

Research article

AN ANALYSIS OF MANPOWER IN VIETNAMESE UNDERGRADUATE EDUCATIONAL SYSTEM

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ABSTRACT

One reality existing in Vietnam is that the outnumbered Bachelor lecturers to other higher level ones. By the time, students entering colleges and universities are steadily increasing. The Ministry of Vietnamese Education and Training (MOET) update the statistics about manpower in undergraduate educational system every year. This study uses their statistics from 1999 to 2011 and applying Grey Model to forecast, this study can do calculation and analyses to have the valuable results. The researchers also apply The Mean Absolute Percentage Error (MAPE) and then construe the trending of faculties and students in all Vietnamese universities. In the discussion session, this research provides a lot of suggestions

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towards the results, analysis and calculation with the support to the MOET, so that they can prepare some kinds of suitable plan in the future. **Copyright © IJEBF, all rights reserved.**

Keywords: Vietnamese Education, Manpower, Grey Forecasting, Grey Model, Faculties and Students.

INTRODUCTION

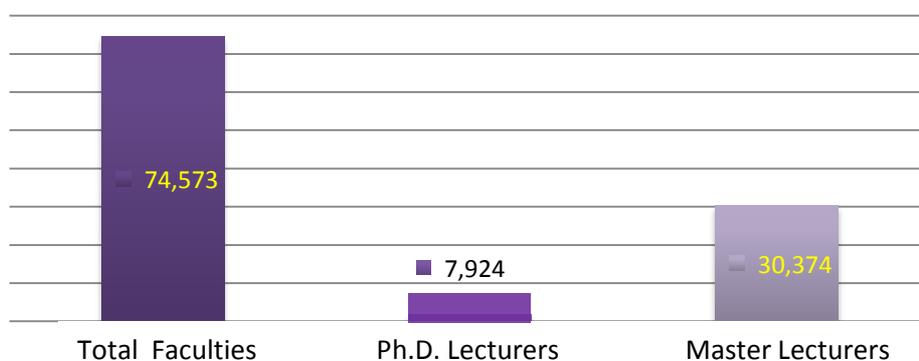
The number of students and faculties is the important factor and not a substitute in any professional education to make this trend become more efficient and globally. Vietnamese education has stepped up in the general development of the whole country since the reform and opening up, which has seemed to be a major contribution to the dissemination and development of society and economy, and improvement in quality.

A lot of studies in the world have been done recently with conscious activities to reveal the nature and the law of higher education, and from that, our society, economy and education can benefit. For example, Trends in Global Higher Education: Tracking an Academic Revolution - A report prepared for the UNESCO World Conference on Higher Education by Altbach, (2009). Another example is the contribution to the Chinese Education system -- Grey System Research on Influencing Factor and Forecast of Scale of Chinese Ordinary Higher Education from Li, (2009). However, researches about tertiary institutes are something new to Vietnam. It is shown that there are lacks of positive researches with single and simple research methods. This is one of the reasons – lack of materials published by Vietnamese educational system, especially detailed studies or even yearbooks. In fact, the Ministry of Education and Training of Vietnam post in their website raw statistics about the number of students and faculties in the recent years. Thus, now is the time to apply the exact methodology for expanding the thinking of higher education researches.

Of the total faculties to Altbach et al. (2009), only 9% of the Chinese academic experts are doctors, whereas 35% in India. Also in Altbach et al. (2009), they figured out that up to 50% of the world's university faculties are Bachelors. About Vietnamese circumstances, by 2011, there were 74,573 lecturers totally, just 7,924 PhDs and 30,374 Masters – shown in Figure-1. From this figure, the Bachelors are outnumbered to the others. This can cause education and training poor, according to Associate Professor Vo Van Sen - President of Social and Human Sciences University. He also stated that one of the weaknesses of Vietnam's education system is a crisis for lack of teachers and qualified people. "Students" is another element, because every year, a huge numbers of freshmen (Figure-3) enter universities to pursue their goals of achieving academic knowledge. As shown in Figure-2 (official data from MOET), 2,162,106

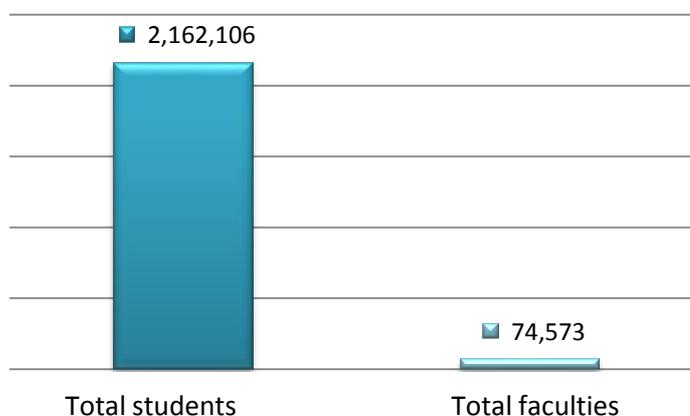
tertiary students compared to only 74,573 faculties in Vietnam by 2011. To have the numbers for the future is a significant goal of this research as the calculation can be applied by the Ministry to the change in the numbers of students and faculties in universities. Whenever the good forecast is applied, it is easier to build the strategy. This study will figure out the isuch strategies which are how to prepare for the huge flow of students annually, and how to supply the mean faculties and facilities. More than that, lecturers play a central role, so to standardize the numbers between students and lecturer is the contribution for the Ministry to consider and solve out some problems in order to minimize the ratio between students per a teaching staff into the ideal digit.

Figure-1. The Total Faculty; PhDs and Master Lecturers in 2011, Vietnam



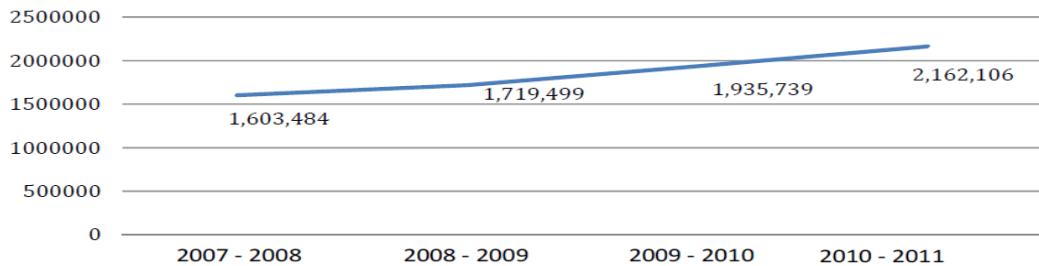
Source: The Statistics of Ministry of Vietnamese Education and Training (2011)

Figure-2. The Total Number of Students Compared with the Total Faculty in 2011, Vietnam



Source: The Statistics of Ministry of Vietnamese Education and Training (2011)

Figure-3. The Total Numbers of Students (Colleges and Universities) in Recent Years, Vietnam



Source: The statistics of Ministry of Vietnamese Education and Training (2011)

With all the above facts and reasons, Grey Model developed by Professor Deng Julong in 1982 is suitable for this research to solve the matter of less data, poor information and uncertainty (Liu et al. 2004) to perform analysis of the positive trend of students and faculties in Vietnam from 2007 to 2011, and to do forecast up to 06 years from 2012 to 2017. Three issues raised and addressed in this article: firstly, it applied Grey Forecasting Model to do some analyses around the predicted numbers of students, and then to estimate the equilibrium ratio of students and university lecturers; secondly, this paper figures out a very urgent concern and importance which is outnumbered bachelor others, and finally, the solution to achieve a team of highly qualified teachers.

Important Reasons to Apply Grey Model

Gu and Xu (2009) stated that many complex or even hard-to-solve problems in education can be made clear, a deeper understanding of the problems involved during the calculation of the some may be solved with the help of the emerging field of research. Furthermore, a critical and unsolved problem of Vietnamese educational system is to forecast the manpower requirement by applying a particular method. This approach is consistent with the trend of the digits, and also opens up a new perspective for forecasting human resource issues related to the above figures in Vietnam's education system. In reality, the numbers of faculties and students in Vietnam fluctuations uncertainty complicated by many factors, such as education policies, research institutes, salary issues, and the brain drain in the technology, the number of students' recruited fluctuations, and the university places means many big cities and back to the suburbs. Therefore, the application of this method is appropriate to study and find

solutions for the future of general manager for the education system is based on the predicted numbers in the future.

CASE ANALYSIS

Data source

This study takes the adopted data from the official website of Vietnam Ministry of Education and Training. MOET update the real numbers of Vietnamese students and lecturers every year. After that, based on the goals and contributions of this paper, the statistics are detached into two main sections: students in universities and teaching staff in universities.

Two types of higher education: full time – day time program (4-5 years); in-service – night time education (students working and studying at the same time); and the total of these numbers are listed separately for easy reviewing and understanding. PhDs, Masters, Bachelors and other degrees teaching staff are mentioned in table 2. After the data are collected, this study uses them to have some calculating samples applying grey forecasting developed by Deng (1982).

Accuracy Inspection Analysis of Forecasting Ability

So far, numerous methods exist for judging forecasting model accuracy, and no single recognized inspection method exists for forecasting ability. Mean Absolute Percentage Error (MAPE) is often used to measure forecasting accuracy (Teng and Huang, 2009). In the book of Stevenson (2009), it stated out clearly MAPE is the average absolute percent error which measures of accuracy in a fitted time series value in statistics, specifically trending

(Stevenson, 2009).
$$MAPE = \frac{1}{n} \sum \frac{|Actual - Forecast|}{Actual} \times 100$$
; nForecasting number of step. The parameters of MAPE stating out the forecasting ability as follows:

- MAPE < 10% says “*Excellent*”
- 10% < MAPE < 20% “*Good*”
- 20% < MAPE < 50% “*Reasonable*”
- MAPE > 50% “*Poor*”

This paper tests the ability of forecasting of Grey Model, so this part calculates the errors of the process. Table 1 shows the range of these errors from 0.09% to 4.46%, forecasting ability.

Table-1. Calculating Process of MAPE

Period	Actual	Forecast	Error (A-F)	Error	$\frac{[\text{Error} \div \text{Actual}]}{\times 100}$
1	893,754	893,754	0	0	0.00
2	918,228	892,763	25,465	25,465	2.77
3	974,119	973,255	864	864	0.09
4	1,020,667	1,061,005	-40,338	40,338	3.95
5	1,131,030	1,156,666	-25,636	25,636	2.27
6	1,319,754	1,260,951	58,803	58,803	4.46
7	1,387,107	1,374,639	12,468	12,468	0.90
8	1,540,201	1,498,577	41,624	41,624	2.70

$$MAPE = \frac{1}{n} \sum \frac{|\text{Actual} - \text{Forecast}|}{\text{Actual}} \times 100 = \frac{17.14}{8} = 2.14\%$$

MAPE is just 2.14% for the 8-period process, so this is a good method for forecasting.

FINDINGS AND DISCUSSIONS

Results

This section shows the analyzed numbers of students and teaching staff through the academic years from 2007 to 2011. In addition, table 5 values out the predicted digits in the period of 6 years from 2011 to 2017 (the newest data from the MOET are updated). Not only the forecasted values but also the irrational numbers of students and faculties are rising. This research finds out that the small parameters of error through calculation, which are in 2011-2012: 6.97% for total students; 4.25% for PhDs; 4.21% for Masters, and 4.72% for Bachelors.

Trending for Development

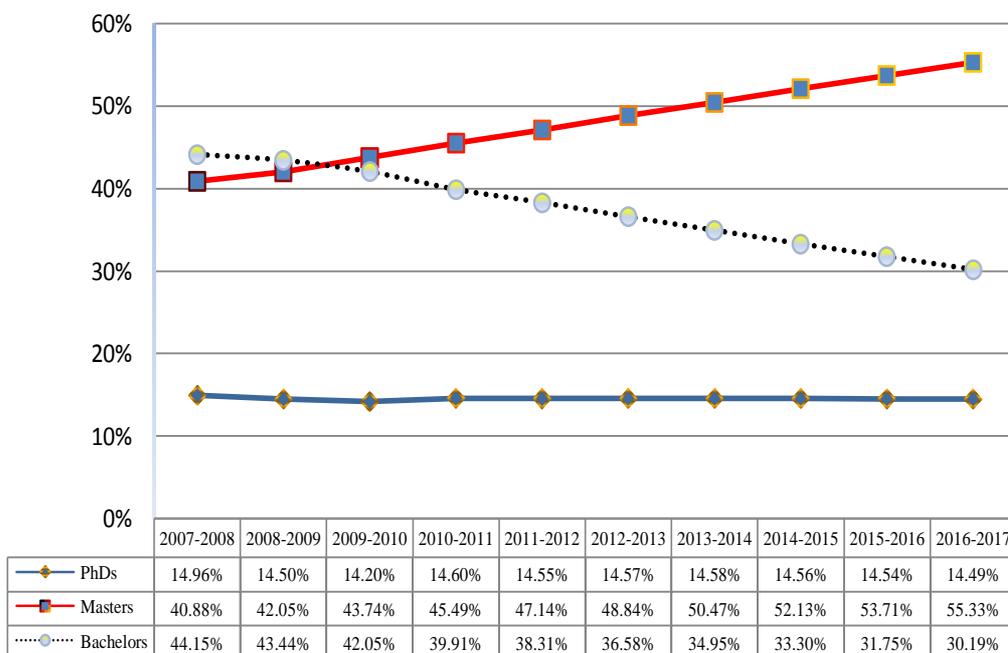
The trend of recent years and six predicted-number years are mentioned in the line graph below. Firstly, Ph.D. lecturers gain the whole percentage of around 14.20% in the earlier and 14.96% in the later. There is an observation to see the steady rise of Masters showing: at only 40.88% in (2007-2008) to 55.33% in (2016-2017) as forecasted. By that time, Bachelor lecturers, in general have been going down so clearly just by comparison with the Masters to be -3.27 (40.88% for Masters and 44.15% for Bachelors) in 2007-2008; and after 10 years it will be +25.14 (55.33% Masters and 30.19% Bachelors). Obviously, this seems to be a good trend for future as the high level of lecturers are going up; by the way, PhDs is also important to raise the percentage of this group.

Table-2. The Results of Forecasting with Updated Data

Academic years	Forecasted by Grey Model				Updated Data (Sept. 11, 2012)*			
	Total students	Faculties			Total Students	Faculties		
		PhDs	Masters	B.A/B.S		PhDs	Masters	B.A/B.S
2011-2012	1,548,994	8,157	26,433	21,483	2,20,313	9,152	36,360	22,889
2012-2013	1,663,581	9,125	30,590	22,912	--	--	--	--
2013-2014	1,785,345	10,186	35,262	24,422	--	--	--	--
2014-2015	1,917,087	11,388	40,768	26,043	--	--	--	--
2015-2016	2,057,203	12,707	46,956	27,757	--	--	--	--
2016-2017	2,208,734	14,202	54,246	29,597	--	--	--	--

*Updated Data Source: The Statistics of Ministry of Vietnamese Education and Training (Sept., 2012). *These are not mentioned in the time of doing this paper (Oct., 2011 – June, 2012)*

Figure-3. The General Trend in Recent School Years and Next Six Years as Predicted



Students-per-Faculty Ratio

The ratios are mentioned as a significant role in the Vietnamese education system, and in this thesis, because it shows that the educational institution Vietnam have good ones in the near future. “The trend to have 450 students among 10,000 citizens, but this trend has to be adjusted to acquire the quality in education, due to the fact. The number of lecturers is not enough; socialized speed is not reached, and the potential of investment on education and training is limited so that we cannot make into the quantity only” said Mr. Bui Van Ga – Vice Ministry of Vietnam Ministry of Education and Training. Vietnam is trying to reduce the ratio between students and teachers, therefore, the number of students focused not overrated.

$$\text{Total in (2007-2008): Ratio: } \frac{\text{Students}}{\text{Teachers}} = \frac{1180547}{38217} = 30.891$$

Table-3. The Ratio of Student per a Lecturer by the Academic Years

School Years	Total Students	Total Lecturers*	The Ratio = $\frac{\text{Students}}{\text{Lecturers}}$
2007-2008	1,180,547	38,217	30.891
2008-2009	1,242,778	41,007	30.306
2009-2010	1,358,861	45,961	29.566
2010-2011	1,435,887	50,951	28.182
2011-2012**	<i>1,548,994</i>	<i>56,073</i>	<i>27.625</i>
2012-2013	<i>1,663,581</i>	<i>62,627</i>	<i>26.563</i>
2013-2014	<i>1,785,345</i>	<i>69,870</i>	<i>25.552</i>
2014-2015	<i>1,917,087</i>	<i>78,199</i>	<i>24.515</i>
2015-2016	<i>2,057,203</i>	<i>87,420</i>	<i>23.532</i>
2016-2017	<i>2,208,734</i>	<i>98,045</i>	<i>22.528</i>

*Lecturers with other degrees are in small in numbers so it does not effect to the results (around 1%)

** Numbers in italics are forecasted.

In table 3, a clear calculation was shown that the ratio of students per a lecturer in the whole period. Apparently, (2008-2009) was 30.306, and 29.565 and 28.182 for (2009-2010) and (2010-2011), respectively. The forecasted digits give out the ratio of from 27.625 (2011-2012) to 22.528 (2016-2017). One lecturer now on to the future can control themselves by the number of students in one classroom, which occurs to be 22 to 30.

The Discussions of the Results

It is steady to forecast the numbers from the list of calculated results as arranged. These digits show the two main factors that have an impact on the development scale around the adult higher education in Vietnam are (1) how the Vietnamese people pay for the tertiary and (2) the society's education structure, whereas the minor ones are the demographic structure of society, the employment structure of society, and the level of economic development.

We consider some of the following significant information before complementing the next analysis.

1. Because of education structure, Vietnamese society now highly appreciates the well-educated applicants. People who accomplish tertiary education have priorities to be accepted by non-school-age faculty with not-high-levels of education in order to get the improvement in their educational level and meet the social requirements.
2. The high-level-educated people can get better salary and this leads to the priority on investing money for better education.
3. Tertiary education plays a good part in the quick development of Vietnamese society and economy, which was demonstrated by the macroscopic view towards the demographic structure, the working environment structure of society and the developing economy.

We can improve the tertiary education's quality if the new training technology and creativity method can be applied. The total number of students in the recent 12 years has increased 2.5 times – from 893,754 in 1999 to 2,162,106 in 2011, especially the change has become faster. However, the teaching staff in 2011 was only 74,573 (1) so the ratio of students per faculty in the country has been at around 28. Moreover, some universities have the bigger digit, up over 100 (2). Our education managers have worried over the above figures while the disagreeable arguments on managing quantity have been made by public.

Suggestions and Conclusions

Nowadays people can interact with diversified cultures and economies in which they can easily access to advanced knowledge and new learning methodology. However, the opportunities are not equally divided to everyone. Oversea students are less than domestic students in very few times. In addition, in economic side, foreign education organizations are

rushed to recruit Vietnamese students for the profitable amount of tuition, and a large number of precious human resources will choose to continue living and working abroad after graduation. That's really a shortage of talents. For these disadvantages, it can be solved by attracting foreign investors on education. These organizations will help Vietnam to build more modern scientific research institutions, schools and facilities for higher learning. After complementing the project of attracting foreign investor, our lectures and students can do the research at their homeland, so it helps to prevent the brain drain and expensive cost.

To conclude, it is necessary to mention some significant factors influencing to the development of tertiary education. These facets are the social educational structure, the eager and affordability to get higher education of the Vietnamese, the recent growth of social economy and infrastructure. This research, as with any studies, is not without limitations. This study is limited because of weak data about higher education, and this leads to some errors. The problem of data for higher education can be solved in further researches, in the mean time of improving the reliability of application Grey Forecasting. At last, the author, with this research method, hopes to bring good strategies to make good progress for Vietnam Education System.

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