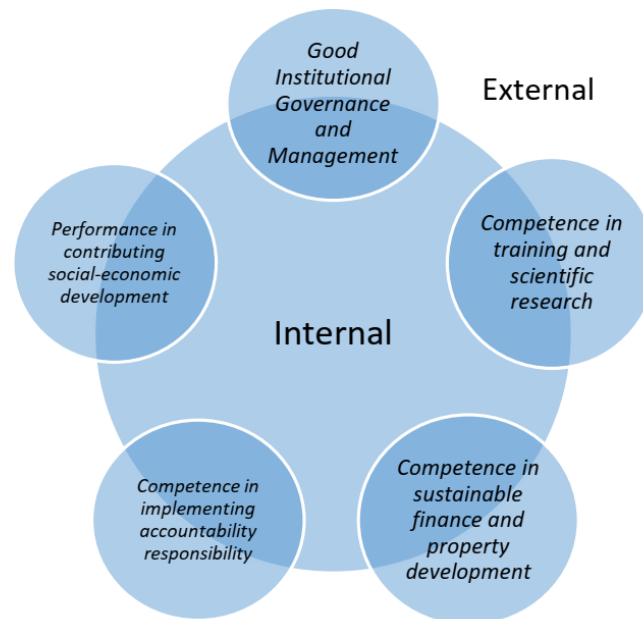

Figure 1. University Autonomy Competence

In addition, HEIs are the central subject of the autonomy mechanism, while the external subjects are the state and society. At the same time, the educational institution itself also has internal subjects with different positions, roles and functions such as: university council, management board, institutes, functional units lecturers, scientists, and students…All these actors will play a certain role in ensuring the success of the transformation process, implementing the model of university autonomy. Therefore, it can be seen that the competence to realize university autonomy mechanism of a certain HEI should be considered as a synchronous combination of both internal and external resources and capacities (Toản, 2016) and can be conceptualized into five key dimensions as Figure 1.

Good Institutional Governance and Management

Governance is a whole process of policy or decision making. Good governance is reflected by a good management structure and a synergistic and constructive relationship between the institution and external stakeholders and between the institution's internal units and individuals. Therefore, good governance and management requires a comprehensive framework of regulations and policies and ensuring transparency of information (SABANDAR, TAWE, & MUSA, 2018). Good governance and management also requires to serve all stakeholders with a highest consensus and equity. The development of a HEI depends on ensuring all its members feel that they are an important elements and always have opportunities to improve or maintain their development (SABANDAR et al., 2018). Accordingly, the HEI's good governance must be demonstrated through effectiveness and efficiency in achieving the designed targets of the institution in accordance with the needs of society; in sustainably developing a competent resource of lecturers and scientists, and in proactively developing educational curriculum and learning materials and facilities. Finally, good accountability is one of the key requirements of good governance (SABANDAR et al., 2018).

The Law 34 in Vietnam requires that in order to effectively implement and increase the HEI's autonomy mechanism the organizational governance and management system of HEIs first meet current legal regulations (Vlachopoulos, 2021). The functional units and departments need to be organized in the most reasonable way with a reasonable assignment and decentralization among the units. Coordination mechanism to perform tasks between units in a scientific and rhythmic manner - avoiding duplication and overlapping and must also be regularly supplemented and modified to suit the actual situation at each other time together (Inga, Inga, Cárdenas, & Cárdenas, 2021; Truong et al., 2021). The HEI's good governance and management should also be demonstrated through the effectiveness and efficiency in formulating and implementing regulations on democratic selection, election and promotion with the right capable and qualified people, in developing policies and incentives on selection, rotation, use, remuneration, and development of essential resources for competitive and effective lecturers, scientists and administrative staffs (Hill & Wie, 2012).

Thus, the HEI's performance of governance and management can be assessed through indicators such as meeting the accreditation standards for educational institutions; ratio of internal regulations which meet the standards prescribed by the state; the level of satisfaction of managers, lecturers, scientists, learners and staffs at all levels; the rate of increase in number of lecturers with doctoral degrees, lecturers with the title of associate professor or professor, international lecturers, international researchers, lecturers who have gone to work and exchange abroad; and also the rate of decrease in number of lecturers, researchers leaving jobs or transferring to other institutions (due to dissatisfaction)…

Competence in training and scientific research

Universities contribute to the innovation ecosystem through different mechanisms and typically manifest in the following three missions: (1) providing human resources with appropriate skills through teaching; (2) promote the development of scientific and technical knowledge through scientific research; and (3) transfer of scientific and technological knowledge to production, business and social organizations through technology transfer. Accordingly, academic staff in higher education have a wide range of work tasks and roles in terms of teaching, research, administration, and technology transfer.

The study of Kyvik, S. (2013) (Kyvik, 2013) proposed that performance in higher education training should be mainly reflected through the employment of graduates and the satisfaction of employers (Kyvik, 2013). And the performance in scientific research should be reflected through the development of networking, collaboration, training future generations of researchers, publishing and transferring the research results to the factual life. Academic networking and collaboration are important to advance knowledge and get success in research; and they are regarded as a role of critical importance to enhance academic reputations and developing an academic career. Collaboration in research can take different forms, from giving advice to colleagues in the laboratory during a single experiment, to collaborative ventures spanning many years (Kyvik, 2013).

Besides, another important part of the academic researcher role is to develop the next generations of researchers. Through supervision of theses, academic staff transmit knowledge to master and doctoral students about the use of theory, methodology, techniques, instrumentation, field work, etc (Kyvik, 2013). Therefore, a HEI's performance in scientific research should also be assessed by the increase in externally funded projects as well as the increase in doctoral students joining with the research projects. Additionally, there are strong expectations that academics should publish, transfer and commercialize the results of their research to the general public (Kyvik, 2013).

In sum, the HEI's performance of training and scientific research should be assessed through indicators, such as the level of satisfaction of students and external employers, employment rate of graduates; the increase in externally funded projects, the rate of student's academic and research awards; the number of articles and books published; citation index; the number of prestigious application products; the number of collaborative research projects with external colleagues, the number of authorship with external researchers, the number of start-up businesses, spin-off businesses; and Webometrics ranking.

Competence in Sustainable Finance and Property Development

In order to do well in financial autonomy, HEIs need to step up the decentralization of units in expanding revenue sources and contracting expenditures; annually, it is necessary to soon complete the internal spending regulations in a scientific and reasonable manner; regulations on financial accountability among all levels in the institution; organize the implementation of financial control, inspection and disclosure activities,... Financial autonomy must necessarily demonstrate its effectiveness in bringing more and more diversified revenue sources; well perform the balance of revenue and expenditure in all aspects of the school's activities including recurrent expenditure and investment expenditure; ensure transparency, publicity and compliance with the provisions of law (Kyvik, 2013).
Thus, it can be said that in order to be granted autonomy power and successfully perform the autonomy mechanism, HEIs need to have the ability to develop sustainable institutional finance and assets. Accordingly, HEIs need to effectively and legally manage, inspect, test, supervise, publicize and explain their activities on finance and property issues. In additional, HEIs need also to have the ability in developing appropriate policies to effectively attract investment capital and bring more and more diverse and legal sources of income to the institution. This competence can be assessed through a set of indicators, such as the completeness of the current management system, quality of current internal regulations, and the sustainable development of investment capital from different sources (hội, 2018).

Competence in Implementing Accountability Responsibility

When HEIs are given a power in autonomy, then accountability is an important legal tool to control the "power" as well as monitor their activities. It can be said that university autonomy and accountability are two aspects of the same entity of university autonomy. The greater the university's autonomy, the higher its social responsibility. There is often a perceived tension between the demand for accountability and institutional autonomy. An appropriate balance between the legitimate need for information and public accountability and institutional autonomy is a particular concern to many institutional administrators and faculty (Lewis et al., 2007).

Accordingly, the autonomous HEIs must have high responsibility to report and transparently inform information in terms of organizational, personnel, professional and financial issues to the state, external society and internal units and individuals in compliance with the legal provisions and their internal operating regulations., HEIs must have responsibility to explain about their policies, regulations and performance; perform and honestly publicize annual financial and property audit statements via their websites; and implement the regime of periodical and irregular reporting to the owner and competent state agencies (hội, 2018). There can be no effective university autonomy if the HEI does not implement accountability responsibility or not enough competent to implement effectively accountability activities as required. Therefore, a certain HEI's competence in implementing its accountability responsibility is able to be considered through the institution's level of commitment on social accountability as well as its capacity to develop necessary databases and inform information for society as required. This competence can be assessed through a range of indicators, such as the percentage of leaders, faculties, and staffs at all levels in favor of autonomy and social accountability, the availability and adequacy of the database in terms of organizational, financial, personnel, training, science and technology, and other professional activities as well as social activities.

Performance in Contributing Social-Economic Development

University autonomy power is tightly clued with responsibility social-economic development. The university plays a nuclear role in achieving both economic growth and social progress. Beyond the teaching–learning process and scientific research activities, higher education also includes the third mission that facilitates engagement with various groups of stakeholders to respond to a society's needs and applying solutions that are oriented towards solving social problems and responding to the demands of the community. The third mission of university implies a commitment to the communities and populations where they are located, identifying weaknesses or problems, perceiving existing resources and collaborating in the design and implementation of solutions that predispose to social change (Pais et al., 2022). Governmental expectations of universities have increasingly stressed the importance of contributing to economic growth and the development of the welfare state, by undertaking applied research and the development of commercial products (Kyvik, 2013).

Therefore, HEIs who want to be granted higher autonomy power should express how well it has been contributing on social and economic development. Generally, the autonomy of HEIs must be strictly associated with the requirement to perform well social responsibility (hội, 2018). The autonomy power granted for a certain HEI should base on the results of serving socio-economic development and contributing to the community during its operation in past and present time. Competence in contributing socio-economic development can be assessed through a set of indicators, such as the rate of disadvantaged students at HEI; the size of HEI's scholarship, number of community service projects, and the number of public, charitable and humanitarian activities serving the community.

Develop Indicators to Assess University Autonomy Competence

Indicators can be defined as "shortcuts" of an underlying reality and calculated from raw data using statistical tools such as percentages, rates, ratios, and indices (Martin et al., 2011). Indicators help to present a better and more reliable picture of a HEIs' existing status, so that enable HEIs to benchmark their own performance, to inform policy developments, and to contribute to the social accountability (Martin et al., 2011). Developing indicator systems for assessment of quality or performance of HEIs has been paid much attention by scholars (García-Aracil & Palomares-Montero, 2010). Until now, there have been many evaluation models and techniques proposed with different opinion about what are the most appropriate indicator systems. However, it can be said that the evaluation of HEIs and measurement of their objectives or productivity achieved is complex. The indicators used to assess HEIs can be based on quantitative and/or qualitative data with both primary and/or secondary sources of data (Cuenin, 1986; García-Aracil & Palomares-Montero, 2010). For example, quantifiable indicators, such as student/faculty ratios or costs per student and qualitative indicators such as student satisfaction measured by surveys or assessing the quality of research and scholarship activity (Lewis et al., 2007). De Miguel (1989) (García-Aracil & Palomares-Montero, 2010)

suggested five main categories of indicators to assess HEIs: (1) based on results (outputs); (2) based on internal organizational processes; (3) based on integrative criteria; (4) based on organizational culture; and (5) based on capacity for change. In this study, all five categories of indicators are adopted to establish a comprehensive set of indicators to assess the degree of university autonomy competence at the institutional level.

It is not absolute that the more indicators are the more helpful to the assessment of UAC but it is important that the criteria selection must cover all the content aspects of university autonomy competence and does not overlap with each other too much (Martin et al., 2011). It is helpful to select a limited number of priority indicators based on the importance/usefulness of the indicator (Blank, 1993). Additionally, indicators should be reported in a format that is understandable by different audiences, including educators, HEIs' managers and policymakers; and the indicators should provide valuable representative or summary statistics/information about the condition of HEIs to support decision-making (Blank, 1993). Generally, the indicator selection should obey the following key principles: reflect the nature and constituents of autonomy competence, measure quality corresponding to specific competence goals, be based on timely information, be based on reliable information, reflect a strategic view and be in accordance with characteristics of the context (Martin et al., 2011). These principles are adopted in this study to develop an indicator system to assess the university autonomy competence. Accordingly, the system of indicators must be feasible, easy to conduct assessment, and the evaluation results must be highly reliable and effective to support HEIs in developing plans to implement autonomy for institutions as well as support policy makers in formulating appropriate policies and mechanisms to promote the national autonomy model.

In order to meet the mentioned principles, the development of higher education management indicators should follow a systematic process. Blank (1993) proposed a process to develop a system of education indicator including nine steps under three major categories of activity: selecting indicators, organizing a cooperative system for data, and reporting comparative data on indicators. Accordingly, the process of selecting indicators requires interaction and consensus among different kinds of experts. It should bring together the different interests and the expertise into indicators to organize a system of indicators based on reliable, valid data (Blank, 1993). Education policymakers have interests in assessing the effects of policies and programs and identifying the nature of practical problems in the education system. Education specialists are needed to identify variables that are important for determining how the system is operating and to pinpoint sources of data that will provide valid indicators. Finally, institutions' managers need to participate to ensure that data will be available for selected indicators and that the data can be aggregated and reported to meet the needs for indicators (Blank, 1993). It is important to draw out a set of highest priority indicators. Three criteria were used in evaluating and prioritizing indicators: (a) importance/usefulness of the indicator, (b) technical quality of the data (available or expected), and (c) feasibility of obtaining data (Blank, 1993).

According to Martin et al. (2011), in order to develop good indicators, it is necessary to identify the phenomena that are most worth measuring. These can depend on a country's choices, inspired by its education policy objectives, or an institution's choices in defining its own plan or project. The relevance of other indicators may be more wide-ranging or more descriptive, but their importance depends on the particular context. Indicators in higher education should also have a descriptive aim (Martin et al., 2011). A simple, precise overview of the whole system is necessary. It should provide points of comparison in the analysis of various phenomena. Moreover, it is essential to present data covering a number of years, since certain aspects of a system can be observed only over a period of time. Finally, indicators should cover differences or disparities in geographic or socio-demographic characteristics such as sex and income levels (Martin et al., 2011). Martin et al. (2011) provided a practical guide on constructing an indicator system or scorecard for higher education. Accordingly, ten steps are required in developing a list of indicators: (1) identify or define objectives, (2) create a list of 'policy' issues based on the objectives, (3) develop a list of indicators, (4) list the data required to calculate the indicators, (5) locate the data sources available, (6) calculate the indicators, (7) verify the results, (8) analyze the indicators, (9) select the final indicators for the system, and (10) select the layout of the indicator system document. In this study, the ten-step process of Martin et al. (2011) is adopted to develop a set of indicators to assess a certain HEI's UAC.

RESEARCH METHODOLOGY

Process of Research

In order to develop a set of criteria for assessing the capacity to exercise autonomy and social accountability of HEIs, this study has applied both qualitative and quantitative research approach using literature review, focus group method, expert method and questionnaire survey. The research process consists of three main steps:
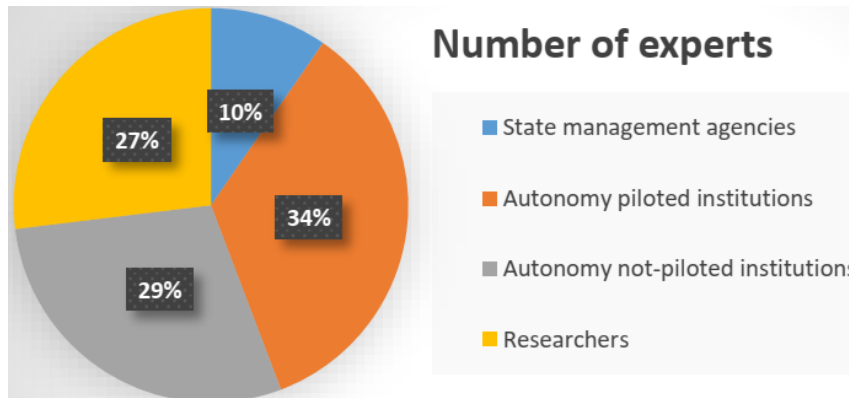

Figure 2. Profile of Experts

Step 1: Literature review. The keywords "university autonomy competence", "university autonomy ability/readiness/capacity" and "accountability" in both Vietnamese and English were used to search for related articles from two databases Elsevier and Google Scholar. A total of 37 domestic and international articles were reviewed to clarify the scientific and practical basis; then, a preliminary framework consists of 7 groups of criteria, 20 sub-criteria with 72 indicators for assessing university autonomy and accountability competence has been established.

Step 2: Four rounds of focus group study were conducted through both online and offline ways with a total of 52 experts including 5 officials from the state management agency in charge of higher education, 18 managers of HEIs that are piloting autonomy mechanism under Resolution 77, 15 managers of HEIs that have not yet piloted autonomy mechanism, and 14 scientists on higher education management (Figure 2). The content of the focus group studies focused on discussing the following issues: (1) conceptualizing the definition of university autonomy competence; (2) unifying the key principles of building the indicator system, (3) establishing the holistic structured framework of indicators; (4) selecting the general indicators and priority indicators, and (5) selecting the appropriate scale and sources of data for each indicator; this is based on the criteria of feasibility, accessibility, availability and accuracy of data. The rating scale for each indicator is defined so that the scoring process is easy, clear, and not create any confusion; especially the scale should be suitable to the context of higher education system in Vietnam today.

After this step, a draft of indicator system has been established including 5 first-tier groups, 14 second-tier groups with a total of 95 individual indicators (Table 2).

Table 2
Framework of Indicators to Assess HEIs' Overall UAC

	First-tier categories	Second-tier categories
	Autonomy competence in organizational governance and personnel management	Quality of HEI's governance and management system
		Performance of governance and management activities
Overall university autonomy competence	Autonomy competence in academic and other professional development	Competence in developing facilities and learning materials for training and research
		Capacity of lecturers and scientists participating in training and research
		Capacity to organize enrollment and improve input quality
		Capacity to build and develop training programs
		Capacity to manage, inspect, supervise, support training, scientific research and innovation activities
		Performance in training, scientific research and innovation
	Autonomy competence in finance and property	Capacity for effective management, inspection, examination, supervision, disclosure and accountability of finance and assets
		Ability to attract development investment capital
	Competence in contributing social development	Effectively contribute to socio-economic development
		Capacity to serve the community
	Competence in implementing accountability responsibility	HEI's commitment to social accountability
		Capacity to develop databases for social accountability

Step 3: In-depth interview with two experts. Open questions sent to the experts include:
+ Did the indicator system comprehensively cover the content of university autonomy competence?
+ How relevant is the indicator for each group it represents? Adding, removing or modifying any indicator? Feasibility of collecting data for each indicator?
+ Is the rating scale for each indicator appropriate? And additional suggestions to perfect the indicator system?

Step 4: Survey and evaluation of the indicator system
In this step, the system has been sent for evaluation with a large sample size. The survey questionnaire is sent online via the google.docx link: https://docs.google.com/forms/d/1g3UZZUVrHBXgkF333XuIkQv-2xP2K5DbjT_p3vteL8k/edit. The questionnaire consists of three main parts: Part 1: Respondent information, Part 2: Comparing the importance of the first-tier categories of the indicator system, and Part 3: Assess the importance of each indicator of university autonomy competence using the 5-point Likert scale: 1 – Very unimportant; 2 – Less important; 3 – Normal; 4 – Important; and 5 – Very important.

After each structured question, there will be an open-ended question for respondents to provide additional comments. The result has 205 responses, including 202 qualified responses when all answers were available. Indicators with average score below 3 will be excluded from the system. As a result, 75 indicators were retained, while 20/95 ones were rejected.

Weighting The Indicator System
In the indicator system for assessment of UAC, there are 3 levels to determine the weights:
▪ Level 1: Determine weights between the individual indicators;
▪ Level 2: Determine weights between the second-tier categories;
▪ Level 3: Determine weights between first-tier categories.

At Levels 1 and 2, the weights are determined by the equal weight method. Accordingly, the weights of all indicators are equal to others in the same second-tier category; and the weights of all the second-tier category is equal to others in the same first-tier category. The weights in the equal weighting method can be defined by the formula:

$$W_i = \frac{1}{n}, i = 1, 2, 3, \ldots, n \qquad (1)$$

Where n is the total number of indicators of each second-tier category (or the total number of second-tier category of each first-tier category).

The weights between first-tier categories are determined by the AHP technique (Vaidya & Kumar, 2006). There have been 202 expert opinions assessing the relative importance values of each pair of the first-tier categories of indicators in which values represent the relative preference of each pair-wise comparison as Table 3:

Table 3
Assessment Scale of the Relative Preference of Each Pair-Wise Comparison

Values	Definition	Explain
1	Equal importance	The two first-tier groups have the same contribution to the overall level of autonomy competence
3	Little more importance	Group A has a little more contribution than Group B to the overall level of autonomy competence
5	More importance	Group A has a more contribution than Group B to the overall level of autonomy competence
7	Much more importance, easy to recognize difference of effects	Group A has a much more contribution than Group B to the overall level of autonomy competence
9	Extremely more importance, completely overwhelming	Group A has an extremely more contribution than Group B to the overall level of autonomy competence
2,4,6,8	Intermediate level between the above levels	Need a compromise between two levels/judgments

The result of the pairwise comparison matrix is as follows (Table 4):

Table 4
The Pairwise Comparison Matrix

	Cate1	Cate2	Cate3	Cate4	Cate5
The first-tier category 1 (Cate1)	1.00	1.62	1.55	1.78	1.50
The first-tier category 2 (Cate2)	0.62	1.00	0.67	2.02	2.07
The first-tier category 3 (Cate3)	0.65	1.50	1.00	1.80	2.12
The first-tier category 4 (Cate4)	0.56	0.50	0.50	1.00	0.90
The first-tier category 5 (Cate5)	0.67	0.48	0.47	1.11	1.00
Total	3.49	5.10	4.18	7.71	7.59

Calculating weights for each the first-tier category (Table 5):

Table 5
Weights for Each the First-Tier Category

	Cate1	Cate2	Cate3	Cate4	Cate5	Weights	Rating
Cate1	0.286	0.318	0.371	0.231	0.198	0.281	1
Cate2	0.177	0.196	0.159	0.262	0.273	0.213	3
Cate3	0.185	0.294	0.239	0.233	0.279	0.246	2

Cate4	0.161	0.097	0.118	0.130	0.119	0.125	5
Cate5	0.191	0.095	0.113	0.144	0.132	0.135	4
	1.000	1.000	1.000	1.000	1.000	1.000	

Next, check the consistency of the experts' judgments throughout the application of the method. T.Saaty indicates that a consistency ratio (CR) less than or equal to 10% is acceptable. In other words, there is a 10% chance that the experts answer the questions completely at random. If the CR is greater than 10%, it indicates an inconsistency in the assessment and needs to be re-evaluated and recalculated (Liu, 2014; Vaidya & Kumar, 2006). Calculating CR includes several steps:

Consistency vector: Take the sum of the weights of the criteria divided by the weights of each criterion (Table 6):

Table 6
Consistency Vector

	Cate1	Cate2	Cate3	Cate4	Cate5	Sum weights	Weights	Consistency vector
Cate1	0.281	0.455	0.435	0.500	0.421	2.091	0.281	7.450
Cate2	0.132	0.213	0.142	0.431	0.442	1.360	0.213	6.374
Cate3	0.159	0.369	0.246	0.443	0.265	1.482	0.246	6.021
Cate4	0.070	0.062	0.062	0.125	0.121	0.440	0.125	3.524
Cate5	0.090	0.065	0.065	0.150	0.135	0.505	0.135	3.743

Calculating the consistency index (CI) by the following formula (Vaidya & Kumar, 2006):

$$CI = \frac{\lambda_{max-n}}{n-1}$$

where λmax is the maximum eigenvalue of the comparison matrix; and n is the number of indicators (in this study n = 5). The λmax is calculated as the average of the consistency vector.
λmax = (7.450+ 6.374+ 6.021+ 3,524+ 3,743)/5= 5.422
Thus, CI = 0.106
Then, consistency ratio (CR) is computed to estimate the consistency of pair-wise comparisons by:

$$CR = \frac{CI}{RI}$$

where the determination of RI (Random Consistency Index) is based on Table 7 (Vaidya & Kumar, 2006).

Table 7
Random Consistency Index

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.54	1.56	1.57	1.59

In this study, the number of criteria n is 5 and RI = 1.12. So:
CR = 0.106/1.12=0.094 (<10%).

Thus, it has consistency among experts in the process of assessing the importance of the component first-tier groups of university autonomy competency.

The Proposed System of Indicators for The Assessment of UAC

Overview of The Proposed Framework

Table 8 presents an indicator system for the assessment of UAC with five first-tier categories, 14 second-tier categories and 75 individual indicators.

Table 8
An Indicator System for Assessing The HEI's UAC

	First-tier categories/ second-tier categories/ individual indicators
I	**First-tier category 1: Good Institutional Governance and Management (Weight: 0.281)**
	Second-tier category 1.1. Quality of HEI's governance and management system (weight: 0.5)
Indicators	The suitability of the governance and management structure system of HEI as compared to the law (weight: 1/3)
	Appropriateness in terms of number and structure of a HEI's board or council (weight: 1/3)
	Eligibility for the members of the council and the administrators of a HEI (weight: 1/3)
	Second-tier categories 1.2. Performance of governance and management activities (weight: 0.5)
Indicators	Be accredited by competent quality accreditation units (weight: 1/12)
	Percentage of internal regulations that meet the standards set by the State (weight: 1/12)
	Satisfaction level of HEI's managers at all levels (weight: 1/12)
	Satisfaction level of HEI's office staffs at all levels (weight: 1/12)
	Satisfaction level of HEI's lecturers and scientists (weight: 1/12)
	Level of students' satisfaction (weight: 1/12)
	Growth rate of lecturers with PhD degrees (weight: 1/12)
	Growth rate of lecturers holding the title of Associate Professor, Professor (weight: 1/12)
	Growth rate of international lecturers and researchers working at a HEI (weight: 1/12)
	Growth rate of working at a HEI (weight: 1/3)
	Growth rate of lecturers going to work and exchange abroad (weight: 1/12)
	Rate of lecturers, researchers leaving, transferring to other HEIs (weight: 1/12)
II	**First-tier category 2: Competence in training and scientific research (Weight: 0.213)**
	Second-tier category 2.1. Competence in developing facilities and learning materials for training and research (weight: 1/6)
Indicators	Organizational structure system to manage and develop facilities and learning materials for training and scientific research (weight: 1/5)
	Internal regulations on investment and development of facilities and learning materials for training and scientific research (weight: 1/5)
	Construction and procurement investment plans to enhance facilities and learning materials for training and scientific research. (weight: 1/5)
	Current conditions of facilities and learning materials for training and research (weight: 1/5)
	Number of HEI's quality scientific journals (weight: 1/5)
	Second-tier category 2.2: Capacity of lecturers and scientists participating in training and research (weight: 1/6)
Indicators	Ratio of lecturers to total training scale (weight: 1/4)
	Percentage of lecturers with doctoral degrees (weight: 1/4)
	Percentage of lecturers holding the title of Professor, Associate Professor (weight: 1/4)
	Percentage of lecturers and scientists with foreign nationality (weight: 1/4)
	Second-tier category 2.3. Capacity to organize enrollment and improve input quality (weight: 1/6)
Indicators	System for organizing enrollment and admission (weight: 1/6)
	Documents and regulations related to enrollment and admission (weight: 1/6)
	Quality of facilities, offices, IT systems for enrollment and admission (weight: 1/6)
	Number of students recruited (weight: 1/6)

Average rate of international student enrollment (weight: 1/6)

Average number of letters, complaints related to enrollment and admission activities (weight: 1/6)

Second-tier category 2.4. Capacity to build and develop training programs (weight: 1/6)

Indicators	HEI's Science and Training Council (weight: 1/8)
	HEI's organizational structure system for building, appraising, evaluating and issuing training programs (weight: 1/8)
	Regulations and procedures for the construction, appraisal, evaluation and issuance of training programs (weight: 1/8)
	Number of new developed or replaced programs (weight: 1/8)
	Number of training programs granted in foreign languages or training links with foreign training institutions (weight: 1/8)
	Number of training programs that have passed quality accreditation by an independent 3rd party (weight: 1/8)
	Number of training programs that meet the requirements according to the Vietnam National Qualifications Framework and the state regulations on training program standards (weight: 1/8)
	Number of subjects newly added or upgraded in line with the new goals and needs of the society (weight: 1/8)

Second-tier category 2.5. Capacity to manage, inspect, supervise, support training, scientific research and innovation activities (weight: 1/6)

Indicators	Organizational structure system to manage, inspect, test, supervise, and support scientific research and training activities (weight: 1/8)
	Percentage of documents and internal regulations on inspection, examination, supervision, and support for scientific research and training activities that are reviewed, revised, completed and built annually (weight: 1/8)
	Percentage of departmental staffs in charge of management, inspection, examination, supervision, and support of scientific research and training activities with appropriate professional certificates (weight: 1/8)
	Percentage of leaders in charge of science and technology who have PhD, associate professor, professor (weight: 1/8)
	Average share of revenue from science and technology activities, innovation, knowledge transfer and start-up projects (weight: 1/8)
	Number of student startups and competitions every year (weight: 1/8)
	Number of science and technology partners (weight: 1/8)
	Number of national and international conferences and seminars held by a HEI (weight: 1/8)

Second-tier category 2.6: Performance in training, scientific research and innovation (weight: 1/6)

Indicators	Employer satisfaction (weight: 1/11)
	Employment rate of learners (weight: 1/11)
	Percentage of scientific articles, academic and scientific research awards by students (weight: 1/11)
	Percentage of scientific articles, academic and scientific research awards by lecturers and scientists (weight: 1/11)
	HEI's scientific article citation index (weight: 1/11)
	Number of new textbooks (weight: 1/11)
	Number of collaborative research projects with external colleagues (weight: 1/11)
	Number of authorship with external researchers (weight: 1/11)
	Number of useful practical solutions, inventions, prestigious application products, spin-off startups of HEI (weight: 1/11)
	Number of trained masters and number of doctors trained/supported by HEI's research projects (weight: 1/11)

	Webometrics Ranking (weight: 1/11)
III	**First-tier category 3: Competence in sustainable finance and property development (Weight: 0.246)**
Second-tier category 3.1. Capacity for effective management, inspection, examination, supervision, disclosure and accountability of finance and assets (weight: 0.5)	
Indicators	Organizing HEI's financial and asset management system (weight: 1/4)
	Quality of HEI's internal regulations on revenue, management and use of financial resources (weight: 1/4)
	Quality of HEI's internal regulations on asset management and use (weight: 1/4)
	Degree of financial autonomy as defined by the law (weight: 1/4)
Second-tier category 3.2. Ability to attract development investment capital (weight: 0.5)	
Indicators	The completeness of policies to attract development investment capital (weight: 1/3)
	Performance in attracting and mobilizing capital for development investment from different sources (weight: 1/3)
	Average income of employees (weight: 1/3)
IV	**First-tier category 4: Performance in contributing social-economic development (Weight: 0.125)**
Second-tier category 4.1. Effectively contribute to socio-economic development (weight: 0.5)	
Indicators	The level of contribution to socio-economic development is reflected in the feedback of recruitment agencies or appraising authorities (weight: 1/2)
	Number of businesses or organizations that contribute to socio-economic development (weight: 1/2)
Second-tier category 4.2. Capacity to serve the community (weight: 0.5)	
Indicators	The rate of disadvantaged students at HEI (weight: 1/4)
	The size of HEI's scholarship (weight: 1/4)
	Quality of a committee in charge of community service activities (weight: 1/4)
	Number of projects, charitable and humanitarian activities serving the community (weight: 1/4)
V	**First-tier category 5: Competence in implementing accountability responsibility (eight: 0.135)**
Second-tier category 5.1: HEI's commitment to social accountability (weight: 0.5)	
Indicators	Compliance with legal regulations on disclosure and accountability (weight: 1/5)
	Quality of organizational systems in charge for social accountability (weight: 1/5)
	Quality of internal regulations and guidelines for social accountability (weight: 1/5)
	Quality of IT infrastructure for social accountability (weight: 1/5)
	Policies to promote a culture of accountability and information transparency throughout HEI (weight: 1/5)
Second-tier category 5.2: Capacity to develop databases for social accountability (weight: 0.5)	
Indicators	Availability of data on the organization, personnel affairs (weight: 1/4)
	Availability of data on training, science and technology, and other professional activities (weight: 1/4)
	Availability of financial and asset data (weight: 1/4)
	Availability of data on social, life, culture, sport activities (weight: 1/4)

Indicators are assessed using different five-point scales. The score of each second-tier category, first-tier category and the overall score of university autonomy competence are calculated by the following formulas:

The score of second-tier category j:

$$\text{SconCate}_j = \sum_1^n In_i . w_i,$$

where In_i is the score of the indicator i (for each indicator, there is an unique scale, $1 \le In_i \le 5$, due to the limited length of paper the scales are not presented), w_i is the weight of the indicator i, n is the number of indicator under the second-tier category j.

The score of first-tier category k:

$$FirstCate_k = \sum_1^m SconCate_j . w_j,$$

where $SconCate_j$ is the score of the second-tier category j, w_j is the weight of the second-tier category j, m is the number of the second-tier category under the first-tier category k.

The overall score of HEI's university autonomy competence:

$$UAC = \sum_1^p FirstCate_k . w_k$$

where $FirstCate_k$ is the score of the first-tier category k, w_k is the weight of the first-tier category k, p is the number of the first-tier category. Categorizing the level of a HEI's university autonomy competence as the Table 9:

Table 8
The Level of a HEI's UAC

Score UAC	Level
Under 2.5 points	Low
From 2.5 point to under 3.5 points	Quite good
From 3.5 points to under 4.5 points	Good
From 4.5 points to 5 points	Very good

Applying The System of Indicators to Assess The UAC of HUCE in Vietnam

Introduction About HUCE

Hanoi University of Civil Engineering (HUCE) is located in Hanoi. HUCE is one of the first four higher education institutions in Vietnam to achieve the international accreditation standard HCERES (French High Council for the Evaluation of Research and Higher Education). HUCE has 47 undergraduate programs, 19 master programs and 19 doctoral programs with a total of about 20.000 students at all levels.

In the latest 5 years, HUCE has completed 30 state-level research projects and international protocols; 193 ministerial-level research projects; 839 institutional-level research projects; and 1,025 students' scientific research projects. In the 2016-4.2022 period, the University has published more than 2,000 articles in specialized domestic and international scientific journals, of which more than 700 are published in the ISI and Scopus journals; had over 5000 international citations; issued 08 inventions and utility solutions. The HUCE's Journal is an ACI (Asian Citation Index) indexed journal. Structure of the teaching staffs by training qualifications: 239 people with a Doctorate degree (36.9%); 409 Masters (63.1%); by academic title: 6 Professors (0.93%); 68 Associate Professor (10.50%). With these results, HUCE's ranking has been significantly improved on the international Webometrics rankings (in 2020 it ranks 22nd out of 178 Vietnamese universities).

Regarding financial resources, in recent years, HUCE's revenue comes from three main sources, which are tuition fees (accounting for about 73.7%), revenue from the state budget for recurrent expenditures (accounting for about 20.8%) and other revenues (accounting for about 5.5%). Basically, the revenue source ensures the balance between revenue and expenditure for the University's activities. However, in terms of financial structure, HUCE's revenue depends mainly on tuition fees; while scientific and technological activities and services have a negligible financial contribution. This is a huge challenge for the University in the coming time toward implementing university autonomy mechanism.

Up to now, basically, the organizational structure and governance model of the University is still the old model, the autonomy and accountability of the units are not high. As for human resources, the inadequacies in the structure of lecturers among training disciplines have been revealed due to rapid fluctuations in enrollment scale; the rate of lecturers with doctorate degrees, professor and associate professor titles is not high; capacity of management and administrative staff is still limited.

HUCE's UAC

The HUCE's UAC is assessed using the proposed system of indicators. The results are presented as the following Table 3:

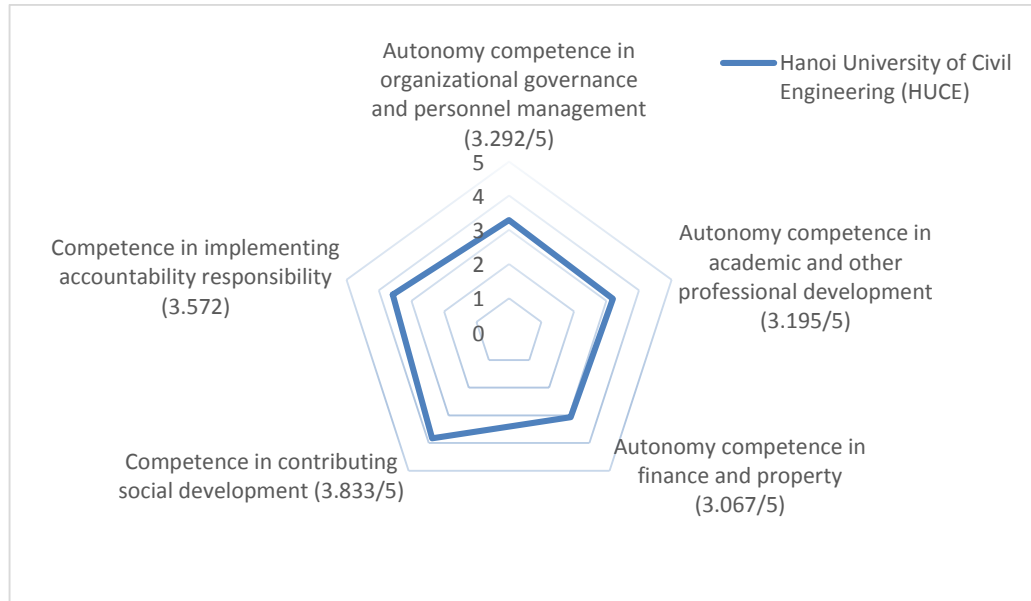*Figure 3.* The HUCE's UAC

The overall score of UAC of HUCE	Level
3.392/5	**Quite Good**

The result shows that HUCE meet the level of "Good" for two aspects of UAC, including contributing social development and implementing accountability responsibility; while it is at the level of "Quite Good" for three remaining aspects, including organizational governance and personnel management, academic and other professional development, and finance and property development. In which, competence in contributing social development of HUCE is highest with 3.833/5 points, and competence in finance and property development is lowest with 3.067/5 point. The general university autonomy competence of HUCE is at the level of "Quite Good" with 3.392/5 points. This result implies that HUCE should pay much more attention on improvement of its governance and management system, finance and property development, and academic and research activities.

The result gained is quite consistent with the current situation of HUCE. It implies that the proposed system of indicator is reliable and valuable.

CONCLUSIONS

The study has developed a multi-dimensional, multilateral system of indicator to assess a HEI's university autonomy competence. Accordingly, each HEI's UAC should be assessed through five key aspects, including autonomy competence in organizational governance and personnel management, autonomy competence in academic and other professional development, autonomy competence in finance and property development, competence in contributing social development, and competence in implementing accountability responsibility.

HEIs can apply the proposed system of indicators to get better and more reliable information of capability and resources and measure its strengths and weaknesses in order to establish an appropriate plan toward the higher autonomy model as well as to monitor its development and progress over time. Additionally, the study also provides for policy-makers a useful tool to assess the situation of the national higher education system as a whole; so that they can make effective policies, plans, programs to promote, manage, and monitor the transformation of university autonomy model in HEIs nationwide. This system of indicators is developed specific to the context of higher education in Vietnam; however, it can be used for the similar contexts.

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