EMPIRICAL DETERMINATIONS OF FEMALE ENROLMENT TRENDS IN TRADITIONAL VERSES NON-TRADITIONAL FIELDS OF STUDY IN PAKISTAN

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Abstract

Globally, since 1970, positive trends in tertiary education in relation to female enrolment have been observed. Today, at tertiary level female students are much more or close to men in terms of talent and performance. However, female enrollment remains strikingly low in science and technology and a clustering of female students are found in the traditional female field of study. High female representations as engineers, scientist, professors, vice-chancellors, directors of finance, doctors and auditors would also be beneficial for the economy of a country and also for female themselves because having better professional positions in all the fields of life will enhance their economic contribution and upgrade their status in society (Bell, 2009). However, female enrolment is very low in non-traditional courses such as in finance, business, management, law, engineering and technology. Consequently, female representation is observed to be poorest in male dominated professional fields such as engineering and banking. However, female representation is found to be comparatively better in traditional subject based institutions such as in medical universities. Therefore, more female representation is observed as doctors, nurses and teachers. These trends persist all over the world, including Pakistan. There are various direct and indirect factors supposed to be responsible for limited access females have to study and professional fields. Therefore, through data analysis, this research paper focuses to present female enrolment trends in both traditional and nontraditional courses during previous years in Pakistan. This research study also identifies the causes and socio-economic obstacles which deprive females of

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their right to get education in all fields of study and restricts their access to few professional fields in this modern era.

Key Words: *Male, Female, Traditional Courses, Nontraditional Courses, Profession, Enrolment Trends*

Introduction

Females' impactful and productive economic contribution can be achieved through enlarging their proportion in all professional fields (European Commission, 2009). However, females have limited access to few fields of study and are poorly enrolled in nontraditional or male dominated fields of study (such as finance, management, engineering & technology). Consequently, in this modern era, females are not able to broadly take part in all economic sectors which in turn affects their socio-economic status in society. Therefore, this study intends to present female enrolment trends in traditional and non-traditional fields of study and find out major impediments towards their full contribution in all professional fields in Pakistan. This research study has four components. The first component gives introduction; second component provides the review of literature. Third component highlights research methodology of this study. The fourth part presents the findings, conclusions and recommendations.

Conceptualization

Women are actively involved in all sectors of economy of the world and are performing various tasks to achieve but they have poor participation in male dominated professional fields. According to European Commission Justice (2011) in most European Union member states, women make up nearly half the workforce and more than half of new university graduates but participate poorly in many male dominated professional positions. World Economic Forum (2011) reported that female representation as senior officials,

managers and legislature in Canada, China, Japan, Saudi Arabia, India and in Pakistan is 36 percent, 17 percent, 10 percent, 9 percent, 7 percent, 3 percent and 3 percent respectively.

According to United Nations Educational, Scientific and Cultural Organization Institute for Statistics (2011) female representation as teaching faculty at university level in Central Asia, Central Eastern Europe, East Asia & Pacific and in South & West Asia is 53 percent, 50 percent, 39 percent, 36 percent respectively. Females' high contribution in all professional fields also depends on their enrolment in traditional and non-traditional courses. United Nations Educational, Scientific and Cultural Organization, (2010) reported that at tertiary level, gender gap in favor of males is more widely pronounced in non-traditional or male dominated fields of study (including Engineering, Commerce etc) without any prominent difference between developed and underdeveloped countries. Table 1 demonstrates that female students are not evenly distributed regarding study fields. Data reveals that subject education is most popular with female students in most countries. In contrast, females are least likely to graduate in the fields of engineering, manufacturing and construction. Furthermore, a mix of patterns is found in the fields of science and social sciences, business and law.

Table-1: Female Graduates by Country and by Fields of Study (%) n = 13

Countries	Education	Arts & Humanities	Science	Engineering, Manufacturing & Construction	Health & Welfare	Social Sciences, Business & Law
Bahrain	48	85	73	26	83	71
Oman	65	88	64	25	78	59
Iran	70	68	69	27	72	53
Turkey	57	54	44	23	66	47
Ethiopia	15	22	18	14	24	23
Australia	74	64	36	24	77	54
Japan	75	69	26	12	63	38
Austria	78	66	33	19	68	57
France	71	71	36	23	73	63
Spain	82	61	36	27	78	63
Switzerland	71	61	28	13	78	47
United Kingdom	75	62	38	21	80	56
United State	78	59	41	19	82	56

Source: United Nations Educational, Scientific and Cultural Organization Institute for Statistics (2010), pp.182 to 191

According to Federal Bureau of Statistics of Pakistan (2011), female enrolment in medical and education courses has become encouraging (i.e. 57 percent and 71 percent respectively) but remains low in engineering and technology (i.e. 15 percent). This led to poor female representation in the fields of engineering and technology and comparatively better female representation in medical & health sector. Clustering of females into traditional fields of study accentuates their limited access into labor market or keeps them from working side by side with men in all professional positions (such as engineers, finance managers, etc) . According to Hill et al., (2010) female self interest in particular fields (including education, medical etc) and cultural norms (such as parents believe that girls

have to avoid male dominated fields) are the major factors for low female enrolment in certain fields of study (engendering, commerce etc). According to the Economic Survey of Pakistan (2010-11), 55 percent Pakistani women are illiterate. On other side in Pakistan, proportion of girls that completes their primary and secondary education is not satisfactory. This keeps away large proportion of the 18 to 23 years old female to reach at university level or to earn higher education degree. Females' limited access at higher education level makes them under represented for better employment positions. Furthermore, socio-economic norms and religious beliefs undermine women's education and prevent them from working at key decision making positions.

This opens the area to investigate female enrolment trends in traditional and non-traditional courses and to find out major hurdles that limit their access to few professional fields.

Methodology

This research study focuses on examining female participation trends in traditional and non-traditional courses in Pakistan. Therefore, secondary data was collected on parameter: female enrolment into traditional courses (such as medical & teaching) and non-traditional course (such as Engineering and Commerce) in professional colleges in Pakistan. This research study is based on secondary data therefore annual time-series data was collected from the website of State Bank of Pakistan, Federal Bureau of Statistics of Pakistan and Economic Surveys of Pakistan. In order to measure the comparative progress in female enrolment in traditional verses non-traditional course, Ordinary Least Squares (OLS)[§] was applied.

[§] In statistics, ordinary least squares (OLS) or linear least squares are a method for estimating the unknown parameters in a linear regression model.

Statistical Package for Social Sciences (SPSS)** and MS-Excel were used to analyze the data and to present the findings. The findings of this study would provide numerical facts about the trends regarding female motivation in traditional verses non-traditional courses, which help to generate compatible initiatives to overcome the hurdles particularly in the direction of female contribution in male dominated professional fields of study and to improve female's professional standing in the country.

Results and Findings

In Pakistan, female's preferred field of study at tertiary level is an important issue because gender gap in favor of males is more widely pronounced in male dominated fields of study (including engineering, commerce and mathematics etc). Figure 1 shows female enrolment trends into non-traditional courses (such as engineering and commerce) in Pakistan. Data indicate that during previous years, females improved their relative positions within commerce and engineering fields. However, these fields are still deemed as male dominated areas. According to Pakistan Education Statistics (2010-11), in Pakistani society where parents believe that their daughters have to choose that subject and profession in which females are in majority in order to have minimum contacts with male counterparts therefore, female participation is limited in fields of study usually reserved for males. According to Iqbal et al., (2014) and Singh (2002), establishment of separate female professional colleges and universities supposed to be a step towards encouraging more female participation in male professional fields.

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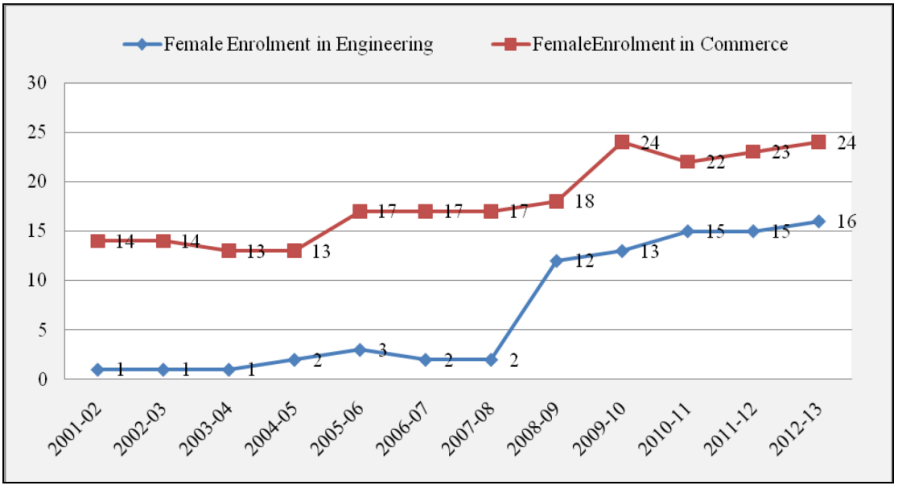
** The Statistical Package for the Social Sciences (SPSS) is a software package used in statistical analysis of data

Figure-1: Female Enrolment Trends In Non-Traditional Course in Pakistan n=12



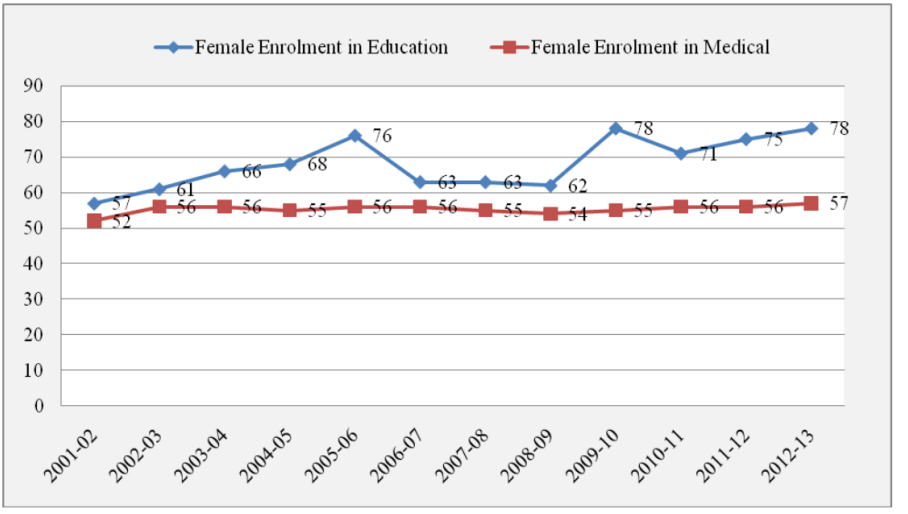
Source: Federal Bureau of Statistics of Pakistan, 2013 & State Bank of Pakistan[††] 2010

Figure 2 shows female enrolment trends into traditional courses[‡‡] (such as medical & education) in Pakistan. Comparative analysis of figure 2 with figure 1 indicates that female enrolment in selected traditional courses is much higher compared to selected non-traditional courses. On other hand, female representation in selected traditional courses remains higher than male one. In selected traditional fields females are in majority because this results in minimum contacts with male counterparts therefore, clustering of females is found in education and medical fields.

[††] The State Bank of Pakistan (SBP) is the central bank of Pakistan, carry out monetary and credit policy in accordance with Government targets.

[‡‡] Course in which female enrolment remains more than 40 %.

Figure-2: Female Enrolment in Traditional Courses in Pakistan n=12

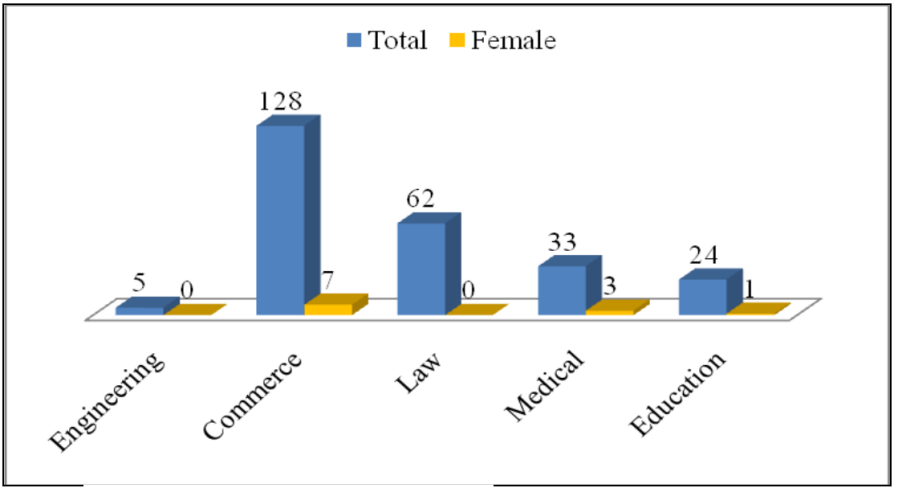


Source: Federal Bureau of Statistics of Pakistan, 2013 & State Bank of Pakistan 2010

A number of countries have encouraged the establishment of separate female professional colleges and assume that these separate female institutions are the important tool for enhancing female access in male dominated professional fields. Whereas, in a gender segregated society of Pakistan establishment of separate female professional colleges can play an integral role in improving female contribution to all economic fields and upgrade their socio-economic status in society. However, figure 3 highlights that Pakistan has insufficient number of separate professional colleges for females. Therefore, it is stated that paucity of separate female professional colleges is one of the major hurdles that limit female contribution in all economic fields in Pakistan. Government ignorance and lack of financial resources is the major cause of few separate female universities & professional colleges. According to Pervez (2009) when the neighboring countries of Pakistan, including India, are doubling the funds for higher education, Pakistan is even

slashing the higher education budget. Economic Survey of Pakistan (2010-11) reported that due to continued financial vulnerabilities, the Government of Pakistan has reduced development budget to Rs. 9.2 billion in 2010-11 compared to Rs.11.3 billion in 2009-10.

Figure-3: Separate Professional Colleges for Female in Pakistan (Numbers)



Source: Federal Bureau of Statistics of Pakistan (2013), p.124

Table 2 presents empirical results of simple liner regression models for selected non-traditional fields of study indicating that female enrolment in selected non-traditional fields has significantly increased. Whereas, comparative analysis of positive values of B-coefficients (i.e. for female enrolment trends in commerce verses engineering) indicate that predicted improvement in female enrolment in commerce (i.e. 1814.68 in model 2) by each passing year is higher as compared to female enrolment in engineering (i.e. 331.297 in model1) and compared to expected improvement in male literacy rate (i.e. 2.815). However, significant values of F-statistics (i.e. 20.95 & 28.73 for model 1 and model 2 respectively) and significant values of t- statistics (i.e. 14.19 and 5.360 for female enrolment trends in commerce and engineering respectively indicate

that the equation 1 and equation 2 both as a whole are statistically significant in explaining female enrolment trends in selected non-traditional fields[§§]. The values of R square (i.e. 0.72 for model 1 and 0.78 model 2) indicate that 72 percent and 78 percent of the variation in female enrolment trends in commerce and engineering respectively, is explained by these models.

Table-2: Empirical Results for Female Enrolment in Selected Non-Traditional Field of Study Pakistan n=12 Years (2001-02 to 2012-13)

Models	Variables		Statistical Measures			
	Dependent (Y)	Independent (X)	R^2	*F-Statistics*	*T-value*	*B-coefficient*
Model 1	Female Enrolment in Engineering	Years	*0.72*	20.95*	14.19*	331.297
Model 2	Female Enrolment in Commerce	Years	0.78	28.73*	5.360*	1814.68

Source: Federal Bureau of Statistics of Pakistan, 2013 & State Bank of Pakistan 2010

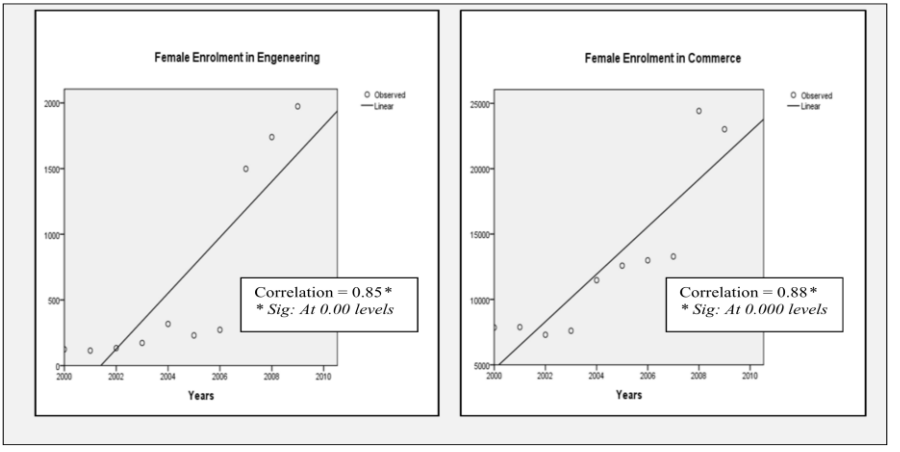
- *Sig: At 0.00 levels*
- R square shows the variation in dependent variable explained by independent variable
- T-statistics indicates that the independent variable has significant impact on predicting dependent variable
- F-test estimates the statistical significance of the regression equation

A simple linear regression presents the mathematical relationship between two quantitative variables, where dependent variable is predicted by using only one independent variable (Christopher, 2011). Figure 4 presents graphical outcome of regression for female enrolment in selected non-traditional fields of study (i.e. engineering

[§§] Course in which female enrolment remains less than 40 %.

& commerce) in Pakistan. Pattern of regression line and high positive values of correlation (i.e. 0.85 and 0.88 for engineering and commerce respectively) confirmed that female enrolment significantly has increased during past years in selected professional colleges in Pakistan.

Figure-4: Graphical Outcome of Regression for Female Enrolment in Selected Non-Traditional Field of Study in Pakistan n=12 Years (2001-02 to 20012-13)



Source: Federal Bureau of Statistics of Pakistan, 2013 & State Bank of Pakistan 2010

Table 3 shows statistical results for female enrolment in selected traditional fields of study in Pakistan. The small value of R^2 (i.e. 0.2 for female enrolment in education and 0.31 for female enrolment in medical) as well as low and insignificant values of F-statistics (i.e. 2.00 for female enrolment in education and 3.61 for female enrolment in medical) and T-values (i.e. 1.4 for female enrolment in education and 1.901 for female enrolment in medical) indicate that beside having high female participation in education and medical field (i.e. presented in figure 2), female enrolment in selected traditional courses (i.e. education and medical) in Pakistan has not significantly increased during past years in professional colleges.

Table-3: statistical Results for Female Enrolment in Selected Traditional Field of Study in Pakistan n=12 Years (2001-02 to 2012-13)

Variables	Statistical Measures			
Dependent (Y)	**Independent (X)**	R^2	***F-Statistics***	***T-value***
Female Enrolment in Education	Years	*0.2*	2.00*	1.4*
Female Enrolment in Medical	Years	0.31	3.61*	1.901*

Source: Federal Bureau of Statistics of Pakistan, 2013 & State Bank of Pakistan 2010

* *not Sig:*

Conclusions and Recommendations

It is concluded that females' full contribution in all professional fields is an effective source of female advancement and increasing opportunities for qualified females to work side by side with men in all professional field. However, in Pakistan and in many other countries of the world, females have limited access to few fields of study, which in turn negatively affects their contribution in male dominated professional fields. Results of the study confirmed that female enrolment ratio in traditional fields of study is still encouraging. On the other side, empirical results show that female enrolment in selected non-traditional fields of study has significantly improved during past decade in Pakistan. However, it is still very low and unsatisfactory. With particular reference of Pakistan, unsatisfactory status of girls' education and negative cultural norms constrain female contribution in non-traditional professional fields. In sex stereotyping society of Pakistan, establishment of separate non-traditional subject based female professional colleges can play integral role in order to promote job opportunities for females and their greater involvement and access to science and technology but paucity of female's universities,

professional colleges and insufficient funding to education sector are supposed to be major obstacles towards female contribution in male dominated professional fields.

It is recommended that education policy should be made more effective and its implementation be ensured for the improvement of the ratio of female enrolment in, both female-dominated traditional courses (i.e. medical, education, nursing etc.) and non-traditional courses (i.e. engineering, commerce, finance, management etc.). It is suggested that government need to increase its budget allocation on education sector and the numbers of separate female universities and professional colleges need to be increased for enlarging female contribution in all fields. There is need to arrange special lectures and seminars to create the awareness among female students at school level about the importance of non-traditional fields of study in their professional career advancement.

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