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Amita Singh¹

Abstract

Most South Asian countries tend to treat Information and Communication Technologies (ICT) as a onetime adoption. Their institutions which govern the advancement of technology are relatively slower as compared to their neighborhood East Asian and Pacific countries. South Asian countries have spent a hefty sum on e-governance projects and invested heavily in ICT infrastructures. They have been fast to adopt ICTs and create cyber cities to expand business and marketing hubs so much so that ICT applications have brought a 'data tsunami'. It is here that these countries suffer a phenomenal lack of trained personnel for reordering data and finding in it a key to growth. If governments do not simultaneously generate capacity to reorder, select and classify this uncontrollable flow of data, the most likely consequence would be derailment of GDP promotion efforts. South Asian countries need skilled personnel to analyze this almost arbitrary and wild communicational parameters of social media, marketing and commercial sites. Data needs to be analyzed, grafted and cleaned before it is stored in ICT storage spaces within each country. In terms of traditional public administration this is equivalent to storing file-information systematically in accordance to its subject, relevance and priority, subsequently discarding the waste unmindfully stuffed in office cupboards and storehouses. South Asian ICT infrastructure is likely to become an office which has unclassified and unmarked files littered all over its spaces to an extent that it becomes too overwhelming and gargantuan for managers to seek any information out of it. Most institutions such as legislatures, Judiciary and Election Commission to name a few encounter extreme challenges in their achievement graph.

1. Introduction

The impact of ICT on the functioning of governance institutions has come to a stage where some immediate and comprehensive steps should be taken. More than two and a half quintillion of data is produced every day in the world and 90 percent of all data today has been produced in the last two years. This indicates that

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governance is likely to get buried or become irrelevant under the load of data. This directs attention towards the problem of organizing data. Big Data (BD) suggests that even digitization of information has reached its saturation point and is now to be stored through higher analytical skills in governance. These special skills are required for use in identifying content as well as their analytical relevance which could be used later or whenever required. Google's Eric Schmidt writes, "Our propensity for selective memory allows us to adopt new habits quickly and forget the ways we did things before."(p.8). BD enables us to keep track and simplify the crowding of scattered data which is creating a 'data tsunami' with the communication companies now. Ignoring this challenge may bring serious hurdles for public policy and for governance. It is also indicated that countries which delay attending to this problem may have to spend large sum of capital on retrofitting through the help of 'Big Data Analytics' from USA and despite that are likely to lose important information. If this capacity to manage Big Data is enhanced then many policies would become self-reflective, participative and relatively more inclusive since access and content simplicity which is the key to BD would enlighten citizens as well as governments. For example, the Human Resource programmes use BD to match positions to existing employees. One big problem in organizations is that the employees' profiles generally do not match the positions they get posted in due to their self-descriptions. HR departments scour through social media profiles, blogs and online conversations across the internet where talents and special skills are discovered for organizational requirements. BD helps to find out all details about the employee to post him/her where best suited. The Big Data expert from the IBM Company, Jeff Jones says, "You need to let data speak to you" and this is possible only when the unstructured data is converted into structured data.

2. Indispensable 'Big Data' for Public Institutions

For many reasons, Big Data is becoming an unavoidable fact of governance in present times. Governance being an overlapping team work between public, private and non-state philanthropic enterprises, organizations need to find better ways to tap into the wealth of information hidden in this explosion of data around them to improve their competitiveness, efficiency, insight, profitability and more (Eaton et al 2012). The realm of BD as Eaton and his group of IBM experts suggest is the analysis of all data (structured, semi-structured and un-structured) so that quick access to relevant information becomes easier for everyone. As Big Data experts have revolved around many 'Vs', it would be interesting to look into some of them here.

The volume of data being created every day is breaking through the storage spaces. In 2003 it was 14 trillions in a day which required five exabytes of space. This volume was produced in two hours in 2011 and 10 minutes in 2013. For an average service to 100 million customers, Customer Service Providers would need 50 terabytes of location data daily. If stored for 100 days it would need five petabytes as almost five billion records are created in a day. In 2010 in US records, the most popular service provider company AT&T had 193 trillion Customer Data Records (CDR) in its database.

The velocity of the data is also increasing. The global mobility data is growing at 78 percent of a compounded growth rate. Cisco Visual Networking Index (VNI-2013-2018), an ongoing initiative to track and forecast the impact of visual networking applications found that, 'Traffic' from wireless and mobile devices will exceed traffic from wired devices by 2016. By 2016, wired devices will account for 46 percent of IP traffic, while Wi-Fi and mobile devices will account for 54 percent of IP traffic². In 2013, wired devices accounted for the majority of IP traffic at 56 percent. Overwhelmingly, the Global Internet traffic in 2018 will be equivalent to 64 times the volume of the entire global Internet in 2005 which suggests that bureaucracy and public officials may have to revise and reframe their capacity which would not be limited by their non-availability in office or by their multifarious tours as excuses for not attending and responding to important queries. To understand that much of the global Internet traffic which would reach 14 gigabytes (GB) per capita by 2018, rising by 5 GB per capita in 2013³ would require additional capacities in the offices of public officials including the ability for BD analytics. As analytics is increasingly being embedded in business processes by using data-in-motion with reduced latency yet the *real time data*⁴ which has to be catered to immediately and with urgency in every government, e.g., www.turn.com capacity of 10m/sec.

The variety of data is rising very fast in equivalence to its volume and velocity. The old time Data Warehouse Technology⁵ used in the 1990s cannot be relevant anymore for the fact that public policy cannot depend upon an individual's understanding anymore. Besides a technically efficient administrator, what is also be needed is an equivalent expansion of key government offices towards an adoption of latest reporting tools, data mining tools (SPSS, etc.) and GIS to name a few. The data would come from various sources and would be transformed using

²VNI Report available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/ip-ngn-ip-next-generation-network/white_paper_c11-481360.html

³http://www.cisco.com/c/en/us/solutions/collateral/service-provider/ip-ngn-ip-next-

generation-network/white_paper_c11-481360.html

⁴Real-time data denotes information that is delivered immediately after collection. There is no delay in the timeliness of the information provided. It is of immense use to public officials as the 'Real-time data' is often used for navigation or tracking.

⁵A data warehouse is the data repository of an enterprise. It is generally used for research and decision support. For further details see Joseph M. Wilson's 'An Introduction to Data Warehousing'(a PPT from Storet Co.) and Samii, Massood (2004) International Business and Information Technology: Interaction and Transformation in the Global Economy, New Hampshire USA: Psychology Press.

Extract Transform Load⁶ (ET) data inside the Warehouse. In earlier times this could be possible by untrained or less trained 'babudom' as it was more or less a structured content but to allow the earlier capacity to continue would be to play havoc with public policy. The public policy spaces would then be littered with consultants, each one asking for their fee and pulling information to their vested commercial interests. Currently, data content is unstructured for lack of a directed objective. Once policy formulation begins differentiation within larger objectives i.e., climate change as a main theme may add ever growing specificities such as coastal regulations, disaster risk reduction, ecosystem studies, disease control , food security and environmental changes then the need for Big Data to improve public policy formulation and implementation becomes important. To organize unstructured texts, sounds, social media blogs etc. government needs more enabling technology like the ones at IBMs Info-sphere stream platform.

Lastly but the most important requirement is the veracity (authenticity) of data for BD. Unlike governed internet data, BD comes from outside-our- control sources. Thus BD requires significant correctness and accuracy problems besides establishing and ensuring the credibility of data for target audience. Thus each Ministry of Government will have to first start with a basic data which routinely arrives at its posts and through analytics store it as Big Data. Right now much of the available data disappears or gets contaminated. Kevin Normandeau (2013) explains that BD veracity refers to the biases, noise and abnormality, the knowledge about which helps to clean the system. Many experts have added validity and volatility as important 'Vs' for BD. This may become important for the coming times when stored data could become outdated or irrelevant thereby suggesting a time period about its validity and also volatility. This is not so important for countries of South Asia which have yet to take their initial test drive on the BD highway.

3. Drivers for BD

In a compelling book of David Feinleib (2013) the author has tried to demystify Big Data as he emphasizes that to understand BD is to capture one of the most important trends of the present day world which surpasses every institutional boundary. The Changing governance paradigmatic requirements, e-governance expansion and rising number of internet and mobile users is a yeoman's task for routine administration to attend to. The new age citizen- customers are more sophisticated consumers who prefer to go on-line before taking a decision. Automation and convergence technology is speeding up faster with IVR, Kiosks

⁶ETL suggests three functions; *extract, transform, load*, combined together into one tool to pull data out of one database and transfer it to another database. Extract is the process of *reading data* from a database. Transformisthe process of *converting the extracted data* from its previous form into the form it needs to be in so that it can be placed into another database. Transformation occurs by using rules or lookup tables or by combining the data with other data. Load is the process of *writing the data* into the target database. This helps to either to shift data to data warehouse or to convert it into data marts which would store data for future usage as well as for marketing.

and mobile telephony usages penetrating the regions untouched so far with any market or governance activity. Information is being collected through a hub and spoke model in a number of South Asian countries but BD is still a distant requirement.

Methodologically, logical atomism can be seen as endorsement of *analysis*, understood as a two-step process in which one attempts to identify, for a given domain of inquiry, set of beliefs or scientific theory, the minimum and most basic concepts and vocabulary in which the other concepts and vocabulary of that domain can be defined or recast, and the most general and basic principles from which the remainder of the truths of the domain can be derived or reconstructed.

4. Origin of the Term

The origin of Big Data can be traced to the earlier analytical philosophers who discovered the mathematical logic in the way language is used. Ludwig Wittgenstein *TractatusLogico-Philosophicus*(1921) and Bertrand Russell's 'logical atomism' in his *Principia Mathematica* (1925-27, with A. N. Whitehead) inspired a debate on the fundamental building blocks of thought processes or an endorsement of analysis through which a given domain of enquiry can be defined and recast in a manner that remainder of the truths could be derived or accessed. Their logic of analysis suggested that the way human beings express themselves in their language propositions, paves the way for understanding the world more logically. Even the fundamental truths of arithmetic, are nothing more than relatively stable ways of playing a particular language-game. Big Data is a form of a revolution within ICT which paves the way for many more ideas to flow in as society advances.

It is said that the lunch table conversations during the mid 1990s at the Silicon Graphics featured the Chief Scientist John Mashey quite prominently. Douglas Laney, a veteran data analyst at Gartner declared John Mashey as the 'father of Big Data'⁷. However, the origin of the term is from scattered sources but as Victor Mayer-Schonberger and Kenneth Cukier (2013) simplify the debate by suggesting that the term has originated from the many debates on astronomy and genomics, sciences where data storage, correlation and retrieval leads to major breakthroughs in our understanding of the universe and well being of people.

It becomes fairly clear that Big Data originates out of the fundamental building blocks of language and culture which can be referred to as its genetics. The new digital forms of communication — Web sites, blog posts, tweets — are often very different from the traditional sources for the study of words, like books, news articles and academic journals.

⁷Lohr, Steve (2013) The Origins of 'Big Data': An Etymological Detective Story, New York Times, Feb.1.accessed http://bits.blogs.nytimes.com/2013/02/01/the-origins-of-big-data-an-etymological-detective-story/, 15.7.2014

5. How would Governance Benefit from Big Data?

5.1 Sophistication in Decision Making Tools

In earlier times the decision making involved no process except the whims and fancies of the rulers. Later it evolved into some scientific principles which formed the inflexible parameter of good decision making. Contesting this approach Herbert Simon indicated a behavioral approach to decision making but warned that a halo of preconceived thoughts around decision makers led to bounded rationality. Big Data minimizes the fuzziness of all approaches and brings logic of science in data corroboration, correlation, forecasting and predictability in decision making. It also helped in making policies more inclusive and decision making increasingly holistic, interdisciplinary and sustainable. Besides these issues, BD is also needed for improved risk management in business and in governance. A case is mentioned below.

In 2009 the FLU virus was discovered in USA. All strains were collected from the Bird Flu, Swine Flu and H1N1 and their correlation was established with the 1918 Spanish Flu which infected half a billion and killed tens of millions .The information had to be relayed back to central organizations and tabulated. This was a big challenge as officials visited this information only once a week which was a fatal time span for communicable disease spread. At such a time Google through its in house BD Analytics made 50m. Common searches that Americans share online and compared with the Communicable Disease Report Data on the spread of seasonal flu between 2003-2008. This correlation established a staggering 450m. Different mathematical models in order to test the search terms and finally helped in finding a solution. Without BD Analytics this was almost impossible or would have taken so long that the whole exercise would have become irrelevant.

5.2 Diagnostic Capability

Monitoring patient's history, well being documents, nature of circulatory systems and frequency of infection can strengthen microscopic-long distance robotics which has enormous scope in telemedicine especially in the Third world and in Army locations. It has the ability to detect nascent heart attacks, early stages of cancer and also management of insulin levels.

Big Data has contributed to the Food and Drug Administration of USA in many ways.ie; Proteus Digital Health, a California based biomedical firm could kick-start the use of an electronic pill. It creates information which helps tissue engineering, genetic testing, DNA sequencing and source based solutions as well as early warning alerts on the basis of information corroboration and analytics.

5.3 Climate Change Related Early Warning Mechanism Systems

Climate change has brought substantial justification to have BD availability. The increasing inter-sectoral and inter-agency information such as the land, air and water bodies related changes, cloud formation, cyclones and hurricanes centred specialized data for over many hundred years and relationships to aquifers, flora and fauna, disasters and droughts, weather and crops etc. This expanse of information and the widening scope of its applicability in public policy has never existed prior to BD. Currently there is data and also the country and region based

information which is scattered and much less accessed even during the period when the problem actually strikes. The meteorological data, density of population inhabitations, ecosystem services, local responses in the past to similar issues and urban planning records would combine in BD analytics to justify and enable retrofitting in decision making during troubled times of climate change.

6. Conclusion

South Asia has the world's largest number of poor. This region also has the largest number of governance challenges in terms of providing health, livelihood, education, skills and disaster mitigation and risk reduction infrastructure. There are many policy changes which have to be brought in through innovation, training and technology. Big Data is a mine of information to overcome and also escape many decisional catastrophes which are likely to come on the overloaded highway of government policies. This also requires balancing of a robust and secure public sector architecture that can accommodate the need for sharing data openly with all stakeholders. This further entails a commitment from national governments to reform and achieve well being for all citizens.

References

- David Feinleib (2013) *Big Data Demystified: How Big Data Is Changing the Way We Live, Love and Learn*, USA: Big Data Group LLC.
- Eaton, Chris, Deroos, Dirk, Deutsch, Tom, Lapis, George, and Zikopoulos, Paul (2012) Understanding Big Data, Analytics for Enterprise Class Hadoop and Streamlining Data, New York: McGraw Hill.
- Normandeau, Kevin (2013) *Beyond Volume, Variety and Velocity is the Issue of Big Data Veracity,* Sept. 12, Inside Big Data Available at http://insidebigdata.com/2013/09/12/beyond-volume-variety-velocity-issue-big-dataveracity/ (accessed on 20.6.2014).
- Schmidt, Eric and Cohen, Jared (2013) *The New Digital Age: Reshaping the Future* of *People, Nations and Business*, New York: Alfred A. Knopf, Random House Publication.
- Victor Mayer-Schonberger and Kenneth Cukier (2013) *Big Data: A Revolution that will transform how we live, work and think,* New York: Houghton Mifflin Harcourt Publishing Co.

Measuring Time-varying Market and Currency Risks with Stochastic Dominance: Evidence from Country Level Stock Returns

Prabhath Jayasinghe¹

Abstract

In this paper, time-varying market and currency risks among a selected set of developed and emerging economies are compared in terms of stochastic dominance. For this purpose, time-varying exchange rate exposure and market betas are obtained through a multivariate model that explicitly allows for time-varying second moments. Two betas are not assumed to be orthogonal and we explicitly allow for non-orthogonality. The cumulative distribution functions of time-varying betas in the sample indicate that stock returns in emerging economies are more exposed to currency risk, though their exposure to market risk is moderate. On the contrary, the stock returns in developed economies are more exposed to market risk while their exposure to currency risk is remarkably low. There is also evidence to establish the notion that, during the postcurrency crisis period, currency risk in Korea is fading out over time.

1. Introduction

The validity of the International Capital Asset Pricing Model (CAPM) has been the subject matter for many research publications during the last few decades. A number of extensions of the CAPM itself have been developed in order to overcome some of its limitations. The International CAPM (ICAPM), one such alternative, suggests that the investments that cross the national borders are not properly explained by the CAPM which does not explicitly take the currency risk into account. With due respect to the fact that there are many versions of the ICAPM, one can outline the ICAPM as a model that explains the return on a certain asset in terms of the covariance between returns and the returns on market portfolio and the covariance between the returns and exchange rate changes². This version of ICAPM with time-varying coefficients is represented by the following equation:

$$E_{t-1}(r_{i,t}) = \beta_{m,t-1} E_{t-1}(r_{m,t}) + \beta_{x,t-1} E_{t-1}(r_{x,t})$$
(1)

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²This version of ICAPM is developed by Adler and Dumas (1983). In extending the CAPM to accommodate cross border investments, Adler and Dumas (1983) use the correlation between inflation in a certain country and the returns on the asset in question. However, if the inflation is assumed to be non-stochastic, then the price difference between two countries mostly stem from the exchange rate differences. This simplification was introduced by Dumas and Solnik (1995). De Santis and Gerard (1998) test the validity of ICAPM using this assumption of non-stochastic inflation.

where $\beta_{m,t-1}$ and $\beta_{x,t-1}$ are market beta and the exchange rate exposure beta, respectively. $\beta_{m,t-1}$ measures the asset's exposure to market risk while $\beta_{x,t-1}$ measures its exposure to currency risk. The intuition is that, while the expected returns on an asset is proportional to market returns and exchange rate changes, depending on the conditioning information that is publicly available at time *t*-1, the proportionality factors (market and exchange rate exposure betas) themselves are also time-varying. In other words, the investors are sensitive to "the new information that periodically becomes available to [them], who then use it to adjust their investment strategies" (Harvey, 1998).

The mean values of time-varying betas are often used to evaluate the market and currency risks of the relevant assets. However, the mean values of time-varying betas are based on only one aspect of the relevant distribution (more specifically, the magnitude of betas). A measure that is based on several aspects of the distribution of time-varying betas would be a more reliable and instructive measure of exposure. Empirical cumulative distribution functions (CDF) of the time-varying market and exchange rate exposure betas are extremely important in this sense. In addition to the magnitudes of betas in a distribution, it also takes into account the probability with which each beta in the distribution would occur. The criterion of stochastic dominance uses CDF as its main analytical tool. In this paper, we compare exposure to currency and market risks among a sample of countries using the stochastic dominance criterion.

The rest of the paper is organized as follows. Section 2 elaborates on how the concept of stochastic dominance should be viewed in an attempt of evaluating the risk of an asset. Section 3 briefs the econometric methodology used to derive time-varying market and exchange rate exposure betas. Section 4 describes the information related to data. Empirical findings of the analysis are reported in Section 5. In addition to the market and currency risk among various economies, currency risk in the same economy in different time periods are also compared. Section 6 includes concluding remarks.

2. The Concept of Stochastic Dominance in Explaining Market and Currency Risk

The concepts of first and second order stochastic dominance criterion can be defined as follows. Let $F_z(r)$ and $G_y(r)$ be the CDFs of the return structures on the two assets z and y, respectively. z is said to first order stochastic dominate y, if two CDFs do not cross each other and $F_z(r) \leq G_y(r)$ for all r. Graphically, $F_z(r)$ lies below and to the right of $G_y(r)$ when this happens. In second order stochastic dominance, wherein two CDFs do cross each other, z is said to dominate y, if $\int_{-\infty}^{r} (F_z(r) - G_y(r)) dr \leq 0$ for all r with at least one strict inequality. When used to compare the return structure of two assets, this means that the dominant asset assigns higher probabilities to higher returns than the dominated asset does so.

Gonzales-Rivera (1996) initiated the use of the stochastic dominance concept to compare the risk associated with the market betas of firms. Brooks et al (2000) employed the concept to carry out a detailed analysis of the impact of regulatory changes on the risk and returns of the US banking industry. In this context, the dominance of one coefficient on the other means that it represents less exposure to risk than the exposure represented by the other. When it comes to the sensitivity of the returns of an asset to a certain risk factor, the usual stochastic dominance inequalities must be reversed. Let $F_z(\beta_t)$ and $G_y(\beta_t)$ be the CDFs of the time-varying exposure betas of two assets z and y, respectively. β_t in both CDFs represents an exposure beta. Asset z 's exposure beta first order stochastic dominates asset y 's exposure beta, if two CDFs do not cross and the following

$$F_{z}(\beta_{t}) \ge G_{y}(\beta_{t}) \tag{2}$$

requirement is met for all β_t with at least one strict inequality:

Graphically, $F_z(\beta_t)$ lies above and to the left of $G_y(\beta_t)$. Asset z 's exposure beta is said to second order stochastic dominate asset y 's exposure beta, if the following requirement is met for all β_t with at least one strict inequality:

$$\int_{-\infty}^{\beta_{x,t}} (F_z(\beta_t) - G_y(\beta_t)) d\beta_t \ge 0$$
(3)

3. Deriving Time-Varying Exchange Rate Exposure Coefficients

Following Jayasinghe and Tsui (2008) whose analysis is based on the version of ICAPM suggested by Adler and Dumas (1983), we employ the following mean structure to derive time-varying exchange rate coefficients³.

$$r_{i,t} = \lambda_{0,i} + \lambda_X h_{ix,t} + \lambda_M h_{im,t} + \theta_i \varepsilon_{i,t-1} + \varepsilon_{i,t}$$

$$r_{x,t} = \lambda_{0,x} + \lambda_X h_{x,t} + \lambda_M h_{xm,t} + \theta_x \varepsilon_{x,t-1} + \varepsilon_{x,t}$$

$$r_{m,t} = \lambda_{0,m} + \lambda_X h_{xm,t} + \lambda_M h_{m,t} + \theta_m \varepsilon_{m,t-1} + \varepsilon_{m,t}$$

$$(\varepsilon_{i,t} \varepsilon_{m,t} \varepsilon_{x,t})' \mid I_{t-1} \sim N(0, H_t)$$

$$\varepsilon_t = z_t H_t^{\frac{1}{2}}$$

$$(4)$$

³ The reasons for selecting this particular model specification are not discussed here. See Jayasinghe and Tsui (2008) for details.

Assuming off-diagonal elements in parameter matrixes are zero, the following BEKK multivariate GARCH structure is used to construct the time-varying second moments:

$$H_{t} = \begin{bmatrix} h_{i,t} & h_{ix,t} & h_{im,t} \\ h_{xi,t} & h_{x,t} & h_{xm,t} \\ h_{mi,t} & h_{mx,t} & h_{m,t} \end{bmatrix} = \begin{bmatrix} c_{i} & 0 & 0 \\ c_{xi} & c_{x} & 0 \\ c_{mi} & c_{mx} & c_{m} \end{bmatrix} \begin{bmatrix} c_{i} & c_{ix} & c_{im} \\ 0 & c_{x} & c_{xm} \\ 0 & 0 & c_{m} \end{bmatrix} \\ + \begin{bmatrix} b_{i} & 0 & 0 \\ 0 & b_{x} & 0 \\ 0 & 0 & b_{m} \end{bmatrix} \begin{bmatrix} h_{i,t-1} & h_{ix,t-1} & h_{im,t-1} \\ h_{ix,t-1} & h_{x,t-1} & h_{xm,t-1} \\ h_{im,t-1} & h_{xm,t-1} & h_{m,t-1} \\ \end{bmatrix} \begin{bmatrix} b_{i} & 0 & 0 \\ 0 & b_{x} & 0 \\ 0 & 0 & b_{m} \end{bmatrix} \\ + \begin{bmatrix} a_{i} & 0 & 0 \\ 0 & a_{x} & 0 \\ 0 & 0 & a_{m} \end{bmatrix} \begin{bmatrix} \varepsilon_{i,t-1} \\ \varepsilon_{x,t-1} \\ \varepsilon_{m,t-1} \end{bmatrix} \begin{bmatrix} \varepsilon_{i,t-1} & \varepsilon_{m,t-1} \\ \varepsilon_{m,t-1} \end{bmatrix} \begin{bmatrix} a_{i} & 0 & 0 \\ 0 & a_{x} & 0 \\ 0 & 0 & a_{m} \end{bmatrix}$$
(5)

where $r_{i,t}$ is return on country index; $r_{m,t}$ is return on world market portfolio; $r_{x,t}$ is exchange rate changes expressed as US dollar price of foreign currency. $h_{j,t}$ for j = i, m, x, im, ix, xm denotes the variance and covariance terms of the three variables involved. $(\varepsilon_{i,t}\varepsilon_{m,t}\varepsilon_{x,t})'$ is conditional on complete information set I_{t-1} and normally distributed with zero mean and a conditional variance-covariance matrix H_t . z_t represents the vector of standardized residuals.

An intercept and a MA(1) term is included in each of the three mean equations in order to capture any remaining risk or market inefficiencies. Following Hamao et al (1990), one can justify the inclusion of MA(1) term in the first equation as that will capture the inefficiencies associated with the non-synchronous closure of the various stock markets in the world.

Following Lim (2005), in deriving market and exchange rate exposure betas, we allow for non-orthogonality between the two variables. As such, market and exchange rate exposure betas are computed as follows:

$$\beta_{m,t-1} = \frac{h_{x,t}h_{im,t} - h_{xm,t}h_{ix,t}}{h_{x,t}h_{m,t} - [h_{xm,t}]^2}$$
(6)

$$\beta_{x,t-1} = \frac{h_{m,t}h_{ix,t} - h_{xm,t}h_{im,t}}{h_{x,t}h_{m,t} - [h_{xm,t}]^2} \,. \tag{7}$$

Assuming that the standardized residuals of the suggested trivariate GARCH model are conditionally normally distributed, the conditional log-likelihood of residual vector \mathcal{E}_t at time *t* can be defined as follows:

$$\ell(\varphi)_{t} = -\frac{1}{2}\ln(2\pi) - \frac{1}{2}\ln|H_{t}| - \frac{1}{2}\varepsilon_{t}'H_{t}^{-1}\varepsilon_{t}$$

$$\tag{8}$$

of log-likelihood function The the sample is obtained as $L(\varphi) = \sum_{t=1}^{T} \ell(\varphi)_t$, where T is the number of observations. The parameter vector φ of the trivariate BEKK-GARCH-M model is estimated by maximizing L with respect to φ . In order to accommodate the non-normal features reflected in the basic statistics of country returns and the exchange rate changes, all estimates of the parameters are obtained through the quasi-maximum likelihood (QML) estimation method proposed by Bollerslev and Wooldridge (1992). Under certain regularity conditions, the OML estimate is assumed to be consistent and asymptotically normal. Therefore, statistical inference can be drawn due to robust standard errors. Required computer programs are coded in GAUSS and use BHHH algorithm to compute QML estimates.

4. Data

We use a sample of nine countries: the US, UK, Canada, Japan, Australia, Korea, Singapore, Taiwan and Thailand. The sample is assumed to represent a balanced combination of developed and emerging markets. We use daily closing stock prices for the period from 5th Jan 1999 to 30th Dec 2005⁴. The resultant sample period provides us with 1824 observations. Except for the exchange rate used for the US, all data series are from Morgan Stanley Capital International (MSCI) and extracted from Datastream. Country level portfolios are represented by MSCI country indexes measured in relevant local currency. World market portfolio is represented by the MSCI world market index MSWRLDL. It is a value-weighted world market index which is not converted into a common/reference currency and, therefore, free from exchange rate fluctuations (Giannopoulos, 1995; MSCI, 1998). Exchange rates used for non-US countries are MSCI bilateral rates that show the units of the relevant currency per one US dollar. The rates are inverted to express the exchange rates as the US dollar price of the foreign currency. A trade-weighted exchange rate compiled by the Bank of England is used to measure the exposure of the US assets.

Continuously compounded daily returns and exchange rate changes are calculated as follows:

⁴The currency crisis period is excluded from the sample in order to avoid the impact of unusual currency moments.

$$r_{j,t} = \ln \left(\frac{R_{j,t}}{R_{j,t-1}} \right) * 100$$
 $j = i, m, x$

where $R_{j,t}$ and $R_{j,t-1}$ are the closing values of stock prices/exchange rates for the trading days *t* and (*t*-1) respectively.

Table 1 shows the summary statistics of return on country indexes. Standard deviation of the return series ranges from the lowest 0.76 (Australia) to the highest 2.16 (Korea). Return in Taiwan, Thailand and the US which are slightly positively skewed whereas the return on the other country indexes are slightly negatively skewed. Highest absolute value is found for Australia (0.45) and the lowest is found for Taiwan (0.07). All return series show excess kurtosis which ranges from the lowest 1.773 for Japan to the highest 7.06 for Thailand. Jarque-Bera statistic is extremely high in all cases. These features justify the use of QML method of estimation. ADF statistics reveal that, although the country indexes are not stationary, continuously compounded returns on all country indexes are stationary and free of unit roots. Q statistic for 20 lags reveal that Canada, Korea, Taiwan, Thailand, UK and World market are not free from linear dependencies. As the Q^2 statistic for 20 lags displays, a great deal of non-linear dependencies is there to be captured by the model of estimation. This provides an enormous empirical support for the use of GARCH-type models to derive time-varying exchange rate exposure betas.

Coefficient	Australia	Canada	Japan	Korea	Singapore	Taiwan	Thailand	UK	US
Mean	0.0279	0.03406	0.0210	0.0585	0.0283	0.0030	0.0426	-0.0018	-0007
Maximum	3.6701	5.0813	6.2730	8.4841	5.5240	9.1716	15.8604	5.5885	5.6104
Minimum	-5.3721	-9.2605	-6.5115	-13.0968	-9.0950	-10.3091	-8.0731	-6.0113	-6.1609
S D	0.7673	1.1386	1.2204	2.1646	1.2024	1.7723	1.8158	1.1426	1.1700
Skewness	-0.4540	-0.3984	-0.2093	-0.1909	-0.3494	0.0746	0.7199	-0.2147	0.0933
Kurtosis	6.4580	8.5220	4.7732	5.6680	7.6216	5.2707	10.0663	5.9358	5.2435
J-B stat	971.42	2365.69	252.26	552.07	1660.39	393.54	3952.48	669.05	385.18
Q(20)	22.37	32.30	17.00	36.44	27.68	35.23	69.01	73.33	29.23
$Q^{2}(20)$	231.66	343.6	180.79	186.38	218.40	432.91	266.59	1885.60	782.87
ADF (index) ^a	0.65	-1.07	-0.27	-0.47	-1.51	-1.73	-0.69	-1.54	-1.59
ADF (returns) ^b	' -43.52	-41.83	-41.11	-41.71	-39.73	-41.75	-36.95	-27.98	-43.63

Table 1: Preliminary statistics of return on country stock indexes

Q(20) and $Q^2(20)$ are Ljung-Box statistics of returns and squared returns for 20 lags. They follow a χ^2 distribution and the critical value at the 5% level of significance with 20 degrees of freedom is 31.41; ^a and ^b - Augmented Dikey-Fuller statistic for stock index (level) and returns (first difference), respectively. Source: Author constructed

5. Empirical Results

In this Section, time-varying market and currency risks are analyzed in terms of the stochastic dominance concept. Time-varying exchange rate exposure and market betas are obtained using the multivariate GARCH-M model outlined by Equations 4 and 5 in Section 3. In order to provide a common platform to compare the currency risk among various countries, bilateral exchange rates between the US dollar and the relevant currencies are used. For this reason, the analysis in what follows is carried out from a US citizen's standpoint. In Sub-section 5.1, market and currency risks between countries within the sample are compared. Sub-section 5.2 attempts to compare the currency risk in the same country (namely Korea) during three consecutive time periods.

5.1 Comparison of Time-Varying Currency and Market Risks between Countries

The stochastic dominance criterion can be used to compare the risk structures associated with the exchange rate exposure betas of various assets. The analysis of the exchange rate exposure betas in terms of CDFs is slightly different from that of the market betas. Suppose that an US investor wants to find out the *level* of exchange rate exposure associated with the assets in the sample. Both negative and positive values of time-varying exposure betas are likely outcomes for a certain country. In some cases, it may even be negative throughout the sample period. Unlike in market betas, a positive value, though it is algebraically higher, does not necessarily imply a higher risk than a negative value. A large exchange rate exposure coefficient, whether it is negative or positive, represents a higher risk. One can get round this issue by viewing exposure coefficients as a kind of elasticity measure. What matters in this sense is the absolute value of exposure betas, but not their algebraic values. As such, to fulfill the aforementioned investor's requirement, the analysis must be carried out using the CDFs of the distributions of the absolute values of exposure betas.

Figure 1 displays the empirical CDFs of the absolute values of exchange rate exposure beta distributions. Apparently, the CDFs of the three emerging markets, Taiwan, Korea and Thailand lie below and to the right of the CDFs of the other countries, suggesting that exposure of the stocks in these countries to currency risk (associated with dollar exchange rate) is higher. Taiwan emerges as the country with the highest currency exposure during the sample period considered. Though Singapore is less exposed to currency risk than Taiwan, Korea and Thailand, it is more exposed than the cases like Australia, Canada, Japan, UK and the US. Though it is not that easy to rank the cases without using second order stochastic dominance, Australia and Canada seem to be less exposed than the other three cases. Based on these results, we can divide the nine countries in the sample into two sub-groups: (a) countries that are relatively less exposed to currency risk (Australia, Japan and Canada, Singapore, UK and the US); and (b) countries that are relatively more exposed to currency risk (Korea, Taiwan and Thailand).

More importantly, this result, obtained through the CDFs of time-varying exposure betas, is not fully reflected in the mean values of time-varying exposure betas. For instance, in terms of the mean values of time-varying exposure betas, Thailand is more exposed to exchange rate changes than Korea (mean values for the two countries are -0.9114 and -0.8660, respectively). However, as Figure 1 shows, Korea seems to be second order stochastically dominated by Thailand, suggesting that Korea is more exposed to exchange rate changes than Thailand. Singapore, UK and the US provide another example. Though UK and the US are more exposed than Singapore in terms of the mean value of time-varying betas, CDF of Singapore lies well down and to right of the CDFs of UK and the US, thus suggesting that the opposite is true. In a way, this is not a surprising result when the volatility measures of relevant betas are also taken into account. Except for the year 2005, in all the other one-year sub-periods, unconditional volatility of exposure beta series for Korea is clearly greater than that of Thailand. The

Unconditional volatility of Singapore is also higher than those measures of UK and the US for all seven one-year sub-periods¹.

Now suppose that the investor in question is a US importer (or a person who has a large number of essential imported goods in his consumption basket) who is looking for means of hedging against currency risk through investment in foreign assets. The above analysis which is based on the absolute values of exposure betas may not help him much in choosing the proper destination for his funds. As such, Figure 2 depicts the empirical CDFs of all distributions of *algebraic* values of exposure betas. Though the results are much similar to that in Figure 1 in this particular example, it may not be the case for a different sample. It is more likely that the investor will be able to fulfill his hedging requirement by investing in assets in emerging markets such as Korea, Thailand and Taiwan, which are highly positively exposed to the depreciation of the US dollar. By the same token, assets in a country like UK would be the appropriate choice for an exporter who seeks means of hedging against currency risk.

We also compare the exposure to market risk among countries using the same tool. The market beta distributions of the countries reveal that, for some countries in the sample, the multivariate GARCH model has computed a few negative market beta values. Unlike a negative value of exchange rate exposure beta, a negative value of market beta implies a less risky status. Therefore, in plotting CDFs of market betas, we did not take the absolute values, but let the negative betas exist.

Figure 3 compares the exposure to market risk among countries in terms of the CDFs of time-varying market betas. Similar to the case of currency risk, one can identify three sub-groups in terms of the market risk. Apparently, the US emerges as the country with the highest exposure to market risk. UK and Canada are the other countries whose stocks are highly exposed to market risk. Australia, Taiwan, Thailand and Singapore can be identified as the countries with relatively low exposure to market risk. Japan and Korea can be situated between these two groups of relatively high and relatively low market risk.



Figure 1: Cumulative distribution functions of time-varying exchange rate exposure betas (absolute values) Source: Author constructed

¹ Results are not reported in order to conserve space.





Source: Author constructed



Figure 3: Cumulative distribution functions of time-varying market betas Source: Author constructed

Based on the Figures 1, 2 and 3, we identify a few important patterns within the sample of nine countries. There are a set of countries whose exposure to currency risk is high, though the exposure to market risk is relatively low (Taiwan, Thailand and Korea). There is another set of countries whose exposure to market risk is high, but the exposure to currency risk is relatively low (Canada, UK and US). Interestingly, the former group consists of emerging markets while the latter consists of Developed markets. There exists a third group of countries with relatively low exposure to both currency and market risk (Australia, Singapore and Japan). This group consists of both emerging and developed markets. Although these patterns of observations are by no means generalizations, they may be extremely useful for the investors in international financial markets. For instance, the information included in Table 2 is good enough to be considered in a pre-investment study of any investor who is seeking locations for his/her funds.

Country	Exposure to market risk	Exposure to currency risk (associated with dollar exchange rate)		
Group 1				
Canada	High	Low		
UK	High	Low		
US	High	Low		
Group 2				
Korea	Low	High		
Taiwan	Low	High		
Thailand	Low	High		
Group 3				
Australia	Low	Low		
Japan	Low	Low		
Singapore	Low	Low		

Table 2: Comparison of the exposure to market and currency risk among countries

Sample period for which these patterns are identified: 1/5/1999 - 31/12/2005; Exposure to currency risk is measured in terms of a bilateral exchange rate between the US dollar and the relevant currency; A trade weighted exchange rate is used for the case of the US. Source: Author constructed

5.2 Comparison of Exposure within the Same Country in Different Time Periods: The Case of Korea

Again we can view the issue from a US citizen's point of view. Assume that a US investor wants to invest in Korean assets. However, may be due to the unpleasant memories of the currency crisis, he wants to examine how the dollar/won exchange rate exposure of Korean assets changed over the few years after the crisis. More importantly, the stochastic dominance criterion can be used in making such a decision. First, Table 3 reports the means and standard deviations of the time varying-exposure betas during three post-crisis periods of equal length (this division is completely arbitrary and is not based on any relevant structural feature). The mean values suggest that exposure during the first period is clearly higher than that in the other two periods. However, there is not much difference between the mean values in second and third periods. Strictly speaking, the exposure during the third period is slightly higher than that in the second period.

Period	No of observations	Mean of $\beta_{x,t}$	Std deviation of $\beta_{x,t}$	
(1) 8/1/1999-7/5/2001	607	1.6590	1.3768	
(2) 8/5/2001-3/9/2003	607	0.4660	1.0593	
(3) 4/9/2003-30/12/200	5 607	0.4696	0.7056	

Table 3: Mean and volatility of time-varying exposure beta for Korea during three sub sample periods

Source: Author constructed

Figure 4 depicts the CDF associated with each time period. It is evident that the period 1 is clearly first order stochastically dominated by the periods 2 and 3. Also, period 3 first order stochastically dominates period 2 and this is not well reflected in the mean values of time-varying exchange rate exposure betas. As a relevant fact, Table 3 indicates that, though the mean value for period 2 is slightly less than the mean value for the period 3, standard deviation of the exposure betas during period 2 is higher than the standard deviation of exposure betas during period 3. These results help us establish the notion that bad memories of the currency crisis in Korea are in the process of fading out over time.



Figure 4: Cumulative distribution functions of time-varying exposure beta during three subsample periods: the case of Korea Source: Author constructed

Diagnostic test results reported in Table 4 show the validity of the multivariate GARCH-M model used to obtain time-varying betas for the analysis. Ljung Box test statistic of standardized and squared standardized residuals (Q and Q^2 , respectively) are not only less than those of country level stock returns, but also less than the critical χ^2 value². This implies that the model used to derive time-varying market and currency betas is correctly specified and is able to capture linear and non-linear dependencies.

² It is worth making a special comment on the case which does not satisfy this requirement: Thailand. Q^2 statistic for standardized residuals of Thailandis below the critical value up to 11 lags ($Q^2(11) = 13.71$).

Coefficient	Australia	Canada	Japan	Korea	Singapore	Taiwan	Thailand	UK	US
Mean	-0.0265	-0.0314	-0.0161	-0.0279	-0.0339	-0.0231	-0.0169	-0.0549	-0.0536
Maximum	3.9285	4.1928	4.8650	3.9242	4.2083	5.1874	7.3946	3.0403	3.5236
Minimum	-6.1078	-5.5514	-4.7516	-7.5811	-7.9686	-5.0443	-4.7672	-5.1153	-5.3602
S D	0.9901	0.9964	0.9852	0.9999	0.9992	0.9953	1.0041	0.9979	1.0045
Skewness	-0.3933	-0.3076	-0.1846	-0.3357	-0.3358	0.0028	0.3999	-0.3553	-0.2431
Kurtosis	4.8198	4.5228	4.3655	5.5817	6.6696	4.4066	6.3975	3.6614	4.0960
J-B Stat	295.64	204.79	151.90	540.22	1056.55	150.21	924.84	71.55	109.07
Q(20) $Q^{2}(20)$	13.87 26.76	27.79 17.63	11.30 24.51	19.54 10.73	18.70 8.28	17.19 24.05	21.19 70.07	26.26 23.14	57.26 15.73

Table 4: Diagnostics: Ret	urn on country	stock indexes
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 $\overline{Q(20)}$ and $\overline{Q^2(20)}$ are Ljung-Box statistics of residuals and squared residuals for 20 lags. They follow a χ^2 distribution and the critical value at the 5% level of significance with 20 degrees of freedom is 31.41. Source: Author constructed

6. Concluding Remarks

Though the mean value of time-varying betas is often used as a measure of the market and currency risks, CDFs of beta distributions provide a better measure as it accommodates the magnitude of betas as well as the probability with which each observation of betas would occur. In this paper, we used the concept of stochastic dominance which took CDFs as its main tool to compare time-varying market and currency risks among a set of developed and emerging economies. A multivariate GARCH-M model was used to derive time-varying market and exposure betas. Two betas were not assumed to be orthogonal and, in computing time-varying beta series, the non-orthogonality was explicitly taken into account.

Empirical results show a few patterns. Stock returns in a set of emerging economies are more exposed to currency risk, though their exposure to market risk is moderate. On the contrary, the stock returns in a set of developed economies are more exposed to market risk while their exposure to currency risk is remarkably low. There exists another set of developed and emerging economies whose stock returns are less exposed to both market and currency risk. Stochastic dominance is also used to compare the currency risk in the same economy among different time periods. This provides evidence to establish the notion that the bad memories of the currency crisis in Korea is fading out over time.

References

- Adler, M. and Dumas, B. (1983) International Portfolio Choice and Corporation Finance: A Synthesis, *Journal of Finance* 88(3): 925-984.
- Bollerslev, T. and Wooldridge, J. M. (1992) Quasi-maximum Likelihood Estimation and Inference in Dynamic Models with Time-Varying Covariances, *Econometric Reviews* 11: 143-179.
- Brooks, R. D., R. W. Faff, M. D. Mckenzie and Y. K. Ho (2000) "U.S. Banking Sector Risk in an Era of Regulatory Change: A Bivariate GARCH Approach", *Review of Quantitative Finance and Accounting*, 14, pp. 17-43.
- De Santis, G. and Gerard, B. (1998) How Big is the Premium for Currency Risk?, *Journal of Financial Economics* 49: 375-412.
- Dumas, B. and Solnik. B. (1995) The World Price of Foreign Exchange Risk, *Journal of Finance* 100: 445-479.
- Giannopoulos, K (1995) Estimating the Time Varying Components of International Stock Markets' Risk, *European Journal of Finance* 1: 129-164.
- Giurda, F. and E. Tsavalis (2004) "Is the Currency risk Priced in Equity Markets?", *Working Paper # 511*, Queen Mary University of London.
- Gonzales-Rivera, G. (1996) "Time-Varying Risk: The Case of the American Computer Industry", *Journal of Empirical Finance*, 2, pp. 333-342.
- Hamao, Y., R. Masulls and V. Ng (1990) "Correlations in Price Changes and Volatility across International Stock Markets", *The Review of Financial Studies*, 3, pp. 281-307
- Jayasinghe, P. and A. K. Tsui (2008) "Time-Varying Exchange Rate Exposure Coefficients (Exposure betas): Evidence from Country Level Stock Returns", *Proceedings of the 5th International Conference on Business* Management (ICBM), University of Sri Jayewardenepura

- Lim, G. C. (2005) Currency Risk in Excess Equity Returns: a Multi Time-Varying Beta Approach, *International Financial Markets, Institutions and Money* 15: 189-207.
- MSCI. (1998) *Methodology and Index Policy*, Morgan Stanley Capital International.

Foreign Direct Investment and Economic Growth in South Asian Region

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Abstract

This study attempts to investigate the determinants of foreign direct investment and the influence of inward foreign direct investment over economic growth in South Asian region. Having identified the gap of analysis of previous literature in this regard, this study was carried out using panel data for the period 1980-2010, adopting panel least square method. Results of the study indicated that there is a significant positive influence of foreign direct investment over economic growth in the South Asian region. The gross domestic product, size of the government, population, gross domestic capital formation and human capital played a momentous role in determining foreign direct investment. To investigate the causality between foreign direct investment and economic growth, Pair-wise Granger Causality tests were employed that suggested the causality is bidirectional at 5% level of significance and uni-directional at 1% level of significance. Further, Pedroni Residual based Cointegration Test confirmed the existence of a long term influence of foreign direct investment over economic growth.

1. Introduction

Through trade and investment, a developing country can achieve a higher economic growth and the extent to which the country could achieve a higher economic growth is stimulated by the process of globalization (Athukorala, 2003). Unlike traditional theories of trade and investment which have suggested international immobility of factors of production, the modern theories consider international mobility of factors of production. In the globalized environment, where countries are not self-sufficient, they have to depend upon trade in goods and services and even in factors of production. It can be seen that it is mostly the developing nations which desire more Foreign Direct Investment (FDI). When a nation suffers from a resource or savings gap, thus causing a foreign exchange gap, an influx of FDI will be helpful in overcoming such crisis situation (Obwona, 2001). The importance of FDI as a source of external finance to developing nations is also highlighted by the international organizations and external advisors (Sahoo, 2006). Most of the developing countries, therefore, have removed restrictions on Foreign Direct Investment (FDI) and offered tax incentives and subsidies in order to encourage foreign investors (Herzer, Klasen and Nowak-Lehman 2006).

With the increasing level of globalization, FDI acts as a catalyst to economic growth (Singh, 2007). FDI may influence the recipient country through

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its impact on capital stock, technology transfer, skill acquisition and market competition (Athukorala, 2003; Obwona, 2001; Nunnenkamp and Spatz, 2003; Sahoo, 2006; Read, 2007; Dhakal et al, 2007), whereas the investing country benefits through efficient utilization of resources (Athukorala, 2003). Apart from that, low cost production facilities, management skills (Graham and Spaulding, n.d.) and augmented domestic savings and investments (Ram and Zhang, 2002) are the benefits that are available to the countries.

Some studies, however postulate that FDI might bring negative repercussions to the host country, particularly in terms of repatriation of funds, transferring inappropriate technologies, creating issues to enterprises, policy implications, creating distortion in the country's social and economic structures (Ram and Zhang, 2002). In the case of Taiwan, for instance, FDI depicted a negative impact on the process of dynamic adjustment, even though the inflow of FDI was expected to exert a positive effect in the short run and long run (Chen et al, 2008).

On the other hand, it is also hypothesized that FDI inflows to a nation is influenced by economic factors. A higher rate of economic growth, for example, is expected to stimulate FDI inflows to a nation (Sun, 2002), while more open social and cultural attitudes, developed management skills and free political system, are believed to be facilitating such inflows.

With this, it is observed that there is a significant degree of ambiguity pertaining to the influence of FDI on economic growth, and also regarding the factors that determine FDI inflows to a particular country or a region. This inconclusiveness prompted the researchers to investigate factors that affect FDI inflows to countries in the South Asian region and also the influence of FDI on economic growth of these countries, in view of suggesting policy recommendations.

This study becomes innovative as it covers the time period from 1980 to 2010 and also all South Asian countries, except Afghanistan due to lack of data. In this study, the researchers have considered both time series aspects and cross section aspects of the data in econometrically studying their dynamics. Non linearity aspects have also been taken into consideration.

Structure of the paper is as follows. In the next section, a review of previous literature is presented. Data and methodology, data presentation and analysis are presented in subsequent sections and the final section is devoted to the conclusion and recommendations.

2. Literature Review

Neoclassical theories advocate that FDI is the engine of economic growth as inward FDI enhances capital formation, generates employment opportunities, stimulates manufacturing of exports, forms spillover effects (Balamurali and Bogahawatte, 2004; Zhang, 2006), enhances market size, affects general wage level, influences the level of education, restructures institutionary environment, tax laws and overall macroeconomic and political environment. They are also the determinants of FDI in the host country (Dhakal et al, 2007). The extent to which a country has the ability to grasp advantages of FDI depends on nation's local conditions, such as absorptive capacity and developments in the local financial markets (Borensztein, et al 1998; Alfaro et al, 2006). Herms and Lensink (2004) suggest that countries can gain significantly from FDI in terms of their growth rates, only if those countries have well developed financial markets. Developing countries could acquire advanced technologies through FDI investments by multinational firms, where those technologically advanced nations account for a substantial part of research and development allowance (Borensztein et al, 1998). Developing countries could overcome the poverty and underdevelopment through proper use of FDI.

As far as determinants of FDI are concerned, the previous literature has emphasized that infrastructure development, size of the government and international competitiveness are important (Ayanwale, 2007; Udoh and Egwalkhide, 2008), whereas Tsai (1994) suggested that domestic markets, market size, trade balance and nominal wage rate too are of importance. Further it was explained that macroeconomic stability, location advantages (Obwona, 2001), technical progress (Bashir, 1999), openness, abundance of natural resources, human capital (Sawkut et al, 2009) and financial developments (Alfaro et al, 2006) also play a major role. It is noted that some studies too have suggested that there is no independent effect of FDI inflows on economic growth.

When assessing the influence of FDI on economic growth, different outcomes have been obtained by different researchers as mirrored in previous literature. Some have observed a positive (Obwona, 2001) relationship while some others have obtained negative (Agrawal, 2000) or overstated (Tsai, 1994) relationships. As far as the causality is concerned, there exists outcomes with unidirectional [FDI to economic growth (Dhakal et al, 2007), economic growth to FDI (Athukorala, 2003)] or bidirectional (Balamurali and Bogahawatta, 2004) causality. Similarly, a unidirectional relationship in the short run and bidirectional in the long run (Khan and Khan, 2011) and no relationships in short run and long run (Herzer et al, 2006) could also be found in the literature. Thus, empirical evidence on the effect of FDI on economic growth is uncertain, even though FDI, in theory, should motivate economic growth in developing countries (Lyroudi et al, 2004).

3. Data and Methodology

United Nations Geographical region classification includes Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka for the definition of Southern Asia. However, as per the World Bank classification, South Asian countries include Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The study is based on the World Bank definition and Afghanistan is excluded from the study due to the non availability of data.

The study was conducted using panel data for the period 1980–2010. Secondary data were collected from the World Bank Data Bank and other trade related documents. The study adopted the Least–Square Dummy Variable (LSDV) model which is alternatively known as Fixed Effects (FE) model, in which, intercept is allowed to vary across countries but not the individual intercept overtime.

As panel data contains more degrees of freedom and sample variability than cross sectional data or time series data, it improves the efficiency of the analysis. Apart from that, it controls omitted variables. However, the significance depends on the compatibility of the assumptions of the statistical tools with the data generating process (Hsiao, 2006).

In order to identify both determinants of FDI and the relationship between FDI and economic growth, the study employed the Cobb-Douglas production function as the base. The following shows the construction of the models based on the Cobb-Douglas production function and the study used the constant values of the variables in view of screening away price effects.

3.1 Determinants Equation The general form of the production function could be written as, $Y = AL^{\alpha}K^{\beta}$

where, Y = Out put A = Technological Progress L = Labour Input K = Capital Input $\alpha = Elasticity of Labour$ $\beta = Elasticity of Capital$

Obtaining the log transformation, the equation can be rewritten as follows:

 $\ln Y = \ln A + \alpha \ln L + \beta \ln K$

Multi variable population regression function could then be derived econometrically by introducing the stochastic disturbance term and taking first difference of the log–linear function, the new equation is generated as:

$\begin{aligned} DLFDI_{it} &= \beta_0 + \beta_1 DLGDP_{it} + \beta_2 DLHC_{it} + \beta_3 DLGOV_{it} + \beta_4 DLPOP_{it} \\ &+ \beta_5 DLNGDFCF_{it} \end{aligned}$

(In the model, i = 1....... 7 stands for individual countries and t = 1980...... 2010 stands for the sample years.)

where,

DLFDI _{it}	= First difference of the log of inward FDI
DLGDP _{it}	= First difference of the log of gross domestic product
DLHC _{it}	= First difference of the log of human capital (Proxied by gross
DLGOV _{it}	secondary school enrolment) = First difference of the log of size of the government (Proxied by
DLPOP _{it}	general government consumption expenditure)= First difference of the log of population
$DLNGDFCF_{it}$	= First difference of the log of gross domestic fixed capital
	formation net of Foreign Direct Investment.

3.2 Growth Equation

The study follows four models in determining the influence of FDI on economic growth. For the purpose of the study, researchers have used the model developed by Balamurali and Bogahawatta (2004). However, it is the observation of the researchers that this model has not incorporated an independent variable representing labour, an important determinant in the Cobb-Douglas production function. For the purpose of this study, researches, in the first instance (Model 01) therefore, have decided to introduce labour force also as a determinant. Next, it was also thought of testing the presence of Government, which the researches feel playing an important role in shaping economic growth, particularly in developing countries in South Asia which are subject to analysis in this study. Thus, a second variant (Model 02), incorporating the Government in the respective countries, – was also tested for its performance in explaining economic growth.

It is also the observation of the researchers that first differences of logarithmic values of variables mirror their growth scales. Therefore, it was felt appropriate to test out models in which year-to-year percentage growth rates of variables used in the first two models are regressed (Models 03 and 04), in the belief that such would enrich the research by (a) making available a wider choice in selecting the best fitting model, and (b) enhancing the reliability of outcomes upon emergence of consistent results.

The four models thus tested are presented below.

 $\begin{aligned} DLGDP_{it} &= \beta_0 + \beta_1 DLFDI_{it} + \beta_2 DLNGDFCF_{it} + \beta_3 DLLF_{it} + \beta_4 DLOPEN_{it}^{--}(1) \\ DLGDP_{it} &= \beta_0 + \beta_1 DLFDI_{it} + \beta_2 DLNGDFCF_{it} + \beta_3 DLLF_{it} + \beta_4 DLOPEN_{it} + \beta_5 GOV_{it}^{--}(2) \\ GDPGR_{it} &= \beta_0 + \beta_1 LFGR_{it} + \beta_2 NGDFCFGR_{it} + \beta_3 DLFDIGR_{it} + \beta_4 DLOPENGR_{it}^{--}(3) \\ GDPGR_{it} &= \beta_0 + \beta_1 LFGR_{it} + \beta_2 NGDFCFGR_{it} + \beta_3 DLFDIGR_{it} + \beta_4 DLOPENGR_{it}^{--}(4) \end{aligned}$

where,

DLGDP _{it}	= First difference of the log of GDP
DLLF _{it}	= First difference of the log of labour force
DLOPEN _{it}	= First difference of the log of openness to trade
DLFDI _{it}	= First difference of the log of inward FDI
$DLNGDFCF_{it}$	=First difference of the log of gross domestic fixed capital
	formation net of FDI
DLGOV _{it}	= First difference of the log of size of the government (Proxied by
	general government consumption expenditure)
GDPGR _{it}	= Growth rate of GDP
LFGR _{it}	= Growth rate of labour force
$NGDFCFGR_{it}$	= Growth rate of gross domestic fixed capital formation net of FDI
FDIGR _{it}	= Growth rate of FDI
OPENGR _{it}	= Growth rate of Openness

*GOVGR*_{it} = Growth rate of size of the government (Proxied by general government consumption expenditure)

For the purpose of the study, the null hypothesis of no significant impact of the independent variable on the dependent variable was tested against the alternative hypothesis of prevalence of a significant impact of the independent variable on the dependent variable.

4. Data Presentation and Analysis

Analysis of the distribution of world FDI illustrates the following. Graphs also depict the rising importance of the Asian region.



Figure 1: Distribution of FDI inflows into different economies (in US Dollars million)

Source: Author constructed based on World Investment Report, 2011 - UNCTAD

The above graph shows the distribution of world FDI inflows among developed nations and developing nations. In order to show the importance of Asia, FDI flown into Asia have also been represented. The graph depicts that FDI flown into developed economies has increased till 2007 and thereafter decreased. At the same time FDI flown into developing nations and Asia also shows a declining trend after 2007. In 2010, developing countries have received close to half of the total FDI inflows. Asia was able to grab more than half of the total FDI inflows.

Figure 02 depicts the distribution of FDI inflows into Asia among South-East Asia, South Asia* (Includes countries categorized as South Asia by the UNCTAD), South Asia** (Includes all countries except Afghanistan as per the World Bank definition of South Asian countries) and West Asia. Figure 02 further explains that the majority of the FDI inflows are flown into South-East Asia and West Asia. However, the importance of the West Asia has declined over time and its place is taken over by the South-East Asia. The importance of South Asia has a declining trend after 2008. This fact represents the appropriateness of investigating the behaviour of FDI and economic growth, in an attempt to reap the full benefit.



Figure 2: **Distribution of FDI inflows into Asia (in US Dollars million)** Source: Author constructed based on World Investment Report, 2011 – UNCTAD

For the study, researchers adopted fixed effects as suggested by the Hausman Test. Prior to the estimation process of the determinants equation and growth equation, all the variables concerned have been tested for stationary process using panel least squares unit root test (Levin, Lin and Chu test) for the period concerned. Table 01 shows the results of the Levin, Lin and Chu test of panel unit root test. All the variables that have been employed in calculating determinant equation and model 01 and model 02 are I(1) variables, whereas, in calculating model 03 and model 04, the researchers have used I(0) variables. First difference of all variables has been defined and denoted by the letter D in front of the log function.

The determinant equation is then estimated to yield the following results (Table 02). Results of the determinants equation confirm that the GDP has a significant impact on the determination of FDI. The positive sign indicates that higher GDP induces FDI and it supports the excellent performance of the country. Foreign investors get attracted to the countries when the country maintains good records of economic performance. Besides, when the country's performance improves, foreign investors are confident about the country and lead them to invest in the country. Thus, this positive relationship has been stressed in the empirical literature as well [Bashir (1999) and Alfaro et al (2006)]. Human capital exerts a significant positive influence in the determination of FDI. It is because in the South

Asian region, educated workforce is available at a cheaper rate of return that induces foreign investors to invest. Further, human capital could affect factor productivity growth through its impact on the capacity of a nation to adapt and use foreign technology. In the determination of FDI, size of the government sector affects positively and significantly. Anyanwu (2011) has also found that there is a significant positive relationship. It is because, as the government expenditure increases, investors will be confident and that leads to increase the level of FDI. As far as population is concerned, there exists a significant positive relationship. It is because of the market size. On the one hand, population provides inputs required for the efficient production, and on the other hand it creates a demand for the products. Wilhelms and Witter (1998) have also reached similar conclusions. Gross domestic fixed capital formation net of FDI exerts a significant positive relationship on FDI showing the importance of domestic investments.

Even though the R-squared is 0.3851, the explanatory power is not given the same interpretation in the panel data. There exist no multicollinearity (conducted through correlation matrix), Heteroskedasticity (Through white test that suggested probability value of obs^*R^2 is less than the chi-square test statistics) and autocorrelation in the model (Durbin-Watson Statistic).

5. Determination of the Influence of FDI on Economic Growth and Causality between FDI and Economic Growth

In order to identify the influence of FDI on economic growth, all four models have been tested and retained for further analysis. In addition to these four models, the researchers also tested the base model [that of Balamurali and Bogahawatte (2004)], and also another model comprising of growth rates of the same variables; but both these variants suffered from a number of weaknesses, and thus could not qualify to be included in the analysis.²

The independent variable representing FDI emerged significant in all models retained as satisfactorily and (at one per cent level in the models 02, 03, and 04 and at five per cent level in the model 01) and bearing a positive influence over the respective dependent growth variables tested in each model. Therefore, it could be safely concluded that FDI exerts a significant positive influence on economic growth in the South Asian countries.

This result conforms to the theoretical reasoning that FDI inflows into developing economies are growth supporting, and also to the findings of Alfaro et al (2006) and Ram and Zhang (2002). With FDI flowing into a country, its people would secure access to modern and advanced technology and know-how which would get transferred over to the national economy by way of locals having acquired know-how in such FDI-based industries moving over to domestic firms. Apart from that, locals could increase their management skills and organization skills that in turn could positively influence the GDP of a nation. As foreign

²They suffered from (a) lower explanatory power (lower value for sum of squared residuals), (b) prevalence of autocorrelation (represented by D-W Statistic), and (c) the value of the constant being significant (possibly indicating omission of variables), that led to the exclusion of these variants from further analysis.

investors would demand domestic resources, it would cause local market stimulation and greater income levels accrue to domestic resource owners. More significantly, the FDI based enterprises generally have a better exposure to the world markets thereby generating a favourable impetus on promoting exports from FDI-recipient economies.

Gross domestic fixed capital formation (net of FDI) caused a significant positive effect on economic growth in all four models. This is also emphasized in Narayan and Sanhita (n.d.). The reason is that the higher capital formation promotes economic growth by increasing productive capacity.

It is interesting to observe that introduction of labour variable proved beneficial as all models tested improved in their explanatory power with that variable than without it. Therefore, the researchers are of the opinion that the present exercise is an improvement upon Balamurali and Bogahawatta (2004). Labour force exerts a significant positive relationship on economic growth as well. Increase in labour force leads to more provision of labour and more local industries where the value addition is very high for the country concerned.

Introduction of the Government variable was another experiment done in this study. Such an introduction also falls in line with the studies conducted by Ayanwale (2007) and Udoh and Egwaikhide (2008), who have indicated that the size of the government would be regarded as a determinant of growth. This appears to have been reconfirmed in the present exercise where all variants of models estimated improved in their explanatory power (as indicated by the lowered sum of squares of residuals) whenever the 'Size of the Government' proxy was introduced as a determinant. There could be a number of economic explanations to this effect, including (a) the possibility of economic stability through better national security and regular mechanisms through Governmental intervention, (b) public investment facilitation in Government's economic activities including public enterprise management and infrastructure development, (c) better reaching needy segments with necessary assistance (welfare and social security) preventing degradation of their purchasing power and thus managing effective demand among low income masses in these counties-, and also (d) development of more human and social capital which would promote and strengthen economic growth.

In the presence and absence of the government consumption variable, models 01 and 02 showed contradictory results (a positive and negative respectively) with respect to the influence of openness over economic growth. However comparing model 03 and model 04, the inclusion or exclusion of the government consumption variable has not changed the sign of the openness variable, thus representing a positive influence over the growth. According to these results, the influence of openness over GDP cannot be directly confirmed, and needs further investigation through research in order to confirm the behaviour. However, comparing sum of squared residuals for all models represented that the best explained is model 02. Therefore, the study concludes that there exists a significant positive influence of openness on economic growth (according to model 02). This also represents the growing importance of the process of globalization.

R -squared value of the models represents the explanatory power of the model. In the case of panel data, the value has no meaningful insight. There exist no
multicollinearity (conducted through correlation matrix), Heteroskedasticity (Through white test that suggested probability value of $obs*R^2$ less than the chisquare test statistics) and autocorrelation in the model (Durbin- Watson Statistic).

As far as four models are concerned, sum of squared residual is the lowest in model 02 and could be concluded that model 02 is the best explained model in analyzing the relationship between FDI and economic growth.

6. Causality among Variables

Analysis of the causality between variables indicates that the null hypothesis of DLFDI does not granger causes DLGDP is rejected at the 5% of significant level. Thus, FDI is a function of GDP at five per cent of significance level. When analyzing the reverse causality, probability at 1% with two lags indicates the null hypothesis of DLGDP does not granger causes DLFDI is rejected and DLGDP is included as a determinant of DLFDI. Causality, therefore is bidirectional at 5% level of significance (with 4 lags) and uni-directional at 1% level of significance (with 2 lags) (refer to Table 4).

7. Tests for Cointegration

In order to test for long run relationship, researchers have employed the cointegration test. Pedroni Panel Cointegration test results are given in Table 5. The test has been carried out with the null hypothesis of no cointegration. The result indicated that the null hypothesis could be rejected at 1% level of significance for all test statistics. Thus, the researchers concluded that there is cointegration between FDI and GDP.



Figure 3: Inward FDI trend in the South Asian countries Source: Author constructed

8. Conclusion and Recommendations

Most of the developing countries have significantly eliminated restrictions on foreign direct investment and have taken measures to attract foreign capital (Herzer, 2010). Through FDI, a nation can acquire foreign technology and know– how and with direct capital financing, FDI helps economic growth and thus towards economic development (Alfaro et al, 2006) and foreign investor confidence (Sun, 2002). However, potential negative effects to the host country have also been considered (Ram and Zhang, 2002). The higher rate of economic growth might induce FDI for a nation through improvements in social and cultural attitudes, enhanced management skills and free political system.

According to the determinants of FDI, the study concluded that economic growth, human capital, size of the government, population and gross domestic fixed capital formation (net of FDI) exert positive and significant relationships. In the determination of the growth rate, researchers have found out that, FDI, gross domestic fixed capital formation, government expenditure and labour force are of importance and all variables have shown positive impacts on the determination of growth, whereas the relationship between openness and GDP is not clear in the results and require more investigation. As far as causality is concerned, FDI causes

GDP at 5% level of significance with 4 lags and GDP causes FDI at 1% level of significance with 2 lags. Cointegration shows that there exists a long run relationship. The study could finally conclude the prevalence of short run and long run relationship between FDI and economic growth.

As FDI exerts a positive effect on economic growth, any increase in FDI leads to an increase in the economic growth of the countries in the South Asian region. Thus, in South Asian region, FDI has played a central role in the short run. That is clearly visible in all four models. FDI has become a vital factor in stimulating the growth potential of South Asia. Thus, the government should promote FDI into the country and at the same time, the countries should ensure that FDI is flown into productive activities in order to reap the full benefits out of it. Increase in GDP would increase investors' confidence about the country and on the return of the investments as well. A higher economic growth would imply both developed infrastructure and financial markets. This would also increase the attractiveness of the country for foreigners. As FDI has a positive impact, the nations should also capture the developed technology, know-how and managerial skills and channel them into the domestic production thereby increasing the productivity potential of the domestic firms. Apart from that, government should promote export oriented strategy that will help to develop the production in the domestic nation.

Thus, national policies should be adopted to strengthen the relationship between FDI and domestic investments and such relationship has to be complementary rather than competitive. Apart from that, FDI externalities might have trivial effects if the links with local business were weak. Thus, it is suggested to increase the domestic savings thereby strengthening the linkages between foreign investors and domestic producers.

When educated labour force is available at a cheaper/concessionary rate, foreign investors are motivated to invest in that country. Thus, this leads to an increase in inward FDI flows. Apart from that, when people are more educated, they will make their investments in the domestic nation that makes the overall value addition to the nation high. This would increase GDP of the country and the governments should take necessary steps to use the productive workers in an attempt to have a positive economic growth. When the domestic market size is continuously expanding, it directs the foreign investors to spread out their activities and it gives them a larger consumer base as well. Increase in the productive labour force would increase the production capacity and GDP of the country as well. Increase in capital formation represents a higher level of social capital and that would get added to production and growth. Increase in social capital would motivate the foreign investors. Further, the more open the trade of a nation is, the more its economic growth will be. This will on the one hand help the consumers and producers, while on the other, would increase the size of the globalization.

As there is a bi-directional causality, it has imperative policy implications. If GDP growth attracts more FDI inflows, then promotional policies to encourage inward flows of FDI alone may become futile. Instead, efforts should be directed to other probable sources of growth. Once growth is enhanced and stimulated, foreign capital will be attracted. This study would be a guide to future research. The research could be extended by analyzing sector wise FDI inflows and domestic value added to each sector. Apart from that, one could carry out a comparative analysis with regard to different sectors. Moreover, separate country-wise analysis could be performed to analyze the relationship between FDI and economic growth in the presence of military/defense expenditure. This type of analysis would be of utmost importance for countries that suffer from civil wars/ unrests. Another important study would be to find out the relationship between exports and FDI. Finally, the same study can be done using primary data and check for differences between the results obtained from secondary data and from primary data. The study could also be extended by the results of the causality and cointegration to provide more sizable results and cross region comparison could be generated.

Since in this study researchers have considered and analyzed data for open economies, it is apparent that the coefficient of openness variable tends to be positive. Thus, results of this study are region specific and further exertion is to be done in order to generalize the scenario into global context. However, this study would be a starting point for such an analysis.

References

- Agrawal, P. (2000) Economic Impact of Foreign Direct Investment in South Asia, Indira Gandhi Institute of Development Research, Mumbai. (http://books.google.com/books?hl=en&lr=&id=2nkdTPzjoucC&oi=fnd& pg=PT144&dq=Agrawal,+P.+(2000)+Economic+Impact+of+Foreign+Dir ect+Investment+in+South+Asia&ots=6-qZbkNBSX&sig=8G63eE1B9-5Q5DUm5Cwkcl8grKE)
- Alfaro, L., Chanda, A., Kalmli-Ozcan, S. and Sayek, S. (2006) How does foreign direct investment promote economic growth? Exploring the effects of financial market linkages. NEBR Working Paper No 1522, Cambridge.
- Anyanwu, John C. (2011), Determinants of Foreign Direct Investment Inflows to Africa,1980 - 2007, Working Paper Series NO 136, African Development Bank, Tunisia.
- Authokorala, P.P.A.W. (2003) The Impact of Foreign Direct Investment for Economic Growth: A Case Study of Sri Lanka. 9thInternational Conference for Sri Lanka Studies. (28th – 30th November 2003,Matara, Sri Lanka)
- Ayanwale, A. B. (2007) FDI and Economic Growth: Evidence from Nigeria. *African Economic Research Consortium*, AERC Research Paper 165, Nairobi.
- Balamurali, N. and Bogahawatte, C. (2004) Foreign Direct Investment and Economic Growth in Sri Lanka. *Sri Lankan Journal of Agricultural Economics*, 6 (1): 37 50.
- Bashir, Abdel-Hameed M., "Foreign Direct Investment and Economic Growth in Some MENA Countries: Theory and Evidence"(1999). *Topics in Middle Eastern and North African Economies*. Paper 9. http://ecommons.luc.edu/meea/9.

- Borensztein, E., De Gregorio, J. and Lee, J.W. (1998) How does foreign direct investment affect economic growth. *Journal of International Economics*, 45: 115 135.
- Chen, H. F., Chiang, S. M., & Lin, M. K. (2008). Foreign direct Investment and economic growth in Taiwan- a cointegrated VAR approach. *Journal of Economic Literature*, 46 (3): 853 – 866.
- Dhakal, D., Rahman, S. and Upadhya, K.P. (2007) Foreign Direct Investment and Economic

Growth in Asia. Indian Journal of Economics and Business, 6(1): 15 – 26.

- Graham, J.P. and Spaulding, R.B. (n.d.) Understanding Foreign Direct Investment, City Bank International Business Portal. (URL)
- Herms, N. and Lensink, R. (2004) Foreign Direct Investment, Financial Development and Economic Growth. *The Journal of Development Studies*, 40(1): 142 – 163.
- Herzer, D., Klasen, S., and Nowak- Lehmann, D. (2006) In search of FDI- led growth in developing countries. *Economic Modeling*, 25 (5): 793 810.
- Herzer, D. (2010) Outward FDI and economic growth. *Journal of Economic Studies*, 37(5): 476 494.
- Hsiao, C. (2006) Panel Data Analysis Advantages and Challenges. IEPR Working Paper 6.45, University of Southern California.
- Khan, M. H. and Khan S. A. (2011) Foreign Direct Investment and Economic Growth in Pakistan: A Sectoral Analysis. PIDE Working Papers, Pakistan Institute of Development Economics, 2011: 67.
- Lyroudi, K. Papanastasiou, J. & Vamvakidis, A. (2004) Foreign Direct Investments and Economic Growth in Transition Economies. *South Eastern Europe Journal of Economics*, 1: 97 – 110.
- Narayan, S. and Sanhita, S. (2011) Effect of FDI and Economic Growth in Bangladesh and India: An Empirical Investigation.*International Journal of Economic Perspectives*
- Nunnenkamp, P. and Spatz, J. (2003) Foreign Direct Investment and Economic Growth in Developing Countries: How relevant are host country and industry characteristics. Kiel Working Paper No 1176, Germany. Kiel Institute for World Economics.
- Obwona, M. B. (2001) Determinants of FDI and their Impact on Economic Growth in Uganda. *African Development Review*, 13 (1): 46 81.
- Ram, R. and Zhang, H. (2002) Foreign Direct Investment and Economic Growth: Evidence from cross country data for the 1990s'. *Economic Development* & *Cultural Change*, 51 (1): 205 – 215.
- Read, R. (2007). Policy arena foreign direct investment in small island developing states. *Journal of International Development*, 20 (4): 502 525.
- Sahoo, P. (2006) Foreign Direct Investment in South Asia: Policy, Trends, Impact and Determinants. ADB Institute Discussion Paper No 56, Asian Development Bank.

- Sawkut, R., Boopen, S., Taruna, R.S. &Vinesh, S. (2009) Determinants of FDI: Lessons from African Economies. *Journal of Applied Business and Economics*, 9 (1): 70 – 80.
- Singh, L. (2007) India's Economic Growth and the Role of Foreign Direct investment. Munich Personal ReREc Archive, MPRA paper No. 642 (http://mpra.ub.uni-muenchen.de/6427).
- Sun, X. (2002) Foreign direct investment and economic development: What do states need to do? mimeo, The World Bank, summarizes the main benefits and the potential negative impacts of FDI on host economies, Washington, D.C.
- Tsai, P. (1994) Determinants of Foreign Direct Investment and Its Impact on Economic Growth. *Journal of Economic Development*, 19 (1):137-163.
- Udoh, E. and Egwaikhide, F. O. (2008) Exchange Rate Volatility, Inflation Uncertainty and Foreign Direct Investment in Nigeria. *Botswana Journal* of Economics, 5 (7): 14-31.
- World Bank Data Bank http://databank.worldbank.org/data/views/variableselection/selectvariables .aspx?source=education-statistics-~-all-indicators
- Wilhems S. K. S and Witter M. S. D (1998) Foreign Direct Investments and its determinants in emerging economies, African Economic Policy Paper, Discussion Paper.
- Zhang, K. (2006). Foreign Direct Investment and Economic Growth in China: A Panel Data study for 1992-2004. Conference of WTO, China and Asian Economies, University of International Business and Economics, Beijing, China.

Variable	Probability			
variable	Level	First Difference		
LFDIN	0.0126*	0.0000**		
LGDP	0.6972	0.0036**		
LGOV	0.7238	0.0000**		
LHC	0.4580	0.0000**		
LPOP	0.0236*	0.0004**		
LNGFCF	0.0058**	0.0001**		
LLF	0.2318	0.0416*		
LOPEN	0.6743	0.0000**		
LCPI	0.0054**	0.0285*		
L(FDI*HC)	0.3421	0.0005**		
GDPGR	0.0000**	0.0000**		
LFGR	0.0008**	0.0000**		
NGFCFGR	0.0079**	0.0000**		
FDINGR	0.0000**	0.0000**		
OPENGR	0.0367*	0.0076**		
GOVGR	0.0000**	0.0000**		

Table 1: Results of the panel unit root test – Levin, Lin and Chu test

**significant at 1% * significant at 5%

Source: Author constructed

Table 2: Results of the determinants equation				
Estimation output of the determinants equation $DLFDIN_{it} = \beta_0 + \beta_1 DLGDP_{it} + \beta_2 DLHC_{it} + \beta_3 DLGOV_{it} + \beta_4 DLPOP_{it} + \beta_5 DLNGDFCF_{it}$				
Variable	Coefficient	Probability		
Constant	-9.5773	0.3875		
DLGDP	0.6850	0.0000**		
DLHC	0.2573	0.0005**		
DLGOV	1.3753	0.0126*		
DLPOP	0.4392	0.0000**		
DLNGDFCF	0.7562	0.0000**		
R- Squared = 0.3851				
Durbin Watson Statistic $= 2.0057$				

Table 2. Degulta of the determinents equation

**significant at 1% *significant at 5% Source: Author constructed

	Mod	el 01	Mod	el 02	Model 03		Model 04		
Variable	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	
Constant	0.0012	0.8472	0.3211	0.5462	0.7752	0.0632	0.5643	0.5375	
DLFDI	0.0413	0.0225*	0.1673	0.0000**	-	-	-	-	
DLCDFCF	0.8584	0.0000**	0.6972	0.0001**	-	-	-	-	
DLLF	0.1607	0.0000**	0.4307	0.0045**	-	-	-	-	
DLOPEN	-0.4636	0.0000**	0.0201	0.0432*	-	-	-	-	
DLGOV	-	-	0.3534	0.0000**	-	-	-	-	
LFGR	-	-	-	-	0.3275	0.0000**	0.0243	0.0057**	
GDFCFGR	-	-	-	-	0.0052	0.0011**	0.0502	0.0000**	
FDIGR	-	-	-	-	0.0175	0.0000**	0.0072	0.0000**	
OPENGR	-	-	-	-	0.523	0.0537	0.2365	0.0153**	
GOVGR	-	-	-	-	-	-	0.723	0.0325*	
R squared	0.5	846	0.5	213	0.4813		0.514		
Sum of squared residuals	2.0	335	2.0	241	2.4	123	2.2	232	
D-W statistic	2.0	651	2.0	2.0032		2.0123		2.071	

Table 3: Results of growth equations

**significant at 1% *significant at 5% Source: Author constructed

1 abit 4. Results of the pair wise of anger Causanty test						
Results of the Pair-wise Granger Causality test						
Null Hypothesis	Probability					
	Lags = 2	Lags = 3	Lags = 4			
DLFDIN does not granger cause	0.5605	0.8931	0.0342*			
DLGDP	0.0065**	0.0021**	0.0000**			
DLGDP does not granger cause						
DLFDIN						

Table 4[•] **Results of the pair-wise Granger Causality test**

**significant at 1% *significant at 5% Source: Author constructed

Table 5: Results of the PedroniCointegration test						
Results of the Pedroni Panel Cointegration test						
Statistic Probability						
Panel v – Statistic	-0.5674	0.0000**				
Panel rho – Statistic	-2.5436	0.0000**				
Panel pp – Statistic	-6.8754	0.0045**				
Panel ADF – Statistic	-5.8765	0.0002**				
Group rho – Statistic	-3.2341	0.0000**				
Group pp – Statistic	-6.9834	0.0003**				
Group ADF – Statistic	-2.6432	0.0000**				

**significant at 1%

Source: Author constructed

Policy Failure on Poverty Reduction in Bangladesh: Seeking an Alternative through RNFE

Mohammod Lutful Kabir¹

Abstract

Poverty remains an overarching problem for policy makers in Bangladesh since its independence in 1971. Though the country has experimented different socialist as well as open market policies to alleviate poverty, still more than 40 per cent of its population remain below the national poverty line. This paper attempts a critical evaluation of the contemporary poverty reduction policies implemented in Bangladesh and argues why such policies have failed to succeed at the given socio-economic structure of Bangladesh. A framework of analysis has been developed to delineate these arguments graphically. Furthermore, this paper demonstrates why the development of Rural Non-Farm Economy (RNFE) would be a better policy option to alleviate poverty under the current socio-economic context of Bangladesh, and presents a statistical model that can be used as an alternative framework for poverty reduction through RNFE development in Bangladesh. Similar models may also be adopted in other developing countries of Asia.

1. Introduction

Bangladesh has experienced a 5–6 per cent growth in real GDP over the last ten years² (European Community 2007; World Bank 2010a; World Bank 2010b); after considering a 1.32 per cent growth rate in population³ though, per capita GDP managed to grow at an average rate of four per cent during the period. However, due to the discontent in government poverty reduction policies, widespread poverty still remains a major policy concern for the country. While per capita income (using Purchasing Power Parity) in 2009 was USD 1585 or more than USD 4 per day, 40 per cent of people still remain below

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²Real GDP is projected to grow at a 5.5 per cent rate in 2010 (World Bank 2010b). During the period 2001–09, the average growth rate in GDP was 5.8 per cent. This average rate, however, shows an increasing trend in the later part of the decade and attained a 6.3 per cent rate during the period 2006–09. See more on World Bank 2010a.

³This was the projected rate of population growth in 2009–10. See more on Government of Bangladesh (GOB) (2010).

the national poverty line (Government of Bangladesh (GOB) 2010; World Bank 2010a). The incidence of poverty in rural areas is even higher than that in urban areas⁴. Further, though the poverty headcount ratio based on the national poverty line has declined to its current 40 per cent level from 51 per cent in 1995, the rate of poverty reduction is sluggish in rural areas (World Bank 2010a). As shown in Table 1, the rate of poverty reduction in rural areas needs to be doubled in order to attain the target of the Millennium Development Goals (MDGs)⁵ by 2015.

Table 1: Annual rate of poverty reduction (attained vs. MDG target required), 2007

Rates	Rural	Urban	National
Existing rate of poverty* reduction	1.82	2.27	2.01
(1990-2007)			
Required rate to attain MDG target by	3.46	2.31	3.00
2015			

Source: Extrapolation from (1) Mid-term progress report on MDG 2007 GOB (2007a); (2) Bangladesh economic review 2007, GOB (2007b).

*The official rate of poverty is calculated using Cost of Basic Need (CBN) approach which is a uni-dimensional approach to measure poverty (BBS 2007). MDGs mean Millennium Development Goals.

The concept of uni-dimensional poverty mentioned above considers poverty from a single dimension like lack of adequate food or income. Income is the major though not the sole factor contributing to human poverty (UNDP 2000; Sen 2009). Empirical study indicates that even when services like education or health care are provided free of cost, opportunity cost or other hidden charges may obstruct poor rural households with lower income or endowment to enjoy those services⁶ (Transparency International 2006). However, contemporary development policies in Bangladesh have failed to ensure a broad based income growth for rural poor. This paper will demonstrate

⁴According to the latest Household Income and Expenditure Survey (HIES), the percentage of rural and urban population living below the national poverty line was 43.8 per cent and 28 per cent respectively (BBS 2007b). The 40 per cent national poverty rate was much closer to the rate of poverty in rural areas because three-quarters of the total population of Bangladesh lives in rural areas. See more on GOB (2010) and UNDP (2010).

⁵The objective of MDG is to halve the number of people who live below USD 1 per day (PPP) during a period between 1990 and 2015. See more on GOB (2009).

⁶For example, sometimes the informal payment needed to be made for the safe delivery of a baby in a public hospital is around two months average income of households in Bangladesh. Though these services are freely provided in public hospitals, hidden costs to such services include the rent-seeking in public hospitals (Transparency International 2006).

why contemporary poverty reduction policies based on agriculture and industrial development have failed to reduce widespread poverty in the country and how development of Rural Non-Farm Economy (RNFE) could accomplish this poverty reduction objective in a much better way.

In this paper RNFE is defined as a set of different forward and backward linkage activities to agriculture, craft activities, and rural services including:

- the supply of fertiliser and seeds;
- repairing agricultural machinery;
- transporting agricultural goods to the market;
- petty trading activities (e.g. hawking, vending and shop-keeping); and
- services of rural doctors, teachers, and other self-employed workers or employees in different craft activities⁷ (e.g. blacksmith and pottery).

However, agricultural activities like crop production, animal husbandry, poultry, fishery, and nursery businesses are not included as RNFE.

2. Objectives and Methodology

The objective of this paper, firstly, is to demonstrate the shortcomings of contemporary poverty reduction policies in Bangladesh and understand why such policies have failed to alleviate widespread poverty, especially in rural areas and among women. It also seeks to answer whether development of RNFE could be a better alternative strategy for effective poverty reduction in the country. After discussing the nature and extent of poverty in section 3, section 4 highlights alternative pathways that the government may use to overcome such poverty. The next section presents a framework of analysis that can be used to choose the most effective pathway for poverty reduction, considering the socioeconomic context of Bangladesh. The framework for policy evaluation developed in this section is also used to evaluate the effectiveness of past poverty reduction policies and identify their loopholes.

Section 6 is then used the same policy evaluation framework to predict the success of RNFE development as an alternative poverty reduction policy in Bangladesh. This section also includes an alternative framework developed for poverty reduction through RNFE development and presents results from an empirical survey among 357 rural households in Bangladesh. It demonstrates the strength of RNFE capabilities in reducing their poverty among rural households. The Structural Equation Modeling (SEM) is used to analyze 42 variables under six different factors that may affect household capabilities to get involved in high income RNFE activities and to get rid of their poverty. 22 of those variables were found statistically significant and loaded under four different factors that were used in section 6.2 to develop a statistical model on

⁷According to the Macquarie Online Dictionary, handicraft means "*a particular manual art or occupation*" and "*the product of such manual art or occupation*". See more on Macquarie Online Dictionary 2010.

poverty reduction through RNFE development in Bangladesh. A list of statistically significant variables is given in Appendix A.

3. Poverty and its Nature in Bangladesh: A Review

In Bangladesh, poverty⁸ affects 27 million people who do not have the ability to consume at least 1805 kilo calories per day (GOB 2010). The poverty head count index and poverty gap index⁹ shown in Table 2 indicate that both the incidence and depth of poverty has been reducing over the years. Moreover, a reduction in the squared poverty gap index¹⁰ indicates that the severity of poverty is also reducing. However, in all three aspects, poverty remains higher in rural areas (Bangladesh Bureau of Statistics (BBS) 2007; GOB 2010). A comparison between percentage changes in the poverty gap and squared poverty gap shown in Table 2 indicates that extreme poverty is declining in a faster pace than the overall rate of poverty reduction in the country. Though in both urban and rural areas, extreme poverty has declined at a similar pace, still 69.3 per cent¹¹ of the total number of extreme poor resides in rural areas. Therefore, poverty reduction in rural areas needs some special emphasis from the government and policy makers in Bangladesh.

⁸In Bangladesh, generally poverty is calculated in Cost of Basic Need (CBN) approach – a uni-dimensional approach that solely depends on the level of consumption by the households. Those who do not have an ability to consume 2122 kilo calories per day are considered poor. The last official statistics of a 40 per cent rate of poverty come from the Household Income and Expenditure Survey (HIES) 2005. See more on BBS (2007) ⁹This indicates the depth of poverty. A poverty gap is the additional amount of consumption (income) that is required to bring the total number of poor people above the poverty line. The poverty gap is calculated by subtracting the actual consumption of poor from the minimum required consumption (income) suggested in a poverty line. This gap is assumed to be zero for all non-poor. A poverty gap index is then calculated by adding the gap for all poor and dividing the result by the number of poor. Therefore, the poverty gap index measures the extent to which poor people on an average fall below the poverty line. See more on Haughton and Khandker (2009).

¹⁰A squared poverty index takes into account the inequality among poor. While a simple average poverty gap is measured to calculate the poverty gap index, the squared poverty gap index for every individual poor is weighted by the percentage distance of original consumption from the poverty line. So, a person who is poorer and far away from the poverty line gets higher weight. After getting the summation of weighted poverty gap for each poor, it is divided with the aggregate minimum consumption required for all poor to attain the minimum consumption indicated by the poverty line. An average shortfall is calculated by dividing total weighted poverty gap with the total minimum consumption. This average figure is then squared to get the squared poverty index. See more on Haughton and Khandker (2009).

¹¹This rate is calculated by dividing the number of extreme poor in rural area by the total number of extreme poor in the country.

	2005*	2000	% change (2000 to 2005	1991-92	% change (1991-92 to 2000)	
Head count in	dex					
National	40.0	48.9	-3.9	58.8	-1.8	
Urban	28.4	35.2	-4.2	44.9	-2.2	
Rural	43.8	52.3	-3.5	61.2	-1.6	
Poverty gap index						
National	9.0	12.8	-6.80	17.2	-2.9	
Urban	6.5	9.1	-6.51	12.0	-2.5	
Rural	9.8	13.7	-6.48	18.1	-2.8	
Squared pove	rty gap in	dex				
National	2.9	4.6	-8.91	6.8	-3.8	
Urban	2.1	3.3	-8.64	4.4	-2.7	
Rural	3.1	4.9	-8.75	7.2	-3.8	

Table 2: Trend on poverty reduction in Bangladesh 1991-2005

Source: GOB 2010

One reason for higher rural poverty is increased landlessness among rural people. As Bangladesh is not industrially developed yet, poverty and food insecurity in Bangladesh are directly linked to the ownership of land. As depicted in Table 3, 57.08 per cent of households are effectively landless with a land holding less than 0.5 acre. More than 50 per cent of these households also remain below the absolute poverty line. The distribution of land tenure is skewed and concentrated in the hands of few big land holders (BBS 2007). Therefore, though the agricultural sector remains as the largest employer in the economy, due to widespread landlessness, poor wages¹² and seasonality in employment opportunities, this sector fails to generate subsistence income to the virtually landless poor (GOB 2010). A high rate of absolute poverty among the landless poor (see Table 3) also indicates that agro-based poverty reduction policies have lower impact on reducing their poverty, and that peasant households do not have access to any alternative means of income to escape poverty.

¹² Laborers in agricultural sector are receiving much lower wages than those involved in the industrial sector. While the base wage of Tk.100 (AUD1.43) for industrial workers in 1970 increases to Tk.6128 (AUD 87.54), in the fiscal year 2008–09, for agricultural workers the wage index increases to only Tk.4274 (AUD 61.06) for the same period. This rate is even lower than the Tk.5026 (AUD 71.8) index value for the general wage level increase in the economy.

For the second					
Land Holding	% of households (2005)	% in Absolute poverty (2005)			
Land less	4.15	66.60			
0.01-0.04 acre	15.84	65.70			
0.05-0.49 acre	37.09	50.70			
0.50-1.49 acre	24.04	37.10			
1.50-2.49 acre	9.28	25.60			
2.50-7.49 acre	8.63	17.40			
>7.50 acre	0.99	03.60			

Table 3: Percentage of people below the national poverty line (2005*)

Source: Estimation from HIES 2005 (BBS 2007).

* This is latest Household Income and Expenditure Survey (HIES) conducted by the Bangladesh Bureau of Statistics (BBS)

Women in rural Bangladesh are even more vulnerable to agro-centric development. This due to many social stigma that restrain women from working in field or even compel them to forfeit their inherited land to their brothers (Khair 2008; Monsoor 1999).

While agriculture has a lower potential for poverty reduction in rural areas, especially for rural women, the prospect for employment and income generation through industrial sector is not impressive either. In terms of employment generation, the industrial sector is contributing only negligibly. For example, according to the latest labour force survey, only 13.53 per cent of the total labour force was engaged in the manufacturing sector (GOB 2010). The ratio of participation of women in the industrial labour force was also very low (GOB 2010). Moreover, as industrial profits are concentrated in the hands of limited number of capitalists, it can be expected that the less educated and less skilled labour force might not be able to share the benefits of growth attained through private industries.

Following this socio-economic context of Bangladesh, the forthcoming sections explain a framework to evaluate poverty reduction policies in Bangladesh and then evaluate the potential of RNFE development as an alternative poverty reduction policy in comparison with other contemporary poverty reduction policies of Bangladesh.

4. Options for Enhanced Effectiveness of Poverty Reduction Policies in Bangladesh

A linkage between the lack of endowment for rural poor and their lower accessibility to different government services to eradicate poverty, as mentioned above, indicates that government has two different options to enhance the capabilities of the poor and thereby to reduce their poverty: (a) the government may increase subsidies to cover any hidden costs and thereby attract the poor to access government services; or

(b) the government may create better job opportunities for the poor by enhancing their endowment and making them more capable to access government services to reduce their poverty.

For a resource poor country like Bangladesh, the second option is more viable for the government. Furthermore, the availability of limited land resources, low rate of capital formation and lack of women empowerment all remain important factors to decide about an effective poverty reduction policy for Bangladesh.

Thus, the next issue is to critically analyse the major poverty reduction policies that governments have taken over the years to enhance the endowment of the poor, and why the development of RNFE would be a better alternative compared to those other policies taken so far. However, before moving to that discussion, a framework of analysis is developed in the next section. The framework is then used to compare the opportunities for the development of RNFE in comparison with other major developmental policies implemented by the government so far to enhance the income and endowment of the poor.

5. Poverty Reduction Policies in Bangladesh: A Critical Evaluation

It has already been noted that different governments in Bangladesh have taken initiatives to reduce poverty by building capabilities of the poor, and that one common factor hindering the poor from getting equal access to government services is the inadequacy of their endowment. Endowment includes all tangible and intangible assets that are legally owned by a person. This section now discusses different government policies that have been taken to reduce poverty and enhance endowment of the poor. However, as mentioned earlier, a framework is developed first to make a comparative analysis of the different poverty reduction policies taken so far.

5.1 A Framework to Evaluate the Effectiveness of Alternative Poverty Reduction Policies

It is imperative to find an alternative poverty reduction strategy that would provide better endowment to the poor and make them able to access different goods, services, and amenities to escape poverty from all dimensions of their lives. The factors impacting this include:

- the scarcity of agricultural land,
- the high rate of unemployment and underemployment,
- the lower wage rate of unskilled labourers,
- lack of infrastructure and other government facilities required for broadbased industrial development, and
- lower access to different government services by the poor.

Based on the nature of poverty and structure of the economy discussed earlier, the following criteria are used to evaluate an alternative strategy suitable for boosting endowment and reducing poverty:

(1) relies less on the availability of land and heavy infrastructure;

(2) generates more employment for the available unskilled and low-skilled labour force;

(3) allows the poor to share the benefits of government services through better income; and

(4) creates more jobs for women who usually suffer a larger burden of intra-household poverty due to their lower engagement in economic activities.

Using these four criteria, a framework (Figure 1) has been developed to evaluate the effectiveness of alternative strategies for poverty reduction through enhanced endowment for poor.



Not in Labor Force



5.1.1 Structure of the Framework

In both of panel A and panel B, unemployment is measured on the horizontal axis from right to left, starting from the full employment level¹ at L_F . The use of capital is shown on the vertical axis. The vertical line at L_F indicates that labour supply is fixed at this label and so does not change as the use of capital changes on the vertical axis. The horizontal line at K_C is drawn to show the capital constraint of the economy. It is assumed that for a certain period of time, the maximum available capital stock is fixed at K_C and so does not vary with the use of labour, once the maximum level is attained at K_C . This is consistent with the lower level of investment and capital formation in Bangladesh (GOB 2011). Two different types of Iso-Cost cures, CIC and LIC, are taken in both panel A and panel B. The CIC curves are drawn for capital intensive industries and are relatively steep because in capital-intensive industries, the marginal rate of substitution of labour for capital remains low.

On the other hand, LIC curves are drawn to represent Iso-Cost curves for labour intensive production and are relatively flat because the marginal rate of substitution of labour for capital remains high for labour intensive industries. Iso-Quant (IQ) curves are drawn to show different levels of output. Higher IQ curves show higher production. Optimal production decisions can be made where any IQ curve becomes tangent with another Iso-Cost curve (like points X, Y or Z). The level of employment is determined on the horizontal axis where an Iso-Quant curve is tangent with an Iso-Cost curve. The level of unemployment is then measured by deducting the level of employment from the full employment level (e.g., $L_{\rm F}$). The equilibrium level of production changes due to an upward or downward shift in Iso-Quant or Iso-Costs curves. Since the land is already scarce in Bangladesh, and the paper is seeking an alternative poverty reduction policy that is not directly linked with available land, availability of land resources is not included explicitly, rather implied as constant, in this framework.

5.1.2 Choice of Appropriate Technology

If stock of capital is constrained at K_C and labour supply is constrained at the full employment level L_F , by using labour-intensive technology the country will be able to produce at the Iso-Quant curve IQ_2 and attain full employment at L_F (panel A). Production at L_F in panel A ensures maximum use of scarce capital resources and a full employment of labour. However, by using a capital intensive technology at point X in Panel A, the country can attain only a lower Iso-Quant curve IQ_1 that will cause huge unemployment of UL_F.

Full employment level is attained where all people in the labour force are employed. At this level, there is no cyclical or seasonal unemployment. However, at the full employment level or at 'full employment level of unemployment', there is no frictional, structural or classical unemployment that may happen at an above equilibrium wage rate that creates excess supply in the market. See more on Dornbusch et al (2006).

Therefore, while formulating its poverty reduction policy, the country will be better of economically by following strategy 1, which ensures higher production and lower unemployment. Another important consideration is the elasticity of factor substitution. As discussed earlier, Bangladesh is a labour abundant and capital scarce country. Therefore, choice of a labour intensive technology as shown on point Y of panel A will be appropriate for the country. However, as the unskilled surplus labour of the economy is not suitable for employment in the urban industrial sector, an appropriate sector must be identified where this surplus labour force can suitably be employed.

5.1.3 Relevance of Labour-intensive Technologies to Poverty Reduction and Gender Equality

Income from this labour intensive production is more evenly distributed among a large number of labourers in the economy. In contrast, capital intensive production concentrates income in the hand of a limited number of well-off capitalists. Therefore, greater reliance on labour intensive technologies will provide higher employment and a better share for the poor to income generated through such production. Further, by using this strategy, the country may be able to reduce gender disparity in income. For example, if such income generating activities can be promoted, in which women can participate suitably without breaking social norms that sometimes restrain them from working outside as agriculture or formal sector labourers, the resulting higher participation of women will make a rightward shift in the full employment level from L_F to L'_F (Panel B). Using this greater labour force and capital stock constrained at K_C, the country will be able to produce an even higher level of GDP at point Z of IQ_3 . Therefore, using this strategy is worthwhile for attaining higher growth, more equitable income distribution and a greater level of gender equality in the country.

5.2 Evaluation of Poverty Reduction Policies taken in the Past

Components of this framework described above are applied in the subsequent discussion of this section to evaluate the effectiveness of the government policies taken so far. A discussion in the next section compares the effectiveness of these policies in comparison with the potential that can be attained through RNFE development as a means of poverty reduction in Bangladesh.

5.2.1 Development through Agriculture with Scarce Land Availability

Since Bangladesh's first Five Year Plan (FYP) in 1973, agricultural development has always had a high priority on the country's development agenda. In the fifth FYP for 1997-2002, 16.46 per cent of total resources were allocated to the development of agriculture. This was the highest allocation to any individual sector followed by 15.85 per cent for industry (GOB 1998). It is

pertinent to mention that agriculture has remained the highest priority sector for all subsequent years.

(19)	90-2009)									
Year	1990- 00	2000- 01	2001- 02	2002- 03	2003- 04	2004- 05	2005- 06	2006- 07	2007- 08	2008- 09
% of total	4.7	4.5	4.42	4.15	4.04	3.13	5.20	6.10	6.66	6.27

Table 4: Annual development expenditure to agricultural sector (1990-2009)

Source: Bangladesh Economic Review, GOB (2010)

Due to this high allocation and priority for development in the agricultural sector, Bangladesh attained self-sufficiency in food production by the year 2000 (Talukder 2005). Most of the credit for this goes to the conversion of rice growing areas from traditional to the modern system of agriculture, which relies on modern varieties of seed, fertilisers, pesticides etc. (Baffs and Gautam 1996). The growth in the gross area used for rice cultivation, however, was negligible (0.20 per cent) (Baffs and Gautam 1996). Though investment in large capital machinery was not necessary for such agricultural growth, one contributing element for sustained growth in agriculture was the liberalisation of agricultural input markets and the importation of minor irrigation equipment that was earlier controlled by the government (Hossain 2002; Hossain et al, 2006).

Adaptation of a high yielding modern system of agriculture also increases the cropping intensity, requires greater use of agronomical inputs in the rice fields, and increases the demand for agricultural labour (Squires and Tabor 1994; Hossain et al 1990; Squires and Tabor 1994). Therefore. agricultural growth under the green revolution can satisfy the first two criteria of the framework developed earlier in section 4.1. Though such growth initiatives do not rely on increased use of land and other heavy capital machinery, they still fail to fulfil the third criteria for development set in section 4.1 above. The reason for the failure is the large number of landless rural households who cannot directly share the benefits of the agro-based development. Since around 60 per cent of rural households in Bangladesh are either landless or holding a land much less than 0.5 acre (BBS 2007), it can be reasonably expected that a large majority of the poor cannot benefit from agricultural growth. Lower landholdings create a form of disguised unemployment in the economy. Moreover, due to the seasonality of agricultural production, full employment at point L_F (Figure 1, Panel A) cannot be attained all over the year. Disguised unemployment and seasonal unemployment push the economic equilibrium back to a sub-optimal point like point S.

Further, women do not benefit much from this agricultural development because of social stigma: women cannot work outside and are confined in lowskilled agricultural processing jobs at home, which are mostly unpaid (Akhter et al 2010; Rahman 2000). Though many landless poor may earn their subsistence by working as agricultural labourer, opportunities are highly skewed against women. Participation of women in the hired agricultural labour force is less than two per cent of the total hired labour force in agriculture (Rahman 2000). Moreover, it is also argued that displacement of agricultural labour due to the automation of post-harvest processing activities mostly affects women (Ahmed 1992). As women cannot benefit from the increased labour demand in the field, and are mostly affected by the labour saving technology used in post-harvest processing activities, the net effect on women's employment due to modern agricultural development in Bangladesh is likely to be negative. Women who are capable to be employed in different income generating activities but are unable to participate in agricultural labour force constitutes a group 'not in labour force' as shown in Figure 1 (Panel B). This unutilized manpower creates inefficiency in labour market and put some extra burden on agro-centred poverty reduction policies.

Since agricultural growth cannot meet the third and fourth criteria set under section 4.1, for promoting a gender equalising pro-poor development, agricultural growth cannot be proposed as a strategy to alleviate widespread poverty in Bangladesh.

5.2.2 Import Substituting Industrialisation

Though the attainment of food self-sufficiency has been the prime objective of every government since independence, another corollary objective has been industrial development – with the aim to transform the economy from an agrarian to an industrial one. Increased allocation of the development budget to the industrial sector reveals that this has been a policy preference by governments over the years.

 Table 5: Allocation of annual development budget to industrial sector

 (2002-2010)

Year	2002- 03	2003- 04	2004- 05	2005- 06	2006- 07	2007- 08	2008- 09	2009- 10
Amount	1945.8	4614.6	5105.2	3190.0	2222.9	2473.1	2636.5	1315.8
% of total	1.26%	2.74%	2.72%	1.64%	1.24%	1.34%	1.34%	1.57%

Source: GOB 2010

Data on Table 5 indicate that, with few exceptions, allocation to industrial development has gradually declined over the years. A comparative analysis of the allocation made to public and private sector industrialisation, as depicted in Figure 2, indicates that heavy involvement of government through public sector industrialisation has declined over the years. Soon after independence in 1971, the then government took a socialist approach and nationalised many industries to promote industrial growth in the country by import substituting industrialisation (Raihan 2008). However, a change in

political government in 1980 meant the socialist agenda was abandoned from a national policy perspective. Moreover, a consistent dull performance of state owned organisations and a requirement for frequent injections of money to state owned organisations from national budget was the major reason for the dethronement of this state owned import-substituting industrialisation policy in Bangladesh (Ahmed 2000; Monem 2005).



Figure 2: Shift in allocation from public to private sector (1973-2002) Source: Fifth Five Year Plan, Ministry of Planning (GOB 1998, p.53) (1997, 1992, 1987, 1980), Bangladesh.

*5th FYP is the latest FYP prepared by the Planning Commission, Ministry of Planning, Bangladesh. See more at <http://www.plancomm.gov.bd/library_dtls.asp?LibID=7>

If the development policy of import substituting industrialisation is compared with the criteria set in Section 4.1, it is evident that such policy was less dependent on land and tried to mitigate the scarcity of capital under public financing. State owned import substituting industrialisation under the first FYP was also able to create three million new jobs during the five year period from 1973 to 1978 (GOB 2005).

Despite all these things, public owned enterprises turned out to be largely ineffective and failed to attain higher industrial growth. In fact, it pushed the economy from point Y to point Z' instead of point T in Figure 1 (Panel B), where the economy is producing IQ_3 inefficiently at a higher cost (LIC₄). This inefficiency reduces growth in an economy. Similarly, analysis of achievement under first FYP reveals that during this period, attained industrial growth was only 0.3 per cent against a targeted industrial growth of 7.1 per cent set in the plan (GOB 1998). Moreover, such a policy could make the government financially overburdened. For example, as of December 1997, 35 per cent of total outstanding debt of the government relates to losing state owned

enterprises (GOB 1998). The failure of government owned enterprises continues even today.

For instance, according to the recent data provided by the Ministry of Planning in 2010, 20 out of 46 state owned organisations were either making a loss, or breaking-even. Though in the fiscal year 2009-2010 all nationalised organisations managed to deposit Tk.4785.3 million (AUD 68.36 million) into the national treasury as dividend, by the end of fiscal year 2009-2010, the total overdue payments of these organisations to government was Tk.7807 million (AUD 111.53 million). Therefore, a policy of import substituting industrialisation through state owned enterprises cannot be suggested as a sound policy for development as it creates inefficiency and makes the economy run below its production possibility frontier.

5.2.3 Export Intensive Industrialisation under Private Investment

As already discussed in relation to Figure 2, discontinuation of export substituting industrialisation through nationalised public enterprises gives rise to a budget allocation towards private sector industrial growth in subsequent FYPs. However, as shown in Table 6, the policy response was not able to attain its target industrial growth over the years.

	Planning period	Industrial growth under five year			
			plans		
		Targeted	Achieved	%	
				attained	
First FYP	1973-1978	7.1	0.3	04.23	
Second FYP	1981-1985	8.4	4.8	57.14	
Third FYP	1986-1990	10.1	4.0	39.60	
Fourth FYP	1991-1995	9.2	6.2	67.39	
Fifth FYP	1998-2002	11.0	7.1	64.55	

Table 6: Achievement of industrial growth under FYPs (1973-2002)

Source: Fifth Five Year Plan (FYP) Ministry of Planning (GOB 1998, p.57). ** Fifth FYP is the latest FYP prepared by the Planning Commission, Ministry of Planning, Bangladesh. See more at

<http://www.plancomm.gov.bd/library_dtls.asp?LibID=7>

Data in Table 6 indicate that even after the policy transformation from import substituting state owned industrialisation to export promoting private sector industrialisation, attained industrial growth under different planning periods was only one-third to two-thirds of target growth for the individual planning periods concerned. Reasons for the lower achievement in industrial growth relate to the sluggish improvement in infrastructure, for example, electricity, transport and communication, and a lack of skilled labour force (with average schooling of only four years) to meet the increasing demand for private sector industrialisation under increased budgetary allocation over the years (World Bank 2007). For example, supply of electricity for urban industrial production failed to attain its target in the fourth FYP period, though the demand for electricity greatly exceeded the target set for the period.

Agency	Particulars	Actual in 1989-90	Target	Achievement in 1994-95
BPDB	Capability (MW)	1,834	2,743	2,133
	Distribution line km	30,256	36,734	34,693
	(33 kv and below)			
	Consumer connection	850438	1,050,000	1,075,734
REB	Distribution line km	35,333	61,188	65,186
	Electrified village number	8,545	14,530	16,484
	Consumer connection	495,565	962,962	1,174,571

Table 7: Lack of infrastructure (electricity) for private industrialdevelopment (1989-1995)

Source: Fourth FYP, Ministry of Planning, GOB (1998)

*Fourth FYP is the second latest FYP and was prepared by the Ministry of Planning, Bangladesh incorporating this data separately. BPDB and REB means Bangladesh Power Development Board and Rural Electrification Board respectively.

Table 7 shows that electricity supplied by Bangladesh Power Development Board (BPDB) to urban industrial consumers has not been sufficient to meet the demand for increased customer connection. The Rural Electrification Board (REB), on the other hand, is capable of meeting the increased demand for its rural consumers including rural enterprises. This superior capability of REB to meet electricity demands for rural consumers will be used as grounds to promote the RNFE in following discussion in Section 6.

Another reason for lower achievement in industrial growth is the lack of good Research and Development (R&D) activities, resulting in poor quality industrial products as indicated by lack of market demand. For instance, in the fourth FYP only 0.16 per cent of the total public sector allocation was spent on the development of science and technology (GOB 1998). Further, in most cases, research projects do not respond to the requirements of private industries (GOB 1998). Thus, the projects do not have any application beyond the premise of respective research organisations. Lower performance in R&D activities failed to shift the Iso-Quant curve, for example from IQ_1 to IQ_2 , IQ_3 or IQ_4 , with a given supply of labour and capital. Further, as shown by point X in Figure 1 (panel A), capital intensive private industrial growth also creates more unemployment in a labour abundant economy like Bangladesh.

Evaluation of private sector industrialisation as a strategy for poverty reduction under the criteria set above in Section 4.1, therefore, reveals that private sector industrialisation does not rely heavily on land availability. In fact, it can absorb the underemployed labour force from agriculture, but lack of sufficient infrastructure seriously hinders its future prospects. Also, in terms of employment generation, the industrial sector is contributing only negligibly. As mentioned earlier in section 2, according to the latest labour force survey, only 13.53 per cent of the total labour force was engaged in the manufacturing sector (GOB 2010). The ratio of participation of women in the industrial labour force was also very low (GOB 2010). Moreover, as industrial profits are concentrated in the hands of limited number of capitalists, it can be expected that the less educated, less skilled, and poor labour force might not be able to share the benefits of growth attained through private industries.

6. Use of the Policy Analysis Framework to Predict Policy Effectiveness: Is RNFE an Alternative?

The importance of the RNFE as a means of poverty reduction and sustainable development in rural livelihood is well documented by a number of scholars around the globe. While Himer and Resnic (1969), as early as in 1960s, emphasised rural non-agricultural activities for the development of agrarian economies, analysing comparative economic data from Asia, Africa and Latin America, Haggblade and Hazell (1989) demonstrated that 90 per cent of the multiplier effect due to one unit increase in agricultural income in Asia accrues to the RNFE. Later, reviewing the literature on the RNFE around the world, Lanjouw and Lanjouw (2001) claimed that, though not inevitable in every circumstance, the RNFE might have a positive impact on both growth and poverty alleviation objectives of an economy. Haggblade et al (2002) reaffirmed this idea by stating that growth of RNFE could be beneficial to both the poor and wealthier sections of a rural economy. Furthermore, in their recent works, Haggblade et al (2010) emphasised the promotion of RNFE as a means of poverty reduction to developing economies.

6.1 Suitability of RNFE Development for Effective Poverty Reduction in Bangladesh

This section demonstrates why RNFE would be a better policy option for poverty reduction in Bangladesh as well. Earlier discussion has revealed that agriculture and industry have only limited potential to enhance the endowment of the poor as a means of increasing their capability. Moreover, according to the latest labour force survey, 75 per cent of the total labour force resides in rural areas and 56.4 per cent of the total labour force is engaged in non-agricultural activities (BBS 2009). In Bangladesh, problems such as land scarcity, predominant rural population, widespread dependence on agriculture by the illiterate rural poor, and a less developed urban formal sector, have made it inevitable that RNFE would grow in importance as a potential sector for development (Hossain 2002). The following section demonstrates how the development of RNFE would meet the criteria of development set out in Section 4.1.

6.1.1 RNFE Employment and Appropriateness for a Labour Abundant Economy

According to the criteria set out in Section 4.1 the optimal development policy in Bangladesh should concentrate on labour intensive production technologies that require lower involvement of scarce land and capital resources. Hence, RNFE employment is appropriate for a labour abundant economy like Bangladesh because unlike the large-scale urban manufacturing sector, RNFE enterprises use labour-intensive technologies (Lanjouw 2001)². In a study conducted on the paddy husking industry of Bangladesh, it has been shown that the change in labour requirements due to a shift from traditional *Dhenki* technology (manual technology used by rural households in Bangladesh to hull paddy) to a small huller mill was only -0.1 (Lanjouw and Lanjouw 2001). Therefore, even automated, RNFE activities remain mostly labour intensive and result in only a small reduction in the number of jobs.

Promotion of small-scale RNFE activities can, therefore, enhance productivity without sacrificing employment. By its higher engagement in RNFE, the economy can attain efficient production points like Y in Figure 1 (panel A) and ensures highest amount of production with its constrained stock of land and capital resources. Furthermore, the ability of RNFE to enhance productivity without sacrificing its labour intensity would enable the economy to advance gradually through the K_CT path shown in panel B of Figure 1.

Moreover, as explained by Lewis (1954), a flourishing non-agricultural sector could be used to absorb the surplus labour in agriculture and thereby increase agricultural productivity and wage rates for agricultural labourers. Though Lewis (1954) emphasised industrial development as a complement to agriculture, as observed by others, through different forward and backward linkage activities to agriculture, including food processing and raw material supply for industrial production, RNFE activities can also absorb excess labour in agricultural sector and contribute to poverty reduction and agricultural growth of an economy (Bezemer and Davis 2003; Davis 2003; United Nations 2009).

Furthermore, RNFE development also promotes the development of domestic industrial sector. Since RNFE entrepreneurs in developing countries usually belong to a lower income class, their purchases are generally confined to locally made goods rather than luxurious imported commodities. Various studies have confirmed the positive relationship between increased income and a bias towards imported commodities. Ranis, Stewart, and Angeles-Reyes (1990) in their study on the Philippines showed that income elasticity of demand for local goods fell from 0.94 to 0.435 as the level of income increased from 3405 Peso to 17930 Peso respectively. Another study conducted in Malaysia by Hazell and Roell (1983) also confirms this argument.

²Labour-intensive technologies require a higher number of labourers per unit of capital (Lanjouw 2001). Such technologies are particularly important for those countries having a large supply of labour with a scarce availability of other capital goods.

In Bangladesh also, demand for imported commodities increased – at the expense of domestic manufactures – as income increased (Hossain 2002). As RNFE households mostly belong to lower income groups, poverty reduction and development of RNFE households might have a synergistic effect on domestic industrial development through increased demand for low-priced domestic products. Therefore, a development of RNFE would move the economy through a sustained path of development- K_CT , not only because of its own development but also because of the corollary developments in domestic agricultural and industrial sectors.

6.1.2 RNFE as a Source of Employment to an Increasing Number of Rural Poor

Like many other developing countries in Asia and other parts of the world, RNFE activities in Bangladesh are evolving as an important part of its rural economy. This is because RNFE activities are undertaken by rural people as an effective means of tackling the widespread problem of open unemployment³, underemployment⁴, and seasonal unemployment⁵ prevailing in rural Bangladesh. As mentioned by Hossain (2004b), according to a BIDS survey conducted in 1987, 49 per cent of rural households in Bangladesh were engaged in RNFE either as their primary or secondary source of employment. In contrast, in a repeat survey jointly conducted by BIDS and IRRI in 2000–2001, as many as 52 per cent of rural households were engaged primarily in RNFE, while another 14 per cent were taking the RNFE as their secondary source of income. In other words, two-thirds of the households in rural Bangladesh are getting their income from RNFE activities (Hossain 2004a). As shown in Table 8, the involvement of rural household to RNFE activities is increasing over the years.

³ Unemployed are those people who are willing to work at the current market wage rate, actively searching for a job but are currently unemployed. In Bangladesh, the percentage of people unemployed in 2009 was 5.1. The rate varies between males and females. Before the great depression in the 1930s, it was widely believed by the neo-classical economists that unemployment is a short-run evil and will evaporate soon through labour market adjustments. However, during the great depression it was realised that unemployment could be a long run phenomena if organised unions and some other structural barriers such as minimum wage rate restrains the necessary adjustment in the labour market. See more on Dooley and Prause (2004).

⁴This is a situation where people are not unemployed but are employed in work that can be done without fully utilising their productive capacity. Such a situation may arise in labour abundant economy where, for example, so many labourers are engaged in agriculture that their marginal productivity remains zero. In such a case, some of the labourers can be withdrawn and deployed to other productive activities without reducing the total productivity of agriculture. See more on Dooley and Prause (2004).

⁵It is a situation when large number of people in a locality becomes unemployed because of some seasonal downturn in production and consequent reduction in the demand for labour. Over the year, people in a locality may experience such unemployment in a cyclical manner. See more on Layard, Nickell and Jackman (2005).

Year	% employed in Rural Non-farm activities				
1981	29%				
1982	25%				
1991	34%				
2000	42%				
2004	39%				

Table 8: Percentage of rural households primarily employed in rural nonfarm activities

Source: Lanjouw and Feder (2001); Nargis and Hossain (2006)

Therefore, development of RNFE may improve the livelihood of a large number of rural households, majority belonging to the landless poor.

6.1.3 RNFE as a Means to Empower Women

As mentioned earlier, women in Bangladesh are still facing many social stigmas that hinder their development. Bangladesh is still significantly behind in its pursuit to attaining women's empowerment both economically (Toufique and Turton 2002) and socially (Kamal 1995). In Bangladesh:

there has been little change in the gender dimension of poverty. Female-headed households are still more likely to live in poverty and females within households are still more likely to be less well-educated, more likely to be malnourished and more likely to fall ill (Toufique and Turton 2002, p.15).

Thus, women are more vulnerable to poverty (ADB 2009). The relatively poor condition of women, especially rural women, and persistent gender inequality have prompted the initiation or strengthening of some rural poverty reducing activities that have a direct impact on the income earning capacity of rural women.

Thus, RNFE development rather than agricultural development could be a more effective tool to attain economic empowerment for women by enabling them to engage in economic activities without violating the social norms⁶ that sometimes prevent them from working outside their home (Balk 1997; Kamal 1995; Naved et al 2007). In other words, women can benefit by engaging in RNFE activities for which it might not be necessary for women to go outside – rather they can perform them at home, for example, food processing, craft

⁶In Bangladesh, gender inequality "owes its persistence largely to the tradition of misogyny deeply rooted in the indigenous culture …Women's mobility is still very restricted in the countryside due to the purdah norm and widespread insecurity. Though poor rural women are now being forced out of the home by their economic hardship, their free movement is still generally condemned by the society" (Ahmed 2004, p. 7). Thus, due to social and religious customs women usually might not work in the crop fields and most of their works are concentrated in un-paid in-house activities. See more on Hossain (1984); Lanjouw (1998).

making or tailoring. Moreover, a greater involvement of women in labour force would gradually shift the full-employment level of the economy from L to L'_F and L''_F , and enable the economy to produce at point Z or T of Iso-Quant curves IQ_3 and IQ_4 respectively.

6.2 RNFE Development: An Alternative Policy Framework for Poverty Reduction in Bangladesh

Scholars around the world have identified different factors that affect the development of RNFE enterprises (Gibson and Olivia 2010; Haggblade et al 2010; Hashemi and Montesquio 2011; Lay, Mahmoud and M'Mukaria 2008; Masakure et al 2008). Numerous studies are also available that identified different variables that affect capabilities of the poor and poverty among households (Alkire 2007; Anand et al 2005; Clark 2005; Narayen at al 2000; Nussbaum 2000; Quilbush 2006). However, to combine these two different types of literature, this paper adopted a list of important factors identified by Ellis (2000) for sustainable development and farm to non-farm income diversification in rural areas.

Ellis (2000) has identified five different types of capital or endowments that are important to develop a framework to discuss the farm income diversification among rural households. These are:

- natural capital
- manufactured capital
- financial capital
- human capital; and
- social capital.

This list was further extended and rearranged to include some key variables under each category, as identified by scholars in various literatures discussing poverty reduction and RNFE development around the globe.

6.2.1 Theoretical Framework

A number of factors have been identified by scholars around the world that may affect the development of the RNFE and poverty among RNFE households. Existing literature in these fields has been used to understand the most plausible impact of different variables on the development of the RNFE and the reduction of poverty. Firstly, the economic entitlement of poor mostly depends on their possession of agricultural land and has a positive impact to reduce household poverty (Sen 2003), while urban proximity is positively linked with better RNFE income (Deichmann et al 2009). Good health and a minimum level of education are generally considered beneficial for RNFE development and reduction of chronic poverty (Jalan and Ravallion 2000; Oduro and Aryee 2003). However, the impact of skills training on the RNFE is rather ambiguous (McKay and Howe 2007; Shaw 2004). Beside these basic economic entitlements, access to financial capital or credit is always taken as a promoting factor for better RNFE capabilities (Masakure et al 2008). Another factor that affects household capability to get engaged in high income RNFE activities is access to market or marketing facilities (Gibson and Olivia 2010; Deichmann, Shilpi and Vakis 2009). All these capabilities to earn high RNFE income affects economic entitlement of the poor and their capability to access different basic services like healthcare and education. For example, because of their low involvement in income generation activities, women in Bangladesh are lagging way behind their male counterparts in accessing health care facilities (BBS 2007).



Figure 3: Framework for poverty and RNFE

While developing a framework to test the linkage between RNFE capability and poverty, household demography is included to capture dependency burden and sex of earning members in a household. The sex of the income earners has an impact on household poverty because women usually receive lower payment for similar jobs performed by their male counterparts and might not effectively participate in the labor force due to other family responsibilities and different social barriers (Mallik and Rafi 2010). Same has been observed by Salway et al (2003), in Bangladesh. Another factor identified for RNFE development and poverty reduction are access to social capital like including trust (Bastelaer 2000), intimacy (Fafchamps 2004) and frequency of interaction among members (Woolcock 2001; Peters and Jackson 2008) of a group involved in a particular type of RNFE. Besides, empowerment through participation in household decision making (Akhter 2000; Sultana 2004; Khair 2008) etc. also have impact on poverty, especially for women in RNFE.

As there is no universal measure of poverty, for the purpose of this paper, poverty is defined as inability to get three full meals in a day. Need for adequate food is universal as it is the most basic need for people to survive. Further a qualitative string is attached with poverty by measuring the quality of food taken. Such quality was measured by the number of times respondents took fish or meat in a week. Based on the premise of this existing knowledge on RNFE development and poverty, a statistical model has been developed using SEM on household data on poverty and capability to get involved in high income RNFE.

6.2.2 Empirical Model on RNFE and Poverty: A Statistical Model Developed under SEM

An empirical model demonstrated in Figure 4 indicates that poverty among RNFE households is directly affected by three factors namely economic entitlement, RNFE capability, and household demography. Variable included for social capital and empowerment are loaded as a single factor under High Income (HI) RNFE capabilities. A value of 0.95 (R^2 value indicating squared multiple correlation) at the poverty construct indicates that the three constructs (HI RNFE capabilities, household demography, and economic entitlement) together can explain 95 per cent of the total variance in household poverty. A 0.57 path coefficient value from economic entitlement to poverty, in comparison with path coefficient values of other constructs towards poverty, indicates that economic entitlement is still the single most important factor to determine household poverty in Bangladesh. This could be the reason why contemporary poverty reduction policies still emphasize mostly on improving economic entitlement of the poor.

However, a careful look at the empirical model reveals that 0.81 or 81% variance in economic entitlement can be defined by the variability in HI RNFE capabilities. In other words HI RNFE capabilities indirectly explain (0.57x0.81) = 0.46 or 46% of total variance in poverty. When this indirect effect of HI RNFE capabilities on poverty is combined with direct effect of HI RNFE capabilities on poverty, HI RNFE capabilities can explain (0.46+0.43) = 0.89 or 89% of total variability of poverty among households. Household demography as defined by dependency burden, and number of male and female earning members in a household, does not have a strong impact on poverty like, 'economic entitlement' or 'HI RNFE capabilities'.



Figure 4: **Empirical model on RNFE and poverty** *Regression coefficients are standardized

	Model Fit Statistics							
	χ^2 (df)	Sig χ^2	RMSEA	RMR	PGFI	NFI	CFI	
Independence model*	4188.27 (231)	0.000	0.221	0.280	0.218	0.000	0.000	
Default model	216.17 (196)	0.154	0.017	0.027	0.735	0.948	0.995	

Table 9: Competing fit statistics of the empirical model on RNFE and poverty

Fit indexes' values in Table 9 indicate that all fit index values satisfy their conventional threshold values. While a value greater than 0.9 is acceptable for CFI and TLI indexes which refer to how well the covariance structure of the empirical data set fits with the covariance structure assumed in the model, RMR and RMSEA measure goodness of fit of the model per Degrees of Freedom (DF). For RMSEA and RMR, index values less than 0.5 are indications of good fit (Byrne 2010). PGFI, on the other hand, is parsimony adjusted goodness of fit index. Like CFI, PGFI examines goodness of fit of a model, taking consideration of total degrees of freedom. A PGFI value, as low as 0.5, is acceptable when other 'goodness of fit' index values exceed 0.9 (Byrne 2010). Since all the fit index values in Table 9 indicate a good fit model and all path coefficient values (regression weights) as marked by single-headed arrows are statistically significant (see Appendix B), it can be reasonably concluded from the model that RNFE development and poverty among RNFE households in Bangladesh are determined predominantly by 'HI RNFE capabilities', 'economic entitlement' and 'household demography'.

7. Conclusion

From the discussion so far, it can be claimed that, compared to other policy interventions for poverty reduction in Bangladesh taken so far, a poverty reduction policy implemented through RNFE development could be more beneficial for the poor. It can provide an alternative income source to landless poor or peasant households who cannot get direct benefits from agro-based development initiatives of the government. It also has more potential for an equitable income distribution, positive repercussion to domestic agricultural and industrial development, and women empowerment. However, empirical studies around the globe haven't shown any definite positive correlation between RNFE employment growth and reduction in rural poverty (Gordon & Craig 2001). Therefore, further research is required to identify how poor rural households can be effectively integrated into high income RNFE activities, rather than taking RNFE as a means of their mere survival.

References

- Ahmed, D. (2004). *The Dispensation of Fatwa and Women's Progress in Bangladesh*. Dhaka, Bangladesh: Bangladesh Freedom Foundation.
- Ahmed, M. R. (1992). Unseen Workers: A Socio Cultural Profile of Women in Bangladesh. *Society and Natural Resources*, vol. 5, no. 4, pp. 375-90.
- Ahmed, M. U. (2000). Privatization in Bangladesh. In G. Joshi (Ed.), *Privatization in South Asia: Minimizing Negative Social Effects through Restructuring*. New Delhi, India: International Labor Organization.
- Akhter, S. (2000). Changing Role and Status of Working Women in Urban Bangladesh: A study of Dhaka city, *Social Science Review*, vol. 17, no. 1, pp. 233-45.
- Akhter, S., Alamgir, M., Sohel, S. I., Rana, P., Ahmed, S. J. M., and Chowdhury, M. S. H. (2010). The Role of Women in Traditional Farming Systems as Practiced in Homegardens: A Case Study in Sylhet SadarUpozilla, Bangladesh, *Tropical Conservation Science*, vol. 3, no. 1, pp. 17-30.
- Alkire, S. (2007). Choosing Dimensions: The Capability Approach and Multidimensional Poverty, in N Kakwani and J Silber (eds), *The many dimensions of poverty*, New York: Palgrave Macmillan.
- Anand, P. (2005). Capabilities and Health, *Journal of Medical Ethics*, vol. 31, no. 5, pp. 299-303.
- Asian Development Bank. (2009). Informal Employment in Bangladesh.Retrieved from www.adb.org/Statistics/reta_files/6430/Informal-Employment-in-Bangladesh.pdf.
- Baffes, J. and Gautam M. (1996). Is Growth in Bangladesh's Rice Production Sustainable?, *Policy Research Working Paper*, no. 1666, Washington, DC: The World Bank.
- Balk, D. (1997). Change Comes Slowly for Women in Rural Bangladesh, Asia Pacific Population & Policy, vol. 41, pp. 1-4.
- Bangladesh Bureau of Statistics.BBS (2007).*Household Income and Expenditure Survey 2005*. Dhaka, Bangladesh: BBS.
- Bangladesh Bureau of Statistics.BBS (2009).*Monitoring of Employment Survey*. Dhaka, Bangladesh: BBS.
- Bastelaer, T. (2000). Does Social Capital Facilitate the Poor's Access to Credit? A review on the Microeconomic Literature, *Social Capital Initiative Working Paper*, no. 8, Washington DC: The World Bank.
- Bezemer, D. and Davis, J. (2003). The Rural Non-Farm Economy in Armenia. In M. Spoor (Ed.), *Rural Economies in Transition*. Lanham, USA: Lexington Books.
- Byrne B.M. (2010). *Structural Equation Modeling with AMOS: Basic concepts, applications, and programming*, 2ndedn, New York: Routledge.

- Clark, D.A. (2005). Sen's Capability Approach and the Many Spaces of Human Well-being, *Journal of Development Studies*, vol. 41, no. 8, pp. 1339-68.
- Davis, J. R. (2003). The Rural Non-Farm Economy, Livelihoods and Their Diversification: Issues and Options. *NRI Report*, no. 2753, Chatham, UK: Natural Resource Institute, University of Greenwich.
- Deichmann, U., Shilpi, F. and Vakis, R. (2009). Urban Proximity, Agricultural Potential and Rural Non-Farm Employment: Evidence from Bangladesh, *World Development*, vol. 37, no. 3, pp. 645–60.
- Dooley, D. and Prause, J. (2004). *The Social Cost of Unemployment: Inadequate Employment as Disguised Unemployment*, Cambridge: Cambridge University Press.
- Dornbusch, R., Fischer, S. and Dorbusch, F. S. (2006). *Macroeconomics*. New York: McGraw-Hill.
- Ellis, F. (2000).*Rural Livelihoods and Diversity in Developing Countries*, Oxford: Oxford University Press.
- European Community.(2007). *Country Strategy Paper Bangladesh*.Retrieved from<www.eeas.europa.eu/bangladesh/csp/csp_07_13_en.pdf>.
- Fafchamps, M. (2004).*Market Institutions in Sub-Saharan Africa: Theory and Evidence*, Cambridge: MIT Press.
- Gibson, J. and Olivia, S. (2010). The Effect of Infrastructure Access and Quality of Non-Farm Enterprises in Indonesia, *World Development*, vol. 38, no 5, pp.717-26.
- Gordon, A. and Craig, C. (2001).Rural Non-Farm Activities and Poverty Alleviation in Sub-Saharan Africa.*NRI Policy Series*, no. 12, Chatham, UK: Natural Resources Institute, University of Greenwich.
- Government of Bangladesh.GOB (1998).*TheFifth Five Year Plan.* Dhaka, Bangladesh: Ministry of Planning, Government of the People's Republic of Bangladesh.
- Government of Bangladesh.GOB (2007a). *Millennium Development Goals: Mid-term Bangladesh Progress Report 2007*, Dhaka, Bangladesh: General Economics Division, Planning Commission, Government of the People's Republic of Bangladesh.
- Government of Bangladesh.GOB (2007b).*Bangladesh Economic Review 2007*, Dhaka, Bangladesh: Planning Commission, Government of the People's Republic of Bangladesh.
- Government of Bangladesh.GOB (2009).*The Millennium Development Goals:* Bangladesh Progress Report 2009, Dhaka, Bangladesh: General Economic Division, Planning Commission, Government of the People's Republic of Bangladesh.
- Government of Bangladesh.GOB (2010).*Bangladesh Economic Review 2010*, Dhaka, Bangladesh: Planning Commission, Government of the People's Republic of Bangladesh.
- Government of Bangladesh.GOB (2011).*Bangladesh Economic Review 2011*, Dhaka, Bangladesh: Planning Commission, Government of the People's Republic of Bangladesh.
- Haggblade, S. and Hazell, P. B. R. (1989). Agricultural Technology and Farm-Non-Farm Growth Linkages, *Agricultural Economics*, vol. 3, no. 4, pp. 345-64.
- Haggblade, S. Hazell, P. and Reardon, T. (2002). Strategies for Stimulating Poverty: Alleviating Growth in the Rural Nonfarm Economy in Developing Countries, *International Food Policy Research Paper*, Washington, DC: International Food Policy Research Institute.
- Haggblade, S. Hazell, P. and Reardon, T. (2010). The Rural Non-Farm Economy: Prospects for Growth and Poverty Reduction, *World Development*, vol. 38, no. 10, pp. 1429–41.
- Hashemi, S.M. and Montesuio, A. (2011). Reaching the Poorest with Safety Nets, Livelihoods, and Microfinance: Lessons from the Graduation Model, *CGAP Focus Note*, no. 69, Washington DC: CGAP.
- Haughton, J. and Khandaker, S. R. (2009). Handbook on Poverty and Inequality, Washington DC: The World Bank.
- Hazell, P. and Roell, A. (1983). Rural Growth Linkages: Household Expenditure Pattern in Malaysia and Nigeria, *IFPRI Report*, no. 41, Washington DC: International Food Policy Research Institute.
- Himer, S. and Resnick, S. (1969). A Model of an Agrarian Economy with Non-Agricultural Activities, *American Economic Review*, vol. 59, no. 4, pp. 493-506.
- Hossain, H., Jahan, R. and Sobhan, S. (1990). No Better Options? Industrial Women Workers in Bangladesh, Dhaka, Bangladesh: University Press Limited.
- Hossain, M. (1984). Productivity and Profitability in Bangladesh Rural Industries, *Bangladesh Development Studies* vol. 12, no. 1/2, pp. 127–61.
- Hossain, M. (2002). Promoting Rural Non-Farm economy of Bangladesh, *CPD-IRRI Policy Brief*, no. 3, Dhaka, Bangladesh: Centre for Policy Dialogue.
- Hossain, M. (2004a). Growth of the Rural Non-Farm Economy in Bangladesh: Determinants and Impact on Poverty Reduction, Paper presented at the *Rice is Life: Scientific Perspective for the 21st Century conference*, Tsukuba: International Rice Research Institute.
- Hossain, M. (2004b). Rural Non-Farm Economy in Bangladesh: A View from Household Surveys, *CPD Occasional Paper Series*, no. 40, Dhaka, Bangladesh: Centre for Policy Dialogue.
- Hossain, M. Bose, M. L. and Mustafi, B. A. A. (2006). Adoption and Productivity Impact of Modern Rice Varieties in Bangladesh, *The Developing Economies*, vol. XLIV, no. 2, pp. 149-66.

- Jalan, J. and Ravallion, M. (2000). Is Transient Poverty Different? Evidence of Rural China, *Journal of Development Studies*, vol. 36, no. 6, pp. 82-99.
- Kamal, S. (1995).Law as an Instrument of Women's Empowerment. In R. Jahan, S. R. Qadir, H. A. Begum, and J. Huq (Eds.), *Empowerment of Women: Nairobi to Beijing*(1985-1995), Dhaka, Bangladesh: Women for Women.
- Khair.S. (2008).Legal Empowerment for the Poor and the Disadvantaged: Strategies Achievements and Challenges: Experience from Bangladesh, Dhaka, Bangladesh: CIDA.
- Lanjouw, J. and Lanjouw, P. (2001). The Rural Non-Farm Sector: Issues and Evidence from Developing Countries, *Journal of Agricultural Economics* vol. 26, no. 1, pp. 1-23.
- Lanjouw, P. (1998). Rural Non-Farm Employment and Poverty: Evidence from Household Survey Data in Latin America, Washington, DC: Development Research Group, The World Bank.
- Lanjouw, P. (2001). Intersectional Transfer, Growth, and Inequality in Rural Ecuador, *World Development* vol. 29, no. 3, pp. 481-96.
- Lanjouw, P. and Feder, G. (2001). Rural Nonfarm Activities and Rural Development: From Experience towards Strategy, *Rural Development Strategy Background Paper*, no. 4, Washington, DC: The World Bank.
- Lay, J., Mahmoud, T.O. and M'Mukaria, G.M. (2008). Few Opportunities, Much Deprivations: The Dichotomy of Non-Agricultural Activities and Inequality in Western Kenya, *World Development*, vol. 36, no. 12, pp. 2713-32.
- Layard, R., Nickell, S. and Jackman, R. (2005). *Unemployment: Macroeconomic Performance and the labour market*, Oxford: Oxford University Press.
- Lewis, W.A. (1954). Economic Development with Unlimited Supplies of Labour, *the Manchester School*, vol. 22, no. 2, pp. 139-91.
- Mallik, D. and Rafi, M. (2010). Are Female Headed Households More Food Insecure? Evidence from Bangladesh, *World Development*, vol. 38, no. 4, pp. 593-605.
- Masakure, O., Cranfield, J. and Henson, S. (2008). The Financial Performance of Non-Farm Micro-Enterprises in Ghana, *World Development*, vol. 36, no. 12, pp. 2733-62.
- McKay, A. and Howe, G. (2007). Combining Quantitative and Qualitative Methods in Assessing Chronic Poverty: The case of Rwanda, *World Development*, vol. 35, no. 2, pp. 197-11.
- Monem, M. (2005). *The Politics of Privatization in Bangladesh*, Dhaka, Bangladesh: Osder Publications.
- Narayan-Parker, D., Chambers, R., Shah, M.K. and Petesch, P. (2000).*Can* Anyone Hear Us? Voices of the Poor, Washington DC: The World Bank.

- Nargis, N. and Hossain, M. (2006). Income Dynamics and Pathways Out of Rural Poverty in Bangladesh, 1988–2004, *Agricultural Economics*, vol. 35, pp. 425–35.
- Naved, R. T., Chowdhury, S., Arman, S. and Sethuraman, K. (2007). Mobility of Unmarried Adolescent Girls in Rural Bangladesh, *Economic and Political Weekly*, vol. 42, no. 44, pp. 63-70.
- Nussbaum, M.C. (2000). Women and Human Development: The Capabilities Approach, Cambridge: Cambridge University Press.
- Oduro.A. and Aryee, I. (2003).Investigating Chronic Poverty in West Africa, *Chronic Poverty Working Paper*, no.28, Manchester: CPRC.
- Quzibash, M. (2006).Capabilities, Happiness and Adaptation, in Sen and JS Mill, *Utilitas*, vol. 18, no. 1, pp.20-32.
- Rahman, S. (2000).Women's Employment in Bangladesh Agriculture: Composition, Determinants and Scope, *Journal of Rural Studies*, vol. 16, no. 4, pp. 497-507.
- Raihan, S. (2008).Trade Liberalization and Poverty in Bangladesh, *Macao Regional Knowledge Hub Working Paper*, no. 15.Retrieved from http://www.unescap.org/tid/artnet/markhub/WP/wp15.pdf.
- Ranis, G., Stewart, F. and Angeles-Reyes, E. (1990).*Linkages in Developing Economies: A Philippines Study*, San Francisco: ICS Press for the International Center for Economic Growth.
- Salway, S., Jesmin, S. and Rahman, S. (2005). Women Empowerment in Urban Bangladesh: A Challenge to Gender Identity?, *Development and Change*, vol. 23, no. 2, pp. 317-349.
- Sen, A. (2009). The Idea of Justice, England: Penguin Books Ltd.
- Sen, B. (2003). Drivers of Escape and Descent: Changing Household Fortunes in Rural Bangladesh, *World Development*, vol. 31, no. 3, pp. 513–34.
- Shaw, J. (2004). Micro enterprise Occupation and Poverty Reduction in Microfinance Programs: Evidence from Sri Lanka, World Development, vol. 32, no. 7, pp. 1247-64.
- Squires, D. and Tabor, S. (1994). The Absorption of Labor in Indonesian Agriculture, *The Developing Economies*, vol. 32, no. 2, pp. 167-87.
- Sultana.N. (2004). Polygamy and Divorce in Rural Bangladesh, *Empowerment*, vol. 11, pp. 75-96.
- Talukder, R. K. (2005). Food Security, Self-sufficiency and Nutrition Gap in Bangladesh, *The Bangladesh Development Studies*, vol. 31, no. 3&4, pp. 35-62.
- Toufique, K. and Turton, C. (2002).*Hands Not Land: How Livelihoods are Changing in Rural Bangladesh*, Dhaka, Bangladesh: Bangladesh Institution of Development Studies.
- Transparency International.TI (2006).*Transparency International Global Corruption Report 2006*, Washington, DC: Transparency International.

- United Nations Development Program.UNDP (2000).Overcoming Human Poverty: United Nations Development Policy Report 2000, New York: United Nations Development Program.
- United Nations Development Program.UNDP (2010).*Human Development Report 2010*, New York: United Nations Development Program.
- United Nations.UN (2009).The Least Developed Countries Report 2009: The State and Development Governance, Washington DC: United Nations Publications.
- Woolcock, M. (2001). The Place of Social Capital in Understanding Social and Economic Outcomes, *ISUMA, Canadian Journal of Policy Research*, vol. 2, no. 1, pp. 11–17.
- World Bank. (2007). Bangladesh: Strategy for Sustained Growth, *Bangladesh Development Series*, no. 18, Dhaka, Bangladesh: Poverty reduction and economic management unit, The World Bank.
- World Bank. (2010a). *Bangladesh Country Assistance Strategy: 2011-2014*, Dhaka, Bangladesh: The World Bank.
- World Bank. (2010b). Bangladesh Economic Update, Economic Policy and Poverty Team, South Asia Region, The World Bank. Retrieved from <www.worldbank.org/>.

Appendix A

Variables used in the poverty model

No.	Name of the variable	Description
1	DPNRATIO	No. of dependents per earning member in a
2	EARNMEMB	No. of earning members
3	FERNMEMB	No. of female earning members
4	ADEQFOOD	Food adequacy
5	FOODQLTY	Quality of food taken
6	AGRICLND	Holding of agricultural land
7	EMPLOY	Period remain employed in the 12 months prior to
8	EDULAVEL	Level of education attained by the respondent
9	CHRONILL	Presence of chronic illness in any member of a
10	SANITLET	Quality of toilet facility used by a household
11	VISITDOC	Ability to visit doctor during illness
12	CHBIRTH	Attended child birth. Reason if un-attended
13	NEIBRHLP	Help expected from neighbours in case of
14	LOJUSTIC	Expectation of getting fair justice
15	SELFABIL	Ability to survive from own fund in case of
16	HHDESIC	Participation in household decision making
17	HELPOTHR	Level of help desired from others in non-
18	GRUPAFIL	Affiliation with any local group
19	TAKELOAN	Frequency of taking credit from bank or NGO
20	SOCGATHR	No. of attendances in social gathering during last
21	ACCSCPTL	Access to capital required for the business
22	MRKTPROB	Whether facing any problem to market product
		or service produced

		Estimate	S.E.	C.R.	Р
Economic Entitlement	< HI RNFE Capabilities	1.547	.159	9.742	***
Poverty	< Economic Entitlement	.600	.081	7.371	***
Poverty	< Household Demography	.215	.039	5.518	***
Bodily Capability	< Economic Entitlement	1.218	.152	8.034	***
Poverty	< HI RNFE Capabilities	1.423	.185	7.691	***
CHBIRTH	< Bodily Capability	1.000			
VISIDOCT	< Bodily Capability	.438	.045	9.757	***
SANITLET	< Bodily Capability	.588	.061	9.602	***
CHRONILL	< Bodily Capability	.546	.053	10.321	***
EDULAVEL	< Economic Entitlement	1.000			
EMPLOY	< Economic Entitlement	1.813	.127	14.250	***
AGRICLND	< Economic Entitlement	1.087	.083	13.123	***
NEIBRHLP	< HI RNFE Capabilities	1.672	.178	9.394	***
SOCGATHR	< HI RNFE Capabilities	2.244	.198	11.304	***
HELPOTHR	< HI RNFE Capabilities	2.025	.169	12.013	***
SELFABIL	< HI RNFE Capabilities	2.455	.218	11.246	***
HHDESIC	< HI RNFE Capabilities	1.779	.185	9.603	***
LOJUSTIC	< HI RNFE Capabilities	1.786	.201	8.878	***
GRUPAFIL	< HI RNFE Capabilities	1.000			
ADEQFOOD	< Poverty	1.000			
FOODQLTY	< Poverty	.746	.045	16.625	***
MRKTPROB	< HI RNFE Capabilities	1.045	.104	10.022	***
ACCSCPTL	< HI RNFE Capabilities	3.339	.262	12.754	***
TAKELOAN	< HI RNFE Capabilities	2.700	.222	12.157	***
FERNMEMB	< Household_Demography	.337	.065	5.201	***
DPNRATIO	< Household_Demography	1.000			
EARNMEMB	< Household_Demography	.498	.079	6.290	***

Appendix B Statistical significance of the coefficients in the model on povertyregression weights: (Default model)

*** indicates 99% level of confidence; Regression coefficients are unstandardized

Human Resource Management Practices as Predictors of Organisational Innovations: An Analysis of Manufacturing SMEs in Japan

Aruna S. Gamage¹

Abstract

Small and Medium Enterprises (SMEs) are prevalent across the Japanese economy, accounting for the lion's share of its GDP. Their importance is indicated not only by the large share of GDP, but also by the number of companies, total number of employees, and value of shipments etc. However, since last two decades, this sector has no longer been a thriving source of growth. The business failure rate remains high while firm entry rate has slipped downward. One of the reasons for high rate of business failures in SMEs is the lack of attention they are paying to the Human Resource Management (HRM) practices of their businesses when compared with their large counter parts. Therefore, the broad aim of this study is to investigate HRM practices in SMEs in Japan. Specifically, this study aims to investigate whether HRM practices are significant predictors of innovations in SMEs, as measured by the number of new products, process and administrative developments which are crucial to face global competition. Further, this study attempts to examine the relationship between HRM practices and organizational innovations shedding some light on the link between the two. A structured questionnaire was developed and sent to 436 SMEs in Aichi Prefecture and 144 firms responded to the questionnaire resulting in 32 per cent response rate. Based on the data analysis, it was found that there is a strong positive relationship between HRM practices and organizational innovations in manufacturing SMEs in Japan.

1. Introduction

SMEs are prevalent across the Japanese economy, accounting for the lion's share of GDP. Their importance is indicated not only by the large share of GDP, but also by the number of companies, total number of employees, and value of shipments etc. There are 4.69 million SMEs in Japan, constituting 99.7 per cent of all enterprises, accounting for 70 per cent of all employment (Small and Medium Enterprise Agency, 2013). Although their relative importance as a share of the number of enterprises and the number of employees is declining compared with the situation at the beginning of the 2000s, there is no change in

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the fact that the SME sector still accounts for the vast majority of enterprises and employees in Japan. The majority of products of large enterprises are still made up of parts produced by SME subcontractors, and therefore, the availability and reliability of Japanese products are supported by the underlying strength of SMEs. SMEs have been recognized as a key source of innovation and playing a major role in revitalizing its fragile economy (Sato, 2013).

However, over the last two decades, SMEs have no longer been a thriving source of growth. The profitability and investment of SMEs have declined significantly and new business registration of SMEs has been in the decline. The number of manufacturing establishments employing 04 to 299 people steadily declined from 434,754 in 1985 to 254,675 in 2007. The sharp decline in the number of establishments was caused not only by failure of enterprises but also by the lower number of enterprises entering the economy. As shown in Figure 1, the entry rate has experienced a prolonged decline since the 1970s while exit rate has trended upward in recent years, based on the number of enterprises. As a consequence, the firm exit rate has considerably exceeded the firm entry rate despite the slight upward swing in the entry rate in recent years (Ministry of Economy, Trade and Industry [METI], 2006).

Nevertheless, successful business management of SMEs largely depends on the quality of human resource that supports companies (Japan Small and Medium Enterprise Corporation [JASMEC], 2001). Proper management of a company's human resources is the key to business survival in today's competitive world. Securing and training of high quality personnel are, therefore, key factors for the growth of SMEs, which often have limited opportunities to utilize managerial resources. There is growing evidence to suggest that HR practices are important predictors of organisational performance. The organizational effectiveness of the firm (Huselid, 1995; Terpstra and Rozell, 1993) and its ability to create a sustainable competitive advantage (Prahalad, 1983; Pfeffer, 1994) hinge upon whether HRM practices are properly thought out and successfully implemented. However, it is argued that, in general, SMEs are paying less attention to HRM practices when compared with their counterparts of large enterprises (Kok, 2003; Wong et al, 1997; Gamage, 2007). Therefore, the prime objective of this study is to examine the applications of HRM practices in SMEs in Japan. Specifically, this study aims to investigate whether HRM practices are significant predictors of organisational innovations in SMEs, as measured by the number of new products, process and administrative developments which are very important to face global competition. Further, this study attempts to examine the relationship between HRM practices and organisational innovations shedding some light on the link between the two.



2. Literature Review

An overview of research which has been conducted so far on HRM in SMEs is presented in this section. Subsequently, it briefly presents main conclusions of studies on the relationship between HRM practices and organisational innovations within SME business context.

2.1 HRM in SMEs

Given the importance of SMEs employees to the national economy, it is disheartening to note that scant attention is given in SMEs research to the study of human resource management practices. No matter where you look, in surveys (e.g., Hornsby and Kuratko, 1990), in reviews of literature (e.g., Good, 1998), and in empirical studies (Heneman and Berkley, 1999), scholars are lamenting over the dearth of information about human resource management practices in SMEs. Proper management of a company's human resources is the key to business survival in today's world. The organizational effectiveness of the firm (Huselid, 1995; Terpstra and Rozell, 1993) and its ability to create a sustainable competitive advantage (Prahalad, 1983; Pfeffer, 1994) can hinge upon whether HRM practices are properly thought out and successfully implemented. The human potentials in a company are generally much more difficult for competitors to duplicate than the plant, equipment or even products that a company produces (Flanagan and Despanade, 1996). Consequently, the nature and well being of a company's employees can become its main strength in carving out a profitable existence in the industry. HRM practices can be particularly important for small firms (Marlow and Patton, 1993) since they tend to be so dependent on human capital. Research indicates that inadequate and insufficient management of employees in small firms has resulted in low

productivity and high turnover rates (Mathis and Jackson, 1991) and is one of the leading causes of small business failures (McEvoy, 1984).

The overall goal of human resource management is to ensure that the company will be able to achieve success through people. HRM aims to increase the effectiveness and organizational skills, which means the ability of an organization to achieve its goals using the available resources in the best way possible. There are growing numbers of research that link HRM practices to organizational performances. Some authors in their studies have found that HRM systems can be the source of firms' new product developments that allow one to face with severe global competition. The organisations' ability to innovate is seen as a key factor to ensure their success within an ever increasing globally competitive business environment (Cohen and Levinthal, 1990; Brown and Eisenhardt, 1998; McGrath, 2001; Tsai, 2001). While researchers have accumulated a lot of knowledge about the relationship between HR activities and organisational performance measured in financial terms (Dyer and Reeves, 1995; Huselid, 1995; Macduffie, 1995), the knowledge about the extent to which HRM promotes organisational innovation especially in SMEs context is still relatively scarce.

2.2 HRM Practices and Organizational Innovations

Innovation is the process of translating an idea or invention into a good or service that creates value for which customers will pay. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers.

Organizational innovation has been widely defined as the creation of new ideas and new behaviour for the organization (Damanpour and Gopalakrishnan, 2001). Organizational innovation can be divided into three main dimensions; product innovation, process innovation and administrative innovation (Chuang, 2005; Tan and Nasurdin, 2010). Product innovation is defined as the development and commercialization of a new product to create value and meet the needs of the external user or the needs of the market (Damanpour and Gopalakrishnan, 2001). Process innovation is viewed as a creation of a new process or improvement to an existing process (Leonard and Waldman, 2007). On the other hand, administrative innovation is viewed as performance derived from the changes to organizational structure and administrative process, reward and information system, and it encompasses basic work activities within the organization which is directly related to management (Chew, 2000; Damanpour and Evan, 1984). Given the importance of product innovation, process innovation and administrative innovation in enhancing performance in a manufacturing firm, this study operationalizes organizational innovations as to be multidimensional comprising of all these three types of organizational innovations.

The literature on the relation between HRM practices and organisational innovation is vast and not easily identifiable, as relevant papers are not necessarily published in HRM journals and may primarily focus on other issues. Until 2000s, the innovation literature was characterized by relatively scant attention being paid to HRM practices and how they influence innovation performance (Laursen and Foss, 2003). According to Wang (2005), innovative firms treat HRM practices as the organization's strategy to encourage team responsibilities, enhance organizational culture, and build up customer relationships through participation and empowerment. In turn, it will help create and market new products and services (Gupta and Singhal, 1993). In order for firms to develop and introduce new products, new processes and new administrative practices, they require innovative and creative employees, who are flexible, risk taking, and tolerant of uncertainty and ambiguity (Chen and Huang, 2009). These employees are highly recognized in manufacturing industries as they contribute to the firm on the basis of market responsiveness. Therefore, it is important for a firm to implement supportive HRM practices that can motivate and stimulate employees to be innovative and creative.

The contention that certain HRM practices impact different aspects of innovation has been conceptualized by Leede and Looise (2005) and Jorgensen et al (2008). Their findings contribute substantially to the understanding of the relationship between HRM and innovation, but they are also limited by having been conducted exclusively in manufacturing firms in large organisations. According to contingency theory models developed by Miles and Snow (1984), characteristics of the organization (e.g. size, external market, industry) are critical factors in determining the appropriate HRM practices for an innovation strategy. Thus, this research aimed at explaining and describing the relationship between HRM practices and organisational innovations in manufacturing SMEs is clearly warranted.

3. Operationalisation of Variables

3.1 Human Resource Management Practices

HRM is the function within an organization that focuses on recruitment of, management of, and providing direction for the people who work in the organization. It is the effective and efficient utilization of human resources to achieve organizational objectives (Opatha, 2010). HRM is the human side of the organizational management. It is mostly responsible for the attraction, selection, training, assessment, and rewarding of employees for getting maximum contribution toward the organizational success. Stone (2005) defined human resource management as productive use of people in achieving the organization's strategic business objectives and the satisfaction of individual employees. This definition clearly indicates that the organizations' objectives are dependent on their work force productivity. The effective use of HRM practices is able to link these practices with organization's goals and objectives. In order to accurately measure 'human resource practices', a number of HR functions may need to be evaluated. The importance of these practices may differ from firm to firm. One of the most comprehensive and widely used measures for human resource practice was presented by Dessler (2008) and Fisher et al (2006). In their studies, human resource management practices are characterized as multidimensional, and it has four major facets namely, staffing, training and development, employee performance evaluation, and compensation of employees.

3.1.1 Staffing

Staffing is the process of acquiring, deploying, and retaining a workforce of sufficient quantity and quality to create positive impacts on the organization's effectiveness. It involves recruitment, selection, hiring and induction of potential employees. Recruitment is the process of finding and attracting suitably qualified people to apply for job vacancies in the organization. It is a set of activities an organization uses to attract job candidates who have needed abilities and attitudes. Selection is the process of making the choice of the most appropriate person from the pool of applicants recruited to fill the relevant job vacancy. Hiring is the process of appointing selected candidates to the posts which are vacant. Induction is the HRM function that systematically and formally introduces the new employee to the organization, to the job, to the work group to which new employee will belong and the work environment where the new comer will work. Various tools and techniques are used by firms for the improvement of staffing process to avoid the loss in terms of time, money and potential employees.

3.1.2 Training and Development

Training and development is another dimension of human resource practices where firms invest on development of their employees' knowledge, skills ability and other required skills to improve the productivity of employees. Training and development is the HRM function that formally and systematically provides new learning to increase employees' capabilities. The primary purpose of training and development is to increase organizational performance by increasing employee performance. Training and development can transform human resource to human capital where skilled employee would better perform in the success of organization as compared with none or less - trained employees.

3.1.3 Performance Evaluation

Performance evaluation is defined as the systematic process of identifying, measuring, influencing, and developing job performance of the employees in the organization in relation to the set of norms and standards for a particular period of time in order to achieve various purposes (Opatha, 2010). This aspect of human resource practices generally involves the activities of various evaluation designs, both formal and informal, and different evaluation periodicities (Shub and Stonebraker, 2009). It is a means of getting better results by understanding and managing performance within an agreed framework of planned goals, standards and competency requirements. It functions as a continuous and evolutionary process, in which performance improves over time. Moreover, it provides the basis for regular and frequent dialogues between managers and individuals about performance and development needs (Armstrong, 2006).

3.1.4 Compensation Management

Compensation is the total amount of the monetary and non-monetary pay provided to an employee by an employer in return for work performed as required. It is one of the most extrinsic practices of human resource function in an organizational setting. Compensation may include payments such as salary and wages, bonuses, profit sharing, overtime pay, recognition rewards, and sales commissions etc. Compensation can also include non-monetary perks such as a company-paid car, stock options in certain instances, company-paid housing, and other non-monetary items. This dimension determines the level of job of an employee on the basis of their perceived knowledge and experience. Moreover, the matching of their job knowledge with the pay or compensation provided to them must demonstrate the market level competitive packages. Good compensation plan would therefore, inevitably influence on employees' performance. However, the extent to which an employee who is getting the good compensation package will perform well would also depend on his or her overall assessment of various factors like the compensation package in other organizations in relation to the work load and the possibility of getting better compensation packages (Purani and Sahadev, 2008).

3.2 Operational Performance (OP)

Operational performances are those related to the goals of an organizational operation, including productivity, product quality, customer satisfaction and organizational innovations. However, in this study, organizational innovation is considered as the operational performance. Drawing upon the conclusions made by previous scholars (i.e., Gupta and Singhal, 1993: Laursen and Foss 2003; Shipton et al, 2005), it is expected that HRM practices to be positively related to organizational innovation of manufacturing SMEs in Japan.

4. Conceptual Framework

For the purpose of this study, four (4) HRM practices namely; employee staffing, training & development, performance management, and compensation management were selected. Then, the relationship between HRM practices and organizational innovation was examined exploring the mediating relationship of HR outcomes. Based on the above theoretical underpinning, a conceptual frame for the study was constructed as in Figure 2. According to the model in Figure 2, HRM practices are linking with organizational innovations and this relation is mediated by HR outcomes.

5. Methodology

A structured questionnaire was developed as the main data collection instrument. Four (04) HRM practices were selected for the study. There were; employee staffing, training and development, performance management, and compensation management. These four HRM practices were the most widely discussed HRM practices in the literature. In order to examine the HRM intensification, forty (40) items (employee staffing, 10; training and development, 12; and performance management, 10, and Compensation management, 8) were included in the questionnaire. Nine (9) HR outcomes; knowledge quality (KQ), occupational health and safety (OHS), job satisfaction (JS), employee commitment (EC), employee attitudes (EA) employee motivation (EM), employee loyalty (EL), employee involvement (EI), and workplace cooperation (WC) were considered for the study. Three (3) items for each HR outcome variables were included in the questionnaire. Four items in the scale were used to measure organizational innovations. The questionnaire was first developed in English and then translated into Japanese to make respondents better understand it.

Four hundred thirty six (436) questionnaires were distributed to a randomly selected sample of manufacturing SMEs in Nagoya in Aichi Prefecture. An electronic data file maintained by the Nagoya Chamber of Commerce was used to draw the sample. One hundred five (105), equivalents to thirty two per cent (32 per cent), responded to the survey. Data was analyzed by using SPSS version 16. Descriptive statistics were used to understand the characteristics of firms and Pearson product movement correlation coefficient was used to examine the relationships among variables.



In order to measure the reliability of instruments, Cronbach's alpha coefficient is widely used. According to Sekaran (2005), if the alpha value is greater than 0.7, the instrument is said to be acceptable. The internal consistency reliability coefficients (Cronbach's alpha) for the scales used in this study are well above the level of 0.7. Table 1 shows coefficients for all variables. According to table 1, each variable has got more than 0.8 alpha values which are well above the standards and thus are acceptable for the analysis purpose. Validation procedures involved initial consultations with subject matter experts about the questionnaire prepared. The experts also judged the face and content validity of the questionnaire and decided as adequate. Hence, the researcher was satisfied with the reliability and validity of the scale.

Table 1: Reliability 2	Analysis
Variable	Cronbach Alpha
Employee Staffing (10)	0.916
Training & Development (12)	0.941
Performance Evaluation (10)	0.939
Compensation Management (8)	0.871
HRM Outcomes (18)	0.921
Product Innovations (4)	0.910

Source: SurveyData, 2013

6. Results of the Survey

Table 2 shows Pearson product movement correlation coefficients among HRM practices, HR outcomes and organizational innovations. According to Table 2, HRM practices are highly and positively correlated with organizational innovations.

First, employee staffing shows positive correlation with labour productivity. This relationship is strong and statistically significant (r= .404, p<0.01.). Second, the correlation of training and development with organizational innovation is also positive and very high (r=.451, p< 0.01). The link between training and development and organizational innovation is strong and it is statistically significant. Third, performance evaluation function also establishes strong correlation with organizational innovations (r= .587, p< 0.01). This relation is also positive and statistically significant. Finally, the relationship between compensation management and organizational innovation also seems positive (r=.336, p< 0.01).

Although the magnitude of coefficient is somewhat lower than when compared with three other coefficients, it is also positive and statistically significant. Among all for variables, performance evaluation establishes very high correlation with organisational innovations. In order to examine the mediating relationship between HRM practices and organizational innovations, HR outcomes were studied. Based on the nine HR outcomes, a cumulative index that represents the aggregation of all nine HR outcomes was developed. The links between HRM practices and HR outcome index were examined. Not surprisingly with earlier studies, this study too establishes very strong correlations between all four HRM practices and HR outcomes, (Employee p< 0.01; Training and development, r=.462, p< 0.01; staffing, r=.458. performance evaluation, r = .483, p< 0.01; and compensation management, r= .406, p < 0.01). On the other hand, the correlations of HR outcomes and organizational innovations also cannot be undermined. HR outcome index shows very high and positive correlation with labor productivity which is r= .503 (p< 0.01). This link is also statistically significant highlighting the fact that the link has established not by chance but is worth further study.

Correlations among Variables										
VARIABLE	ES	TD	PE	СМ	HROC					
Employee Staffing (ES)	1									
Training & Development (TD)	.794**									
Performance Evaluation (PE)	.702**	.632**								
Compensation Management (CM)	.600**	.581**	.724**							
HR Outcomes (HROC)	.458**	.462**	.483**	.406**						
Product Innovations (PI)	.404**	.451**	.587**	.336**	.503**					
** (Investation is significant at the 0.01 level (2 tailed)										

Table 2: Correlations among Variables

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

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey Data, 2013

7. Discussion of the Findings

7.1 HRM Practices and Organisational Innovations

In this study the four areas of HRM practices highlighted their role and relationship with organizational innovation. Similar to the findings of other studies in large organizations, this study also establishes very strong and statistically significant positive correlation of HRM practices with organizational innovations in manufacturing SMEs in Japan. According to the findings, all four HRM practices were highly and positively correlated with organizational innovations. It implies the idea that four HRM practices; employee staffing, training and development, performance management, and compensation management are having positive correlations with organizational innovations. This conveys the fact that effective HRM practices lead to organizational innovations even in SMEs. In other words, an increase in the usage of above HRM practices gives rise to organizational innovations. As all these relations are positive, with the increase of the usage of the said HRM practices, organizational innovations will increase. Therefore, the conclusion that can be drawn from this finding is that, SME owners/managers who are concerned about increasing organizational innovations and thereby to have new product developments should be prepared to apply effective and efficient utilizations of its human resource through HRM practices which best fit the organisation.

7.2 HRM Practices and HR Outcomes

Analysis of the data clearly establishes very high positive correlations of HR outcomes with organizational innovations. Therefore, it is intuitive to assume that HR outcomes are playing a mediating relationship between HRM practices and organizational innovations. With this correlation, it is reasonable to assume that an increase of the usage of above HRM practices gives rise to higher organizational innovations through HR outcomes. Drawing from these findings, it can be concluded again that those owners/mangers in SMEs who are concerned about increasing their organizational innovations through HR outcomes should focus on effective use of HRM practices prescribed above. However, in order to examine the magnitude of the exact impact of mediating effect of HR outcomes, further analysis with sophisticated statistical techniques is needed.

8. Implications, Limitations, and Directions for Future Research

The results of this study offer several key theoretical and practical implications for SMEs owners and managers interested in improving business performance of their SMEs. Effective HRM practices lead to positive HR outcomes. The effective use of HR practices; employee staffing, training and development, performance management, and compensation management in SMEs was shown to be related to HR outcome index which represented knowledge quality, occupational health and safety, job satisfaction, employee commitment, employee attitudes employee motivation, employee lovalty, employee involvement and workplace cooperation. These positive HR outcomes in turn are translated into positive operational performance: increase in organizational innovations. This highlights the fact that employees do matter even for SMEs and are shown to be linked with organizational innovations in their businesses. Therefore, as the study highlights, when evaluating many options that are available to SMEs, it is very important to keep in mind not to discount the importance of human resource management and the related practices. Effective human resource management practices lead directly to positive outcomes on employees of the firm, which in turn lead to positive organisational performance.

This study was subject to certain limitations encountered in the research process. The study was based on the data collected only from 136 manufacturing SMEs in Aichi Prefecture Japan. Therefore, generalisability could have been increased if a sufficient number of manufacturing firms representing all the prefectures in Japan had been taken. Further, the study focused only on the relationship, not on the effect or impact, between HRM practices and organizational innovation. However, it is better if this study could focus on the effect of HRM practices on organizational innovations also. Further analysis with sophisticated statistical testing is very much sought to examine the impact of HRM practices on organizational innovations and mediating role of HR outcomes between these two. Therefore, future research with relatively larger samples expanding to other sectors in SMEs will be very much useful in this direction.

References

- Aizzat, M. N., Muhamad, J., and A.F. Fitriah. Academy of Management Journal, 9(2):63–85, Unpublished MBA Dissertation, UniversitiSains Malaysia, Penang, Malaysia.
- Armstrong, M. (2006). *A Handbook of Human Resource Management Practice*, 10th ed., London: Kogan Page.
- Brown, S. L., and Eisenhardt, K. (1998). *Competing on the edge: strategy as structured chaos*. Boston, MA: Harvard Business School Press.
- Chen, C. J., and Huang, J. W. (2009). Strategic human resource practices and innovation performance: The mediating role of knowledge management capacity. *Journal of Business Research*, .62(1):104-114.
- Chew, C. H. (2000). Organizational cultural characteristics and innovation: A *perspective from electrical and electronics industry in Penang*. In Country of origin effect on organizational innovation in Malaysia: The mediating role of structure Asian, (Ed).
- Chuang, L.M. (2005). An empirical study of the construction of measuring model for organizational innovation in Taiwanese high-tech enterprises. *The Journal of American Academy of Business*, 9(2): 299-304.
- Cohen, W. M., and Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective of Learning and Innovation. *Administrative Science Quarterly*, 35(1): 128-152.
- Creativity and Innovation Management, 14(2): 108-117.
- Damanpour, F., and Evan, W. M. (1984). Organizational innovation and performance: The problem of organizational lag, *Administrative Science Quarterly*, 29(3): 329-409.
- Damanpour, F., and Gopalakrishnan, S. (2001). The dynamics of the product and process innovations in organizations. *Journal of Management Studies*, 38(1): 45-65.
- Dessler, G. (2008). *Human Resource Management*, 11th ed., NJ: Pearson Prentice-Hall, Upper Saddle River.
- Dyer, L., and Reeves, T. (1995). Human resource strategies and firm performance: What do we know and where do we need to go? *International Journal of Human Resource Management*, 6: 656–670.
- Fisher, C.D. Schoenfeldt, L.F., and Shaw, J. B. (2006).*Human Resource Management*, 6th ed., Boston, MA: Houghton Mifflin.
- Flangan D. S., and Despande, S. P. (1996). Top management's perceptions of changes in HRM practices after union elections in small firms, *Journal of Small Business Management*, 34(4): 23-34.

- Gamage, A.S. (2007). Impact of HRD practices on business performance: An empirical analysis of manufacturing SMEs in Japan. *Meijo Review*, 8(3): 85-109.
- Good, D. C. (1998). *Gender and successful human resource decision in small business*, New York: Garland publishing.
- Gupta, A., and Singhal, A. (1993). Managing human resources for innovation and creativity, *Research Technology Management*, 36(3) 8-41.
- Henman, H. G. III, and Berkley, R.A. (1999). Applicant attraction practices and outcomes among small businesses, *Journal of Small Business Management*, 37 (1): 53-74.
- Honsby, J. S., Kuratko, D.K. (1990). Human resource management in small business: critical issues for the 1990s, *Journal of Small Business Management*, 28(July): 9-18.
- Huselid, A. M. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38 (3): 635–672.
- Japan Small and Medium Enterprise Corporation (JASMEC), (2001). Role of Japanese SMEs: What is SMEs? Tokyo
- Jorgensen, F., Hyland, P., and Kofoed, L. (2008). Examining the role of Human Resource Management in Continuous Improvement, *International Journal of Technology Management*, 42(1&2):127-142.
- Kok, J. D. (2003). *Human resource management within small and medium-sized enterprises*. Amsterdam: Rozenberg Publishers.
- Laursen, K., and Foss, N. J. (2003). New human resource management practices, complementarities and the impact on innovation performance. *Cambridge Journal of Economics*, 27(2): 243-263.
- Leede, D. J., and Looise, J. K. (2005). Innovation and HRM: Towards an integrated framework.
- Leonard, J. A., and Waldman, C. (2007). An empirical model of the sources of innovation in the U.S. manufacturing sector. *Business Economics*, 42 (4): 33-45.
- MacDuffie, J. P. (1995). Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry. *Industrial and Labor Relations Review*, 48: 197–221.
- Marlow, S., and Patton, D. (1993). Managing the employment relationship in the small firm: Possibilities for human resource management. *International Small Business Journal*, 11(4): 57-64.
- McEvoy, M. G. (1984). Small business personnel practices. *Journal of Small Business Management*, 22(4): 1-8.
- McGrath, R. G. (2001). Exploratory learning, innovative capacity and managerial oversight. *Academy of Management Journal*, 44: 118–131.
- Miles, R. E., and Snow, C. D. (1984). Fit, failure, and the hall of fame, *California Management Review*, 26:10-28.

- Ministry of Economy, Trade and Industry (METI), (2006). *White paper on SMEs in Japan 2006*, Japan Small Business Research Institute: Tokyo.
- Opatha, H.H.D.N.P. (2010). *Human resource management*. Colombo: Author published
- Organization for Economic Co-operation and Development (OECD), (2002).*Management Training in SMEs*, Retrieved from www.oecd.org/pdf.
- Pfeffer, J. (1994). *Competitive advantage through people: unleashing the power* of the workforce. Harvard Business School press: Boston.
- Prahalad, C.K. (1983). Developing strategic capability: An agenda for top management. *Human Resource Management*, 22(3): 237-254.
- Purani, K., and Sahadev, S. (2008). The moderating role of industrial experience in the job satisfaction, intention to leave relationship: an empirical study among salesmen in India. *Journal of Business and Industrial Marketing*, 23(7): 475-485.
- Sato, K. (2013). *Japan's Policies for Small and Medium Enterprises*. Economic Attache Embassy of Japan in the KSA: KSA.
- Sekaran, U. (2005). *Research Methods for Business: A Skill Building Approach*, John Wiley & Sons.
- Shipton, H., Fay, D., West, M., Patterson, M., and Birdi, K. (2005). Managing people to promote innovation. *Creativity and Innovative Management*, 14(2): 118-128.
- Shub, A. N., and Stonebraker, P. W. (2009). The Human Impact on Supply Chains: Evaluating the Importance of "Soft" Areas on Integration and Performance, *Supply Chain Management: An International Journal*, 14(1): 31-40.
- SMEs Agency, (2013).Contribution of SMEs to the national economy of Japan.Retrieved from http://www.chusho.meti.go.jp/sme_english.
- Stone, R. J. (2005). *Human Resource Management*, 5th ed., Australia: John Wiley & Sons.
- Tan, C. L., and Nasurdin, A. M. (2010). Human resource management practices and organizational innovation: An empirical study in Malaysia. *Journal* of Applied Business Research, 2(4):105-115.
- Terpstra, E. D., and Rozell, J. E. (1993). The relationship of staffing practices to organizational level measures of performance *Personnel Psychology*, 46 (1): 27–48.
- Tsai, W. (2001). Knowledge transfer in intra-organizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44: 996–1004.
- Wang, Z. M. (2005). Organizational effectiveness through technology innovation and HRM strategies. *International Journal of Manpower*, 26(6): 481-487.

Wong, C., Marshall, N., Alderman, N., and Thwaites, A. (1997) Management training in small and medium-sized enterprises: methodological and conceptual issues', *International Journal of Human Resource Management*, 8(1):44-65.