

FACTORS AFFECTING SCIENTIFIC RESEARCH ACTIVITIES FOR QUALITY ASSURANCE: A CASE STUDY OF VIETNAM UNIVERSITIES

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ABSTRACT

Scientific research activities play an essential role in economic growth and social development. Scientific research activities require extensive investment resources of the State, research organizations, and universities. Because spending on scientific research is so significant, it is necessary to evaluate the effectiveness of such expenditure objectively. Moreover, it lays the foundation for managing and monitoring research progress, helps to assess the impact and essential significance of research activities, and drawing lessons to adjust scientific research policy and suggest future research directions. Therefore, the authors surveyed 700 researchers who are working at many universities in Vietnam. In addition, the objective of this article is to identify the factors affecting the scientific research activities to serve the quality assurance with one percent significance. The paper was applying Structural Equation Modeling (SEM). Finally, the authors had policy recommendations to enhance the scientific research activities to improve the quality assurance at Vietnam universities.

Keywords: Scientific, Research, Quality, Assurance, Universities, Vietnam

INTRODUCTION

Sawrence & Thautveter (2017) showed that in the current context of globalization and deep integration, scientific research activities play a significant role in the cause of national construction, development, and defense. Therefore, scientific research activities always receive special attention from the Party and State. Law on Education, No. 43/2019/QH14 dated June 14, 2019, the 14th National Assembly, Socialist Republic of Vietnam has affirmed: "Scientific research activities are the tasks of higher education institutions." The State creates conditions for educational institutions to conduct science and technology activities, combine training with scientific research and production to improve the quality of education; to build the academic institution into a cultural, scientific, and technological center of the locality or the whole country by Harley (2016).

Thereby, it is shown that any higher education institution has an important task: scientific research and technology transfer. This activity has an organic relationship with training activities in the university, two essential strategic functions of the university for the quality assurance by Nguyen (2015). The fact that lecturers and students of the university actively participate in scientific research activities is one of the necessary tasks to improve the quality of training and create human resources to meet the increasing demands of society. In particular, in the criteria for ranking universities: the percentage of scientific research activities accounts for a relatively large proportion. Scientific research activities make a vital contribution to affirming the university's prestige. Each highly appreciated scientific work associated with the university's name is once the university's brand. Therefore, the article found out various factors affecting scientific research activities for quality assurance of Vietnam universities.

LITERATURE REVIEW

Scientific Research Activities (SRA)

Until now, the concept of scientific research is used to refer to activities aimed at researching and exploring the nature, laws, and effects of objects and phenomena in the heart. According to Treswell (2018), in the development process of society, practical requirements for science are constantly increasing. The content of applied research in scientific research activities is increasing day by day. Lewis (2015) studied that the concept of scientific research becomes familiar, including requirements for both basic research, applied research, and implementation research. Scientific research is an activity of seeking, examining, investigating, or experimenting. Based on data, documents, knowledge, etc., gained from scientific research experiments to discover new things about the nature of items, the natural and social world, and create methods, new technical facilities higher, more valuable by Harley (2016). Scientific research is not only in laboratories, in research institutes, but increased strongly at universities. Many education and training requirements, especially at undergraduate and postgraduate levels, require close association with scientific research by Gokcekus (2015). Teaching and research back into two main tasks of the lecturer students at universities.

Financial Policy (FP)

According to Allexander (2013), financial policy is one of the groups of factors that play a crucial role in researching and applying scientific research results. Completing the topic/project speed or slow depends significantly on this group of elements related to cost estimation, funding, and payment for implementing the project. Project by Henkel (2015). However, depending on each topic and assignment, the stages implemented from estimating, budget, and setting up payment procedures are evaluated differently from scientists and the importance of these factors by Charms (2014). The financial policy has the science and technology development fund at the ministerial/provincial/city level that should further promote active rights to these funds in lending activities on the principle of efficiency assurance. Besides, the State only needs to check monitoring through periodic reporting indicators combined with inspection work as prescribed. Based on the above, we have the following hypothesis H1:

H1: Financial Policy (FP) has a positive relationship with scientific research activities for quality assurance of Vietnam universities.

Approval Procedures (AP)

According to Bauer (2015), this procedure stipulates responsibilities and methods for storing, preserving, using, and destroying scientific research projects such as scientific research files and related documents. The process for approval and acceptance of the project/theme is a group of factors that decide whether the project can be implemented and applied to the research results by Read (2012). The procedure for approving and accepting the topic is complicated and cumbersome, which will prolong the implementation time and slow down the application progress of scientific research results. The process of carrying out a scientific research project at the university level provides for the steps to be taken, implementation, assignment of responsibilities, and time for completion by Habes (2016). This process helps units, and the lecturers are proactive in planning, implementing, preventing, and properly handling the situations that arise during the implementation of the project. Based on the orientation on scientific and technological research of the ministries, departments, and agencies, based on the proposals of the groups' strategic analysis, annual scientific research plan of the university. The scientific research management department synthesizes information to notify the unit. Units disseminated to lecturers, guided to register topics. The university prioritizes the approval of

issues according to the above orientation. Based on the above, we have the following hypothesis H2:

H2: Approval Procedures (AP) has a positive relationship with scientific research activities for quality assurance of Vietnam universities.

Scientist Motivation (SM)

According to Akbar (2015), the motivation of scientists to participate in scientific research is evaluated through many criteria. In addition to improving professional qualifications and developing research capacity, passion, income, and reputation are evaluated differently by scientific researchers. The leader is to create motivation for scientific research. It is necessary to help lecturers increase their research ability and experience (especially more critical in international publications) and at the same time provide incentives with rewards following their goals by Fabian (2012). Particular policies related to the international journal are conducted transparent and public to avoid misperceptions of "expectations" (efforts will lead to success). Research motivation also affirms the supporting role of the organization in creating research motivation by Watermeyer (2014). Accordingly, managers need to use various forms of support and cooperation in research suitable to each unit and subject of lecturers. Based on the above, we have the following hypothesis H3:

H3: Scientist Motivation (SM) has a positive relationship with scientific research activities for quality assurance of Vietnam universities.

Scientist Capacity (SC)

According to Veller (2013), scientific research is a critical task besides the teaching duties of the lecturer so that the lecturer can apply the results of science and technology into the teaching process. To be successful in scientific research requires researchers to have research motivation and a good research environment and ensure scientific research capacity. Scientific research can create, discover new knowledge, new technologies, and develop effective and practical solutions. According to Jaider (2014), the faculty's scientific research capacity can effectively carry out scientific research activities according to identified problems and objectives. This capacity includes the ability to detect problems, the power to develop a research proposal, capacity to organize the research. Conduct research, process documents, and research data, publish, apply research results into practice, guide students in science research, and evaluate students' scientific research results by Sheldon (2017). Based on the above, we have the following hypothesis H4:

H4: Scientist Capacity (SC) has a positive relationship with scientific research activities for quality assurance of Vietnam universities.

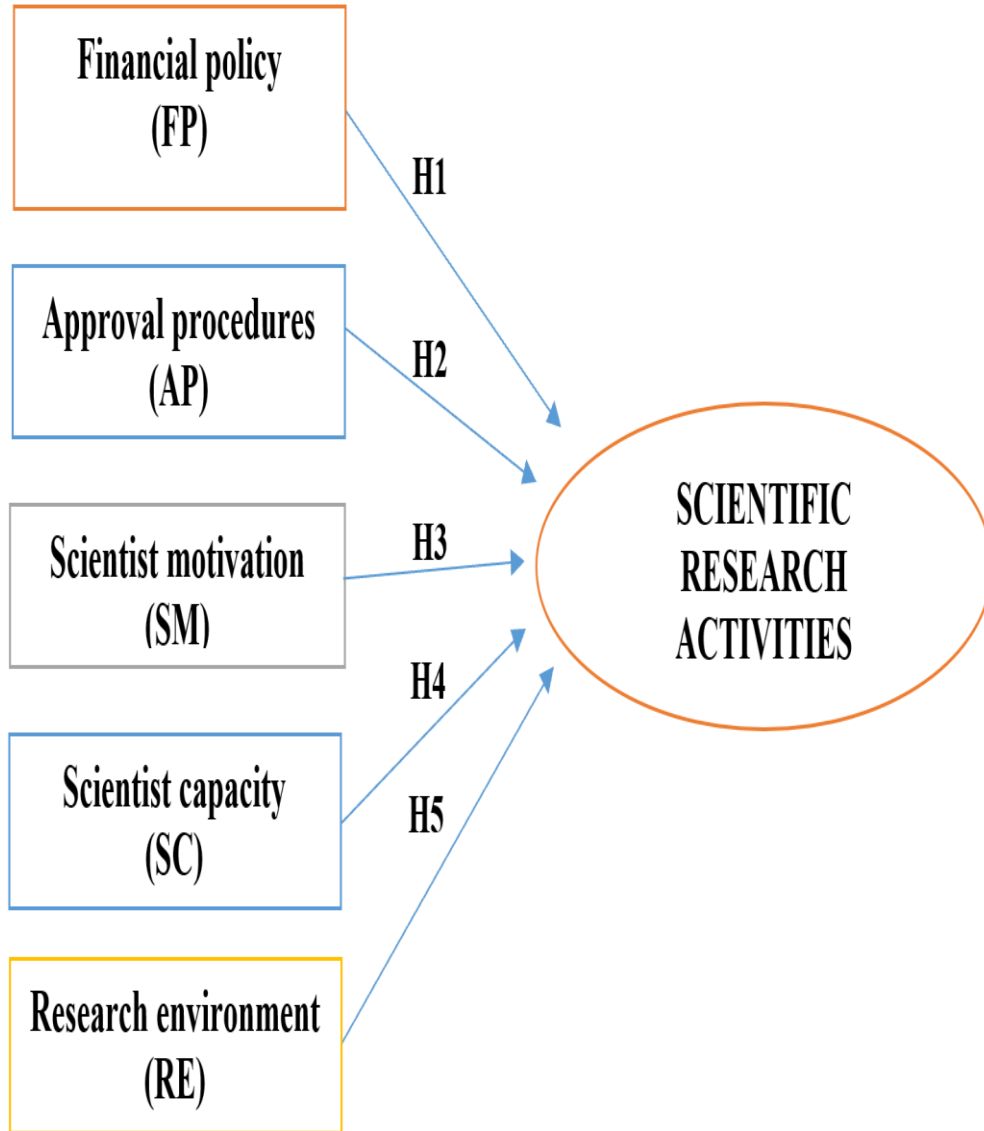
Research Environment (RE)

According to Auranen (2014), universities' research environment is essential to improve universities' quality of education and training. Scientific research activities established significant contributions. Besides, the research environment included the facilities and working environment considered motivational factors to implement science and technology topics and projects. Adequate facilities met for researchers in terms of documents, databases, equipment and laboratories, working rooms. And Leaders have care, support, and coordination stakeholders, including leaders, governing bodies, research collaborators, and people, promoting research activities and deploying and applying scientific research results quickly by Sole (2017). In addition to investing in facilities and equipment, many universities have built a remuneration and commendation regime; create an actual scientific research environment to encourage lecturers

and researchers whose internationally published articles are on the list of ISI/Scopus. Scientific research needs to make the right environment. Based on the above, we have the following hypothesis H5:

H5: Research Environment (RE) has a positive relationship with scientific research activities for quality assurance of Vietnam universities.

Based on the above analysis, the authors proposed the below model for factors affecting scientific research activities for quality assurance of Vietnam universities.

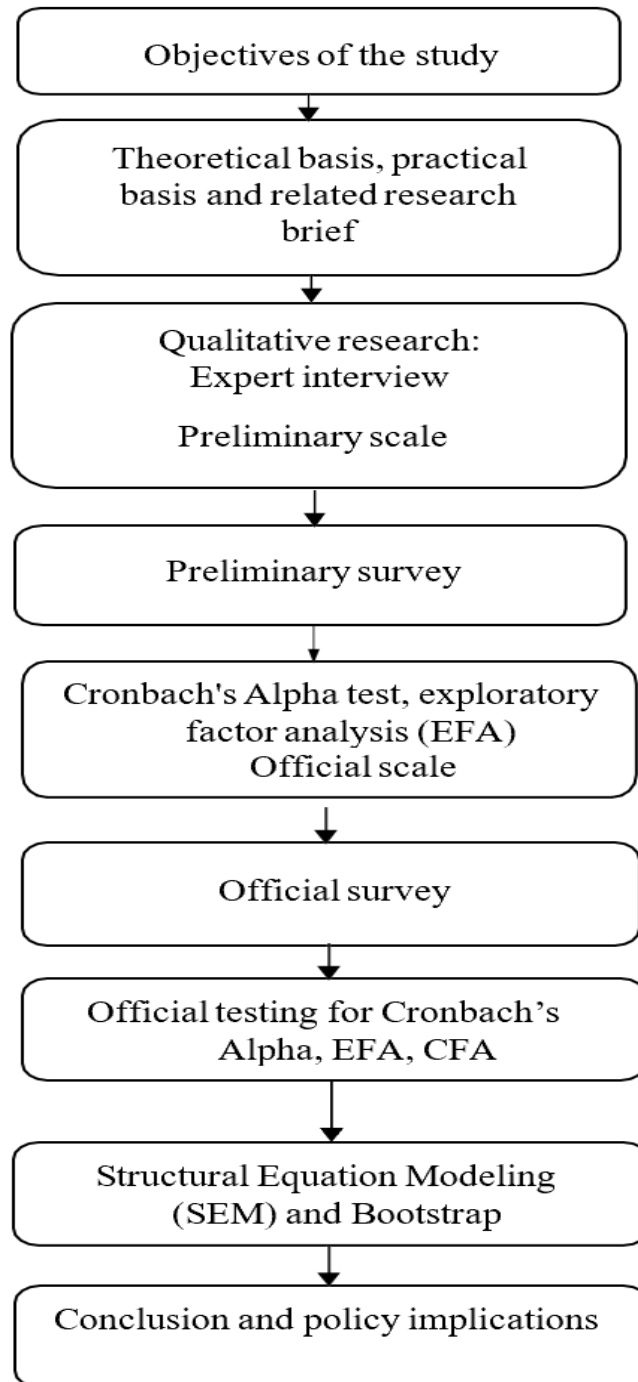


Source: The authors proposed

FIGURE 1
A RESEARCH MODEL FOR FACTORS AFFECTING SCIENTIFIC RESEARCH ACTIVITIES
FOR QUALITY ASSURANCE OF VIETNAM UNIVERSITIES

METHODS OF RESEARCH

To conduct the research paper, the authors follow the specific step-by-step process as following.



Source: The authors proposed

FIGURE 2
A RESEARCH PROCESS FOR FACTORS AFFECTING SCIENTIFIC RESEARCH
ACTIVITIES FOR QUALITY ASSURANCE OF VIETNAM UNIVERSITIES

Step 1: From the research problem, the authors synthesize theories related to scientific research activities; The authors review the studies related to previous research in Vietnam and the world by Brew & Lucas (2009).

Step 2: Based on theoretical synthesis and review of related previous studies, the authors build the factors affecting scientific research activities to serve as data for discussion in the interviews with experts at the university in Step 3 by Brew & Lucas (2009).

Step 3: The authors use a qualitative method through interviews with experts who are knowledgeable in scientific research, precisely many university administrators of Vietnamese universities who are assessed as having the ability to do such resources, knowledge, and many

years of experience in the field of scientific research to exchange, interview and discuss to build a preliminary scale by Hair, Anderson, Tatham & Black (2010).

Step 4: The authors use a preliminary scale to randomly survey researchers (lecturers) at universities in Vietnam with a sample of 100 to perform the steps of reliability testing. Reliability of the scale to build an official ranking for the official survey for quantitative research. The authors conducted the official study by sending survey questionnaires with distributed 700 questionnaires and 645 votes collected. After screening the questionnaires and eliminating unsatisfactory responses (select only one rating level or leave it blank), the authors obtained 645 suitable responses and included them in the formal data analysis.

Step 5: The authors collected data and used SPSS 20.0 software to test the scale, explicitly trying Cronbach's Alpha preliminary scale to remove variables with a total correlation coefficient <0.3 . And analyze exploratory factor analysis EFA to remove variables with low factor load (<0.4) and Confirmatory Factor Analysis (CFA) by Hair, J., Anderson, Tatham & Black (2010).

Step 6: The authors design the official survey questionnaire and survey the official scale. The subjects are lecturers who are working at universities in Vietnam. The authors screened the survey results and performed Confirmatory Factor Analysis (CFA). It is to test the appropriateness of the scale.

Step 7: Besides, the authors aggregated reliability, extracted variance, convergent, discriminant. And the authors tested Structural Equation Modeling (SEM) and Bootstrap. Finally, the authors had conclusions & managerial implications by Harding (2013).

RESEARCH RESULTS

Testing the Cronbach's Alpha for Factors Affecting Scientific Research Activities (SRA)

| Code | Scientific Research Activities (SRA) | Cronbach's Alpha |
|-------------------------|---|------------------|
| SRA1 | You are satisfied with the finance, procedures for approval, and acceptance of the topic/project | 0.939 |
| SRA2 | You are satisfied with the motivation and research capacity of scientists | 0.890 |
| SRA3 | In general, you are satisfied with the facilities and working environment are recognized as factors affecting research activities | 0.950 |
| Cronbach's alpha: 0.950 | | |

Source: The authors processed by SPSS 20.0

Table 1 showed that Cronbach's alpha for scientific research activities (SRA) satisfied the technique's requirements. Specifically, Cronbach's alpha values of the scientific research activities (SRA) are 0.950, and Cronbach's alpha if item deleted (>0.6).

| Code | Financial Policy (FP) | Cronbach's Alpha |
|-------------------------|--|------------------|
| FP1 | The university has a policy for making budget estimates for the implementation of a topic or project | 0.946 |
| FP2 | The university has the reasonableness of the spending norms for the contents to implement the topic or project | 0.960 |
| FP3 | The university has timeliness in providing funding for the implementation of the topic or project | 0.959 |
| FP4 | The university has a financial policy for making payment for the implementation of the topic or project | 0.942 |
| Cronbach's alpha: 0.964 | | |
| Code | Approval Procedures (AP) | Cronbach's Alpha |

| | | |
|----------------------------------|---|------------------|
| AP1 | The university has the procedures for approval and acceptance of the topic/project | 0.944 |
| AP2 | The university has the criteria on transparency of the topic review process, continuously and throughout | 0.946 |
| AP3 | The university has the council for approval and acceptance of the topic/project has appropriate qualifications | 0.950 |
| AP4 | The university has the criteria for evaluating the topic/project are quantitative and transparent, and objective | 0.933 |
| Cronbach's alpha: 0.957 | | |
| Code | Scientist Motivation (SM) | Cronbach's Alpha |
| SM1 | Scientific research is both a mandatory task and a passion | 0.807 |
| SM2 | Scientific research is to improve professional qualifications and develop research capacity | 0.816 |
| SM3 | Scientific research is to increase income, improve prestige and teaching quality | 0.853 |
| SM4 | Scientific research is to review the work of emulation, commendation, title review, and promotion | 0.808 |
| Cronbach's alpha: 0.859 | | |
| Scientist Capacity (SC) | | |
| SC1 | Research knowledge of scientists includes many factors such as professional qualifications, experience, and research skills | 0.885 |
| SC2 | Research skills of scientists including computer skills, foreign languages | 0.838 |
| SC3 | The amount and time of work that the scientist needs to carry out project/topic | 0.897 |
| SC4 | Attitudes include enthusiasm, passion for science; sensitivity to happening events; objective, honest, seriousness; persistence | 0.864 |
| Cronbach's alpha: 0.900 | | |
| Research Environment (RE) | | |
| RE1 | Fully equipped facilities for researchers in terms of documents, databases, equipment and laboratories, working rooms | 0.950 |
| RE2 | Leaders concerned support and coordination of stakeholders to create the best conditions for scientific research | 0.952 |
| RE3 | documents and databases will provide the best sources of information for scientific research | 0.958 |
| RE4 | A good working environment is considered very important for research activities | 0.938 |
| Cronbach's alpha: 0.962 | | |

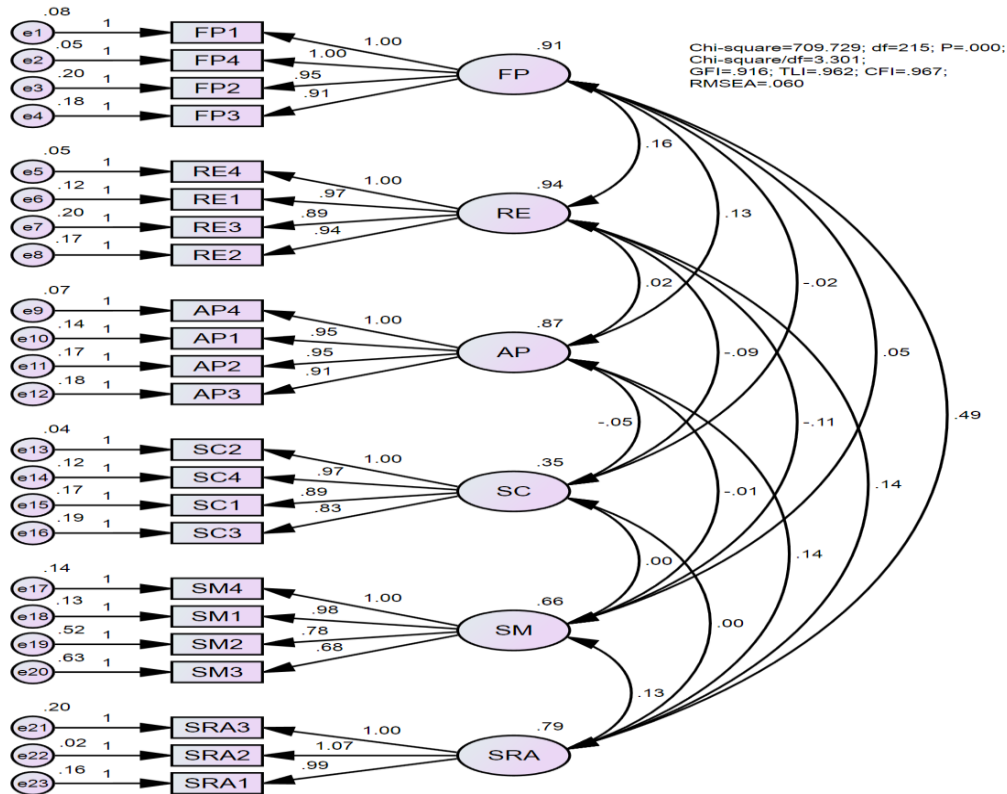
Source: The authors processed by SPSS 20.0

Table 2 showed that five of Cronbach's alpha is ≥ 0.6 . Cronbach's alpha if item deleted has a variable value from 0.0 to 1.0. The research results showed a total correlation coefficient is ≥ 0.3 . Cronbach's Alpha coefficient is ≥ 0.6 that satisfied the requirements of reliability.

| TABLE 3 | | |
|---|--------------------|-----------|
| KMO AND BARTLETT'S TEST FOR FACTORS AFFECTING SCIENTIFIC RESEARCH ACTIVITIES FOR QUALITY ASSURANCE OF VIETNAM UNIVERSITIES | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.836 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 15271.062 |
| | df | 253 |
| | Sig. | 0.000 |
| Extraction Sums of Squared Loadings: Cumulative is 84.973 % | | |

Source: The authors processed by SPSS 20.0

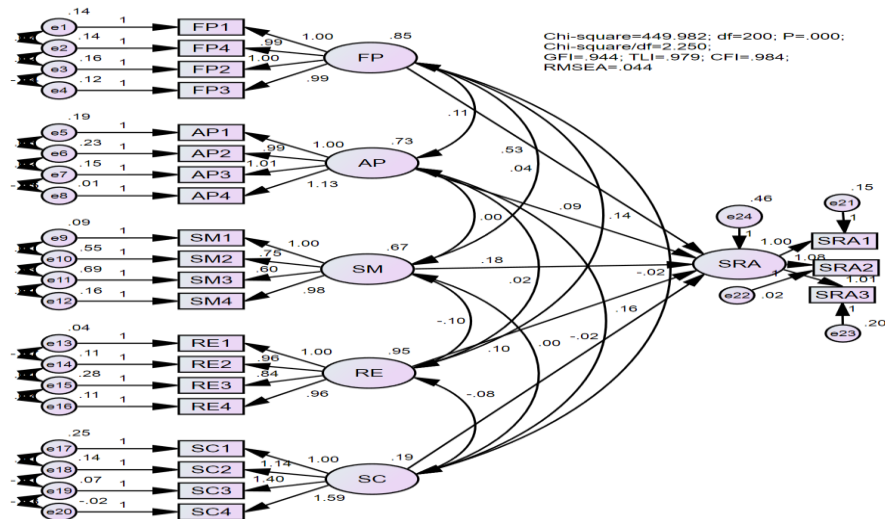
Table 3 showed that the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) is 0.836 (>0.5). This result is consistent with the actual data investigated by 700 scientists working at many universities in Vietnam. There are the extraction sums of squared loadings for cumulative is 84.973 %.



Source: The authors processed by SPSS 20.0 and Amos

FIGURE 3
TESTING CONFIRMATORY FACTOR ANALYSIS (CFA) FOR FACTORS AFFECTING SCIENTIFIC RESEARCH ACTIVITIES FOR QUALITY ASSURANCE OF VIETNAM UNIVERSITIES

Figure 3 showed that the assessment of the scale of the scientific research activities for quality assurance of Vietnam universities including: CMIN/DF=3.310 (<5.0), GFI=0.916 (>0.8), TLI=0.962 (>0.9), CFI=0.967 (>0.9) and RMSEA=0.060 (<0.08).



Source: The authors processed by SPSS 20.0 and Amos

FIGURE 4
TESTING STRUCTURAL EQUATION MODELING (SEM) FOR FACTORS AFFECTING SCIENTIFIC RESEARCH ACTIVITIES FOR QUALITY ASSURANCE OF VIETNAM UNIVERSITIES

| Relationships | | | Unstandardized Estimate | Standardized Estimate | SE. | CR. | P | Results |
|---------------|------|----|-------------------------|-----------------------|-------|--------|-------|----------|
| SRA | <--- | FP | 0.534 | 0.559 | 0.034 | 15.778 | *** | Accepted |
| SRA | <--- | AP | 0.094 | 0.092 | 0.033 | 2.901 | 0.004 | Accepted |
| SRA | <--- | SM | 0.184 | 0.171 | 0.037 | 4.932 | *** | Accepted |
| SRA | <--- | RE | 0.099 | 0.109 | 0.030 | 3.306 | *** | Accepted |
| SRA | <--- | SC | 0.159 | 0.078 | 0.059 | 2.693 | 0.007 | Accepted |

Source: The authors processed by SPSS 20.0 and Amos

Table 4 showed five factors affecting the scientific research activities for quality assurance of Vietnam universities with a significance level of 0.01. Five factors including Financial Policy (FP), Approval Procedures (AP), Scientist Motivation (SM), Scientist Capacity (SC) and Research Environment (RE). CMIN/DF=2.250 (<5.0), GFI=0.944 (>0.8), TLI=0.979 (>0.9), CFI=0.984 (> 0.9) and RMSEA=0.044 (<0.08).

| Parameter | | | SE | SE-SE | Mean | Bias | SE-Bias |
|-----------|------|----|-------|-------|-------|--------|---------|
| SRA | <--- | FP | 0.046 | 0.001 | 0.535 | 0.001 | 0.001 |
| SRA | <--- | AP | 0.045 | 0.001 | 0.085 | -0.010 | 0.001 |
| SRA | <--- | SM | 0.041 | 0.001 | 0.175 | -0.010 | 0.001 |
| SRA | <--- | RE | 0.027 | 0.001 | 0.096 | -0.003 | 0.001 |
| SRA | <--- | SC | 0.057 | 0.001 | 0.150 | -0.009 | 0.002 |

Source: The authors processed by SPSS 20.0 and Amos

Table 5 showed that the bootstrap test results are very good with a sample of 30.000 for the scientific research activities for quality assurance of Vietnam universities with a significance level of 0.01.

CONCLUSION & POLICY IMPLICATIONS

Conclusion

Universities are places for training and fostering human resources at the graduate and postgraduate levels and scientific research institutions. Scientific research activities of universities are directly involved in improving the university's quality of education and training work. Therefore, improving the quality of scientific research activities is a regular requirement of universities to perform their functions and tasks well. The management of scientific research has a significant meaning in deciding on the steps. At the same time, scientific research is also the need of lecturers to build and perfect the worldview, scientific methodology towards building and perfecting the quality, personality, and competence, working in the process of teaching and learning at university. The article is to identify the factors affecting the scientific research activities to serve the quality assurance with one percent significance. The paper was applying Structural Equation Modeling (SEM). Finally, the authors had policy recommendations to enhance the scientific research activities to improve universities' quality assurance in Vietnam.

Policy Implications

Scientific research at universities is a significant and practical activity to improve universities' quality of education and training. Scientific research activities were established as substantial contributions. The article outlines the current status of scientific research activities, thereby proposing some policy implications to improve scientific research activities at universities following.

(1) Policy implications for improving the financial policy (0.559). The universities should continue developing a mechanism to manage the efficiency of the monetary policy for scientific research tasks. The universities must derive from the educational, training, and scientific research tasks of universities, closely following the scientific research orientations of the Ministry of Education and Training, identifying key, short-term and long-term objectives. Besides, the universities decide on goals of scientific research tasks associated with educational and training functions, which do not overlap with duties assigned by superiors. Together with the university's functional agencies, the Science and Training Council develops and organizes scientific research tasks within the scope of their management. Agencies and faculties directly manage scientific research tasks associated with their functions and duties, assign responsibilities to monitor, urge and inspect the performance of scientific research tasks. Finally, the universities should clearly define the priority scientific research tasks at all levels, focusing mainly on applied scientific research tasks, stemming from the university's political mission requirements as teacher education, education, training, and scientific research. Implement a coordination mechanism with other universities in the entire implementation process from identifying tasks, implementing forces, selecting, organizing, evaluating, and putting research results into practice.

(2) Policy implications for improving the scientist motivation (0.171). The universities increase the scale and scope of ensuring information sources in scientific research activities; guide how to effectively exploit information sources for teaching and scientific research for officials, lecturers, students. Increase investment in building university libraries that are modern in terms of equipment and rich in documents; improve the quality of management and exploitation. Arrange and classify appropriately to help officials, lecturers, trainees, and students convenient in searching and exploiting. There is coordination in supplementing documents between universities and large scientific libraries, sharing data and information in document exchange, interlibrary lending, and complimentary coordination. Ensure regular dialogue and cooperation between libraries of domestic universities and libraries of foreign universities. Finally, to promote scientific research in universities, policies and institutions also need to innovate to remove administrative barriers to reduce paperwork time, creating motivation to attract people. It is necessary to ensure fairness and transparency in reviewing research topics and reviewing the acceptance process with research efficiency. Improve the procedure for reviewing issues in annual ordering and linking user units such as enterprises, organizations, and research institutions.

(3) Policy implications for improving the research environment (0.109). The universities should improve the efficiency of management of the scientific potential of universities, strictly manage and promote the effectiveness of human scientific resources, facilities, and equipment for scientific research activities and learning. Besides, firmly grasp the quantity and quality of human scientific resources and the requirements of human scientific resources of universities, well perform the planning and selection of human scientific resources to meet the development of the task situation. Teaching, scientific research, and university construction services, focusing mainly on the university staff and lecturers, ensure succession, connection, and continuous development. Finally, the universities regularly educate to raise awareness about the role and value of facilities, equipment, and means to ensure scientific research tasks, actively research. Besides, the universities apply and promote effectively and raise a sense of responsibility for preserving and preserving facilities and equipment, ensuring good, durable, safe, and economical use to reduce unnecessary costs while still achieving efficiency of scientific research

in the future. Closely combine physical facilities and technical equipment in service of education and training tasks with scientific research.

(4) Policy implications for improving the approval procedures (0.092). University leaders need to consider "hard" and "soft" policy mechanisms for lecturers. The "hard" policy mechanism on scientific research, such as specific regulations on the duration of scientific research for lecturers, is transparent so that lecturers can see that scientific research is still the responsibility and obligation of the lecturer, not research to deal with school regulations. Combined with a "soft" policy mechanism to encourage lecturers to participate in scientific research with real passion, not research for the sake of formality or honor. There is a reward system in kind and cash for lecturers who actively participate in scientific research, especially lecturers whose works are published in prestigious international and domestic journals. For prestigious journals, usually, the number of publications in the year will not be many. The quality of review is good, the cost of publication is very high, creating difficulties in research, leading to lecturers being easily discouraged, gave up their research. Therefore, university leaders need to have a mechanism to support lecturers in pursuing scientific research.

(5) Policy implications for improving the scientist capacity (0.078). The universities should develop information technology infrastructure as a basis for digitizing document sources. Based on the system of existing facilities combined with new and modern invested equipment for improving scientist capacity. The universities need to build an integrated database for all library activities, using the latest achievements of the information technology industry, especially internet technologies, improving the quality of the document capital, and developing modern library information services. At the same time, fostering, training, and retraining librarians to meet the requirements of their tasks, especially in information technology, knowledge of information-library services, and foreign languages. Besides, scientific research activities are meaningful and play a significant role in the scientific research mission of universities. So, it must be paid regular attention and constantly improving efficiency, focusing on accessing and updating national and international scientific management achievements. Regularly review practices, enhance the level and efficiency of scientific research management, contribute to promoting scientific research activities of universities to gradually develop, stabilize, and become a more orderly positive impact on the completion of each university's educational and training mission.

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