OBSTACLES TO THE GROWTH OF SMALL SOFTWARE FIRMS IN ISLAMABAD

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ABSTRACT

This study investigated the relationship between long terms obstacles and firm's labour productivity. A survey method was used to gather data from 69 small and medium-sized software firms in Islamabad region of Pakistan. Factor and multiple regression analysis were conducted to examine the relationship between obstacles and labour productivity. The results of the study reveal that small firms have higher labour productivity than large firms because of their internal flexibility. Nevertheless, obstacles such as shortage of skills generally, competition, keeping staff and regulations showed negative impact on the firm's labour productivity. The findings of this study suggest that these small software firms require specific policy instruments to remove such obstacles for higher firm labour productivity.

Keywords*: Labour productivity, Obstacles, SMEs.*

Introduction:

Small and medium-sized enterprises play a vital role in the economic development of a country. Several studies (*e.g.,* Moktan, 2007; Ghoneim, 2003; Okpara, 2011) suggest that SMEs contribute significantly to the GDP and poverty alleviation and provide employment opportunities. However, some researchers (*e.g.,* Beck and Kunt *et al.* 2005) discussed that in low income countries small firms have low survival and growth rates compared to large firms due to resource constraint. This apparently suggests that small firms face more obstacles to the success of their business than large firms (Mambula, 2002).

In addition, Bezic *et al.* (2002) identified long term obstacles to the growth of firms such as: transport, custom regulations, access to building/land, competition, obtaining finance. Their study (*i.e.,* used Tobit model for 9 Transition economies) found that competition and customs and trade regulations are the most important obstacles for doing business. Similarly, a number of researchers (Mintoo, 2006; Reddy, 2007) investigated key macro environment issues such as infrastructure development (*e.g.,* power, telecommunication, roads), quality of labour force, regulatory framework (low tax and corruption), poor law and order reduced the firm performance whether small or large.

To date, very few empirical studies (Mathew, 2007) have undertaken related to the software industry. The software industry comprises small software firms with high innovation and absorptive capacity (*i.e.,* a firm ability to internalise external knowledge) because of qualified IT professionals and better organisational capabilities (Matusik and Heeley, 2005). These software firms have strong linkages with other sectors of the economy such as the banking sector, airline industry, and the manufacturing sector, which improve the firm competitive performance (Westhead, 1997). This study primarily will focus on the analysis of Pakistan software industry.

According to the Board of Investment website, Pakistan has attracted substantial FDI in the Telecom and IT sector in recent years: specifically from 2002 to 2008. Pakistan is currently home to some of the world largest and most prominent information technology multinationals: Microsoft, Siemens, IBM, Cisco, HP and Oracle. These multinationals companies contribute to the capability development within the local industry through development partnership with local software companies (P@SHA, 2007). However, according to P@SHA (Pakistan Software House Association) annual report the shortage of good well-trained workers, is one of the most significant obstacle for Pakistan software industry. Overall, the interesting characteristics of the Pakistan software industry and the lack of research in this area

motivated the researcher to identify and analyse the obstacles to the growth of these software firms.

This paper has been structured into 3 sections: section 1 provided introduction and section 2 discusses the theoretical background of the study with hypothesis. Section 3 discusses the empirical findings and reported the policy implications of the study.

Theoretical Background:

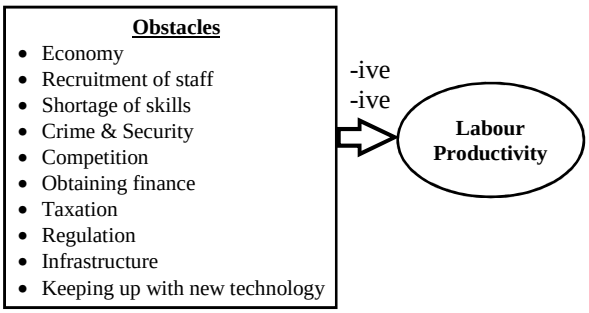
Bartlett and Bukvic (2001) identified the barriers to SMEs growth using micro level analysis of 173 Slovenian firms. There study classified obstacles to the small firms growth such as i) institutional (*e.g.*, degree of corruption, legislative); ii) internal organisation and resource (*e.g.*, managerial capacity, skills, firm objectives); iii) external market (*e.g*, degree of competition); iv) financial (availability of cost and capital, finance) and social barriers (*e.g.*, support from local agencies). Their study found that institutional and financial barriers have a negative impact on the firm growth (age). Similarly, Olawale and Garwe (2010) conducted a study on 100 South African new SMEs (firms' existence for less than 42 months). They examined the obstacles to the growth of new SMEs using principal component analysis. Their empirical study mainly subdivided obstacles into internal and external[1] environmental factors. The findings revealed that these new SMEs face financial problem as their most important obstacle for their firm growth.

Additionally, Freel (1999) points out to the internal skills gaps in small innovative firms. His study (was based on 245 manufacturing firms in UK) suggests that small firms require improvement in technical and management skills, marketing competencies for higher innovation performance. This apparently suggests that small firms need to tackle skills problem for better firm performance. Similarly, Hay and Kamshad (1994) carried out a study on UK SMEs from 3 sectors such as Instruments, Printing and Software. Their study observed that intensity of competition in recession (*i.e.*, lower demand in the economy) reduces the firm growth across all sectors. This implied that during recession firms require to survive the recession instead pursuing competitive strategies. On the contrary, internal barrier (*e.g.*, management skills) cited by software firms as their most important obstacle for growth (Hay and Kamshad, 1994). This outcome indicated that most of these firms started by scientists who found shortage of managerial skills as the firm expands.

Additionally, Okpara (2011) investigated the 211 Nigerian SMEs and found that financial constraints, management problem, corruption and poor infrastructure have a negative impact on the small firm's growth. Overall, Okpara (2011) empirical study (using multiple regression analysis) showed that in developing countries (*e.g.*, Nigeria) SMEs contribute to poverty alleviation and removal of such barriers are key to the success of small businesses. Nonetheless, Bohata and Mladek (1999) conducted a study on 100 Czech SMEs and found that high burden of taxes, lack of access to credit, shortage of qualified workers/managers are the major impediments to the growth of small firms.

In summary, the literature evidences (*e.g.*, Reddy, 2007; Bartlett and Bukvic, 2001) suggest that obstacles such as competition, skills shortage, access to finance, poor infrastructure and so forth reduce the performance of small firms. However, these studies were limited in approach to analyse the impact of these obstacles on the labour productivity of software firms. This study would contribute to the literature related to the analysis of Pakistani software industry. We can develop our hypothesis from the literature (see figure 1).

Figure 1: Obstacles to the growth of small firms



H: Long term obstacles have a negative impact on the firm's labour productivity growth.

Empirical Analysis:

Methodology:

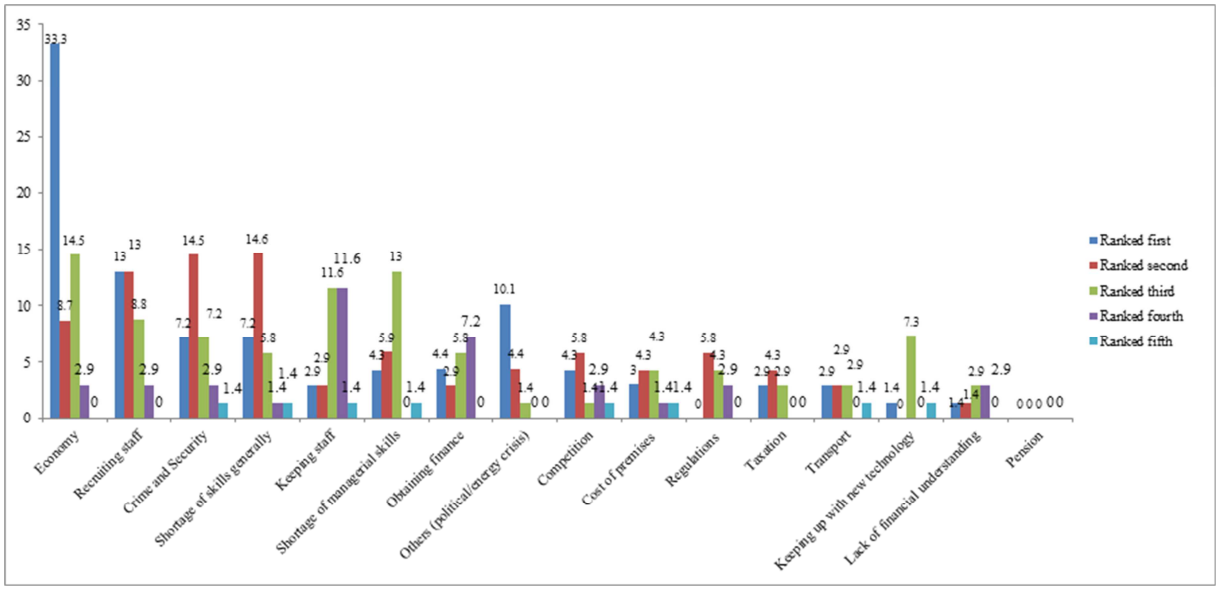
Source of Data:

For this report, a survey was made by the researcher during May-June, 2012. A list of 300 IT companies was provided by Pakistan Software Export Board (PSEB). However, 150 firms were excluded from the list, because the firms were not involved purely in the software business or the list did not provide correct information about the firms' whereabouts. Finally, 150 firms were randomly selected for face-to-face interviews using a structured questionnaire. Firms' were contacted through emails and phone calls for appointment and only 69 firms responded (46%) for interviews. Of the total, 65 firms were interviewed in Islamabad and the remaining 4 in Rawalpindi. Further, 8 firms refused to provide financial information (sales). The data were analysed with Stata 10.

The survey asked all the firms to rank (*i.e.* from 1=most important to 5=not important) 16 obstacles to

[1] The internal factors include access to finance, management skills, location and networking, investment in IT and cost of production. In comparison, external factors include economic variables such as inflation, interest rate, crime and corruption, labour and infrastructure/regulations.

Figure 2: Long term obstacles to the success of firm growth (figures are in percentage)



the long-term success of their business. Figure 2 provides information about these obstacles. For example, of the 69 firms, 33.3% of firm's ranked economy as their most important obstacle. This suggests that the 'economy' is overall the major issue for the majority of firms[2]. Further, firms ranked (first & second) 13% recruiting staff as their obstacle for firm growth. Only a small proportion of firms (7.2 %) ranked crime and security crisis as their first obstacle to the long term success of their business. Further, political and energy crises ranked most important to 10.1%. The last four obstacles (*i.e.*, transport, keeping up with new technology) in figure 2 show the lowest ranked obstacles to the long-term success of their business. In the case of 'taxation' only 2.9% of firms ranked this as the most important obstacle. Lastly, none of the firms ranked pension as their obstacle to the growth of their business. Overall, figure 2 suggest that these obstacles may a have negative impact on the firm's labour productivity. In the next sub section, we would investigate their statistical association between obstacles and labour productivity using factor and multiple regression analysis.

Factor & Regression Analysis:

The questionnaire was structured for face to face interviews with owner-managers and initial information was collected related to the firm long term obstacles to the success of their business. In order to extract core information, principal component factor analysis has been used. This method is used when variable are highly correlated, and objective of this method is to reduce the data.

Principal component factor analysis reduces the number of variables and examines the structure relationship between variables. Kline (1994) defined this "factor as a dimension or construct which is a condensed statement of the relationship between a set of variables". Factors are linear transformation of the variables and this transformation is exact with no error terms. These factors are extracted based on Kaiser Criterion (Kaiser, 1960); which suggest that retain those factors with Eigen values equal or greater than one.

Table 1 provides information on factor analysis of long-term obstacles to the success of their business. Each firm (n=69) was asked to rank long-term obstacles to the success of their business from 1=most important to 5 = not important. Seven principal component factors are extracted and labelled as 'recruitment', 'shortage of skills', 'keeping staff', 'competition', 'taxation', 'regulations' and 'finance'.

Column 1 shows the list of 15 obstacles which are subdivided into seven factors with higher factor loadings (shown in bold italic values). The first obstacle 'economy' has higher factor loading and negative correlation with factor 1 (*i*.e., -0.6916). This suggests that poor economy would have a negative impact on the firm's recruitment process. 'Obtaining finance' as a long-term obstacle is also negatively correlated with the same factor 1 and implies that lack of access to external finance may reduce firm quality of recruitment process. The third obstacle 'taxation' has a positive correlation with factor 5. It suggests that overall taxation problem could affect the performance of firm. The next two obstacles such as 'keeping staff and transport issues' with higher factor loadings suggest that they could affect overall staff performance. The column labelled 'uniqueness' which represents the proportion of each variable, is not

[2] According to economic survey 2010-11, Pakistan faced the worst flood in her entire history. The ongoing war on terrorism, increased in world oil prices restricted the economic growth to 2.2% against the target of 4.5%. These factors not only damage the agriculture sector but also had a negative impact on the manufacturing and services sectors. (www.tribune.com.pk, June, 2011).

Table 1: Factor analysis of long terms obstacles to the success of their business

Obstacles	Factor 1 Recruitment	Factor 2 Shortage of skills	Factor 3 Keeping staff	Factor 4 Competition	Factor 5 Taxation	Factor 6 Regulations	Factor 7 Finance	Uniqueness	KMO[1]
Economy	***-0.6916***	0.0352	0.0883	-0.1254	-0.0105	0.1966	-0.0140	0.4580	0.5674
Obtaining finance	***-0.4015***	-0.3020	-0.3598	-0.1376	-0.1645	-0.3981	0.2190	0.3658	0.5492
Taxation	0.0234	-0.2850	0.0975	0.0302	***0.7495***	-0.1551	-0.0617	0.3183	0.4231
Recruitment	***0.7277***	-0.1032	0.0201	0.0256	0.0748	-0.0032	-0.0342	0.4519	0.5817
Keeping staff	0.0705	0.1150	***0.7678***	-0.0937	-0.0253	0.1264	-0.0376	0.3655	0.3867
Transport issues	-0.1927	-0.1859	***0.6874***	0.1596	0.0259	-0.2034	-0.0043	0.3883	0.5181
Regulations	-0.2973	-0.0856	-0.0629	0.0392	0.0177	***0.7489***	0.1204	0.3231	0.4307
Keeping up with new Technology	-0.0944	***0.7186***	0.2073	0.0555	-0.1118	-0.1111	-0.2685	0.3332	0.4606
Availability/Cost of suitable premises	0.1283	-0.3666	0.3379	0.0048	-0.4448	***0.4480***	-0.0225	0.3359	0.5397
Competition in the market	0.1406	0.1160	0.2010	***0.7017***	0.0294	-0.3057	0.1933	0.3023	0.3934
Shortage of managerial skills	0.3292	-0.1229	-0.0750	***-0.5276***	-0.3764	-0.2646	0.3124	0.2832	0.4718
Shortage of skills generally	-0.0591	***0.7634***	-0.1809	-0.0373	-0.0311	0.0024	0.2708	0.3054	0.4358
Lack of financial understanding	0.0545	-0.0263	0.0269	-0.0865	-0.0651	-0.0718	***-0.8874***	0.1913	0.4899
Crime and security	0.2218	0.1093	-0.0868	-0.1470	***0.6539***	0.2728	0.2260	0.3566	0.4347
Others (i.e., political/energy crisis)	0.1984	-0.1317	-0.1656	***0.7435***	-0.2108	0.2571	0.0177	0.2507	0.3781

1. Overall, Kaiser-Meyer-Olkin measure of sampling adequacy is 0.4600.

Table 2: Correlation matrix of all variables

	LP	Size-1	Size-2	Size-3	Size-4	Recruitment	Shortage of skills	Keeping staff	Competition	Taxation	Regulations	Finance
*LP	1											
[1]Size-1	0.08	1										
Size-2	-0.05	-0.28	1									
Size-3	0.28	-0.29	-0.31	1								
Size-4	-0.11	-0.23	-0.24	-0.25	1							
Recruitment	-0.00	0.04	0.01	-0.07	0.18	1						
Shortage of skills	-0.07	0.14	-0.22	0.10	0.06	0.02	1					
Keeping staff	0.24	-0.16	-0.13	0.23	0.14	0.02	0.14	1				
Competition	-0.13	-0.08	-0.21	0.31	-0.02	-0.23	0.02	0.04	1			
Taxation	0.24	-0.00	0.12	0.10	-0.15	0.02	-0.01	0.06	0.00	1		
Regulations	0.18	0.10	0.05	-0.11	-0.01	0.02	-0.00	-0.00	0.02	-0.02	1	
Finance	-0.01	-0.30	0.15	-0.00	0.04	-0.01	0.00	-0.03	-0.06	0.00	-0.02	1

*Labour productivity measured as sales per employee

[1] Size 1 (1-20, employees), size 2 (21-30),size 3(31-80), size 4(81-500) are coded as dummies. Size 1 coded 1 if firm employees between 1-20, otherwise zero.

shared with other variables in the factor model. This means that the higher the uniqueness value of a variable the lower the importance of that variable in the factor model. For instance, the first variable 'economy' has a unique value of 0.4580; which means 45.80% of this variable is not associated with other variables in the factor model. Recruiting staff has a comparatively higher uniqueness value. In comparison obstacles such as 'shortage of managerial skills and expertise', 'lack of financial understanding' and 'political and energy crisis' have lower uniqueness values (see Table 1). This suggests that the greater proportions of these variables are shared with other variables in the factor model. For factor model appropriateness, the Kaiser Meyer Olkin (KMO) measure of sampling adequacy is 0.4600 which is a low value (<0.8). This outcome may be better having a large dataset.

Before estimation the correlation matrix is used to present the correlation between two variables and

indicates that any variable that is perfectly correlated with itself (see Table 2). The correlation matrix is used to examine the problem of multicollineairty. Multicollineairty arises when some or all of the explanatory variables are highly correlated with each other and it is hard to tell which variable is influencing the explained variable. In the majority of cases correlation between variables are lower than 0.5 and this suggest that multicollinearity is not an issue in our econometric model (See Table 2).

Table 3 provides the relationship between obstacles (independents) and labour productivity [3] (dependent) using multiple regression analysis. Of the 61 observations (8 firms refused financial information), the R-squared value which is 0.3463 shows that approximately 35% of variation in labour productivity explained by the model. Similarly, the Ramsey reset test accepted the null hypothesis and present that the model is adequately satisfied without functional form of misspecification error. The robust standard errors have been used to eliminate the heteroskedasticity. Interestingly, the model has found the positive relationship between small firm size (1&3) and labour productivity (see Table 3). This suggests that these small firms are less capital or intermediate intensive and have higher technical and efficiency levels. In addition, small firms are flexible in terms of their less centralised decision making, low production channels compared to large firms. This organisational flexibility provides an edge to SMEs despite their lack of resources. Further, the coefficient value of recruitment as an obstacle showed the negative impact on the firm's labour productivity. However, the effect is too small to reject the null hypothesis even at 10% significance level.

Table 3: Multiple regression analysis of long terms obstacles to the success of their business

Labour productivity (as dependent) Coefficients	*P-value*	
Size (1-20)	0.8211 (0.3995)	0.045
Size (21-30)	0.2792 (0.3171)	0.383
Size (31-80)	1.1476 (0.2556)	0.000
Size (81-500)	0.3855 (0.3611)	0.291
Recruitment	-0.0877 (0.1213)	0.473
Shortage of skills	-0.1681 (0.0944)	0.08
Competition	-0.2928 (0.1259)	0.024
Keeping staff	-0.2296 (0.1091)	0.041
Regulations	-0.2077 (0.1016)	0.046
Taxation	0.1808 (0.1254)	0.156
Lack of finance	0.0625 (0.0961)	0.518
Constant	8.6343 (0.1782)	0.000
N=61 $R^2 = 0.3463$ Ramsey Reset Test: F=2.13; *P-value*= 0.1090		

Figures are shown in parenthesis are robust standard errors

Furthermore, obstacle such as 'shortage of skills generally' have a negative association to firm's labour productivity. This outcome rejected the null hypothesis (*i.e.*, β=0) and accepted our prior expectation from the literature. This finding suggests that these small software firms are facing problem of shortage of skills for boosting their labour productivity. Alternatively, this implies that this knowledge intensive industry is lacking highly qualified software developers which result in lower firm performance. This outcome supports the literature findings of Freel (1999) and Bohata and Mladek (1999). A 100% increase competition as an obstacle firm's labour productivity is decreased by 29%. This negative association suggest that these small software firms have lower capabilities (*i.e.*, innovative, marketing) to survive in the competitive markets. Intense competition reduces the labour productivity of these software firms due to their less innovative products. In other words, during interview with owner-managers, it was found that none of the firm patented their products and services. This apparently indicates that majority of firms are involved in incremental type of innovations. In addition, these software firms are predominantly (81%) engaged in exporting to the international markets (*e.g.*, US, UK, Canada). Competition is higher in such highly innovative international markets and this clearly suggests that these software firms are serving the bottom of international markets. This outcome supported the literature findings of Hay and Kamshad (1994). On the other hand, the parameter values of keeping staff and regulations as obstacles showed negative impact on the firm's labour productivity. Alternatively, this may suggest that staff turnover (leaving jobs) and regulations (*i.e.*, trade related) reduce the firm performance. In particular, high quality software developers leave the job quickly when good opportunity (with higher salary) is available abroad. These software firms confront difficulty to retain highly skilled labour force. These findings in line with the literature results of Mintoo (2006) and Reddy (2007) and support our prior hypothesis. In summary, our empirical results suggest that removal of these barriers would increase the firms' labour productivity.

Conclusion:

This study identified the long term obstacles to the success of firm performance. However, previous studies were limited to investigate the relationship between obstacles and firm's labour productivity for software industry. This empirical study was based on a survey analysis mainly in Islamabad region of Pakistan. The paper examined that smaller firms had higher labour productivity than large firms due to their internal flexibility and have higher technical and efficiency levels. On the other hand, obstacles such as shortage of skills generally, competition, keeping staff and regulations had a negative impact on the firm's

[3] Labour productivity = log (sales/employees) in 2010

labour productivity and supported our hypothesis drawn from the literature.

Policy Implications:

The positive relationship between small firms and labour productivity implies that private and public sector organisations should make SME friendly policies for boosting the small software firms' productivity. In contrast, government should remove barriers (*e.g.*, shortage of skills) to the growth of these small software firms. This implies that more investment is required on improving the quality of IT education in Pakistan. Similarly, investment is required to encourage these small software firms for improving their competitive performance through highly innovative products and services. Trade related regulations (*e.g.*, lower custom duty on imported IT equipments, banking regulations related to financing software firms) should be minimised for higher labour productivity.

Limitations:

Lower number of observations (n=69) result in poor KMO test value which suggest that large sample is required for future analysis. The study was based in a one region and limited in scope for generalizing to the rest part of the country. This suggests that this study could be extended to other parts of the country like Karachi and Lahore for better empirical analysis.

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