Factors affecting the linkage between public universities, in the context of university autonomy: Case study in Vietnam

Quang Bach Tran[a], Thi Hanh Duyen Nguyen[a*], Hoai Nam Nguyen[a], Thi Hoang Mai Tran[a], Thi Thuy Quynh Nguyen[a] and Dang Duc Nguyen[b]

[a]*Lecturer, Faculty of Economics, Vinh University, Vietnam*
[b]*Lecturer, Nghe An Trading and Tourism College, Vietnam*

CHRONICLE	ABSTRACT
	University autonomy is a necessary condition for the implementation of advanced university governance methods to improve and enhance the quality of training. This study aims to examine the influence of factors on linkage between public universities in the context of university autonomy in Vietnam. Using quantitative research methods, through multiplicative model analysis, with a scale of 528 samples being managers, experts, scientists at public universities which are then divided by different sectors. The results show that there are 5 factors that favorably influence the linkage between public universities in the context of autonomy with the order of influence defined as: Information sharing; Goal consensus; Financial resources; University brand values; Commitment. Based on the research findings, the authors propose a number of recommendations to strengthen the linkages between public universities in the context of university autonomy in Vietnam.

1. Introduction

Entering the 21st century, for the education sector, it is necessary to overcome many weaknesses by preparing elements for innovation in school leadership through State policies and to do this well, it is necessary to build partnerships between schools and other fields, at the same time, it is necessary to draw the attention and support from the State. Ramanathan (2014) affirmed that research institutes and universities are the driving force for innovation and technology transfer, he also mentioned the issue of building Institute-University partnerships to transfer technology and promote commercialization of research results, emphasizing the role of cooperation in promoting and creating Institute-University linkages and inter-university linkages.

International links are also a trend that is increasingly in great demand and the study of international links is increasingly important. So far, in their studies, many authors have mentioned university linkages and shown its importance to the development of schools. Susan (2010) addresses the partnership between public and secondary universities, which clarifies the issues that need to be addressed as well as the possibilities for establishing and managing this relationship effectively. Similarly, Yarime (2009) recognizes the importance of linkages in research and training because scientists can use the knowledge and resources of other institutions effectively, universities as platforms for association.

Linkages between public universities will promote the comparative advantages of each school to enhance its strengths in terms

of training, science and technology, and community service. Therefore, contributing to creating high-quality human resources for the locality and the country, this is an urgent requirement for the existence and development of public universities. In the context of globalization and international economic integration, the education system in Vietnam and especially higher education needs to be changed to suit practical conditions. Over the years, the Party and State of Vietnam have issued many policies and guidelines to renew education and training to meet social needs, one of which is university autonomy, the linkages between universities. However, the reality is that public universities in Vietnam still seem to operate in their own way, not closely linked. Therefore, universities still face many difficulties in activities, which has led to the competitiveness of Vietnamese public universities compared to universities in the region and the world is limited, especially in the context of fierce competition of private universities, greater autonomy and internationalization of education. Therefore, deepening the linkage between public universities to attract learners, promote scientific research, and enhance the ability to serve the community is a vital issue of public universities in Vietnam.

The study aims to examine the influence of factors on the linkage between public universities in the context of autonomy in Vietnam. The study's findings show a theoretical and practical contribution when the research successfully demonstrates the positive influence of factors on the linkage between public universities in the context of autonomy and the order of their influence. The study's findings show a theoretical and practical contribution to demonstrating the positive influence of factors on the linkage between public universities in the context of university autonomy and the order of their influence.

2. Literature Review and Hypotheses

2.1. Literature Review

Potter (2008) considers the concept of science and engineering to imply inter-disciplinary collaboration and sometimes to link multiple organizations. The study also presents the problems of managing this bond, showing how to manage it to achieve high efficiency. To take the right approach when building a partnership, one also needs to define the format of the relationship. Barry (2009) studies the internationalization of the university on the most general level, with attention to clarifying the underlying causes of the internationalization of the university; key measures for success; activities that are fundamentally necessary to improve the effectiveness of this internationalization; strategic planning issues for internationalization; basic knowledge, skills and attitudes in university internationalization; the interaction between internationalization and multiculturalism; common models of internationalization; the challenges and opportunities surrounding the study of foreign programs and finally an overview of international organizations in the field.

Referring to financial autonomy, Cazenvae (1982) argues that the issue of financial autonomy of the university is the legal status; school budgets; estimation process; the election and discretion of the principal; appointment of treasurer; the composition, duties of the school board and state control. In addition, Cazenvae (1982) also emphasizes issues directly related to financial autonomy such as the right to recruit personnel, the right to pay salaries, ownership of facilities, the ability to buy or build new and maintain buildings with school money, the state budget system. According to Yeager et al. (2012), financial autonomy includes organizational resources, expenses, strategic planning, resource allocation, and financial management of higher education institutions. Thus, we can say that financial autonomy has a relationship with resources, expenses, resource allocation and financial management. In other words, finance involves both monetary and non-monetary resources. Rothblatt (1992) argue that financial autonomy consists of two aspects: the freedom to allocate public finances and the freedom to create and use private financial resources. While Daniel (1996) mentions three aspects: Borrowing in the capital markets; Fully dispose of activities related to commercial research and teaching contracts; Retain profits. Verhoest et al. (2004) address two issues in the autonomy of an educational institution: the degree of freedom to make its own decisions and what is required of a higher education institution in its use of this freedom.

Bennett and Choudhury (2008) see the school brand as a characteristic of an institution that distinguishes one school from another, reflects its ability to meet learners' needs, builds confidence in its ability to provide quality education at a higher level, and helps learners make the right decisions on admission. A strong brand can create learners' trust in a good quality environment, which is the basis for helping learners make choices, adding value to learners and creating an enjoyable experience (Chun & Davies, 2006). Brand value is a core concept in brand management, Aaker (1991) defines brand value as a set of assets and responsibilities associated with a brand, its name and logo, plus or subtracted from the value provided by a product or service to a company or its customers. He thinks that brand value consists of 5 components, namely: brand loyalty; brand awareness; perceived quality; brand associations and other brand assets. According to Keller (1998), brand values include: brand awareness; brand image; reaction to the brand and relationship with the brand.

The level of information sharing involves the timely and appropriate capture and exchange of information to those members prior to decision-making, planning and control. Information plays an essential role in today's organizations, and it helps managers make the necessary decisions, so information is a valuable asset and the foundation of an organization's competitive advantage (Bock et al., 2005). However, people are not willing to share the information they have accumulated because individuality and ownership always exist in every human being. They feared that they would lose their intellectual power in the organization if shared with others (Davenport & Prusak, 1998). Information sharing is one of the main, important activities of information management (Gupta et al., 2000; Alavi & Leidner, 2001; Lee & Al-Hawamdeh, 2002; Becerra-Fernandez et

al., 2004). Thanks to technology, information sharing can take place anywhere and anytime. Davenpork and Prusak (1998) argue that information technology systems have a positive relationship with information and knowledge sharing, which will improve the performance of the organization and increase the rate of knowledge sharing in that organization.

Commitment is broadly defined as "strength based on the relationship of an individual's close attachment and that individual's involvement in the organization (Mowday et al., 1982). Morgan and Hunt (1994), define commitment as the utmost effort to maintain a relationship between partners. That is, the committed party believes that the relationship endures indefinitely and commits to be at the heart of all exchange of relations between the company and its various partners. This factor is also reflected in several studies by Nyaga et al. (2010); Cao and Zhang (2011); Chen et al. (2013).

Goal synchronization between partners is the degree to which partners perceive their own goals to be protected by accomplishing the common goals of the affiliate network, which is the degree of goal agreement between partners (Angeles & Nath, 2001). Goal synchronization refers to the process by which partners coordinate decision-making in planning and operations in order to optimize the common good (Simatupang & Sridharan, 2002). Planning decisions are required to determine the most effective way to use resources, towards achieving specific goals.

2.2. Hypotheses

2.2.1. Financial resources and the linkage between public universities

Argenti (2009) asserted that in university linkages, the resources of the members are harmoniously integrated, the integration of which constitutes strength superior to the sum of the component strengths. The efficiency of financial resource management is an important factor contributing to the development of education in general and higher education in particular. Financial resource management involves an organization's decisions about how to generate funds, control financial resources through financial resource allocation, and accountability measures. Along with the process of renovating the financial management mechanism for higher education, the expenditure policy of university universities in Vietnam is also oriented to adjust to contribute to helping universities proactively use their funds effectively to create networks between universities. In order to test the relationship between financial resources and the linkage between public universities in the context of autonomy in Vietnam, the following hypothesis is proposed:

H₁: *Financial resources positively affect the linkage between public universities in the context of autonomy in Vietnam.*

2.2.2. Brand value and the linkage between public universities

The brand is always associated with long-term values, creating and developing the brand is posed to bring universities many advantages in all activities. According to Joe (1999), the way to create a value-added brand in today's competitive global marketplace is to create a tailored, effective strategy that includes advertising, marketing, public relations, and research investigations. Long-term relationships are made up of sustainable values, and so images and brands are always promoted in those relationships (Tran, 2021). In the context of the autonomy of public universities in Vietnam, how brand value affects the link between universities, the following hypothesis is proposed:

H₂: *Brand value positively influences the linkage between public universities in the context of autonomy in Vietnam.*

2.2.3. Information sharing and the linkage between public universities

Information sharing refers to the extent to which a person shares relevant, accurate, complete and timely information with partners (Angeles & Nath, 2001; Cagliano et al., 2003; Sheu et al., 2006). Sharing information between universities creates a professional academic environment, promotes scientific research, has the effect of improving the quality of research and training. It serves as a key in linking, building strong relationships between universities. Therefore, the study hypothesizes:

H₃: *Information sharing positively affects the linkage between public universities in the context of autonomy in Vietnam.*

2.2.4. Commitment and the linkage between public universities

Research by Morgan and Hunt (1994) shows that cooperative and transferable behavior is a positive outcome of commitment, an aspect that reflects management effectiveness, contributing to the effectiveness of national development. Commitment influences linkages and in turn influences organizational performance (Nguyen, 2021). Commitment refers to the willingness of partners to strive to build relationships and suggest future directions in which organizations try to build relationships that can be sustained in the face of unforeseen problems. Studying the relationship between commitment and the linkage between public universities, the authors formulated the hypothesis:

H₄: *The commitment positively affects the linkage between public universities in the context of autonomy in Vietnam.*

2.2.5. Goal consensus and the linkage between public universities

In his work, Thomas (1997) sees associative institutions as a new scientific institution. Also with the view that linkages are a network of socio-technical integration, Brian (2016) sets out to assess the structure and functioning of academic research networks in relevant fields in several countries. The goals of educational institutions in general and universities in particular

are very diverse, but the system of consensus goals, based on long-term association relationships always brings common values to universities and towards sustainable development. In the context of public universities in Vietnam, in order to study the relationship between Goal Consensus and university linkages in the context of university autonomy, the following hypothesis is proposed:

H5: *Goal consensus has a positive influence on the linkage between public universities in the context of autonomy in Vietnam.*
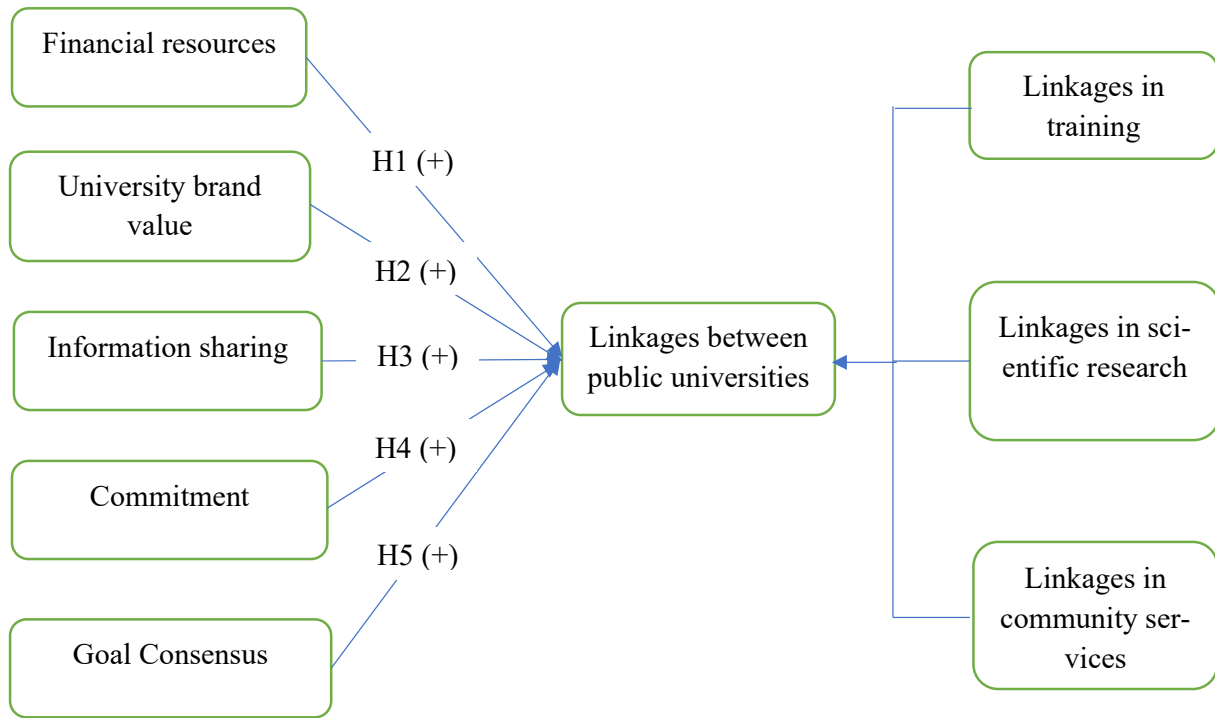
Fig. 1. Proposed Research Model

3. Research Method

3.1. Research Scale

Based on theoretical overview and related research works. The article proposes a research model with independent variables including: Financial resources; University brand value; Information sharing; Commitment; Goal consensus; The dependent variable is Linkages between universities including linkages in training; Linkages in scientific research and Linkages in community service. The scale used in the study was a likert scale with 5 levels (Strongly agree; Agree; Normal; Disagree; Strongly disagree). Indicators measuring the variables applied are adapted to the characteristics of the sample studied from previous studies.

Table 1
Origin of the scale of variables

No.	Variable	Code	Number of observations	Scale origin
1	Financial resources	FIR	5	DeGroote (2011)
2	University brand value	UNB	7	Yoo et al. (2000)
3	Information sharing	INS	5	Togar and Ramaswami (2005); Chennamaneni (2006).
4	Commitment	COM	5	Morgan and Hunt (1994); Torres (2012)
5	Goal Consensus	GOC	6	Angeles and Nath, 2001
6	Linkages between public universities	LPU	17	
	Linkages in training	LIT	8	Togar and Ramaswami (2005)
	Linkages in scientific research	LIS	5	
	Linkages in service to the community	LIC	4	

3.2. Research Sample

The study sample was selected according to the method of non-probabilistic sampling which is convenient sampling. The study conducted surveys by delivering questionnaires to managers, experts and scientists at public universities divided by

sectors: technological and natural engineering; humanities and economic law; agro-forestry and fishery sector. These universities are distributed in all three North, Central and South regions of Vietnam. The investigation process is conducted in two ways: direct and online voting. The total number of questionnaires issued is 800, the number of questionnaires received is 561, the number of valid questionnaires used for analysis is 528. According to the study by Hair et al. (1998) for reference on the expected sample size, the minimum sample size is 5 times the total number of variables observed. With the number of observations in the paper is 45, the scale of the study includes 528 samples to ensure analysis requirements. Time to complete data collection is from January, 2022 to June, 2022.

3.3. Data Processing

The results of data collection through the process of investigation and survey are processed by SPSS software. From this, it is possible to draw conclusions that demonstrate the appropriateness of the model and the research hypotheses. First, the study was conducted to evaluate the reliability of the scale with Cronbach's Alpha coefficient requirement >= 0.7 and the total variable correlation coefficient >= 0.3. Next, the study tested the value of the scale by analyzing the EFA discovery factor, which requires a loading factor > 0.5; KMO factor >= 0.5 and <=1; Sig value. < 0.05 and Average Variance Extracted > 50% (Hair et al., 1998), the factor extraction method used was Varimax. After eliminating the indicators of non-conformity, the study re-test the reliability of the scale. Next, the study tested Pearson's correlation coefficient to measure the relationship between variables. Pearson's correlation coefficient test provides information about the importance of the relationship, the correlation, as well as the direction of the relationship. In addition, testing the Pearson correlation coefficient also helps to identify the occurrence collinearity problems when independent variables are strongly correlated with each other. To test hypotheses, the study conducted multiple regression model analysis. Finally, the study of statistical analysis describes the data in order to evaluate and compare the actual data with the results from the model test.

4. Results and Discussion

4.1. Testing the Reliability of the Scale

To evaluate the reliability of the scale, the study conducted Cronbach's Alpha analysis for each group of variables. The results show the reliability of the scale used in the analysis when all Cronbach's Alpha values of the variables included in the model are consistent with the total variable correlation coefficient of the observed variables > 0.3 and Cronbach's Alpha coefficient > 0.7. However, the UNB7 indicator has Cronbach's Alpha if Item Delete is 0.763 larger than the Cronbach's Alpha coefficient of the UNB variable (0.759); the COM5 indicator has Cronbach's Alpha if Item Delete is 0.901 larger than the Cronbach's Alpha coefficient of the COM variable (0.894); the GOC6 indicator has Cronbach's Alpha if Item Delete is 0.840 larger than the Cronbach's Alpha coefficient of the GOC variable (0.798); the LIT4 indicator has Cronbach's Alpha if Item Delete is 0.916 larger than the Cronbach's Alpha coefficient of the LIT variable (0.894); the LIS5 indicator has Cronbach's Alpha if Item Delete is 0.875 larger than the Cronbach's Alpha coefficient of the LIS variable (0.843). Therefore, to increase the appropriateness of the scale, the study eliminated indicators UNB7; COM5; GOC6; LIT4 and LIS5.

Table 2
Rating the reliability of the scale through Cronbach's Alpha coefficient

No.	Variable	Code	Cronbach's Alpha
1	Financial resources	FIR	0.902
2	University brand value	UNB	0.763
3	Information sharing	INS	0.855
4	Commitment	COM	0.901
5	Goal Consensus	GOC	0.840
6	Linkages in training	LIT	0.916
7	Linkages in scientific research	LIS	0.875
8	Linkages in service to the community	LIC	0.913

4.2. Exploratory Factor Analysis (EFA)

After testing the suitability of the scale, the study conducted a factor analysis to explore EFA for both independent and dependent variables. Results showed that the data qualified for analysis with loading factor >0.5; KMO factor >= 0.5 and <=1; Sig value. < 0.05; Average Variance Extracted is > 50% and satisfies two conditions "Convergent validity" (observational variables converging on the same factor) and "Convergent validity" (observational variables belonging to one factor differentiate from another factor).

Table 3
EFA factor analysis results

EFA Analysis	KMO coefficient	P-value	Average Variance Extracted (%)	Loading Factor	Conclusion
Independent variables	0.922	0.000	63.868	All of them > 0.5	Ensure the analysis requests
Dependent variable	0.882	0.000	72.445	All of them > 0.5	Ensure the analysis requests

4.3. Pearson correlation coefficient test

The results of the correlation analysis show that all independent variables have an impact on the dependent variable (Linkages between public universities. At the same time, the variables are fairly closely correlated with each other (Sig coefficient). (2-tailed) are both <0.05). Therefore, to ensure accuracy, it is necessary to carefully review the role of the independent variable on the multivariate regression model by considering the level of impact of each independent variable on the dependent variable.

Table 4
Correlation coefficient between variables in the model

Variable	FIR	UNB	INS	COM	GOC
Linkages between public universities	0.459**	0.472**	0.537**	0.492**	0.538**
Financial resources		0.398**	0.357**	0.475**	0.469**
University brand value			0.499**	0.441**	0.441**
Information sharing				0.445**	0.563**
Commitment					0.583**
Goal Consensus					

**. Correlation is significant at the 0.01 level (2-tailed)

4.4. Multiple regression model analysis

The results of regression analysis show, with Sig value. < 0.05, at the same time the Beta normalized regression coefficient is positive, all hypotheses from H1 to H5 are accepted. Therefore, it can be concluded that independent variables in the model include: Financial resources; University brand values; Information sharing; Commitment and Goal Consensus both have a positive influence on the linkage between public universities – in the context of autonomy in Vietnam. These conclusions are similar to studies by Morgan and Hunt (1994); Thomas (1997); Joe (1999); Angeles and Nath (2001); Cagliano et al. (2003); Sheu et al. (2006); Agrenti (2009); Brian (2016).

At the same time, with the highest normalized regression coefficient of all independent variables of 0.245, the variable sharing information has the most influence. The next order of influence is Goal Consensus (0.179); Financial resources (0.165); University brand value (0.146); Commitment (0.136), respectively. The regression equation is obtained:

$$LPU = 1.262 + 0.121 \times FIR + 0.136 \times UNB + 0.198 \times INS + 0.097 \times COM + 0.136 \times GOC.$$

Table 5
Results of regression analysis of factors affecting the linkage between public universities - in the context of autonomy in Vietnam

No.	Independent variable	Coefficient of regression	Beta normalized regression coefficient	Sig.	VIP (Variance Inflation Factor)
	(Constant)	1.262		0.000	
1	Financial resources	0.121	0.165	0.000	1.441
2	University brand value	0.136	0.146	0.000	1.507
3	Information sharing	0.198	0.245	0.000	1.669
4	Commitment	0.097	0.136	0.002	1.725
5	Goal Consensus	0.136	0.179	0.000	1.935

The corrected R^2 coefficient is 0.434, which means that the independent variables included in the model affect 43.4% of the variation of the dependent variable (Public University Linkages).

Other tests show that the hypothesis of regression is not violated. The results of testing the models without collinearity due to the VIP of all variables < 2. Sig. of the F test is 0.000 < 0.05. At the same time, the Durbin - Watson coefficient is 1.845 (range from 1 to 3), demonstrating that the model has no autocorrelation. In addition, for both models, the sig value of the rank correlation between the normalized residual (ABSRES) and the independent variables was > 0.05, so no change error variance occurred. These results represent the appropriateness of the model and the study data.

Thus, with the demonstration of the positive influence of factors included in the model including Financial resources; University brand values; Information sharing; Commitment and Goal Consensus to the linkage between public universities – in the context of autonomy, along with determining the order of influence of each factor, the study has shown its contributions both theoretically and practically, as the basis for proposing effective solutions to strengthen the linkage of public universities – in the context of university autonomy in Vietnam.

4.5. Descriptive Statistical Analysis

In order to determine the actual value and compare with the results, the study conducted a statistical analysis describing the value of the variables. The analysis results show that, with the average of the highest rating of all variables included in the

model is 3.8968, the association in community service is assessed at a fairly high level. This shows the fact that in Vietnam, community values are always appreciated, universities are not only interested in organizing and implementing activities to serve the community but also express the desire to cooperate, share information and experiences with each other. With these activities, the target audience of universities is people and workers in different positions and areas, which will create a large number of support from the masses, have a great and long-term effect on creating initiative in many university activities such as enrollment, link training and aim to improve the quality of output. These can be considered as very positive signs, demonstrating the right guidelines from public universities in Vietnam and are the axiom for the long-term development of universities, as well as a sustainable connection between universities.

Besides, with an average value of 3.6527, the financial resource factor is evaluated at the lowest level of all factors included in the model. Vietnam is on the path to implement university autonomy, financial resources will be a problem for public universities to improve the quality of training, promote scientific research, or expand the linkages for university development in a solid way. This is considered a very important factor, which almost dominates all activities of the university. Therefore, in the context of switching to an autonomy mechanism, how to balance and ensure financial resources for all activities, creating a stable and sustainable revenue source will be a difficult problem for universities, requiring management models, modern, professional and effective operation needs to be built and deployed in the most reasonable way.

Table 6
The results of statistical analysis describing the variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Linkages between public universities	528	1.13	5.00	3.7898	0.48201
Linkages in training	528	1.00	5.00	3.7662	0.73579
Linkages in scientific research	528	1.25	5.00	3.7064	0.64372
Linkages in service to the community	528	1.00	5.00	3.8968	0.70794
Financial resources	528	1.00	5.00	3.6527	0.65950
University brand value	528	1.00	4.83	3.6376	0.51827
Information sharing	528	1.00	5.00	3.6413	0.59667
Commitment	528	1.00	5.00	3.7150	0.67393
Goal Consensus	528	1.00	5.00	3.7595	0.63277

5. Conclusions and Recommendations

The study aims to model and examine the influence of factors on the linkage between public universities in the context of university autonomy in Vietnam. The results of the study have shown both theoretical and practical contributions, demonstrating the positive influence of 5 factors on the linkage between public universities in the context of autonomy with the order of influence defined as: (1) Information sharing; (2) Goal consensus; (3) Financial resources; (4) University brand value; (5) Commitment (0.136). Besides those contributions, the study also has certain limitations. Given the convenience sampling method is a limitation of the study, it is possible to reduce the controllability of the sample representativeness. Moreover, the research context is also limited to public universities in Vietnam, and in addition to the factors included in the model, it is possible to consider examining the influence of other factors. With the results achieved, the paper opens the direction of development in research conducted in other countries in the region and in the world. The results of the study demonstrated both theoretical and practical contributions, showing the positive influence of 5 factors on the linkage between public universities in the context of university autonomy with the order of influence defined as: (1) Information sharing; (2) Goal Consensus; (3) Financial resources; (4) University brand value; (5) Commitment (43913).

Firstly, with information sharing, it is necessary to increase the sharing of information and data between universities, universities need to build databases, invest in information infrastructure to improve the quality of activities and promote research products. Organize regular conversations between the university as well as other partners to share knowledge and experience in training activities, and scientific research, serving the community as a basis for establishing linkages.

Second, with consensus goals, universities need to develop plans and establish a system of consensus goals to encourage university cooperation. In addition, it is necessary to promote the development of technology markets, organise and participate in technology fairs, and develop forms of contractual technology exchange, technology transfer and technology services in accordance with the inter-nationalization context.

Thirdly, with financial resources, universities need to study and develop a method of allocating funds for training activities, scientific research, and innovation of tuition policies according to the principle of cost-sharing with society, in which public universities have the status of service providers. At the same time, with revenues, in addition to income from tuition fees, universities need to pay special attention to mobilising revenues from career activities in accordance with universities' professional fields and capabilities. The State should strengthen the legal corridor for universities to thrive on products from scientific research and invention and have mechanisms to commercialize these products.

Fourthly, with the brand value of the university, it is necessary to build a brand image with sustainable competitive value, creating a unique brand identity of each university but also have a common integration with the global educational

environment. In addition, universities need to develop and synchronously implement integrated brand communication programs, there should be unity of brand messaging, coordination in the use of different media, space, time and cohesion of programs.

Fifth, with commitment, besides implementing solutions on training and education, universities need to implement and ensure commitments to stakeholders, partners and society on the effectiveness of activities that have been implemented. Create trust and support from learners and partners, thereby creating a basis for strengthening the link between public universities.

Acknowledgement

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