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Determinants of FDI in BRICS Countries: A panel analysis

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Abstract

This study examines the factors determining FDI inflows of BRICS countries using annual dataset from the period 1975 to 2007 (for Russia required data set is available from 1990 onwards). The study employs Panel data analysis and finds that the selected variables Market size, Labour cost, Infrastructure, Currency value and Gross Capital formation as the potential determinants of FDI inflows of BRICS countries. The Economic Stability and Growth prospects (measured by inflation rate and Industrial production respectively), Trade openness (measured by the ratio of total trade to GDP) are seems to be the insignificant determinant of FDI inflows of the BRICS countries. The empirical results are robust in general for alternative variables determining FDI flows.

Keywords: foreign direct investment, panel data, economic stability

1 INTRODUCTION

The world has experienced a massive transformation in terms of geopolitics, economics and in organisation and distribution of production. For several reasons, emerging economies of Brazil, Russia, India and China (BRIC) have acquired important role in the world economy as producers of goods and services. BRICS countries prominently attract larger capital because of their larger potential consumer market having the common characteristic of large population. The BRIC countries are listed as emerging economies but these countries as a whole do not have any trade or integrated economic union. Brazil, Russia, India and China have emerged as major destination for Foreign Direct Investment (FDI) inflows, resulting in BRIC - a strong constructive term which was prominently coined by the 'Goldman Sachs Investment Bank' (Wilson and Purushothaman, 2003) to represent Brazil, Russia, India, and China as an economic Block.

Global competition for FDI had given the bargaining power to Multi-National Corporations (MNCs) and their allies (Boros Torstila, 1999). Competition forced the countries to lower their entry regulations, taxes, environmental clearances, and stipulations on working conditions for attracting FDIs. Goldman Sachs predicted that China and India are likely to emerge as dominant global suppliers of manufactured goods and services while Brazil and Russia to dominate in supply of raw materials.

While Asian, European and Latin American continents are represented in the profile, absence of Africa would undermine the importance of the 'Developing World' in the Global economy. Hence, it is interesting and important to look beyond BRIC. The potential of Africa, and particularly South Africa, the largest economy in the region, is also poised to play an important part in Global economic growth and development, similar to BRIC. The study by Goldman Sachs showed that South Africa could achieve five per cent growth over the next decade if the right policies were put in place. This projected growth rate was based on the similar conditions set for the similar growth rate for the BRIC. Therefore, this study includes South Africa and coins a new term *BRICS (Brazil, Russia, India, China and South Africa)* to represent the four continents of the World, which are of economic significance, in the process of Globalization.

The role played by FDI in Economic growth of an economy and living experience of BRIC economies drew the attention of researchers and policy makers to explore the FDI led growth linkage and identify the push and pull factors of FDI destinations.

The Goldman Sachs investment report (2003) pointed out not only the importance of South Africa as the biggest economy in the African continent but also as an emerging economy in the World. Although, South Africa- an emerging economy does not possess the characteristics of BRIC countries in terms of territorial extension and the size of the population, yet it has certain desirable features like:

- an enormous potential consumer market with larger middle-income group
- abundant supply of natural resources
- well developed financial parameters
- good communication and network
- effective energy and transport sectors and
- sound legal system and modern infrastructure supporting an efficient distribution of goods and services

Also, it plays an important economic and political role in the African continent.

In the recent days BRIC as emerging economies, exhibit economic strength in the face of the US credit turmoil and growth slowdown. BRICS countries characterise a cyclical component of strong domestic demand growth. There are also structural factors at work that bode well for the medium-term growth prospects. Such factors can be captured in a simple growth accounting framework. Generally, economic growth of an economy can be measured through several components, namely, changes in labour and capital inputs, and total factor productivity. The total factor productivity captures technological progress and/ or efficiency gains and residual remain unexplained due to changes in labour and capital inputs. Growth accounting provides an analytical framework to assess medium-term economic growth dynamics. However, the BRICS economies differ greatly in terms of their growth prospects.

The demographic trends, labour supply dynamics and/or low urbanisation ratios seem to remain favourable for Brazil, India and South Africa. In Brazil, India and South Africa the working age population continues to expand until the middle of the current century, while in China it may decline after 2015 and in Russia it is at the risk of collapsing (UN projects Russia's working age population to decline from 97 million in the year 2005 to 47 million by the year 2050). A low urbanisation ratio of 40 per cent in China may help to counteract the projected decline in the working age of the population by

allowing the transfer of labour from the countryside into the more productive urban economy. In Brazil, not much should be expected from further urbanisation, as the country is already more highly urbanised than many of the developed countries in the world. However, the demographic profile of Brazil is relatively favourable and benefitable from a 20 per cent increase in the population of working age between the year 2005 and 2025. The Russian population of working age is already in decline and little help will come from *'surplus rural labour'* due to a high urbanisation ratio. From a purely demographic point of view, India and South Africa face the most promising prospects, combining solid population growth and a lower degree of urbanisation. Though this situation may pose challenges of its own (in terms of urban development and infrastructure), but definitely be supportive for growth dynamics. The recent capital accumulation trends favour China and India. Assuming that investment ratios do not change dramatically over the next few years, China and India face much brighter prospects than Brazil, Russia and South Africa. Currently domestic investment ratios are around 40 per cent and 30 per cent of GDP in China and India, respectively, where as an investment ratio of Brazil, Russia and South Africa account to 20 per cent to 23 per cent of GDP. Russia and South Africa probably increase its investment ratio because of large savings generated by the commodity boom. Brazil, having a more modest increase their domestic savings may drive a moderate up-tick in investment ratio. It seems that Chinese and Indian capital accumulation will proceed at a much faster pace than Brazil and Russia.

The relative and absolute economic importance of BRICS is expected to continue to rise for the foreseeable future. In terms of economic growth, China has been outperforming the other four countries by a wide margin over the past thirty years. Over the past decade, real GDP growth averaged 10 per cent in China, 7 per cent both in India and Russia, 4.6 per cent in South Africa and 3.3 per cent in Brazil. In general, high savings rate, low level of urbanisation, low per capita income, higher export-orientation, manufacturing-based development strategy underpinned by strong investment in infrastructure and education will combine to sustain BRICS countries as superior economies of world. Thus, BRICS may become the largest economies of the world in the upcoming decades.

The BRICS countries have been the predominant recepients of FDI during the last decades. However, the evolution of FDI inflow shows very distinct trajectories for the five countries. Until 1984, Brazil was the major FDI recipient country among the BRICSs, overtaken by China in 1985 and since then China continues to be a major destiny of FDI, especially in the automotive and consumer durables sectors. China became the world major recipient of FDI in the 1990s, matching with country's efforts to integrate with the world economy. Many Multinational Companies have moved their operations to China to take advantage of its low labor costs and huge domestic market. South Africa and India received an almost constant and small part of the world total FDI flows during last two decades. India has many restrictions to FDI inflows, where, public enterprises dominate in many key sectors. Equally, the low and constant inflow applies to the Russian Federation since 1990. It is also worth of pointing out that the type of FDI received by each country has been significantly different and that the type depends on policies of the recipient countries. For instance, some of BRICS countries like Brazil, Russian Federation and South Africa liberalized their economies in more unconditional way and received more portfolios of FDI. For these countries, FDI was directed to the productive sectors, mostly by way of acquisitions of local firms. China and India have not liberalised the Capital account, where the FDI flows seem to be concentrated on 'Green Field Investments' in new production capacity.

Thus, the BRICS countries appear to have prosperity of economic and social development in the forth coming decades, if these countries form a formal union like European Union, ASEAN, G6 and G8 etc, and pool their resources. The economic growth will be tremendous and can throw competition and challenges towards the developed countries.

However, the current flow of FDI into BRICS is extremely complex and subject to various factors related to the competitive environment in the home and host countries. In this context, this study intends to examine the major determinants of FDI flows into BRICS countries. There are several studies contributing to the economic literature on the determinants of FDI.

The existing literature includes a number of Surveys, Case studies (see: Lankes and Venables, 1996; Meyer, 1998; Boros-Torstila, 1999; Resmini, 2000) and econometric studies (see: Lansbury et al., 1996; Wang and Swain, 1995; Hollond and Pain, 1998; Wood ward et al., 1997). There are some empirical studies formulated cross sectional analysis and found a set of explanatory variables that determine FDI flows (see: Agarwal, 1980; Gastanaga et al, 1998; Markusan and Maskus, 1999; Love and Hidalgo, 2000; Lipsey, 2000; Chakraborti, 2001; Moosa, 2002; Beven and Estrin, 2000; Singh and Jun, 1995; Sahoo, 2006; and Nunes et al., 2006 etc).

However, the above mentioned studies are investigated for the transition economies and developing economies as well as for groups like ASEAN and European Union using short time series of data. In all the above, presently available research literature pertaining to BRICS countries is still

limited. In this context, our study intends to examine the factors that determine the FDI flows to BRICS countries by employing long recent data. This study is expected to contribute its empirical results for BRICS countries along with existing economic literature.

The Panel data analysis is conducted to overcome the problems of endogeneity, heteroscedasticity and non stationarity in the regression models. However, our analysis establishes empirical evidences that the determinants of FDI inflows to BRICS countries are Market size, Labor cost, Currency value, Infrastructure and Gross capital formation. The significant effect of Gross capital formation in relation to FDI indicates that the privatization and ownership changes do not affect Capital formation of BRICS countries.

This study is organised as follows: section 1 is the present one and section 2 provides the theoretical literature relating to determinants of FDI. In section 3 we discuss the potential variables that are expected to attract FDI flows. We provide data and model specification in Section 4. We discuss empirical results in Section 5 and Summary and Conclusion in Section 6.

2 REVIEW OF LITERATURE

In this section, we provide brief literature reviews which investigate the determinants of FDI inflows across various economies.

The classical model for determinants of FDI begins from the earlier research work of Dunning (1973, 1981) which provide a comprehensive analysis based on ownership, location and the internationalization (OLI) paradigm. The empirical studies based on aggregate econometric approach are made by Agarwal (1980), Schneider et al (1985). Later on Lucas (1993) examines the determinants of FDI inflows for select East and South Asian economies during 1960 to1987 by using a model based on a traditional derived-factor of a multiple product monopolist. The study finds that FDI inflows are more elastic with respect to cost of capital than wages and also more elastic with respect to aggregate demand in exports than domestic demand.

Loree and Guisinger (1995) study the determinants of FDI by United States towards developed nations from 1977 to 1982. The study concludes that the Host country policy related variables are significant in developed countries and infrastructure seems to be an important determinant for all the regions. Applying the qualitative economic variables Sing and Jun (1995) find a positive relationship between taxes on international transactions and FDI inflows to developing countries, where the export related variables strongly explain pulling of FDI to a country. Duran (1999) uses the Panel data and time series techniques to find out the drivers of FDI for the period 1970-1995. The study indicates that the size, growth, domestic savings, country's solvency, trade openness and macroeconomic stability variables are the catalysts of FDI. Beven and Estrin (2000) establish the determinants of FDI inflows to transition economies (Central and Eastern Europe) by taking determinant factors as country risk, labour cost, host market size and gravity factors from 1994 to1998. The study observes that country risks are influenced by private sector development, Industrial development, the government balance, reserves and corruption. A dummy variable employed for capturing the key announcements of progress in EU accession seems to be directly influencing the FDI receipts. Lipsey (2000) captures a positive effect of FDI on growth and has a strong interaction with the level of schooling in the host country.

Levy-yeyati et al (2002) examine the extent of business cycles and interest rate cycles of developed countries impact on FDI flows to developing countries for the period 1980 to 1990. They consider the determinants of bilateral FDI using a gravity model.They find that FDI flows from US and Europe move counter cyclical to the business cycle in the source country, as well as, the interest rate cycles are the important determinants of FDI inflows. Aguilar and Vallejo (2002) study the forces behind the bilateral FDI due to the regional integration agreement for Latin America. They use gravity model and find that the size and development of both the domestic and foreign economies, the distance between them and the common language existence are the major determinants of bilateral FDI flows.

Garibaldi et al (2002) analyse the FDI and Portfolio investment flows to 26 transition economies in Eastern Europe including the former Soviet Union from 1990 to 1999. The regression estimation indicates that the FDI flows are well explained by standard economic fundamentals such as market size, fiscal deficit, inflation and exchange rate regime, risk analysis, economic reforms, trade openness, availability of natural resources, barriers to investments and bureaucracy. However, the portfolio flows are poorly explained by the fundamentals. The study of Nonnenberg and Mendonca (2004) finds that the factors such as the market size measured by GNP, growth rate of the product, the availability of skilled labour, the receptivity of foreign capital, the country risk rating and stock market behaviour seem to be the important determinants of FDI flows for developing countries comprising of 33 countries from 1975 through 2000. In the context of Latin American countries, Nunes et al (2006) find the variables such as market size, openness of the economy, infrastructure, macroeconomic stability

(inflation), wages, human capital and natural resources as the determinants of FDI flows during the period 1991 to 1998. The study observes that the market size, infrastructure and inflation are positively influencing and wage rate is negatively influencing the FDI flows. Similarly, by estimating the panel co-integration test, Sahoo (2006) finds that the market size, labour force growth, infrastructure index, and trade openness are the important determinants of the FDI flows in South Asian countries.

Thus, the reviews help us in choosing the factors or alternatives that may gauge the FDI inflows of BRICS countries.

3 POTENTIAL VARIABLES DETERMINING FDI INFLOWS

Based on the discussed literature review, our study gauges a set of potential determinant variables that influence the FDI flows and we classify the variables into seven broad categories, viz., Market size, Economic stability and Growth prospects, Trade openness, Currency value, Infrastructure facilities, Labour cost and Gross capital formation.

Market size

Larger market size should receive more inflows than that of smaller countries having lesser market size. Market size is generally measured by Gross Domestic Product (GDP), GDP per capita income and size of the middle class population. It is expected to be a positive and significant determinant of FDI flows (see: Lankes and Venables, 1996; Resmini, 2000; Duran, 1999; Garibaldi, 2002; Bevan and Estrin, 2000; Nunes et al., 2006; Sahoo, 2006). In contrast, Holland and Pain (1998) and Asiedu (2002) capture growth and market size as insignificant determinants of FDI flow.

Economic stability and growth prospects

A country which has a stable macroeconomic condition with high and sustained growth rates will receive more FDI inflows than a more volatile economy. The proxies measuring growth rate are: GDP growth rates, Industrial production index, Interest rates, Inflation rates (see: Duran, 1999; Dassgupta and Ratha, 2000). Contradictingly, when inflation is taken as proxy for the level of economic stability, then the classic symptoms of fiscal or monetary control will result in unbridled inflation. In connection with this, investors prefer to invest in more stable economies that reflect a lesser degree of uncertainty (see: Nonnenberg and Mendonca, 2004). Therefore, it is expected that GDP growth rate, Industrial production index, Interest rates would influence FDI flows positively and the Inflation rate would influence positively or negatively.

Labour cost

Higher labour cost would result in higher cost of production and is expected to limit the FDI inflows; therefore, we expect the negative and significant relationship between labour cost and FDI. Labour cost can be proxied by wage rate (see: Lankes and Venables, 1996; Nunes et al 2006). There are few studies which find labour force determining FDI flows positively, (see: Wheeler and Mody, 1992; Kumar, 1994; Sahoo, 2006). However, Resmini (2000) did not confirm the significance of wages, perhaps because of using wages that are uncontrolled for productivity and exchange rates (Bevan and Estrin, 2004).

Infrastructure facilities

The well established and quality infrastructure is an important determinant of FDI flows. On the other hand, a country which has opportunity to attract FDI flows will stimulate a country to equip with good Infrastructure facilities. Therefore, we expect positively significant relationship between FDI and Infrastructure. The previous studies of Wheeler and Mody (1992), Kumar (1994), Loree and Guisinger (1995) and Asiedu (2002) also support our expected hypothesis. The availability of quality Infrastructure can be constructed by considering Electricity, Water, Transportation and Telecommunications (see: Sahoo, 2006). Whereas, Nunes et al. (2006) consider public expenditure on capital to acquire fixed capital assets, land, intangible assets and non-financial and non- military assets for Infrastructure.

Trade openness

Trade openness is considered to be a key determinant of FDI as represented in the previous literature; much of FDI is export oriented and may also require the import of complementary, intermediate and capital goods. In either case, volume of trade is enhanced and thus trade openness is generally expected to be a positive and significant determinant of FDI (see: Lankes and Venables,

1996; Holland and Pain, 1998; Asiedu, 2002; Sahoo, 2006). Trade openness is proxied as the ratio of the Export plus Import divided by GDP (Nunes et al. 2006; and Sahoo, 2006).

Currency valuation

The strength of a currency (Exchange rate) is used as proxy for level of inflation and the purchasing power of the investing firm. Devaluation of a currency would result in reduced exchange rate risk. As a currency depreciates, the purchasing power of the investors in foreign currency terms is enhanced, thus we expect a positive and significant relationship between the currency value and FDI inflows. The currency value can be proxied by the Real Exchange Rate, Real Effective Exchange Rate (REER) and Nominal Effective Exchange Rate (NEER).

Gross Capital Formation

In a transition economy, improvements in the investment climate help to attract higher FDI inflows. It translates into higher Gross capital formation which in turn leads to greater economic growth. Libor Krkoska (2001) and Lipsey (2000) find little evidence of FDI having an impact on capital formation in developed countries and observe that the most important aspect of FDI in the selected sample of countries is related to ownership change. The relationship between FDI and Capital Formation is not simple (Libor Krkoska, 2001). In the case of certain privatization, it may not lead to increase at all or even result in reduction. Thus, the unclear relation between FDI and capital formation may also hold in a transition economy. However, a positive or negative and significant relationship between FDI and Capital Formation is expected.

4 DATA AND MODEL SPECIFICATION

The data set consists of yearly observations for the period 1975 - 2007 for the five fast developing countries namely Brazil, Russia (the data set is available from 1990 onwards), India, China and South Africa (BRICS countries). The required data set for the selected countries were obtained from 'World Development Indicators (WDI) CD-ROM- 2008', except for Industrial Production index and Exchange rate. The Industrial Production index is obtained from Center for Monitoring Indian Economy (CMIE)'s '*International Economic Indicators'* and Exchange rate is obtained from *The Federal Reserve Board Statistics* (Releases and Historical data).

The dependent variables in our study is the Log of FDI inflow in current USD (LFDI) and the independent variables that are expected to determine FDI flows are carefully chosen, based on previous literature and availability of dataset for the selected period. The independent variables in our estimation generally include Gross Domestic Product, Industrial production index, Inflation rate, Wage rate, Infrastructure Index, Trade Openness, Exchange Rate and Gross capital formation. The Infrastructure index (INFRAI) is constructed by indexing Electric Power Consumption (kwh per capita), Energy use (kg of oil equivalent per capita) and Fixed line mobile phone subscribers (per 100 people). We ignore Air freight transport variable due to non availability of data for selected countries for the study period. The variable Currency value, Exchange Rate is substituted with Real Effective Exchange Rate Index (REER) because latter variable seems to be robust in the estimation than the former variable.

In connection with discussions of the previous section, we propose an estimation model as follows, where the selected variables are expected to determine the FDI inflows:

$$LFDI_{ti} = \alpha + \beta_1 LGDP_{it} + \beta_2 IPI_{it} + \beta_3 IFLA_{it} + \beta_4 WAG_{ti} + \beta_5 INFI_{it} + \beta_6 TRDO_{it} + \beta_7 REER_{it} + \beta_8 GCFN_{it} + e_{it} \quad (1)$$

Where,

$LFDI_{ti}$ is the log of Foreign Direct Investment in current US$ for country i at time t.

$LGDP_{it}$ is the log of Gross Domestic Product in current US$ for country i at time t and is the measure of market size

IPI_{it} is the Industrial Production Index and $IFLA_{it}$ is the Inflation Rate (Annual percent) for country i at time t, which are the measures of Economic Stability and Growth prospectus of a country

WAG_{it} is the log of workers remittances and compensation of employees received in US $ for country i at time t and is the measure of Labour cost

$INFI_{it}$ is the Infrastructure Index for country i at time t. The simple Infrastructure index is constructed for the selected countries as:

$$Y_{jt} = \frac{X_{jt}}{X_{jt-1}} \times 100 \tag{2}$$

X_{jt} is the value of jth indicator at time t for each country.

Y_{jt} is the transformed value (index in percent) of the jth indicator at time t for each country. Then the above Y_{jt} is summed up and divided by three to arrive at the Infrastructure index in percent for each country i ($INFRAI_i$), which is presented as:

$$INFRAI_{it} = \sum_{j}^{3} Y_{jt} \ /3 \tag{3}$$

$TRDO_{it}$ is the Trade Openness for country i at time t and is computed as ratio of Import of Goods and Services plus Export of Goods and Services divided by GDP

$REER_{it}$ is the Real Effective Exchange Rate for country i at time t and is the measure of currency value. Real Effective Exchange is the currency index i.e. the weighted average of a country's currency selective to an index or basket of major currencies adjusted for the effect of Inflation and is the measure of currency valuation

$GCFN_{it}$ is the Log of Gross Capital Formation to the percent of GDP for the country i at time t and

e_{it} is the error term over the time t

This study analyses the fast developing countries in the context of BRICS. However, the study does not analyze how the selected determinant variables influence the FDI inflow on each country, but in general BRICS as a whole. The panel data estimation is employed in the study to capture the dynamic behaviour of the parameters and to provide more efficient estimation and information of the parameters. The ordinary least square method can provide consistent and efficient estimates of α and β. In practice, the advantage with panel data is that they allow us to test and relax some of the assumptions, and allow for greater flexibility in modeling differences in behavior across individuals (Ho. C. H, 2004). The dynamic approach offers advantages to Ordinary Least Squares (OLS) and also improves efforts to examine the FDI growth links using panel procedures (Carkovic and Levine, 2002). In addition to this, the study also tests dynamic panel models so as to incorporate maximum information of the yearly FDI inflow and its selected determinant variables of the BRICS countries. The panel data analysis is a pooled cross section and time series data which allows us to exploit the time series nature of the relationship between FDI and its determinant variables for selected countries (our panel procedure control for specific effects).

The Panel data model includes three different methods: (a) Common constant, (b) Fixed effects, (c) Random effects. The study estimates all these three methods so as to incorporate the best fit of the estimation. The Common constant method (also called as pooled OLS method) of estimation presents result under the principal assumption that there are no differences among the data matrices of the cross-sectional dimension (N). In other words the model estimates a Common constant for all Cross-sections (Common constant for countries). Practically, the Common constant method implies that there are no differences between the estimated cross-sections and it is useful under the hypothesis that the data set is a *priori* homogeneous. However, this case is quite restrictive and case of more interest involves the inclusion of Fixed and Random effects in the method of estimation (Asterious, 2006).

The Fixed effects method treats the constant as group (section)-specific, i.e. it allows for different constants for each group (section). The Fixed effects also called as the Least Squares Dummy Variables (LSDV) estimators, because it allows for different constants for each group and it includes a dummy variable for each group. To understand this, consider the following model:

$$\gamma_{it} = a_i + \beta_1 X_1 + \beta_2 X_{2it} + \ldots + \beta_k X_{kit} + \mu_{it} \tag{4}$$

Where, the dummy variable is the one that allows us to take different group-specific estimates for each of the constants for every different section.

However, while using Fixed effects method, we need to apply tests to check whether Fixed effects (i.e., different constants for each group) should indeed be included in the model. To do this the standard F-test can be used to check Fixed effects against the simple Common constant OLS method. The null hypothesis is that all the constants are the same (homogeneous), and thus therefore the Common constant method is applicable:

$$H_{0:} \qquad \alpha_1 = \alpha_2 = \ldots = \alpha N \tag{5}$$

The F statistics is:

$$F = \frac{(R^2_{FE} - R^2_{CC}) / (N - 1)}{(1 - R^2 FE) / (NT - N - k)} \sim F\,(N\text{-}1,\ NT - N - k) \tag{6}$$

Where R^2_{FE} is the coefficient of determination of the Fixed effects model and R^2_{CC} is the coefficient of determination of the Common constant model, if F-statistical is bigger than the F-critical then we reject the null hypothesis.

Therefore, while using Fixed effects one should care about the validity of estimation even the F-test suggests to do so. The significant disadvantages of the Fixed effects method suggests for using the Random effects method presented in the next section.

The Random effects method is an alternative method of estimation which handles the constants for each section as random parameters rather than fixed. Hence the variability of the constant for each section comes from the fact that:

$$a_i = a + v_i \tag{7}$$

Where v_i is a zero mean standard random variable.

The Random effects model therefore takes the following from:

$$\gamma_{it} = (\alpha + \nu_i) + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + u_{it} \tag{8}$$

$$\gamma_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + (\nu_i + u_{it}) \tag{9}$$

One obvious disadvantage of the Random effects approach is that one need to make specific assumptions about the distribution of the random component. Also, if the unobserved group-specific effects are correlated with the explanatory variable, then the estimates will be biased and inconsistent. However, the Random effects model has the advantage:

- that, there are fewer parameters to estimate compared to the Fixed effects method and
- it allows for additional explanatory variable that have equal value for all observations within a group (i.e., it allow us to use dummies).

Thus the use of Random effects method in the estimation requires lot of care and must be employed only if it is necessary and meaningful in comparison to Fixed effect method. Generally in the panel data analysis, the Fixed effects model assumes that each country differs in its intercept term, whereas the Random effects model assumes that each country differs in its error term. When the Panel is balanced (i.e., contains all existing cross sectional data), one might expect Fixed effects model to work well. Otherwise, the Random effect method will be more appropriate when the sample contains limited observations of the existing cross-sectional units. However, the Hausman specification test (1978) guides us to choose the appropriate Panel data model either Fixed effects method or Random effects model.

However, this study performs all the above three methods of panel data model to analyse the robustness of parameter co-efficient in explaining the factors that determine the FDI inflows to the BRICS countries. The Fixed effect method is rejected in the analysis based on the Hausman specification test (1978), a test that assists in making choice between the Random effects. However, we

present both the results in Table-1, but will not consider for the interpretations. We show Random effects instead of Common constant method because the results of latter observed to be similar with the former. Moreover, the Random effects method has more estimation advantages than the Common constant method, since the data classification seems to be a *priori* homogeneous. The estimation ensures homogeneity by choosing the sample countries which are assumed to be the most emerging economies of the world in terms of their growth and market potentials.

Hausman (1978) adopts this based on the idea that under the hypothesis of no correlation, both Ordinary Least Square (OLS) and Generalised Least Square (GLS) are consistent but OLS is inefficient, while under the alternative OLS is consistent but GLS is not. More specifically, Hausman assumed that there are two estimators $\overline{\beta}_o$ and $\overline{\beta}_1$ of the parameter vector β and he added two hypothesis-testing procedures. Under Ho, both estimators are consistent, but $\overline{\beta}_o$ is inefficient, and under $H_{1,}$ $\overline{\beta}_o$ is consistent and efficient but β_1 is inconsistent.

According to Ahn and Moon (2001), the Hausman statistic is viewed as a distance measure between the Fixed effects and the Random effects estimators. Thus we actually test H_0, that Random effects are consistent and efficient, versus H_1, that Random effects are inconsistent (as the Fixed effects will be always consistent). The Hausman test uses the following test statistic:

$$H= (\overline{\beta}^{FE} - \overline{\beta}^{RE}) [Var(\overline{\beta}^{FE}) - Var (\overline{\beta}^{RE})]^{-1} (\overline{\beta}^{FE} - \overline{\beta}^{RE}) \sim X^2(k) \quad (10)$$

If the value of the statistic is large, then the difference between the estimates is significant, so we reject the null hypothesis that the Random effects model is consistent and we use the Fixed effects estimators. In contrast, a small value of the Hausman statistic implies that the Random effect is more appropriate estimator.

5 EMPIRICAL RESULTS

The descriptive statistics and correlation results for the selected variables for BRCIS countries are given in Table-1 and 2 respectively. The REER value observation in the estimation is 82 and other variables are having 120 to 130 observations. The IFLA has highest mean and standard deviation of 120.581 and 43.829 respectively in the data distribution. The independent variable LGDP is highly correlated with IPI, WAG, INFI, and GCFN. The variable WAG is highly correlated with GCFN and INFI and IPI highly correlated with TRDO. The existence of high correlation among the independent variables will lead to the problem of multicollinearity in the estimation. Still we consider these variables because of advantageousness of the panel data estimation which takes care of the collinearity problems.

We estimate Panel data analysis including OLS pooled regression (Common constant method), Fixed effects method and Random effects method for the selected study period. The robustness of parameter coefficients are used to explain the relationship between LFDI inflows and the selected independent variables. Since, the results of OLS pooled regression and Random effects parameter coefficients sign and their significance levels are almost similar, we choose Random effects model to check the robustness with Fixed effects model. The Fixed effects model is rejected in the analysis based on Hausman specification test (1978). The estimation results of both Fixed effects and Random effects model are given in Table- 3. However, we show both results but we discuss only the results of Random effects model.

Our study also analyses an alternative econometric approach to the normal panel data so as to use a dynamic Panel data framework of Arellano and Bond (1991) model including lags of dependent and independent variables in the estimation. The result of Dynamic Panel data estimation observed to be inconsistent and the Sargan test rejected the validity of the instrumental variables as well as auto correlation problem deducted at first and second order. Therefore, it is not represented and discussed in the present study.

Table-3 showing the results of Random effects model confirms the significance of Market size (LGDP), Labor Cost (WAG), Currency value (REER) at 1 percent level of significance. The Infrastructure and Gross capital formation are significant at 10 percent level. The co-efficient signs for each of these variables are as expected, positive for Market size and Infrastructure and negative for labour cost. We find significantly negative relationship between LFDI and Currency value (REER), which is a contradictory result as expected. Therefore, the study substitutes REER with Exchange rate currency per US $ in the estimation to check the change in sign and significance. The result changed

positively insignificant with low coefficients. Hence, the study keeps the estimation results of REER and this observed result may be due to the stability of REER in BRICS countries.

The negative and statistically significant effect of Gross capital formation in relation to LFDI indicates that the privatization and ownership changes do not affect Gross capital formation of BRICS countries. The Economic Stability and Growth Prospects measured by Inflation and Industrial production are negatively insignificant in determining the LFDI inflows while the trade openness measured by the ratio of total trade to GDP is positively insignificant. Thus, the empirical results on determinants of FDI in BRICS countries are quite similar to those studies of developing countries.

Table 1: Descriptive Statistics of Variables in the study

	Obs	Mean	Std. dev	Min	Max
LFDI	129	9.218	0.997	4.093	10.898
LGDP	130	11.508	0.331	10.826	12.421
IPI	120	82.826	19.925	44.200	126.80
IFLA	130	120.581	43.829	0.192	273.50
WAG	128	77.752	5.500	65.157	87.627
INFI	128	107.371	6.445	93.675	145.37
TRDO	130	35.027	18.295	12.351	110.577
REER	82	106.752	20.277	73.940	166.297
GCFN	130	24.811	8.202	14.313	44.624

Table 2: Correlation of Variables in the study

	LFDI	LGDP	IPI	IFLA	WAG	INFI	TRDO	REER	GCFN
LFDI	1								
LGDP	0.736	1							
IPI	0.489	0.422	1						
IFLA	-0.015	0.093	0.054	1					
WAG	0.378	0.456	0.011	-0.134	1				
INFI	0.562	0.529	0.214	-0.258	0.435	1			
TRDO	0.270	0.065	0.592	-0.050	0.207	0.129	1		
REER	-0.101	-0.020	-0.135	0.076	-0.265	-0.150	0.023	1	
GCFN	0.286	0.442	-0.140	-0.062	0.841	0.434	0.180	-0.303	1

Table 3: Determinants of FDI inflows: Panel Data Estimation results based on Fixed Effects (FE) and Random Effects (RE) Models

Explanatory Variables	FE		RE	
LGDP	0.497	(0.71)	2.116*	(8.83)
IPI	0.003	(0.66)	-0.003	(-0.78)
IFLA	-0.000**	(-1.69)	-0.000	(-1.59)
WAG	-0.024	(-0.68)	-0.046*	(-3.94)
INFI	0.016	(1.47)	0.016**	(1.81)
TRDO	0.009	(1.12)	0.004	(1.16)
REER	0.001	(0.39)	-0.006*	(-2.75)
GCFN	-0.021	(-1.07)	-0.015**	(-1.78)
Adj. R^2	0.05		0.84	
Hausman test (prob> chi^2)	11.23 (0.129)			

Notes:

a) Figures in the parenthesis represent t- value

*b) * denote Significant at 1 percent level, ** denote Significant at 10 percent level*

c) A constant term is included but not reported

6 SUMMARY AND CONCLUSION

In recent days, BRICS- the fast developing economies of the world having larger market potentials are expected to attract larger inflow of FDI. However, the factors attracting the FDI inflows towards these countries are relatively less researched. This study made an attempt to identify the factors determining the FDI inflows of BRICS countries from the period 1975 to 2007. The determinant factors include: Market size, Economic Stability and Growth Prospects, Cost of Labour, Infrastructure Facilities, Trade Openness, Currency value and Gross capital formation. The study finds that other than Economic Stability and Growth prospects (measured by inflation rate and Industrial production respectively), Trade openness (measured by the ratio of total trade to GDP) all other factors seem to be the potential determinants of FDI inflows in BRICS countries. The empirical results are robust in general for alternative variables determining FDI flows.

The empirical analysis has some policy implications towards the improvement of investment climate to attract higher FDI inflows into BRICS countries that are expected to facilitate their economy in enhancement of Market potential, Infrastructural development and Capital Formation. Inflation (the Economic stability variable) and the Industrial production (the Growth Perspective variable) are critical factors in attracting FDI, which helps to make appropriate policies for improving the performance of domestic economy. Therefore, it is an important object to maintain the stability of the currency of the host country to attract increased FDI. The benefit of trade openness in terms of their impact on FDI is not validated in this study. Thus, BRICS countries as developing nations have to involve themselves in the path of economic reform and liberalisation activities. As expected, the negatively significance of wage rate seems to validate the study as the determinant of FDI.

The tag of fast-paced economic growth notwithstanding, Brazil, Russia, India, China and South Africa (BRICS), will have to tackle the challenge of ensuring and achieving growth without sacrificing equity, and by utilizing the benefits of innovation to address the issues of inequality of economies. The challenge is to have an innovation policy that will ensure growth accompanied by equity, for which they must have necessary institutional mechanisms in place. Thus, BRICS nations should face the challenges, ranging from gradual deterioration of demographies and questions about environmental sustainability to potential international trade frictions. The economic growth should be maintained at least at current levels instead of slow down. The BRICS countries' short and medium-term outlook remains favourable in relation to the advanced economies. Investment ratios in Brazil remain very low. Russia is highly dependent on hydrocarbons and therefore it faces very adverse demographic developments. India will have to overcome domestic opposition to growth-enhancing and growth-sustaining economic reforms. South Africa has to make initiation in promoting investment flows. Overall, the emergence of the BRICS nations have to be seen in the context of the innovation system that could evolve a proper understanding of the dynamics of innovation in these countries under globalization which would be of immense policy relevance not only for each of these countries but also for the BRICS as a group and other less developed countries that are aspiring to catch up. Thus, the

BRICS nations have to figure out that the engine of growth and development including for heavily indebted countries lies in the execution of major infrastructure projects, investment, and technological innovations carried out in an environmentally conscious fashion.

The future studies can focus on the variables relating to the regional competency of the nations as well as equivalent to home countries of the foreign investors. Such variables should include: Relative Market Share and Relative Growth of the economy, Relative Corporate Rate, Risk Factors and Corporate Governance. Sectoral analysis also expected to enhance the understanding of industry specific FDI flows and its associated determinants. Thus, the overall significance of the model specified in this study would contribute to a greater understanding of the FDI determinants in the emerging markets, as well as, the findings of this study would also lay emphasis on the importance of liberalisation and economic policy reforms.

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3D Product authenticity model for online retail: An invariance analysis

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Abstract

This study investigates the effects of different levels of invariance analysis on three dimensional (3D) product authenticity model (3DPAM) constructs in the e- retailing context. A hypothetical retailer website presents a variety of laptops using 3D product visualisations. The proposed conceptual model achieves acceptable fit and the hypothesised paths are all valid. We empirically investigate the invariance across the subgroups to validate the results of our 3DPAM. We concluded that the 3D product authenticity model construct was invariant for our sample across different gender, level of education and study backgrounds. These findings suggested that all our subgroups conceptualised the 3DPAM similarly. Also the results show some non-invariance results for the structural and latent mean models. The gender group posits a non-invariance latent mean model. Study backgrounds group reveals a non-invariance result for the structural model. These findings allowed us to understand the 3DPAMs validity in the e-retail context. Managerial implications are explained.

Keywords: 3D product authenticity, control, animated colours, value, behavioural intention, invariance analyses

1 INTRODUCTION

Scholars (e.g., Li et al., 2001, 2002, 2003) classify experiences, based on the interaction between a product or an environment and an individual, into three types. First, direct experience permits consumers to interact (e.g., physically) directly with a product. Second, indirect experience often allows consumers to interact with second-hand source such as static visual pictures. Third, virtual experience allows consumers to interact with three dimensional (3D) virtual models. According to Steuer (1992, p.78) virtual reality (VR) is "*a real or simulated environment in which a perceiver experiences telepresence*". In contrast, virtual experience (VE) derives from VR and can be defined as "*psychological and emotional states that consumers undergo while interacting with a 3D environment*" (Li et al., 2001, p. 14). A 3D presentation enables consumers to interact with products, enriches their learning processes, and creates a sense of being in a simulated real world. Furthermore, direct and virtual experiences combine within VR, such that the latter enhances and enriches the overall experience because consumers use almost all of their senses when interacting with a 3D product visualisation (Klein, 2003; Li et al., 2001, 2002, 2003). Despite widespread discussions and various definitions of VE, we notice that previous scholars, within the online retail context, consider the notions of 3D telepresence as virtual substitutes for actual experience with the products. However, the telepresence and presence constructs are not necessarily wholly appropriate concepts for marketers since they represent a process of being mentally transported into other areas or being immersed into an illusion environment. Such notions may not be particularly helpful for marketers and website designers who are concerned with 3D product visualisation of real products. Instead, we propose the 3D product authenticity construct, which refers to simulating a real product authentically online. We therefore first discuss the notions of telepresence or presence in the immersive virtual reality (IVR) environment then proceed to explain applications of non-immersive virtual realties (NIVR i.e., an online retailer context). We also offer a new definition and measurement scale for the construct of 3D authenticity. Furthermore, we introduce the 3D product authenticity model to replace the telepresence model in the virtual reality environment. To validate our findings of the 3D product authenticity model, we investigate the effects of different levels of invariance analysis, across gender, levels of education and study backgrounds subgroups.

2 THEORETICAL BACKGROUND

2.1. 3D Product Visualisation in the Immersive and Non-Immersive VR

VR terminologies enter the vocabulary with the emergence of IVR devices, such as head-mounted display, which allow users to interact with virtual environments and to visualise different objects (Suh and Lee, 2005). As a result, the notions of telepresence or presence emerge. Notwithstanding, previous literature in the IVR area has provided readers with different classifications and conceptualisations of VR experience. For example, Steuer's (1992, p. 76) definition of VR focuses on human experience, not technological hardware, and differentiates between two types of VE; presence and telepresence. Whereas presence refers to "*the experience of one's physical environment; it refers not to one's surroundings as they exist in the physical world, but to the perception of those surroundings as mediated by both automatic and controlled mental processes*", telepresence is "*the experience of presence in an environment by means of a communication medium*". In turn, Sheridan (1992) distinguishes between virtual presence and telepresence, such that presence relates to the sense of being in a computer-mediated environment, whereas telepresence indicates a sense of being in any real remote location. However, Biocca (1992) defines VE (based on the telepresence construct) as users' ability to be, psychologically, transported into another area. To that end, Biocca and Delaney (1995) argue that the definition of virtual reality experience depends on technological hardware and software. The authors define VE as perceptual immersion. This type of VE depends on sensory immersion in virtual environments. To extend prior literature, Lombard and Ditton (1997) identify six taxonomies of VE: social richness, realism, transportation, immersion, social actor within medium and medium as social actor. Notwithstanding Lombard and Ditton's (1997) classification, two types of presence are identified in the NIVR area, concerning users interaction with e-retailers' websites and products using desktop or laptop computers (Suh and Lee, 2005). The first is telepresence, or the illusion of being in a place far from the physical body (Biocca, 1997; Heeter, 1992). This conceptualisation of telepresence relates to transporting a user, self, or place, to another place. The second form is telepresence in a social sense, such that other beings exist in the VR world with whom users can interact (e.g., avatars). Authors such as Heeter (1992) and Lombard and Ditton (1997) empirically test this concept, and McGoldrick and colleagues (2008) emphasise the avatar's role in enhancing virtual personal shopper capabilities. Moreover, to identify the main determinants of VE within IVR, researchers follow

interactivity and vividness theories. For example, previous scholars (Biocca & Delany, 1995; Heeter, 1992; Lombard & Ditton, 1997; Sheridan, 1992; Steuer, 1992) assert that interactivity and vividness may represent the main antecedents of virtual reality experience. Interactivity appears particularly of interest since the appearance of new communication channels such as the World Wide Web, for which it represents a critical concept and primary advantage (Rafaeli & Sudweeks, 1997). Considerable research investigates and empirically tests the construct, but there is little agreement on the definition or operationalisation of the interactivity construct (e.g., Ariely, 2000; Klein, 2003; Liu & Shrum, 2002; McMillan & Hwang, 2002). For example, Steuer (1992) classifies it into three elements: speed, mapping and range. Rafaeli and Sudweeks (1997) argue interactivity relates to the communication process, and Ariely (2000) defines it on the basis of the control construct (the narrowest definition). Rowley (2008) focuses on information interactivity. Still other scholars (e.g., Lui & Shrum, 2002; McMillan & Hwang, 2002) argue that definitions of interactivity cannot be restricted to messages, human interactions or communications but rather should include multidimensional aspects. Thus speed, responsiveness and communications represent the main elements to define and measure interactivity construct. In contrast, vividness, according to Steuer (1992, p. 81) is "*the way in which an environment presents information to the senses*". Steuer explains that vividness is stimulus driven and depends completely on the technical characteristics of a medium. In turn, it represents a product of two important variables: sensory breadth, and sensory depth. Most scholars use this definition of vividness.

To that end, Lee (2004) revises all the previous definitions of telepresence or presence and argues that none of the previous definitions could be used to tap the concept of using virtual environment to reflect consumers' virtual experience. The author posits two ways for an experience to become a virtual. First, using "Para-authentic objects" in which the users interact with objects in which they can find in real life aspects such as clothing. Secondly, using "Artificial objects", which simulates objects that do not exists in real life. On that basis, we claim that using the notions of 3D telepresence or presence and their definitions to define VE neither help marketers and e-retailers to understand the effect of 3D product visualisation on consumers' VE, nor suit the online retail context. Because (i) these notions represent a process of being mentally transported into other areas or being immersed into an illusion environment, such notions often reflect negative meanings such as immersion, delusion and transportation (Lee, 2004); (ii) presence and telepresence measurement scales, were originally built upon external devices, such as head-mounted display, which are not used in online retailers' 3D virtual model; and (iii) the lack of agreement upon the antecedents of telepresence and presence (interactivity and vividness) often complicates measuring the 3D product visualisation VE, and (iv) these notions measure VE based on different technologies (see Table 1). For example, to measure VE, Shih (1998) proposes a conceptual framework. Coyle and Thorson (2001) focus on videocassette movies. Klein (2003) employs a simple technology such as Authorware © 3.0 and 4.0, and Hopkins *et al*. (2004) investigate websites VE. Moreover, we notice that only few of the previous studies focused on the use of 3D product visualisation to measure VE (see Table 1). For instance, Li et al. (2001, 2002, 2003) and Fiore et al. (2005a) measured VE using 3D product visualisation. Unfortunately, both studies measured it based on the telepresence construct. Based on the above gaps, we claim that a 3D virtual experience should be an authentic representation of the direct (offline) experience. The concept of 3D authenticity of the product visualisation implies that ability of the 3D to simulate the product experience in bricks-and-clicks contexts. We felt that it is important to measure how consumers, within the online retail context, could imagine that 3D presented products. Particularly, we introduced our new construct, namely, 3D product authenticity to reflect customers' virtual experience, where customers can feel the authenticity of the 3D products.

Table 1: Previous research on online VR using 3D telepresence

Study	Sample	Stimuli	Virtual experience measurement	Virtual experience antecedents	Invariance analysis
Shih (1998)	Conceptual paper	N/A	Conceptual	Vividness (breadth and depth) and interactivity (speed and control)	N/A
Coyle and Thorson (2001)	Students	Videocassette movies. Blues music CDs. Women's golf clothing and equipment. Hot sauces.	Transporting into another place; being there.	Vividness (breadth and depth) and interactivity (speed and control)	N/A
Li *et al*. (2001)	Students	3D products: Bed, ring, watch, laptop computer.	Illusion and Immersion	Virtual experience is vivid, involving, active, affective and psychological states	N/A
Li *et al*. (2002)	Students	3D/2D bed, ring, watch, laptop advertisements	Presence: based on physical engagement, naturalness, and negative effects.	Interactivity and media richness	N/A
Li *et al*. (2003)	Students	3D/2D product type: wristwatch, bedding material and laptops	Telepresence and virtual affordance	Interactivity and media richness	N/A
Klein (2003)	Non-students	Authorware © 3.0 and 4.0 Study = 1, Wine Study = 2, Face cream	Telepresence: transporting into another area	User control and media richness (full-motion video and audio)	N/A
Hopkins *et al*. (2004)	students	Website for the National Arbor Day Foundation	Telepresence: being there	Vividness (media richness)	N/A
Fiore et al. (2005a)	Students	Clothing (3D virtual model)	Telepresence: being there	Interactivity and vividness	N/A

3D Product Authenticity (3DPA) Construct

None of the previous definitions of telepresence or presence that use 3D virtual models realistically taps consumers' virtual experiences. A 3D virtual experience should be an authentic representation of the direct (offline) experience. We therefore propose a new notion that relates to the simulation of online products and virtual experience, namely, the authenticity of the 3D product visualisation. Telepresence and presence are not particularly well suited to the online retail context, because they reflect illusion and transportation to other places. In contrast, the concept of 3D authenticity of the product visualisation implies the ability to simulate the product virtual experience in bricks-and-clicks contexts. We propose the following definition of perceived 3D product authenticity in a computer-mediated environment: 3D Product Authenticity (3DPA) is a *psychological state in which virtual objects presented in 3D in a computer-mediated environment are perceived as actual objects in a sensory way*. Furthermore, we identify users' ability to control the content and form of the 3D flash (interactivity), animated colours (vividness) and 3D authenticity as the main elements of the 3D virtual experience. Moreover, we define control and animated colours as the main antecedences of 3D authenticity.

3 RESEARCH MODEL

We demonstrate our research model in Figure 1. Our model is testing the relationships between control, animated colours, 3D product authenticity, hedonic and utilitarian value and behavioural intention. As the objective of our study is 3D product authenticity model's measurement equivalence, the focus of our model is concentrated on whether gender, education levels and study backgrounds affect participants' responses to our 3D product authenticity model.

3.1 3D Product Authenticity Antecedents and Definitions

We use the control construct to represent interactivity in an online retail context. Ariely's (2000) definition of control refers to users' abilities to customise and choose Web site contents to achieve their goals. We focus more on consumers' ability to control and easily interact with the 3D virtual model. Therefore, we define control as *users' abilities to customise and choose the contents of the virtual model (i.e., 3D product visualisation), rotate, and zoom in or out on the product in the virtual model and the ability of the virtual model (3D) to respond to participants' orders properly.* In turn, we hypothesise:

H_{1a}: A high level of control of 3D product visualization increases 3D authenticity.

Furthermore, 3D vividness should facilitate virtual experience by providing more sensory depth and breadth (Li et al., 2002, 2003). High-quality online animations enhance perceived reality of the 3D products (e.g., Fortin and Dholakia, 2005; Klein, 2003; Shih, 1998). Specifically, we consider vividness of the visual imagery, such that consumers can see online products with different colours (skins) just as they would see them in person. Media richness may lead to a real (authentic) experience, according to research on online shopping (Algharabat and Dennis, 2009a; Klein, 2003; Schlosser, 2003). Moreover, consumers' ability to change the animation (colours) of the 3D product might help them sense control over the product. We therefore hypothesise:

H_{1b}: A high level of 3D animated colours increases perceived 3D authenticity.
H_2: A high level of 3D animated colours increases control.

3.2 Effects of 3D products Authenticity on Utilitarian and Hedonic Value

To identify the main consequences of using authentic 3D product visualisations, and to explain cognitive and emotional experiences that consumers might have from navigating an authentic 3D product visualisation, we follow the hedonic and utilitarian value theories (based on Babin et al., 1994; Fiore et al., 2005a). Scholars (e.g., Fiore and Jin, 2003; Fiore et al., 2005a; Kim et al., 2007; Klein, 2003; Li et al., 2001, 2002, 2003; Suh and Chang 2006) explain the importance of using 3D product visualisations in enhancing consumers' understanding of product attributes, features and characteristics. 3D visualisation increases consumers' involvement and encourages them to seek more information about the products (Fiore et al., 2005a). Suh and Lee (2005) posit a positive relationship between higher levels of 3D product visualisation and seeking more information about the products' characteristics and features. Suh and Chang's (2006) empirical research of the influence of 3D product visualisation and product knowledge reveals a positive relationship between 3D and perceived product knowledge. Using 3D product visualisation helps consumers to imagine how a product may look and it gives them more details about the products' characteristics (Fortin and Dholakia, 2005; Klein, 2003; Shih, 1998). Therefore, we hypothesise:

H_{3a}: 3D authenticity in a retailer website will positively affect website use for utilitarian value.

Scholars (Fiore et al., 2005b; Kim and Forsythe, 2007; Lee et al., 2006; Schlosser, 2003) report the importance of 3D product visualisation in enhancing the experiential aspects of a virtual shopping. The above researchers find that the ability of 3D product visualisation to produce hedonic values for shoppers is greater than its ability to produce utilitarian values. Fiore et al. (2005b) assert that 3D virtual model produces hedonic value, which is highly correlated with consumers' emotional pleasure and arousal variables. Fiore et al. (2005a) posit the importance of virtual models in boosting hedonic value (enjoyment). Fiore et al. (2005a) also report the importance of 3D virtual model technology in producing more hedonic value. Many scholars in the communication field (e.g., Heeter, 1992; Lombard and Ditton, 1997; Song et al., 2007) report the importance of enjoyment as a consequence of using 3D. Consumers use 3D product visualisation to have more fun, enjoyment and entertainment (Kim and Forsythe, 2007). Such sources of fun or enjoyment come from consumers' ability to rotate, and zoom in or out on the product (Fiore et al., 2005a), seeing different animated coloured pictorial images that may enhance their mental pleasure when using 3D sites.

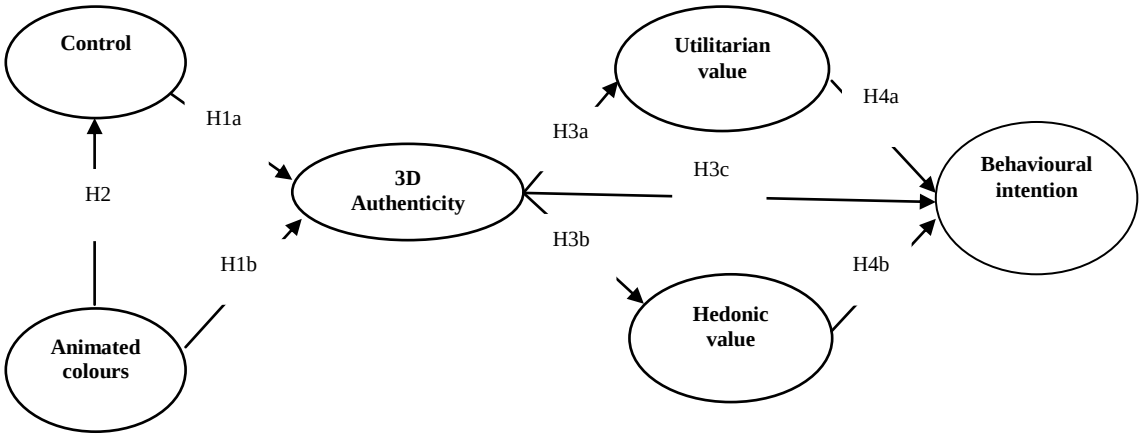
H_{3b}: 3D authenticity in a retailer website will positively affect website use for hedonic value.

3.3 Effects of 3D Product Authenticity, Utilitarian and Hedonic Value on Behavioural Intention

The role of 3D product visualisation in enhancing behavioural intentions appears well supported; 3D utilitarian and hedonic values improve willingness to purchase from an online retailer (Fiore et al., 2005a, 2005b), intention to buy (Schlosser, 2003) and purchase intentions (Li et al., 2001; 2003). Moreover, 3D realism improves users' beliefs and attitudes towards an online store (Klein, 2003). Therefore,

H_{3c}: The relationship between 3D authenticity and behavioural intention is positive.
H_{4a}: The relationship between utilitarian value and behavioural intention is positive.
H_{4b}: The relationship between hedonic value and behavioural intention is positive.

Figure 1: Conceptual framework (source: the authors)



4 METHODS

4.1 *Stimuli*

A retailer's website with one stimulus was custom-designed for this study. The stimulus was illustrated in 3D product visualisation sites in which participants can see, the focal product, laptops from different angles; they can rotate it and zoom it in or out. The 3D stimulus is designed to help consumers to imagine the product in appropriate and relevant ways and it enhances consumers' virtual experiences (Li et al., 2001). Moreover, we decide to use the 3D stimulus which users can control (content and form) and see from different colours to bridge the gaps in measuring VE using the 3D product visualisation. Previous scholars measure VE based on movies, simple technology but not 3D product visualisation. Moreover, those who use the 3D product visualisation measure it based on the telepresence construct (see Table 1).

4.2 Interface Design

We designed one stimulus, a 3D flash (site), for testing the proposed hypotheses. The site allows participants to control the content and form of the 3D flash. For example, participants can zoom in or out on the product, rotate it and can see different parts of the product when clicking on it. The 3D flash permits participants to change the colour of the laptop and see it with animated colours. Also the flash allows participants to get actual and perceived information about the laptop features and attributes. Moreover, our site enhance participants' fun and enjoyment values by enabling them to control (i.e., to zoom in or out on and rotate), to change the colour of the laptop and to see more information about the product (see Appendix A). In designing this interface, we consider a comprehensive site to visualise an electrical online retailer to surpass actual experience. Moreover, this study adds more features and cases to the ones that might be found in real sites. For example, none of the national sites that sell laptops (e.g., Sony and Dell, to the best of the authors' knowledge) has a flash combining both 3D and information about laptops. The website we created for this study was not previously known to users, nor did users have any knowledge of the fictitious brands on the site. Thus, we eliminated any impact

of previous experiences or attitudes (Fiore et al., 2005a). The site offers a wide variety of laptops, similar to those that many college-aged women and men currently buy and use. Therefore, site provides a suitable context for the present sample.

4.3 Participants

Student samples are well suited to online shopping research (e.g., Balabanis & Reynolds, 2001; Fiore et al., 2005a; Kim et al., 2007; Li et al., 2002, 2003), because they are computer literate and have few problems using new technology. Students also are likely consumers of electrical goods (Jahng et al., 2000). We employed a sample of 312 students to perform this study. The sample was gender balanced, consisting of 48% women and 52% men, and 90% of the sample ranged from 18 to 30 years of age. Approximately 90% reported having had prior online shopping experience.

4.4 Instrument

Participants were informed that this study pertained to consumers' evaluations of an electrical retailer's Web site. The questionnaire contained five-point Likert-type scales, anchored by "strongly disagree" and "strongly agree".

To measure the control construct, we developed a five-item scale that centres on users' ability to rotate and zoom in or out the virtual model based on Liu and Shrum's (2002); McMillan and Hwang's (2002) and Song and Zinkhan's (2008) studies. To measure animated colours, we developed a four-item animated colour scale based on Fiore and colleagues (2005a), Klein's (2003), Steuer's (1992) studies. The items tap how closely the simulated sensory information reflects the real product. We could not find an existing scale to measure 3D product authenticity so we developed a new five-item scale. We submitted the items to evaluations by academics (lecturers in online retailing and Ph.D. students); these respondents considered the items relevant for measuring the authenticity construct. We followed Churchill's (1979) procedures for developing a marketing construct scale and adopted Christodoulides and colleagues (2006) procedures for developing a scale for the online context. Each item began with "After surfing the 3D sites", and then obtained responses to the following: "3D creates a product experience similar to the one I would have when shopping in a store", "3D let me feel like if I am holding a real laptop and rotating it" (i.e. virtual affordance), "3D let me feel like I am dealing with a salesman who is responding to my orders", "3D let me see the laptop as if it was a real one", and "Being able to zoom in/out and rotate the laptop let me visualise how the laptop might look in an offline retailer". To measure hedonic values, we adopted a modified version of Babin and colleagues (1994) scale. We based the study on 4 of the 11 items. To measure utilitarian values, we adopted a modified version of Fiore and colleagues (2005a) scale. To measure Behavioural intention, we used a modified version of Fiore and colleagues (2005a) scale. See Table 2 for the purified items.

5 RESULTS

5.1 Measurement Model for the 3D Product Authenticity Model

We evaluated the measurement and structural equation models using AMOS 16. The measurement model includes 23 indicators, and we provide its results in Table 2, including the standardised factor loading, standard error (S.E), critical ratios (C.R), composite reliability, squared multiple correlation and average variance extracted (AVE) for each construct. The standardised factor loadings (λ) are all greater than .61. The composite reliabilities for control (.80), animated colours, (.782), 3D authenticity (.86), utilitarian (.85), hedonic (.86) and behavioural intention (.88) are acceptable (Hair et al., 2006). Moreover, average variance extracted by each construct exceeds the minimum value recommended by Hair et al. (2006), (i.e., exceeds .5).

Table 2: Measurement model results for hypothetical 3DPAM.

Construct Indicator	Standard-ised factor loading (λ)	S.E	C.R	Average Variance extracted	Squared multiple correlation	Composite reliability
η1 (Control)				0.50		0.80
- I felt that I could choose freely what I wanted to see	.78	–			0.602	
- I felt that I had a lot of control over the content of the laptop's options (i.e. angles and information)	.71	0.077	12.097		0.508	
- I felt it was easy to rotate the laptop the way I wanted.	.71	0.076	10.009		0.503	
- I felt I could control the laptop movements.	.61	0.071	8.916		0.369	
η2 (Animated colours)				.502		0.78
-There are lots of colours on 3D laptop websites.	.79	–			0.631	
- Colours brightness of the 3D laptop let me visualize how the real laptop might look.	.71	0.067	11.391		0.499	
- The laptop illustrated by 3D was very colourful	.61	0.064	10.099		0.375	
η3 (3D Authenticity)				.608		0.86
- 3D Creates a product experience similar to the one I would have when shopping in a store.	.77	–			0.598	
- 3D Let me feel like if I am holding a real laptop and rotating it (i.e. virtual affordance)	.79	0.078	14.093		0.628	
- 3D Let me feel like I am dealing with a salesman who is responding to my orders.	.81	0.078	14.581		0.656	
- 3D let me see the laptop as if it was a real one.	.74	0.076	13.293		0.550	
η4 (Hedonic value)				0.59		.86
- Would be like an escape.	.64	–			0.411	
- Would be truly enjoyable	.77	0.105	12.752		0.589	
- Would be enjoyable for its own sake, not just for the items I may have purchase.	.88	0.128	11.987		0.722	
- Would let me enjoy being immersed in an existing new product.	.79	0.144	11.123		0.618	
η5(Utilitarian value)				.582		0.85
- Help me make a better decision about the product.	.80	–			0.637	
- help me buy the right product.	.92	0.079	16.179		0.844	
- Aid me in evaluating the laptop items.	.69	0.067	12.481		0.475	
- Help me in finding what I am looking for	.61	0.066	11.002		0.375	
η6 (Behavioural intention)				0.631		.88
- After seeing the web site, how likely is it that you would buy a laptop from this online store.	.81	–				
- I would be willing to purchase a laptop through this online store.	.82	0.061	16.151			
- I intend to buy a laptop from this online store.	.82	0.075	15.323			
- I would be willing to recommend this online retailer to my friends.	.72	0.059	13.160			

5.2 Structural Equation Model for the 3D Product Authenticity Model

The hypothesised model achieves a chi-square of 350.225 (df = 219), with a goodness-of-fit index (GFI) of .911, comparative fit index (CFI) of .965, root mean square residual (RMR) of .038 and root mean square error of approximation (RMSEA) of .044, normed fit index (NFI) of .912, relative fit index (RFI) of .9, incremental fit index (IFI) of .965, and χ^2/df = 1.599. These results indicate a good fit of the data to the model (Byrne, 2001; Hair et al., 2006). Furthermore, the structural equation model confirms that control and animated colours have significant positive effects on 3D authenticity (H_{1a} t = 2.098; H_{1b} t = 7.951). Moreover, animated colour exhibits a significant positive effect on control (H_2 t = 7.888). Finally, as we hypothesized, 3D authenticity, hedonic and utilitarian values have positive effects on behavioural intention (H_{3c}: 2.465, $H4_a$: t = 2.216, H_{4b}: t= 2.454). Table 3 reports estimates, standardised estimates, and critical ratio for each hypothesized path. All the hypothesized paths are supported ($p < .05$).

Table 3: Summary of results of structural model estimation

Standardised regression paths (β)		Estimate	S.E	C.R	P	Hypothesis
H_1	Animated colours → Control	.539	.068	7.888	***	Supported
H_{2a}	Control → 3D Authenticity	.165	.079	2.098	.036	Supported
H_{2b}	Animated colours → 3D Authenticity	.672	.085	7.951	***	Supported
H_{3a}	3D Authenticity → Utilitarian	.470	.055	8.567	***	Supported
H_{3b}	3D Authenticity → Behavioural intention	.229	.093	2.465	.014	Supported
H_{3c}	3D Authenticity → Hedonic	.483	.054	8.875	***	Supported
H_{4a}	Utilitarian → Behavioural intention	.211	.086	2.454	.014	Supported
H_{4b}	Hedonic → Behavioural intention	..274	.124	2.216	.027	Supported

6 INVARIANCE ANALYSIS

We use the invariance analyses to determine the effects of gender, education levels and study backgrounds and their relationships in our conceptual framework. We start with conducting a measurement invariance analysis (measurement weight) for gender, education levels and study backgrounds to determine whether, for example, the males and females groups would use the same pattern in measuring the observed items. If the result is invariant, then the data of each group is suitable for further analysis (i.e., structural invariance analysis). However, if the two groups understood the items in different ways (i.e., non-invariance), then, we identify the source of the non-invariance. To do so, we identify the observed item(s) that caused the non-invariance. If the result of the measurement model is invariance, then, we go to the next step. However, if the results still non-invariant, then, we stop the analysis.

Secondly, after having the insignificant results in the measurement model, we conduct the invariance structural model analysis to determine if gender, education levels and study background groups have invariance or non-invariance results in perceiving the relationships between the unobserved constructs. To conduct this analysis, we follow two steps; (i) if the members of any group (e.g., the males and females groups) perceive the relationships between the constructs similarly (i.e., invariance), then, we move to the third step (i.e., latent mean invariance analysis), (ii) however, if the members of any group perceive the relationships between the constructs differently (i.e., non-invariance), then we determine the source of the non-invariance. Moreover, if the structural model analyses are non-invariance, we calculate the un-standardised direct, indirect and total effects. Thirdly, we conduct the latent mean invariance analyses among latent constructs to determine if the groups have perceived each construct similarly (invariance) or differently (non-invariance). In all the three previous steps, we report $\Delta\chi^2$ and Δdf and fit indices (TLI, CFI and RMSEA) models for the comparison purposes.

6.1. Invariance Analysis Results

The invariance analyses provide a better understanding of our conceptual model and its constructs invariance validity. Following a series of invariance analyses, we could conclude that our conceptual framework was invariant of measurement loading, structural loading and latent mean across gender,

education level and study background. The following explains the invariance analysis and it reports the non-invariance models.

Gender

We classify the participants into two groups according to their gender (i.e., males or females). The measurement model results (Table 4) reveal insignificant differences between the males and females groups regarding the measurement and structural models. However, result shows a significant difference in the mean model. The females group is higher (.179) than the males group in perceiving the behavioural intention construct (Table 5).

Table 4: Results of factorial invariance analysis for gender: assuming model unconstrained to be correct.

Model	P	χ^2	df	$\Delta\chi^2$	Δdf	CFI	RAMSE
Measurement model	**.404**	635.786	455	17.761	17	.952	0.036
Structural model	**.082**	649.793	463	14.007	8	.952	0.036
Structural mean model	**.019**	650.619	464	15.136	6	.946	.950

Table 5: Means: (male-Measurement weight)

Construct (gender mean 312)	Estimate	S.E	C.R	P
Control	-.138	.088	-1.562	.118
Animation	.069	.069	.994	.320
Authenticity	.016	.097	.168	.867
Hedonic	.071	.065	1.092	.275
Utilitarian	.048	.055	.875	.382
Behavioural intention	.179	.069	2.581	.010

Education Level

The second invariance analysis classifies participants into two groups according to the participants' educational levels (undergraduates and postgraduates groups). The measurement model, structural model and latent mean model results reveal invariance differences (i.e., insignificant differences) between the undergraduates and postgraduates groups (Table 6).

Table 6: Results of factorial, structural and mean invariance analysis for education: assuming model unconstrained to be correct.

Model	P	χ^2	df	$\Delta\chi^2$	Δdf	CFI	RAMSE
Measurement model	**.562**	649.828	455	15.466	17	.949	0.37
Structural model	**.240**	660.190	463	10.363	8	.943	.948
Structural mean model	**.072**	656.679	464	11.575	6	.945	.949

Participants' Study Backgrounds

The third invariance analysis classifies the participants into two groups according to the participants' study backgrounds (Business-Social and Maths-IT-Engineering groups). The measurement model and mean model results (Table 7) reveal insignificant differences between the Business-Social studies and the Maths-IT-Engineering studies backgrounds. However, structural model results reveal non-invariance (significant) differences between the Business-Social studies and the Maths-IT-Engineering studies groups in determining the relationships between the proposed constructs (Table 8). The relationships between 3D product authenticity→ hedonic, and hedonic → behavioural intention (BI) are the source of this non-invariance. In other words, both groups perceive the importance of the hedonic values differently.

Table 7: Results of factorial, structural and mean invariance analysis for background: assuming model unconstrained to be correct

Model	P	χ^2	df	$\Delta\chi^2$	Δdf	CFI	RAMSE
Measurement model	**.221**	675.953	455	21.115	17	.943	0.040
Structural model	**.010**	696.033	463	20.080	8	.934	.939
Structural mean model	**.664**	681.002	464	4.094	6	.938	.944

Table 8: Results of path coefficient invariance analysis for study background.

Model	P	χ^2	df	$\Delta\chi^2$	Δdf	TLI	CFI	RAMSE
Animation →Authenticity	.221	654.963	439	.125	1	.935	.944	.040
Control→ Authenticity	.589	655.131	439	.292	1	.935	.944	.040
3D Authenticity→ Hedonic	.002**	664.788	439	9.950	1	.932	.941	.041
3D Authenticity →Utilitarian	.128	657.156	439	2.317	1	.935	.943	.040
Utilitarian →BI	.295	655.934	439	1.096	1	.935	.944	.040
Hedonic → BI	.048*	658.745	439	3.906	1	.934	.943	.040
Animation → Control	.326	655.804	439	.966	1	.935	.944	.040
3D Authenticity →BI	.419	655.493	441	.654	1	.935	.944	.040

** p < 0.05; ** p <0.01.*

Table 9 shows the results of un-standardised indirect, direct and total effects- estimates for the Maths-IT-Engineering studies background group and the Business-Social studies background group.

Table 9: Results of un-standardised indirect, direct and total effects- estimates

Predictor variables	Behavioural intention toward the online retailer		
	Indirect effects	Direct effects	Total effects
Animated colours	.221	------	.221
Control	0.029	------	.029
3D Authenticity	.075	.230	.306
Utilitarian value	------	.169	.169
Hedonic value	------	.029	.029
R^2	.34		

Predictor variables	Behavioural intention toward the online retailer		
	Indirect effects	Direct effects	Total effects
Animated colours	.433	------	.433
Control	0.224	------	.224
3D Authenticity	.156	.419	.574
Utilitarian value	------	.069	.069
Hedonic value	------	.225	.225
R^2	.34		

Un-standardised indirect, direct and total effects- estimates

6 DISCUSSION

This research aims to measure 3D product visualisation virtual experience, to provide a validated conceptual model that integrates different constructs and to clarify the theoretical problems of using different measurement of the 3D virtual experience. Moreover, this research provides invariance analysis to determine the main moderators within our model. Our survey validates the hypothesised model, and the model findings confirm that animated colours and control are the main determinants of 3D authenticity (VE). Moreover, we find that the authenticity of the 3D model, hedonic and utilitarian values are the main determinants of users' behavioural intention. We follow a series of invariance analyses to confirm our results across gender, education levels and study background. Results show that our 3D product authenticity model is invariant in respect of measurement model. Furthermore, we find invariance results regarding the structural model across gender and education level. However, the non-invariance results appear well in the mean model (across gender) and the structural model (across study background). The difference (non-invariance) in the latent mean between males and females groups suggests that females tend to accept the idea of buying from our fictitious e-retailer more than the males group does. This result supports Tversky and Morrison's (2002) findings regarding the ability of the animated graphics to increase females' comprehension and learning. Moreover, the ability of the 3D flashes to enhance users' understanding of the laptops' features especially when using animations makes Females' ability to make purchase decisions (based on non-verbal cues) easier (Dennis et al., 1999) than men.

The non-invariance (significant) differences between Business-Social group and Maths-IT-Engineering groups clearly come in the relationships between the proposed constructs (i.e., the structural model). The 3D authenticity→ hedonic and the hedonic→ behavioural intention relationships are the source of the coefficients non-invariance. In other words, both groups perceive the importance of the hedonic values and the behavioural intention differently. That is, Maths-IT- Engineering group tend to accept that the 3D authenticity and the novelty of the 3D flash increases the level of fun and entertainment. On the other hand, Maths-IT- Engineering group does not accept that the high level of entrainment may end with a positive behavioural intention towards the online retailer. In regards to the un-standardised effects, students with the Maths-IT- Engineering backgrounds perceive the total effects of the 3D authenticity construct on the behavioural intention (.574) more than the Business-Social backgrounds (.306) do. This could be justified due to the Maths-IT- Engineering group ability to understand and criticize the novelty of the 3D more than the Business-Social backgrounds. However, the Business-Social background group perceives the total effects of the utilitarian values (.169) on behavioural intention more than the Maths-IT- Engineering group does. On the other hand, the Maths-IT- Engineering group perceives the total effects of the hedonic values (.225) on behavioural intention more than the human-studies group (.029) does. In contrast to the Maths-IT- Engineering group who perceives the direct effect of the hedonic values (.225) on behavioural intention more than utilitarian values (.069), the Business-Social studies group perceives the direct effect of the utilitarian values on behavioural intention (.169) more than the hedonic values (.029). These results could be explained as follows. First, Raijas (2002) finds that the experienced people know what they are looking for. Moreover, these results support the findings of Dennis and King (2009) and Dholakia and Chiang (2003) regarding shopping styles. In other words, when shopping for technical and expensive products shoppers who are Empathisers turn to become Systemisers and vise verse. Second, in comparison to the Business-Social group, the Maths-IT- Engineering group bought on average more laptops online ($M_{\text{Maths-IT- Engineering}} = 1.33$, $M_{\text{Business-Social}} = 1.3$) than the Business-Social group did. The Business-Social group are more interested in a laptop features and characteristics than entertainment features. The animation construct had the strongest indirect effect (.221, 433 respectively) in both groups. However, the indirect effect of the control construct in the Maths-IT- Engineering group (.244) is greater than the indirect effect of control on the Business-Social studies group (.029). Finally, in both groups, the 3D authenticity construct has the strongest direct effect and total effects.

7 CONCLUSION AND CONTRIBUTION

From a theoretical standpoint, our results contribute to the existing literature in several ways. First, previous research on VE has focused on three elements to surpass the offline (direct) experience; interactivity, vividness and 3D telepresence. However, we claimed that the notion of 3D telepresence reflects negative meanings. Instead we propose the notion of 3D authenticity to reflect the 3D virtual experience. Second, to solve the lack of agreement regarding defining and measuring the interactivity and vividness constructs. We narrowed the operationalisations of 3D authenticity antecedents to control and animated colours to reflect a real authentic VE. In line with other online retail researchers who investigated the influence of using 3D product visualisation on VE (Li et al., 2001, 2002, 2003), we find that marketers should focus on specific aspects of interactivity and vividness (rather than on the abstract constructs) when defining 3D virtual experience. For example, when it comes to 3D virtual models, we prefer focusing on the narrowest, most relevant aspects of interactivity (i.e., control). Whereas Heeter (2000, p. 75) describes interactivity as "*an overused and under defined concept*", we posit that control represents a useful construct for 3D models in the online retail context. Moreover, in support of previous research (Ariely, 2000; Coyle & Thorson, 2001) we narrow our conceptualisation of control to consumers' ability to control the content and form of the 3D flashes. In other words, users' ability to zoom in or out, rotate and get more information about the product enhances their perceptions of the authenticity of the 3D products. Furthermore, whereas prior research defines vividness according to sensory breadth and depth, we argue that research might benefit from a tighter focus on specific aspects of vividness through illustration, such as we have applied here. This result is in accordance with Pimentel and Teixeira's (1994, p. 146) study that asserts that visual stimuli are the main sensory cues in producing virtual experiences.

Third, our use of invariance analyses gives this research a plus, since previous research has not examined them in the context of 3D virtual experience. The invariance analyses led to another contribution, which highlights the importance of this research's conceptual framework applicability in the e-retailing area. Following a series of invariance analyses, it could be concluded that our conceptual framework is invariance of the measurement model, structural model and latent mean model across gender, education level, and study background. However, the effect of 3D authenticity on hedonic and the impact of hedonic on behavioural intention are moderated by study background. This result posits

that the study background is a significant moderator between the effect of 3D authenticity on hedonic values, and the effect of hedonic value and behavioural intention. Marketers and website developers should focus on this moderator when designing 3D product visualisation for the online retailer. Any 3D flash should reflect more innovation in designing and it should reflect a state of enjoyment for students with Maths-IT- Engineering backgrounds and Business-Social group. This conclusion posits that overall all the subgroups conceptualise the constructs and variables (animated colours, control, 3D authenticity, utilitarian, hedonic, and behavioural intention constructs) similarly. Also, this suggests that our results have no obvious bias of gender, education level, and study background (Lai and Li, 2005).

8 MANAGERIAL IMPLICATIONS

E-retailers should pay more attention to 3D product authenticity antecedents, i.e., control and animated colour when designing their 3D virtual models. Including real colours and flashes that consumers can control easily will lead to more authentic online experiences. The direct and indirect effects of animated colours and control constructs reveal the importance of these constructs within the 3D e-retail context. Any 3D flash should include the essential information that consumers seek rather than just a pretty picture. For example, consumers should be able to click on any part of the 3D flash to get access to information about it. Website developers should take advantage of technological advancements to develop and update online retailers' 3D flashes. Pechtl (2003) asserts a positive relationship between perceived innovation attributes and online adoption behaviour. Algharabat and Dennis (2009a) posit the importance of authentic 3D product to enhance users' hedonic and utilitarian values. Managers and Web sites designers should work together to ensure that the 3D product visualisation provides customers with the complete and accurate information they need. In addition, marketers should decide what information (or knowledge) to focus on before developing 3D flashes. It should be accepted that developing 3D flashes is not a money-free issue. Nevertheless, many companies have already claimed to have improved their sales as a result of designing and using 3D flashes. For example, J.C. Penny, eBags and Wal-Mart claimed that their online sales have increased 10% to 50% after using rich media such as 3D flashes (Demery, 2003). Moreover, Demery (2006) posits that the numbers of companies who are investing in 3D virtual models is increasing steadily because these companies are seeing the potential of the technology for selling more products. Nantel (2004) asserts that consumers shopping online for clothing are 26% more likely to purchase from the sites that have 3D virtual model than from sites that have not. Moreover, Fiore (2008) posits that media richness is an important way to differentiate retailers. Wagner (2000) asserts that online retailers with 3D product visualisations may reap benefits that extend beyond sales. For example, 3D increases site stickiness: users will spend more time on the online retailer, which leads to more opportunities to learn more about the products, interact with them, build trust and confidence. Finally, according to the Social Issues Research Centre (SIRC, as cited in Herrod, 2007) study it is expected that "by 2020 virtual commerce (v-commerce) will replace e-commerce" and the development of 3D virtual models (such as 3D virtual shopping malls) will be leading the whole industry by 2020.

9 LIMITATIONS AND FURTHER STUDIES

Although the generalisability of the results is limited by the student sample, and cannot be generalised to all online consumer groups, we argue that students represent the shoppers of tomorrow (Algharabat and Dennis, 2009b; Balabanis and Reynolds, 2001) and the research thus has prescient value. Second, since this study has focused only on laptops, which we consider to be products that are associated with more search or experience, it is unclear to what extent the results can be generalised and applied to other online products. On the bases of our results, we recommend that website developers should pay more attention to simulating 3D animation colours to reflect the real products more authentically. Moreover, they should work to create an environment in which consumers sense that they can feel the online products when they navigate the site. We recommend research efforts to extend the generalisability of our findings to other contexts (e.g., clothing) and to non-student samples. Further research may add and test other stimuli, for example by simulating real sounds to investigate how auditory vividness may influence 3DPAM.

APPENDIX A

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Understanding family dynasty: Nurturing the corporate identity across generations

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Abstract

This study aims to analyse the Ahlstrom annual reports. The content analysis contributes to family business corporate identity. According to the results family business corporate identity is based both on history and on the future. Human resource management, customer relationships, high quality, and also family ownership reflect corporate identity in large family corporations. Modern family business corporate identity is based on continuously developing the business concept and its core competency. Meeting the needs of customers and technical quality standards combined with upgrading and developing the business idea characterises family business corporate identity.

Keywords: corporate identity, family business, annual reports, content analysis

1 INTRODUCTION

The aim of this study is to analyse corporate identity in the context of multigenerational family dynasty. The study is based on conducting a content analysis of annual reports. Corporate identity among one publicly listed family corporation, Ahlstrom, will be analysed. Like Leuthesser and Kohli (1997) note the annual reports share the corporate values with stakeholders. Corporate identity can be constructed with programmes and strategic decision-making. At the same time, annual reports include mission statements: strategy in the contexts of marketing, human resource management, and supplying are described annually. Shareholders are informed about the current and future prospects.

Family businesses have a role in socializing and encouraging next generation to be entrepreneurial. Family firms have been and still are business entities with critical individualism and unpredictable fate. Sudden changes, flights and drops, occurring in the family business concern also every family member: the whole existence of the company leaves an eternal imprint on the minds of owners and their descendants. It is worth starting the discussion about the challenges awaiting family companies from the very succession – about half of all companies throughout the world undergo management and ownership transition (Danco, 1975). The latter could be proved from the historical occasions: coming out of succession proudly holding the family flag is the characteristic of only half of the family firms. There are much turmoil, internal conflicts, and absence of knowledge so particular to transformation of the business (Poza, 1997). All in all, succession might be named as one of the main challenges for the family firms ever existed.

The interest in studying family firms can be explained not only by the sheer quantity of them (in several countries more than half of all firms are family firms, Astrachan & Shanker 2006, 62), but especially by the characteristics of them. Successions are nowadays a challenging issue practically, politically, educationally and academically, as thousands of firms will face succession during the next few years. It has been estimated that the next Finnish "peak" in successions will take place between 2010-2011 (Discussion, Family Business Network Finland 2007).

Family firms need the appropriate knowledge so as to handle the successions. At the same time, family firms represent one dimension other firms do not have – family as family members, teams, owners, managers, board members and employees (see Moores & Craig 2006, 209). This is related to what Sharma (2006, 45) calls a "*family firm filter*": the combination of the family, management and organization studies. Family brings emotions, transferred knowledge and expertise, traditions, conflicts, family harmony, and founder-successor dilemmas to business and ownership.

Succession partly defines family business management. It seems to be one of the challenges to family business continuity. Le Breton-Miller, Miller and Steier (2004, 305) in the context of Ward's (1987) and Birley's (1986) studies, suggest that only 10-15 % of all family firms survive to the third generation. The growth from a small family firm to a family corporation is a unique process, which usually takes decades and even generations. Acquisitions, management buy-outs and management buy-ins convert family firms to non-family ones and vice versa. Family influence is still strong in management, product development and daily business operations even if the family has sold the business to non-family investors (see for example the study by Steen & Welch 2006, 299).

Fast growth is sometimes a challenge for family firms due to deeply rooted traditions and internal culture that prevents changes, opposes to risk taking and conducting turnaround strategy. Like Upton, Teal and Felan (2001, 67-69) describe, fast growing family firms share a vision and information with employees and managers on business goal setting and goal achievement. Small family business success can be explained by precise and systematic planning and the controlling of goal achievement and goal setting by the family business owner-manager (Miller, McLeod and Oh 2001, 84-86).

The conceptual definition of what a family firm is has been under active debate in recent years. Family firm is used in this study as a synonym for family business and family enterprise. In some recent research (Koiranen 2002, 178), family business has also meant the family business system (family, business and ownership). Family firms can be small, medium and large firms. Like Tourunen (2007) has analysed, 46 % of medium sized firms in Finland are family firms. Out of large corporations, every third (30 % of all large corporations) is a family corporation. Numerically speaking, most family firms are small businesses (just like the majority of all firms in Finland are small firms).

Ownership, succession, size, generation, management structures and family offer explanations about the build-up and nature of a family firm. However, like Moncrief-Stuart, Paul and Craig (2006, 216) mention, there is no generally accepted universal definition for the concept of family firm. One of the earliest descriptions of what a family firm is was made by Tagiuri and Davis (1996) which describes a family firm to be a system of ownership, family and business. These dimensions overlap in family business. Succession among the family dimensions is a typical characteristic for family

enterprises. Like the early studies by Handler (1992; 1994) have suggested, succession is an interaction between the founder(s), the successor(s), the family firm (key stakeholders like top managers) and the environment (conditions and resources).

2 FAMILY BUSINESSES AND THEIR CHARACTERISTICS

Astrachan, Klein and Smyrnios (2006, 167) argue that firms should not be analyzed as family firms and non-family firms ("black or white"), but with a continuum of family business characteristics. On the F-PEC-scale they have suggested that firms should be analyzed in the contexts of power (P), experience (E) and culture (C). This means that family firms represent generational, managerial and cultural scales that must be analyzed in order to achieve an understanding of the family influence, as Astrachan, Klein and Smyrnios (2006) call it.

The family has a synergic impact on family business operations (Habbershon, Williams & MacMillan 2006, 78): it collects and utilizes resources and capabilities from the existing environment. Especially family business founders, have resources in the form of alliances and networks, which represent unique family resources and expertise locally and industrially. According to Heck *et al.* (2006, 86), sustainability is one of the family business goals that must be based on resource exchanges. The family and its networks help gather flexibly resources when the family firm particularly needs them.

Family business has also non-financial resources among key members and networks which are adopted and nurtured over decades. Tokarczyk, Hansen, Green and Down (2007, 29) call these resources '*familiness*', and they suggest it has an influence on the business operations and marketing in family firms. Familiness can be a reflection of family interaction and key family members' expertise. Aldrich and Cliff (2003, 590) have analyzed the role of family profile in the context of creating new ventures in family business. They argue that not only changes in family relations (marriages, funerals, birth of children, divorces and economic changes in the family), but also cultural dimensions have an impact on family business venture processes. Family characteristics challenge also resource allocation and opportunity recognition and seizing in the family business. According to Olson, Zuiker, Danes, Stafford, Heck and Duncan (2003, 659-660), family impact on business operations in the family business is much greater than the influence of business and industry on family.

Commitment, as van Auken and Werbel (2006, 58-60) suggest in the context of spousal entrepreneurship, decreases conflicts and other motivational problems in the family firm. At the same time, commitment among family members contributes to increasing overall profitability. The spousal relationship and also the whole family unity and shared values positively affect family firm performance (Lee 2006, 187). Conflicts however can have an altruistic nature (Kellermanns & Eddleston 2004, 220-222) and consequent negative impact on financial results. Like Kellermanns and Eddleston argue, family business needs sometimes conflict on the governance level. It must be tailored to firm's characteristics, ownership structure, family influence, and strategic directions, which are based on family business culture, traditions, and future vision.

Family business topics cover such themes as succession, next generation, firm performance, founder-driven firms, family dynamics, ownership, family business management, corporate governance in large family corporations and family business growth (for a more detailed list of family business topics researched during recent decades see the article by Sharma 2006). The existence of family in business influences on management education and training as well as on academic education in business schools: the family in business makes family enterprises distinct from non-family firms (Steier & Ward 2006, 893). Family business ownership, management and business operations might differ in part from non-family firms. This can have an influence on family business education and management training. Like Craig and Dibrell (2006, 283) argue, family firms are very adaptive to environmental changes. They are very flexible that finds its reflection in changing goals and strategic goal settings.

3 CORPORATE IDENTITY – WHAT IS IT IN PUBLICLY OWNED FAMILY CORPORATIONS?

Corporate identity is based on communication and interaction. It answers the question "who are we?" It can be seen as the behavior of individual and organisations. Also, symbols within an organization offers concrete explanations regarding what corporate identity looks like (Leuthesser and Kohli 1997). In family business, symbols can be the color and the name of the family. At the same time, family business reflects its values. Individual stakeholders identify themselves with the corporation through corporate identity. Flags, colors, music, logos, and other symbols might increase identification and its construction (Morsing 2006). Corporate identity is obviously a part of leadership

and commitment creation: members' identification with a certain organization eventually increases motivation.

According to van den Bosch, de Jong, and Elving (2004), corporate identity is a part of corporate visual identity. Corporate visual identity is an umbrella of concepts at the strategic, operational and production levels: it covers communication as corporate image, brand, and the whole design process of marketing communication. While corporate identity is a formulation of behavior and symbols, corporate visual identity has its roots in communication science. Corporate visual identity is effectively managed by tools and assistance (van den Bosch, de Jong and Elving 2006), however it is not a project-based, linear and mechanical set of activities (Suvatjis & de Chernatony, 2005). On the contrary, it is born over the long term in family firms. According to Melewar, Karaosmanoglu and Paterson (2005), corporate identity can be influenced by planning and implementing strategy. Vision and mission statements, in both written and oral forms, concretely represent blocks of corporate identity. In its turn, annual reports are part of the corporate visual identity: they are concrete, printed leaflets of corporation existence. They create corporate identity, "what we will tell about ourselves" to stakeholders. As such, annual reports represent corporate identity as words and phrases.

David, Kline and Dai (2005) argue that corporate identity has a dual nature: it is a mix of both management expertise and values that exist in a corporation. They suggest that in marketing, corporate identity plays a role in attracting customers by understanding their behavioral patterns and collecting more revenues. Corporate social responsibility, as values, influences customers' decision-making when comparing corporate identity. However, this moves towards image: how companies are seen by outsiders. As such, corporate identity cannot be seen as a synonym for image or brand, purchasing products and services. Gray and Balmer (1998) see the roles of corporate identity and corporate visual identity differently. They suggest that corporate identity is a part of the overarching corporate reputation building process. As such, corporate identity, viewed through communication at all levels of the company, creates reputation, and the image of the company. Gray and Balmer mention that this process is unique for each corporation, just like corporate identity, which seems to be unique for each organization.

Corporate identity as annual reports is not equal for every case, it is generally assessed by the top managers. Like Murphy (2002) mentions, these decision-makers are often male, and on average experienced managers. In family businesses, this might include family members who are active in family company management. In addition to that, corporate identity is a culturally constructed phenomenon. It reflects not just the founder's and family's culture in a family company, but also the local cultural environment and circumstances in society. According to Schmitt (1995), language and meanings as linguistic questions, and cultural understanding should be analyzed in international business operations. Corporate identity, especially in founder generation family firms, might need development and planning before entry strategy and decisions. Like Stuart (2002) summarizes, corporate identity is presented by a company's top managers themselves, but it is not part of the visual identity. Just as in the case of annual reports, corporate identity is carefully planned and reported to all stakeholders. Annual reports document the financial data of companies in addition to mission and vision statements. Corporate identity in the context of annual reports is considered as being fully documented, planned, strategically sophisticated and showing an inner picture.

According to Stuart (2002), organizational identity differs from the corporate one by the subjects and their experiences. Organizational identity is initially created by the joint experiences of an organization and further formulated by employees. It. Corporate identity is more often developed by managers and the main strategic decision-makers. It is also visible to all stakeholders, while organizational identity can only be experienced through membership or a job at the firm. Dowling (2004) mentions that corporate reputation, corporate image and corporate identity were seen as synonyms in some of the 1980s and 1990s research literature. However, in recent years both the concepts of reputation, image, brand, and corporate identity have been diversified and defined more precisely by the marketing and management literature. Like Dowling (2004) suggests, corporate image is people's understanding of the firm itself. It can cause negative or positive feelings and experiences as reputation. As such, corporate identity together with its symbols and behavior reflects values stakeholders have about the business and industry itself. Corporate identity is a mix of behavior, symbols and statements in a family firm. It is decided on, managed and monitored by the top management. Corporate identity describes for stakeholders the picture managers want to share with them. At the same time, corporate identity is accountable: it is both influenced by financial data, and the quality expectations of customers and competitors.

Like Uhlaner (2006, 126) mentions, a family firm can be defined as a firm "*in which the majority of the ownership resides in the hands of one family and in which at least two members from the same family either own/or manage the firm together*". Family dynamics and relationships, business

operations, ownership plans and actions overlap in a family business. Uhlaner (2006) suggests that family creates a long-term focus for the family business operations. The family interactions finally create more stability and responsibility in decision-making.

The concept of a family business can be approached through the lens of resource-based theories. The latter analyze family impact on business operations (Chrisman, Chua & Sharma 2005, 562-563). Family firms posses and manage resources which cannot be found in non-family firms, especially in the form of family capital. Like Sirmon and Hitt (2003, 345) explain, resources in the form of capital can be divided into the dimensions they have labeled as "*human, social, patent financial, survivability and governance structure and costs*". Hence, family business resources are not only financial, but also non-financial, such as human capacities and organizational resources in the form of structures. These include managerial capital, which has a positive influence on the internationalization of a family firm (on the managerial capital's positive impact on family business internationalization see the study by Graves and Thomas, 2006:221). On the whole the resource-based view has an impact on wealth creation in family business (Chrisman, Chua & Zahra 2003, 359-360).

4 METHODOLOGY OF THE STUDY

This study is based on analyzing annual reports with qualitative content analysis. Annual reports were collected from the Jyvaskyla University Library and the Economic Central Archives of Finland (ELKA, located in Mikkeli). Ahlstrom's annual reports covered the years 1946-2007 (the following years are missing: 1995, 1997, 2000-2004). Only those annual reports which had descriptions and text concerning the company (instead of only financial data) were selected for the research.

Content analysis is typically preferred for understanding advertisements and printed documents (Singh and Schoenbachler 2001). Content analysis is also widely used in communication sciences. Media and news are often researched through the content analysis approach (Semetko and Valkenburg 2000). Annual reports are adopted for content analysis in order to understand family business corporate identity. Contents as phrases and words will be analyzed with qualitative methodology. Unlike Gibson and O'Donovan (2007), this study does not focus on the numeral data of annual reports. Only the written sentences, words, and phrases will be studied for deeper understanding family business corporate identity.

Content analysis can be applied to printed materials, such as mission statements, as Peyrefitte and David (2006) show in their quantitative analysis: it has both a quantitative and qualitative nature. In quantitative research content analysis can be based on generalizing the contents of the chosen research data. On the contrary, in quantitative content analysis, descriptive statistics on frequencies and on thematising the contents are conducted (Singh and Schoenbachler 2001). Codes for categorizing the data can be formulated (Farrell and Cobbin 2000). As such, quantitative analysis generalizes findings from the documents.

This study is based on qualitative content analysis due to the research topic being corporate identity. Corporate identity is better comprehended through qualitative analysis, and not by measuring the annual reports. Secondly, this study attempts to increase awareness of family business corporate identity. The qualitative approach, which thematises and interprets the findings, offers possibilities for achieving the research aims of this study. The qualitative content analysis model suggested by Bell and Bryman (2007) will represent the methodology ground. The tone of the annual reports will be taken into consideration. In general tone can be based on the research question or the research aims of the study. In addition to tone, values, principles, and practices will be analyzed in this study. *Values* reflect the contents of annual reports as corporate social responsibility. *Principles* are statements which guide the family business corporate identity. *Finally practices* are concrete acts which reflect family business corporate identity as everyday business operation. Altogether these three blocks feature the themes of family business corporate identity.

Direct quotations, like Calder and Aitken (2008) suggest, will be used in this content analysis to interpret the findings. The aim of the direct quotations in this study is also to make the results of the study accountable in the research process. Accountability in findings eventually legitimizes the qualitative analysis.

5 INTERNATIONALISATION FROM THE EARLY YEARS ONWARDS

Annual reports of Ahlstrom Oyj were chosen for the research. The reason for selecting Ahlstrom Oyj as a case was to understand the corporate identity in a large family business, which was recently listed on the public stock exchange (2006). Today, approximately 75 % of all shares are still owned by the Ahlstrom family branches.

Typically, annual reports also included descriptions on the current business operations, marketing and the future prospects. International business, high quality and customer needs were emphasized as the backbones of the Ahlstrom corporation (1969-1970, these years refer to Ahlström's annual reports). The family itself is viewed especially in the context of history. Ahlstrom's annual reports include the history of the factories and the family business, dating back to original stories 1850s of the founder Antti Ahlström in the 1850s. As a part of the family business corporate identity Ahlström was introduced in Noormarkku 100 years ago: "*A. Ahlström Ltd's home is in Noormarkku, which is located about 15 kilometers from Pori to the north. The name of the place is linked closely to the company's history and its development… The founder of Ahlström, farmer's son Antti Ahlström, started his business career on the Isotalo farm in Merikarvia in 1851. The business was based on forestry: the cutting down of trees and selling of the cut wood."* (1970-1971). History was also a source for inspiration for the business: "*Just like our company's founder did over 100 years ago, we will also sail to Asia to develop our teams there and to be a part of the future of that area.*" (1994).

The Iittala glass factory bought by Ahlstrom was founded in 1917 (1971-1972). Iittala is a well-known brand of the Finnish glass design. Ahlstrom's corporate identity, hence, was built on the traditions of a well-known Finnish design as well as on heritage and local circumstances. Although Ahlstrom's corporate identity was based partly on history, it was connected at the same time to the present. When family ownership by the founder's descendants was mentioned along with the 140 years history, the company's modern product category, research and development, and increasing expertise was described (1988).

During the 1960s and the 1970s the role of the political decisions and society's regulations was emphasized in the business actions. Corporate social responsibility is a part of family business corporate identity. Also, stakeholder thinking was a vpart of the corporate social responsibility in Ahlstrom: "*Our good starting points, capable employees and positive relationships with the stakeholders, create for us hope in believing that we can cope with the changing environment."* (1987).

This was also seen as creating team spirit and an organizational culture which would be collaborative: "*Ahlström celebrates its 140th anniversary in 1990. Our industrial traditions are unexpectedly long. It must be noted also that the company had been owned by the same family all the time… We are proud to continue these long industrial traditions. We will serve also in the future our customers by using our organizational expertise of engineering and business. We will trust people and they will trust Ahlström – together we will learn and develop to serve the customers even better*." (1990).

In the 1960s and the 1970s financial politics and political decisions were reflected in the annual reports (for example annual reports of 1969-1970, 1970-1971, 1971-1972 include descriptions of political circumstances and the family business's role in them). Annual reports were based on realism. Also negative circumstances were traced: lack of demand, recession in the economy, and unemployment were described (1974-1975).

The role of employment was viewed in the corporate identity context. As such, employment was considered to have a crucial role in family business corporate identity: "*At the factories more attention was paid to employment education and the increasing of expertise. New employee recruitment is linked to education."* (1974-1975). *"Our employees are capable and they work closely together with our customers, whom we have known often for a long time. We are trying to maintain long and trusting relations by serving our customers as well as possible during and after the delivery."* (1987).

Employees were further groomed through education: *"Ahlstrom's group-wide performance excellence program called aPlus is designed to consolidate the know-how and experience of Ahlstrom employees and to incorporate best practices across the organization. The ultimate target is to ensure the effective running of all industrial operations in a safe working environment.* (2007). The annual reports from 2005-2007 were available in English. Direct quotations from annual reports before 2005 are translated from Finnish to English.

In the mid-1970s during the world economic crisis the role of the management in connection with the family business' future was described in the following way:

"*In autumn 1975 the board of directors accepted a strategic program. The main goal is to guarantee enough profitability in the long-term… by analyzing and recognizing future business directions Ahlstrom's top management try to guarantee the traditional position of the company as a wealthy Finnish large corporation and employer."* (1975-1976).

Ahlstrom celebrated its 125th anniversary in 1976. The chairman of the board of directors, Börje Ahlström, described also family business traditions. He wrote that every family member who wants to work at Ahlstrom should be at least as good as any other applicant who applies for a selected position. The family business itself does not 'give' a career to any of the family members. Ahlström was also aware that the size of the family branches were increasing and that the family business might loose its

nature as a family corporation. He mentioned that: "*A. Ahlström was founded as a family business… many employees who have worked at the company have expressed their gratitude for being able to work in this particular company…they work much better in a business, which has got a clear concept – in this case family – than in a company owned by thousands of shareholders, which can be anonymous and impersonal. Maybe there is something secure in a family business. Due to Ahlström being a family business I can see that there are a lot of benefits for the family and for the business, and I hope that it can stay this way as long as my generation is alive… I can see that after my generation the family will have grown so large that it cannot keep the family business unity and traditions alive."* (1975-1976).

The family plays a major role in large family business corporations, as is mentioned in the following: "*Ahlström's family has remained loyal to their company, while many other family companies' holdings have changed to being faceless and heterogeneous. Antti Ahlström's descendants own about 80% of the company. Family brings continuity and patience to the business. It can be seen for example in internationalization. The company did not sell or quit the international business operations although the first years were difficult…*". (1990).

Continuous improvement was one of the goals Ahlstrom had. Renewal and technological improvements were reported in the annual reports as being issues of extra importance. Also future directions were evaluated: "*Continuous marketing, increasing productivity, product development, and precise cost monitoring were key factors in developing Ahlström and its profitability for the future.*" (1980). "*Ahlström has for 135 years successfully operated as a family business. We will celebrate this by continuing to work for and maintaining the quality of the products and by serving our customers well. We believe this is the way to thank our customers for the trust they have placed in us over the long-term.*" (1985).

Part of the corporate identity can be explained by entrepreneurship, and by the continuous renewing of the business and organization: *"Ahlstrom is strategically positioned on six continents. In order to provide global service to its customers, Ahlstrom is continuously evaluating opportunities to expand both its sales network and production capabilities into growing markets such as Asia, Latin America and Eastern Europe*." (2007). Ahlstrom already had international business operations from the early part of the 1900s onwards. The company evolved in the middle of the internationalization of employment and business: "*The growth of the corporation and internationalization has increased the need for employees who speak different languages, who are qualified, and who have good work motivation, at the different levels of the organization. For this reason, even more attention has been paid to human resources and on educating employees to perform more demanding tasks.*" (1984).

The family business focused on core competency instead of delegating resources to different industries, as was done before the 1990s: *"Dedication to the manufacture of purely fiber-based materials and the company's global presence have helped Ahlstrom to achieve a leading position in several market segments."* (2005). *"Ahlstrom's knowledge of fibers, fiber processing, and chemicals is based on over 150 years of Ahlstrom entities operating in paper and fiber markets. The company has extensive expertise in the use of natural and synthetic fibers, their various combinations, and a wide range of chemicals."* (2006).

6 DISCUSSION

Based on the content analysis, tone, values, principles and practices were evaluated in the context of family business corporate identity. The chosen family business corporation, Ahlstrom started in 1851. The company has survived several successions and remained a family owned large corporation. Family members have been involved in management and on the board of directors. Ahlstrom represents a company, which has been influenced by the same owning and managing family for over 150 years.

The tone of the family business corporate identity is progressive. The family business is seen as a company which should be developed to meet future demands. *Pro*-activeness in technical research and development has sustained success of the family business. The family business corporate identity, as a tone, is active and entrepreneurial. At the same time, traditions guide the future. Survival and continuity in the context of corporate social responsibility can be seen as a part of the family business corporate identity at Ahlstrom. The tone is also realistic, as it should be, in the annual reports, which inform shareholders and stakeholders for the better and for the worse: all negative circumstances, such as recessions, are reported.

The values which reflect family business corporate identity are:

1) Stakeholder thinking,
2) Active behavior and actions, and
3) Long-term orientation.

Customers, employees, and the existing environment are stakeholders which guide corporate social responsibility in family business. Activeness, in decision-making, internationalization, recruiting and technical development have been some of the values which describe family business corporate identity. Being active in developing the business concept is part of the entrepreneurial family identity: every generation adopts once again the family business values. Long-term orientation in its turn is one of the values which can be seen as a part of the family business corporate identity. As a result there is an unfeigned respect for past traditions, but also an understanding that the business should be kept alive and innovative.

Principles, based on family business corporate identity, are competitiveness and international expertise. Ahlstrom's main goal has been to remain competitive by making decisions proactively: the future expectations and the current situation guide family business strategy. Profitability, even in the hard times of the 1970s, has been one of the basic principles in the family business. Family business corporate identity was based on practices such as internationalization. Ahlstrom has always been, even from the founder generation, international. Recruiting the best possible non-family and family persons to the company sustains the future of the family business.

In accord with the resource-based perspective, deliberately outlined by Habbershon and Williams (1999), awareness of non-financial resources, mostly familial in nature, contributes to more thorough outlook of the advantages of the firm to be family-owned. Statements of mission, tones of annual reports, value settings - all this indicate the future competitive capabilities of the family business both on the individual level of owners and group level of major stakeholders.

Constitution of stable corporate identity facilitates organizational culture, while strengthening the shared beliefs' structure. Bundle of organizational resources gradually finds its reflection in the performance outcomes: the whole family firm's processes lead to a balanced competitive advantage and create preconditions for reaching a 'dynasty' status by a multi-generational family business. It's worth mentioning that psychological and process aspects of family ownership affect firm's corporate identity to a certain extent. In respect to a market position, dynasties feature edges, since its owners put weight on business values, rather than solely treating management practices. Another link to a resource-based approach in the corporate identity context rests on the more flexible work practices applied in the family dynasty: as a result internal orders re-create a certain family language stemming from effective communication processes. Finally ever-growing family motivation, patient capital and less interdependence with the macroeconomic trends leaves a sizeable footprint on the unique corporate identity of a family dynasty.

7 CONCLUSIONS

The family business is more than mere business – it is the social obligations, it is the buttress of the constitution of fairness and longevity (Barnes, 1991). Enriched by the shared purpose of doing things together, family members along with active non-family employees at managerial positions will be able to squeeze through the hardest ordeals and come out of all troubles as victors. And as we know, victors need never explain. Only such attitude to the family business helps it exist in the next generations. (Hubler, 1999).

Through identifying possible threats to the planning process, owners and other interested parties would be able to reasonably judge about the measures on overriding difficulties, stimulate their strategic thinking and explore new opportunities for business advancement (Carlock & Ward, 2001). Entrepreneurial identity helps a family business to be prepared for succession, and international competition. Those with no intention to plan create many obstacles by their inaction. For solving the problem, clear explanation of benefits of the planning and business development is required.

Next-generation owners could be better educated during the on-job training along with tradition higher education (Carlock & Ward, 2001). For this very purpose, employment policy of the family business has to exist: the earlier, the better. Even on later stages of firm's development, when the number of employees tends to increase in the geometrical progression, owners would be ready to suppress such a tendency, and hence, save the longevity of the business. Consequently, in order to survive beyond the current generation, family business owners should not only pass the baton to their followers, but also try to maintain business practices up to standards, feel corporate identity and enlist to the support of the highly influential parties, create vast networks of subcontractors, and surround the business with loyal customers (Harris et al., 1994).

It is a matter of primary importance to preserve values and augment awareness of the necessity to run effectively. However, there are huge number of contradiction and intersections when dealing with the corporate identity. What makes it easier to maintain the healthier atmosphere among family members comes to the flashpoint in continuing the business. Such contradiction leads to a dilemma, which is formulated into the following question: "What prevents the owners to be financially healthy

and happy when running the family business?" The only thing to remember is that actions undertaken by family members today will find its echo in the years to come (Mintzberg, 1994). What long-lasting dynasties correctly do is that they feel such complications as opportunities to test new tactics and dissolve all knotty points (Gregersen & Black, 2002). No one starts riding a bicycle without making a try. This is inherent to business life as well. Only from trials and failures, owners retain their business stamina.

a) To plan a corporate identity construction the following things might be noticed in family business:
b) First of all, business values are maintained within the family and inside everyone's mind (Collins & Porras, 1996).
c) Interaction is seen to be dramatically corrected to the appropriate level.
d) Anticipation of processes and policies to be employed critically contributes to the healthier inner atmosphere and pressure relief (especially concerning ownership practices and employment policy).
e) In addition to that, fairness and openness of the made decisions increase, which unite family members around their creation.
f) Finally, capital budgeting and cost analysis (Jones, 1982) can be viewed with greater preciseness and with less harm to anyone within the family business.

From the other point of view, concerns about family stability in-house may exaggerate the reasonable level, being deleterious to the business itself (Schein, 1983). Hence, family focus is easily traceable in all business affairs. Decision-making process brings in familial tones, which creates individual attributes of all without exception family enterprises. However, too many emotions at the working desk would sooner threaten the long-term success and erroneously teach next-generation members (Hubler, 1999). Leadership on the whole is put at stake: balancing family aspects with those of purely management ascertains dynasty's longevity.

As a possible avenue for future research, there is a possibility to empirically compare corporate identity constructs across the whole cultures and countries. Whether political order, social tensions and country's economic model are factors affecting corporate identity of the family dynasties is a matter of further investigations.

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Book Review: Information Systems Management In Practice

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BOOK REVIEW

This comprehensive overview to information systems management is an enhanced version of an original title regularly updated since its original format more than ten years ago. Its expanded format successfully guides the student reader through a basic introduction to aspects of information technology both within systems and as systems in their own right. Using case-driven analyses in order to explore examples, the authors have striven to make sure that this edition is as comprehensive as possible. A chapter on the digital economy, for example, now reflects the changing face of distributed systems and distributed computing. This offers a more fair balance to the use of standard material, such as managing system development.

More vital to such a standard form textbook aimed at students, however, is the inclusion of material that encourages the consideration of further topics within the same sphere, such as issues within the information management discipline. In encouraging outreach between disciplines which both encounter information systems management, a cohesive basis for a learning strategy has been emphasised which can produce positive collaborations between formerly distant subject areas.

In recent years, management of information security – especially issues regarding personal data theft – have become an increasingly important topic. This has occurred not only within the discipline of IS, but within related disciplines, such as records management. It would be encouraging to find that the practical outcomes of the role of IS design in terms of the fundamentals of information security by architecture were being represented in the taught concepts of IS. Sadly, this is not explored within the text, but could prove promising for a further edition. Whilst many varieties of networks – both historical and modern - are discussed in terms of their utility and architecture, little is said about the potential problems with the drafting and construction of such systems. This is possibly an area of expansion for a future edition, and would be appreciated by both information management professionals and others from the specialised areas of librarianship and archives, finance, and medical sciences.

As media concerns grow with the practical concerns of data and information management both in the UK and USA, such a text is both timely and relevant for not only IS professionals, but also for another audience. Whilst the title of 'information professional' is becoming wider and more encompassing – the academic discipline of the IS professional and their role in business may not be fully recognised or appreciated. This text, then, should be recommended as a basic text for those unfamiliar with the work of the IS technician, the systems analyst or IT worker within business. As a reflection of the wider awareness of the importance of information and knowledge management in business, two chapters in particular stand out as key reading for the target student audience. Supporting IT-enabled collaboration, and knowledge management are wide topics with a firm basis in professional progression of IS. There are overlaps of subjects with many other disciplines, and within both science and business cases, these show the wideness and diversity of the relevance of these topics.

The construction of the chapters is a positive learning mechanism for students at any level. Case studies show the direct life-relevance to the discussed IS mechanisms, and allow for a longer discussion of relevant issues. Exercises and review – discussion questions at the end of each chapter look to enhance reader awareness of the text, whilst encouraging individual development by readers seeking out their own examples through business and other potential, real-life cases.

Although the overall presentation of the text is clear, text within illustrations and diagrams is quite compact, which can limit the impact of including such detailed pictures and charts. Graphically, backgrounds for text within case studies are subtly shaded grey to highlight and separate pieces within chapters unobtrusively. The choice of halftones and a monochrome text layout makes for an uncluttered reading, and assists with reproducibility and overall legibility. However, though some may find the repetition of chapter contents on each first page of benefit, it can also distract the reader from approaching the whole book smoothly as a holistic text. This is the book's major approach: units as chapters are a common concept, and whilst this book does not move away from that in any great measure, it provides more case-study based content integrated within each unit than commonly found.

Overall, this is a thorough and standard text for basic awareness of IS management and issues surrounding current IS practice. Its main highlights are the currency of the topics chosen, its proactive approach to drawing the attention of the reader out towards real-life IS practices, and its firm basis of observations rooted in practice. It is hoped that this volume could also be recommended transdisciplinarily, to other disciplines sharing an interest in the present and future practices of how IS develops, as well as set as core reading for those dealing with aspects of IS and BIS practice.

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Book Review: Business, Politics, and Society: An Anglo-American Comparison

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BOOK REVIEW

Michael Moran is a Professor of government and politics who admits his major concern over the past 30 years of his academic career has been to investigate what happens when you marry capitalism and democracy? In his new book he investigates the relationship between business, politics and society in the UK and USA. I reviewed this book from the perspective of an academic in the field of new technology management, information systems and e-government. I found this book extremely well written and very edifying. The book is broken down into 8 chapters each of which is linked with material in the previous chapters and references to future chapters yet to be read.

The first chapter lays the foundations of the book highlighting the major themes and summarising the major arguments that will be covered in the following 7 chapters which explore the interaction between capitalism, democracy and the power of business. The book focuses on the UK and US as examples of the two most high profile and established capitalist democracies that have a common assimilation to a single model, but with differences that have emerged from variations in their histories and institutions. Chapter 2 traces through the historical roots of business communities, their relations with systems of politics and the wider civil society in the two countries. Moran presents a "path dependent" nature of the historical development of systems of business and politics where rather than the past determining the present, he maintains that historical experience has produced important divergences that have shaped the different patterns of interaction between politics and business in the UK and US. Chapter three isolates one of the factors that impact relationships between business, partisan politics and the wider relations with society – namely business lobbying. This chapter charts the growth and professionalization of business lobbying with increased resources and sophistication and the birth of partnership between big business and big government and the importance of multinational enterprise in the new age. This leads seamlessly to the next chapter which examines the giant multinational corporation as a key participant in politics and economic life. Their importance is underlined by the statistics - in the UK, multinational corporations account for 0.1% of enterprises by number but 41% employment and 49% turnover (p.61). The political strength of corporate giants has arisen from the extensive resources that are available to them on a multinational scale and the central importance of business in the economic functioning of a modern capitalist state. With such strengths come the increasing unpopularity of giant corporations in society and the need for them to counter growing critical institutions in civil society through reputation and brand management and corporate governance. Having established the political character of the giant corporation, the next chapter (5) examines the impact of small business on politics, which is the largest in numbers (nearly 99% of firms are small in the UK) and thus the potential political strength of this collective group. The difficulty of small businesses is that they are extremely heterogeneous, operating in many different sectors has given rise to political and institutional innovation to represent their interests. Moran however sees this as a sign of weakness not strength which he goes on to explain in Chapter 6. The connection between business and party politics are summarised into two questions: "how far do parties have to rely on business support?" and "how dependent is business on parties?" and explored throughout the chapter. The escalation of campaigning costs, the dwindling number of party members and voluntary party activists has meant that a much closer relationship with business has had to be forged by political parties often giving rise to political scandal and increased regulation on both sides of the Atlantic. As the book draws to a close, the final couple of chapters do an excellent job in summarising the major themes and issues and placing them in a theoretical context of Marxism and pluralism. He presents Gramsci and Schumpeter as the lens through which to view social and cultural context of business institutions in modern capitalist society, where both agree on the convergence of advanced capitalist systems in their dominant cultural traits, but differ in their discourse on what capitalist systems converge on. Mixed into this framework is the perspective of pluralism. In the final chapter Moran concludes that Schumpeter's "restless capitalism" has combined with restless democracy. Although a model of capitalism is an economic image, it is primarily a political image shaped by regulatory regimes under which economic institutions operate. Moran observes that the UK and US systems are not converging and rather than undergoing Americanisation, the UK system is looking increasingly European because of the role of the EU in regulation – a critical factor in understanding how politics intervenes in the business system. What Moran does see is that there are common features in the exercise of business power and influence in both Anglo-American political systems. The differences, which he sees as very important, are highly contingent on national history, culture and institutional setting.

Overall, I highly recommend this book to all who have an interest in business, e-government, government and society. It knits together the major issues and while focusing on the systems in the UK and US, throughout the book Moran presents separate vignettes or "boxes" of information that vary in

themes examining the interplay of politics and business in Russia, Europe, South Korea, and including examples from the large corporate such as Nestle, BAT and Wal-Mart, all of which enhance points being made and extend the scope of the book beyond the Anglo-American. It is an easy read, and for the non political scientist and economist, the theoretical frameworks he presents are done so very lucidly and in a way that is clear and easy to understand without having to dip into other economics and political science reference books.