Is FDI driving Intellectual capital? A panel data analysis
Karam Pal Narwal\textsuperscript{1}, Sushila Soriya\textsuperscript{2}, Ruhee Mittal\textsuperscript{3}
\textsuperscript{1} Profesor, Haryana School of Business
Guru Jambheshwar University of Science & Technology, Hisar (Haryana) India
\textsuperscript{2} Assistant Professor, Department of Commerce, Central University of Rajasthan, Ajmer, Rajasthan
\textsuperscript{3} Junior Research Fellow, Haryana School of Business
Guru Jambheshwar University of Science & Technology, Hisar (Haryana) India
sushila.soriya@gmail.com

ABSTRACT
The study examines physical and intellectual capital factors for a period of 20 years spanning from 1990 to 2010 on a panel of 9 developing and developed countries in attracting FDI inflows. Data is estimated using econometric models: OLS, Fixed Effect, Random Effect and GMM estimation. Contrary to the expectations, physical infrastructure is negatively associated with the FDI, which indicates its declining importance in foreign capital inflows. Human capital and innovativeness are positively related with the FDI inflows. This implies that intellectual capital plays a dominant role in attracting the FDI inflows.

Policy makers can invest and manage intellectual capital along with other aspects to attract more FDI inflows. In the developing countries where FDI contributes to economic growth and prosperity, this study can be used as a benchmark to highlight the issue.

Keywords: FDI inflows, OLS, GMM estimation, intellectual capital, physical infrastructure.

1. Introduction
Foreign direct investment (FDI) is an alternative approach for any host country to acquire advanced technologies, better infrastructure and human capital and therefore in the development of a country (Yuan, Chen and Wang, 2010). There are two schools of thoughts regarding advantages and disadvantages of FDI. The proponents argue that FDI bring prosperity and higher growth in recipient country through technology transfers, job opportunities enhancement and improve government revenues. On the other hand, opponents argue that it would increase recipient country’s dependency and hence vulnerability on FDI exporting-developed countries (Yussof and Ismail, 2002). The overall global environment for the FDI has been favorable in the recent decade; it has increased from $421.1 billion in 2002 to about $1017.3 billion in 2011 for developed economies and from $197 billion in 2002 to about $586.7 billion in 2011 for developing economies.

Therefore, many countries have focused on formulating policies to attract foreign capital inflows as a part of their economic development plans. Thus, to increase the share of FDI inflows, many countries adopted trade liberalization policies, tax incentives, subsidies, domestic financial reforms, strengthening of macro policies, low labor cost, large domestic markets, improvised infrastructure, privatization of state-owned enterprises and transparent
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and easy entry and exit policies (Chen, 1996; Kimino, Saal and Driffield, 2007). These determinants have gained importance over the years and increased the growth of FDI investments in the host countries. But with these, other main components of intellectual capital i.e. human capital, research and development and number of patents registered in the host country which may be acting as important determinants in attracting foreign capital perhaps didn’t get their due attention.

This raises the question in the mind of researcher to enquire whether there is any significant impact of intellectual capital when combined with physical capital factors in attracting the foreign direct investments. In this context, the objective of the present paper is to examine the role of physical and intellectual capital factors in attracting foreign direct investment for the panel of nine developing and developed economies namely Australia, China, India, Japan, New Zealand, Republic of Korea, Philippines, Thailand and Singapore (See Table 1.1). Econometric tools such as regression analysis and GMM are used to determine if there is significant relationship between FDI with human capital, research and development, labor cost, patent registered, openness, market size, lending rate and gross capital formation. Intellectual capital is the factors related to the intellect of the human beings whereas physical capital is variables related to the physical infrastructure of the country. This study resolves around the traditional and modern theories of foreign trade. Thus, the available literature is likely to be extended by including intellectual capital as a driving force in determining inflow of the foreign direct investment in a country.

Table 1: Characteristics of the sample countries

<table>
<thead>
<tr>
<th>Classification</th>
<th>Countries</th>
<th>Economic perspective of countries</th>
</tr>
</thead>
</table>
| Developing Countries | India     | • Most competitive host for foreign investments in Asia-Pacific region attracting foreign capital  
• Liberalization in 1991 and launch of New Industrial Policy Statement welcoming FDI |
|                    | China     | • Growing rapidly since 1978  
• Open policy adopted  
• Large, skilled, low-cost, and flexible workforce |
|                    | Thailand  | • Progressing to achieve the status of newly industrialized economies  
• Prospering through export-led strategies with intensive use of cheap but less skilled labor |
| Republic of Korea  |           | • After Asian Financial crisis in 1997/1998, Korean govt. was forced to pursue FDI-friendly policies  
• In 1998, government passed Foreign Investment Promotion Act (FIPA) providing tax reductions in high-technology manufacturing, a comprehensive one-stop investment service, designation of Foreign Investment Zones (FIZ) and inexpensive long-term leases of land. |
| Philippines        |           | • Trade liberalization policies through which country went for globalization during 1994-2000  
• Various investment Incentives were offered such as tax holidays, fiscal measures such as reduced tax rates on profits, import duty exemptions and accounting rules allowing accelerated depreciation |
The paper is structured in five sections. Section I introduces the concept. Section II presents review of literature. Section III throws light on the research methodology applied in the study. Section IV discusses the results of the estimations, and lastly Section V concludes the study.

2. Review of literature

Due to increasing globalization, FDI is becoming an important tool for the integration of world economies. Many researchers and academicians have focused on studying the determinants of inward and outward flow of foreign capital. A brief review of more than 20 studies covering the period from 1996 to 2011 is presented in the table 1.2 on next page.

Thus, from the brief review of existing literature it may be observed that much attention is given on studying the impact of physical factors such as market size, inflation rate, trade openness, exchange rates, imports, exports and many more on FDI. However, the role of intellectual capital factors such as human capital, research and development and number of patents registered in foreign investments have, perhaps been neglected by scholars over the years. However, these factors are acting as important tool in attracting the foreign capital to the country.

2.1 Research gap identified

From the literature review, it may be summarized that there are plethora of studies examining the impact of physical factors on FDI in various countries. But, some developed and developing economies have large potential of human capital. The human capital can be effectively utilized to attracting FDI inflows. These factors are human capital, research and development and patents represent the intellectual capital of a country. These Intellectual factors play a significant role particularly in emerging economies, which has been ignored by the researchers. Thus, the present study is a modest attempt to fill this research gap.

3. Research methodology

3.1 Objectives

The main objective of the study is to examine the physical and intellectual factors influencing the foreign direct investment inflows in the sample countries. Major intellectual capital factors taken in the study are human capital, research and development and number of patents
registered in the country and physical factors are physical infrastructure GFC, market size, and trade openness. For attaining the above objective panel data set having both time series and cross-sectional effect is used.

3.2 Data collection

Data is collected from theDataStream database.

3.3 Sample size and period

The sample consists of the six developing and three developed countries which include Australia, China, India, Japan, New Zealand, Republic of Korea, Philippines, Thailand and Singapore for a time period of twenty years spanning from 1990 to 2010.

3.4 Country specification

Table 1.1 reports the economic characteristics and perspective attracting the FDI in the sample countries. Figure 1.1 and 1.2 show the trends observed in the FDI inflows for the selected economies during the reference period.

3.4 Hypothesis specification

3.4.1 Market size

The market size of the host country is one of the major factors in attracting the FDI inflows in a country. If the markets of the host country are large and developed then they are expected to have a positive impact on the FDI inflows. Traders get benefits from the economies of scale by having large market size and hence attract FDI inflows. The study of the past literature shows that Gross Domestic Product (GDP) has been taken as the proxy for the market size of the country. Jensen (2002) used the log GDP as proxy for denoting market size of the country. Thus, the researcher expects to have a positive relation between market size and FDI inflows. Contrary to the present study, Leitao and Faustino (2008); Naude and Krugell (2007) expected FDI to be negatively related to market size.

\[ H_1 \] GDP proxy for market size is positively related with the FDI inflows.

3.4.2 Labor cost

Economic theories suggest that labor cost plays significant role in decision making process of the multinational corporations. Cheaper labor attracts firms and hence the level of foreign investments into the host country. Na and Lightfoot (2006); Katsaitis and Doulos (2009) reported that labor cost is an important variable in attracting the foreign capital in China and a panel of EU-15 countries respectively. Unit labor costs are used as proxy variable for labor cost in the FDI location decisions.

\[ H_2 \] Unit labor cost is negatively related to FDI inflows.

3.4.3 Physical infrastructure

Countries with healthy economic environment and well developed physical infrastructure will have favorable impact on the FDI inflows. The big multinational companies are in search of a location with better physical resources and assets. Asiedu (2002); Loree and Guisinger (1995)
concluded that infrastructure quality have a positive and significant impact on FDI inflows. Thus, for the present study Gross fixed capital (GFC) formation is used as a proxy for the physical infrastructure of the country.

H3. Physical infrastructure is positively related with FDI inflows.

3.4.4 Patent

The application and approval of patent is the sign of the current knowledge and innovativeness of the country. The number of patent application indicates inventiveness of the host country. Patents are considered as the outcomes of the intellectual capability of the human capital. Cantwell and Iammarino (1998) suggested that to indicate advanced technological capacity, patents were considered as the most reliable proxy for innovative activities. Singhania and Gupta (2011) used number of patent application as a substitute for research and development. So, in the present study numbers of patents application in a year is taken as proxy for the inventiveness of a country.

Table 2: Survey of selected articles on determinants of FDI

<table>
<thead>
<tr>
<th>Authors and year</th>
<th>Direction of FDI flows</th>
<th>Countries</th>
<th>Period of study</th>
<th>Significant determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yuan, Chen and Wang (2010)</td>
<td>FDI per capita</td>
<td>81 countries</td>
<td>2002-2006</td>
<td>Size of government, GDP per capita, rule of law</td>
</tr>
<tr>
<td>Hailu (2010)</td>
<td>Inflows</td>
<td>African Countries</td>
<td>1980-2007</td>
<td>Stock market availability, market openness, political instability, labor quantity and quality, domestic private investment, gross fixed capital formation, inflation, infrastructure conditions</td>
</tr>
<tr>
<td>Musila and Sigu (2006)</td>
<td>Inflows</td>
<td>Africa</td>
<td>1970-2002</td>
<td>Market size, labor costs, infrastructure quality, openness,</td>
</tr>
<tr>
<td>Authors</td>
<td>Type</td>
<td>Region/Time Period</td>
<td>Variables</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Apergis, Katrakilidis and Tabakis (2006)</td>
<td>Inflows</td>
<td>Panel of 30 countries</td>
<td>1992-2002; Public deficits (DEF), exports of goods and services (X), imports of goods and services (IMP), gross fixed capital formation (GFC) and the effective exchange rate (E)</td>
<td></td>
</tr>
<tr>
<td>Ramasamy and Yeung (2010)</td>
<td>Inflows</td>
<td>Provinces of China</td>
<td>1988-2007; Average wage rate, the number of employed persons, industrial output</td>
<td></td>
</tr>
<tr>
<td>Trevino and Mixon (2004)</td>
<td>Inflows</td>
<td>Seven Latin American countries</td>
<td>1988-1999; Real exchange rate, consumer prices in the host country’s currency, gross domestic product, domestic privatizations, political risk rating</td>
<td></td>
</tr>
<tr>
<td>Azam et al. (2011)</td>
<td>Inflows</td>
<td>Seven South Asian countries</td>
<td>1996-2007; GDP per capita, labor force, Macroeconomic Policy Index, Institutional Quality Index, internet users</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Interest rate

Higher interest rate indicates high cost of investment in a country and vice versa. Interest rate shows the economic stability of the country. Tsen (2005); Erdal and Tatoglu (2002) used interest rate as the measure of cost of capital. Cavallari and d’Addona (2011) have indicated volatile relationship between FDI and country’s interest rate. Study implied that increase in volatility with interest rates has a negative effect on foreign investments when originated in the host country. Then, it may have a negative association with the FDI inflows.

\( H_5 \). Interest rate is negatively related with the FDI inflows.

3.6 Openness

The liberalization of a country’s foreign economic policies is expected to influence its imports and exports positively. Katsaitis and Doulos (2009) have taken openness as an important determinant of the FDI inflows. Openness to trade and investment is defined as the sum of the imports and exports share of GDP. Janicki and Wunnave (2004) have pointed that countries were liberal towards trade have opportunities to attract more foreign firms.

\( H_6 \). Openness is positively related with the FDI inflows.

3.7 Research and development (R&D)

Different studies have used different proxies to signify the research and development of the country. Santis and Vicarelli (2001) in their study used number of researchers as a proxy of the skilled labor force. Rysava and Galeotti (2009) used the number of people employed in R&D to represent the role of research and development in the FDI inflows. The role of research and development has become more significant in the recent years. Higher number of persons in R&D or higher expenditure on R&D represents high quality of skilled labor in different studies. This study uses gross domestic expenditure on R&D as a percentage of GDP as the proxy for the research and development.

\( H_7 \). Research and development is positively related with the FDI inflows.

3.8 Human capital

Rodriguez and Pallas (2008) employed human capital as the percentage of employees with upper-secondary education level to represent the strength of human capital in the country. Yussof and Ismail (2002) constructed competitiveness by including alike characteristics of human capital such as labor availability, cost, skills, trainability and managerial or technical skills. In this study, number of students in secondary education has been taken to represent human capital of the countries.
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$H_8$. Human capital is positively related with the FDI inflows.

3.9 Model estimation

This section introduces the OLS, Fixed Effect, Random Effect and GMM estimation for examining association of the given variables with FDI inflows. The variables selected above have been divided into two major components namely intellectual and physical factors. The following econometric model has been developed for the study:

$$\text{FDI} = f (\text{Market size, labor cost, physical infrastructure, patent, interest rate, openness, research and development, human capital})$$

The model specified for research assumes that FDI inflows of selected countries are influenced by the factors like market size, human capital, research and development and so on. The model specified is as follow:

$$\text{FDI}_{it} = \alpha_0 + \beta_1 \text{GFC}_{it} + \beta_2 \text{GDP}_{it} + \beta_3 \text{HC}_{it} + \beta_4 \text{INT}_{it} + \beta_5 \text{LABOR}_{it} + \beta_6 \text{OPEN}_{it} + \beta_7 \text{PTS}_{it} + \beta_8 \text{RD}_{it} + \mu_i + \epsilon_{it}$$

where $i$ denotes the host economies, i.e. Australia, China, India, Japan, New Zealand, Republic of Korea, Philippines, Thailand and Singapore, $t$ for the time period, i.e. $t = 1999-2010$ and $\mu_i$ for fixed effects and $\epsilon_{it}$ is the error term. The dependent variable represents the inward FDI normalized by the recipient economy’s GDP. The summary statistics for the independent and dependent variables is represented in table 1.3. For robust results, a methodology similar to that of Rysava and Galeotti (2009) is used for empirical analysis. The estimation is carried out using the ordinary least squares (OLS), Fixed Effect Method, Random Effect Method and Generalized Methods of Moments (GMM) estimator. GMM was developed by Arellano and Bond (1991).

4. Analysis of the results

4.1 Unit root test

Levin, Lin and Chu unit root test is applied on the panel data to determine the stationarity of the data (Levin, Lin and Chu, 2002). Results of the test lead to reject the unit root hypothesis. Hence, the data is stationary in nature.

<table>
<thead>
<tr>
<th></th>
<th>FDI</th>
<th>GDP</th>
<th>HC</th>
<th>GFC</th>
<th>INT</th>
<th>LABOR</th>
<th>OPEN</th>
<th>PTS</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.714</td>
<td>8.857</td>
<td>15.441</td>
<td>3.289</td>
<td>7.237</td>
<td>100.141</td>
<td>4.239</td>
<td>6.673</td>
<td>0.274</td>
</tr>
<tr>
<td>Median</td>
<td>2.275</td>
<td>9.573</td>
<td>15.283</td>
<td>3.245</td>
<td>6.822</td>
<td>99.312</td>
<td>4.093</td>
<td>6.282</td>
<td>0.491</td>
</tr>
</tbody>
</table>

Table 3: Descriptive statistics of the variables used in the study
Table 4: Correlation matrix of dependent and independent variables

<table>
<thead>
<tr>
<th></th>
<th>FDI</th>
<th>GDP</th>
<th>GFC</th>
<th>HC</th>
<th>INT</th>
<th>LABOR</th>
<th>OPEN</th>
<th>PTS</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.196***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GFC</td>
<td>-0.096</td>
<td>-0.452*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC</td>
<td>-0.500*</td>
<td>-0.736*</td>
<td>0.637*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>-0.118</td>
<td>-0.516*</td>
<td>0.010</td>
<td>0.100</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LABOR</td>
<td>0.047</td>
<td>0.110</td>
<td>0.256**</td>
<td>0.066</td>
<td>-0.003</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPEN</td>
<td>0.791*</td>
<td>0.098</td>
<td>-0.092</td>
<td>-0.551*</td>
<td>-0.076</td>
<td>0.008</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTS</td>
<td>-0.281**</td>
<td>0.538*</td>
<td>0.062</td>
<td>0.122</td>
<td>-0.059*</td>
<td>0.241**</td>
<td>-0.452*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RD</td>
<td>0.077</td>
<td>0.267*</td>
<td>-0.023</td>
<td>-0.244**</td>
<td>-0.499*</td>
<td>0.186</td>
<td>-0.142</td>
<td>0.283*</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: * for 1% level of significance, ** for 5% level of significance and *** for 10% level of significance.

4.2 Multicollinearity

To check the problem of multicollinearity in the data correlation matrix of dependent and independent variables is made. As suggested by Aivazian, Ge and Qiu (2005), if the correlation co-efficient of independent variables is less than 30% then multicollinearity is not a problem among the variables. Table 1.4 shows the correlation matrix of chosen variables and it can be detected from the results that multicollinearity is not a problem among the selected variables.

Table 5: Results of the OLS, Fixed, Random Effect and GMM Estimation

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>Random Effect</th>
<th>Fixed Effect</th>
<th>GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-24.367 (-0.890)</td>
<td>-24.367 (-1.205)</td>
<td>-36.627 (-1.293)</td>
<td>-60.603 (-1.623)</td>
</tr>
<tr>
<td>GDP</td>
<td>1.195 (0.835)</td>
<td>1.195 (1.131)</td>
<td>1.891 (1.304)</td>
<td>3.522*** (1.801)</td>
</tr>
<tr>
<td>GFC</td>
<td>-5.021*** (-1.702)</td>
<td>-5.021** (-2.303)</td>
<td>-7.704** (-2.607)</td>
<td>-13.211* (-2.956)</td>
</tr>
<tr>
<td>HC</td>
<td>1.518 (1.384)</td>
<td>1.518*** (1.873)</td>
<td>2.217*** (1.982)</td>
<td>3.953** (2.515)</td>
</tr>
<tr>
<td>INT</td>
<td>-0.120 (-0.527)</td>
<td>-0.120 (-0.713)</td>
<td>-0.038 (-0.162)</td>
<td>0.146 (0.448)</td>
</tr>
<tr>
<td>LABOR</td>
<td>0.021 (1.032)</td>
<td>0.021 (1.397)</td>
<td>0.039*** (1.738)</td>
<td>0.027 (1.091)</td>
</tr>
<tr>
<td>OPEN</td>
<td>5.222* (4.842)</td>
<td>5.222* (6.554)</td>
<td>5.686* (5.140)</td>
<td>7.003* (4.601)</td>
</tr>
<tr>
<td>PTS</td>
<td>-2.100* (-3.209)</td>
<td>-2.100* (-4.343)</td>
<td>-2.107* (-3.379)</td>
<td>-2.914* (-3.584)</td>
</tr>
<tr>
<td>RD</td>
<td>4.433* (4.048)</td>
<td>4.433* (5.480)</td>
<td>3.931* (3.759)</td>
<td>4.990* (3.450)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.713 (0.713)</td>
<td>0.713 (0.713)</td>
<td>0.784 (0.784)</td>
<td>0.699 (0.699)</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.680 (0.680)</td>
<td>0.680 (0.680)</td>
<td>0.718 (0.718)</td>
<td>0.659 (0.659)</td>
</tr>
<tr>
<td>Sargan (p-value)</td>
<td>$\chi^2$ (8) 65.419*</td>
<td>$\chi^2$ (8) 65.419*</td>
<td>$\chi^2$ (8) 65.419*</td>
<td>$\chi^2$ (8) 65.419*</td>
</tr>
<tr>
<td>Wald test</td>
<td>167.819*</td>
<td>167.819*</td>
<td>167.819*</td>
<td>167.819*</td>
</tr>
</tbody>
</table>
Table 1.5 reports the results of OLS, Fixed Effect, Random Effect and GMM estimation. These estimations are applied to have robust results. Result of the Hausman test indicates that Fixed Effect model is more appropriate than Random Effect Model. Value of adjusted $R^2$ is 68%, 68%, 71.8% and 65.9% in case of OLS, Random Effect, Fixed Effect and GMM respectively. It indicates satisfactory explanatory power of the model. Fixed Effect estimation implies that the variables namely GFC, HC, LABOR, OPEN, PTS and RD are significant in the model. In GMM estimation, endogenous variable is chosen cautiously for robust estimation. $R^2$ and F-statistics are checked for choosing the endogenous variable. The variable with highest F-statistics is taken as instrument for estimation. Sargan test is used to check the validity of instruments. Results of the Sargan test do not reject the null hypothesis of no-second order serial correlation in difference residuals. It implies that the model is correctly specified.

The results of GMM estimation technique is found superior among the four estimates. Therefore, the results obtained from GMM estimation are considered to be valid for the purpose of study. Similarly, Katsaitis and Doulos (2009) suggested that GMM is a better estimation as it corrects for the presence of correlated firm-specific effects as well as the biases originated from the endogeneity of explanatory variables with the error term. An instrumental variable must satisfy two requirements to be a good instrument: it must be correlated with the included endogenous variables and orthogonal to the error process. Baum, Schaar and Stillman (2003) has suggested that GMM is better than instrumental variables estimators only if the heteroskedasticity is present otherwise the GMM estimator is no worse asymptotically than the instrumental variables estimator.

Results of the GMM estimation implies that GDP representing market size of the country is positively associated with FDI inflows of the sample countries at 10% level of significance implying that hypothesis $H_1$ is accepted. Similar results were obtained by Tsan (2005); Cheng and Kwan (2002); Erdal and Tatoglu (2002). It indicates that market size of the host countries attracts more FDI. In a similar study, Wei (2005) analyzed that China’s huge domestic market was the major driving force of inward FDI. Katsaitis and Doulos (2009) evaluated set EU-15 countries for the time period 1970-2005. They found that major factors to attract foreign capital were market size, growth, agglomeration effects, unit labor cost, macroeconomic stability and level of institutional quality. But contrary to the present results Edwards (1990); Jaspersen et al. (2000) found a negative relationship between FDI inflows with GDP.

Unit labor a cost is expected to be positively associated with the FDI inflows but the results found no significant association between labor cost and foreign capital. So, results of the study tend to reject the hypothesis $H_2$. Goldsborough (1979); Flamm (1984); Culem (1988); Schneider and Frey (1985); Shamsuddin (1994) discovered a negative effect labor cost on FDI flows. Caves (1974); Swedenborg (1979); Wheeler and Mody (1992) on the contrary analyzed positive effect on the FDI flows.

GFC is found to be negatively (at 1% level of significance) associated with FDI inflows. It indicates that now-a-days only GFC is not a major factor in attracting foreign investment into countries. Similarly, Hailu (2010); Chenga and Kwanb (2000) also established that physical infrastructure was the major determinant factors in attracting FDI. Hence, hypothesis $H_3$ is
rejected. Contrary to this result Asiedu (2002); Loree and Guisinger (1995); Wheeler and Mody (1992) found positive and significant relationship between FDI flows with quality of the physical infrastructure. Patent registered in the country is negatively associated (at 1% significance level) with FDI inflow, rejecting the hypothesis $H_4$. But the study by Kottaridi and Nielsen (2003) found positive and significant association of patents with FDI inflows.

Results of the study indicate that interest rate does not have significant association with foreign capital. So, the hypothesis $H_3$ is rejected. Trade openness is statistically and positively significant (at 1% level of significance) in attracting foreign capital. Thus, the hypothesis $H_6$ is accepted. Similarly, Asiedu (2002); Edwards (1990); Gastanaga et al. (1998) found positive and significant relationship between FDI flows with trade openness in their studies. Research and development expenditure is positively associated with the FDI inflows (significant at 1% level), thus accepting the hypothesis $H_7$. There are alike studies by Ueng and Ojah (1997); Tomiura (2003); Caves (1996) confirming the same results. Human capital is supposed to be related with FDI inflows and results found it positively (at 5% significance level) associated with FDI inflows. So, the hypothesis $H_8$ is accepted. Human capital also found significantly attracting foreign capital in studies by Fosfuri et al. (2001).

The major factors representing intellectual capital of a country i.e. human capital, research and development expenditure are found to be positively and patent registered negatively related with inflows of FDI. Yussof and Ismail (2002) found that the level of FDI inflows of a country was dependent upon various factors including resource availability and cost, openness, human capital achievement and technical advancement.

5. Conclusion

In the present study the major factors affecting FDI inflows are studied. The driving forces are divided into two important components – physical and intellectual capital. The factors representing intellectual capital are research and development, patents registered by host country and human capital while physical capital is represented by physical infrastructure, market size and trade openness. The control variables included for analysis is labor cost. The analysis is done on a panel dataset of nine developed and developing economies for a period of twenty years spanning from 1990 to 2010. Results obtained using GMM estimation technique shows that the major determinants of FDI inflows come out to be market size, human capital, openness and research and development. These factors are positively contributing in the expansion and progress of the host countries in attracting FDI. Physical infrastructure and patents registered in the host country are negatively associated with FDI inflows. Thus, concluded that contrary to expected results not only good physical infrastructure contributes in the growth and expansion of the country but proxies used for intellectual capital i.e. human capital and the research and development are also emerging factors. This underlines the importance of the intellectual capital in determining the economic growth of the countries.

The survey has discovered that the major determinants of FDI can be segregated into physical and intellectual factors with a shift in the trend from the former to the latter. The changing concept of internalization and world becoming a global village has changed the driving forces of FDI. Emerging economies have large potential to use their human capital in their growth and development. Increasing expenditure on research and development may act as an important factor as it leads to innovation and technological advancement. Thus, it can be implied that physical factors are still attracting the foreign investment but intellectual factors may be considered as the upcoming dimension. Present study may be an eye opener to the
government and policy makers of the countries. Intellectual capital plays a significant role in the economic growth of the countries by attracting the foreign direct investment inflows to the host countries.

6. References


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