

## **Venture Capital and its impact on Indian economic growth**

**SAVITHA.M.<sup>1</sup>**

Research Scholar, BHARATIAR UNIVERSITY: COIMBATORE – 641 046

Contact Address and E-mail id: No 2 and 3, “Janani”,

1st floor, 7th Cross, Central Excise Layout, Sanjaynagar,

Bengaluru – 560094

**Dr. Patel Nagaraj Goud<sup>2</sup>,**

Associate professor in commerce

Coordinator at PG studies in Commerce

HKE Society’s Shree Veerendra Patil Degree College

Sadashivanagar, Bangalore – 560080.

### **ABSTRACT**

*Funds being the main requirement of any business, especially seed capital, can be met by VCI, enabling business to achieve its corporate objectives. With the tough business environment, it is relevant to explore the impact of VCI on economy. We have formulated a framework which pinpoint activities, consequences and footprints of VCI and its impact on economic growth. We analysed economic impact of VCI based on three key factors of economic growth: innovation, efficiency and competitive capacity. In the analysis of the links between VC and economic growth we found positive result of VC activity. Our study noticed VC foster innovation by improving patenting and promoting R & D, thus elevates economic development. Other findings shows VC enhance the efficiency of the business through capital formation and creating new business, which is also directly related to economic growth. Enhancements in efficiency of business can lead to increased competitive capacity of the economy as a whole. It helps invested business to trade at domestic and international levels in the form of export. Improved competitive capacity of the economy contributes for economic growth.*

*Key words: Capital formation, Employment, Exports, Internationalisation, Patent, Research and Development (R & D), Venture capital investment (VCI).*

### **1 Introduction**

Majority of the business wants to modify the method they operate and magnify their market to improve potentials. For this they require access to funds, trade know-how and managerial expertise. Eventually, they need to adjust to a changing business environment by becoming more efficient and strengthening their competitive capability. Funds being the main requirement of any business, especially seed or initial capital, can be met by venture capital investment. This enables

the business to achieve corporate objectives and in return they provide monetary benefit to the investors. According to study of Dr S Gurusamy, (2009) Venture capital refers to an equity/equity related investment in a growth oriented small/medium business, to enable the investors to accomplish corporate objectives in return for the monetary shareholding in the business or the irrecoverable right to acquire it. Venture capital is a typical private investment. Venture capital is one of the powerful financial instruments that raise funds from investors and fill the early stage-funding gaps faced by new and young entrepreneurs. With the tough business environment in India, it is relevant to explore the impact of VCI on trade growth and recovery. This study strive to enrich our perception by viewing and identifying, in an extensive way, the role and economic impact of the VC investment on economic growth in India. This study attempted to draw the impact of VCI on economic growth by considering prevailing evidence and by drawing various avenues in which VC investments can influence entrepreneurs, business, industry and the Indian economy as a whole. To be specific, the study establish different avenues whereby VC activity and related results encourage key elements that contribute to economic growth in India. The study emphasised on 3 key factors of economic growth, which have notable evidence of impact of VC activities: The drive that the VCI impart to innovation and its aids in creating new products and market operations; VC enriches efficiency by attracting funds from investors, forming new business and increasing business profitability; the handout of VCI in creating competitive capacity by providing funds for risky, but profitable new business, helping companies for internationalisation and fabricate new businesses.

Contents of this report followed by introduction is set out as follows: Part 2 reviews the literature to discuss the evidence of the role of VC on innovation, efficiency and competitive capacity on economic growth. This help to set the backdrop for the rest of the analysis; Part 3 explains about data sources; Part 4 describes well-established economic impact evaluation methodology through the analytical framework, which is used in the report to identify and explain the avenues that link VC and economic growth; Part 5 explores the empirical evidence linking VC with innovation, efficiency and competitive capacity; Part 6 concludes the report.

## **2 Reviews the literature**

In the study by M Haritha, Ravi V, Maruthi Reddy (2012) says the Venture capital is the life blood of new industry in the financial market today. It is an important source of equity for start-up companies. The academic and professional studies are reviewed to understand the contribution of VC for different factors of economic growth, is as listed:

### **2.1 Innovation**

Francesco Bogliacino and Matteo Lucchese (2011) analysed young and small innovative companies is deemed to play a large role in the process of innovation and employment creation in the modern economies; however, being such a dynamic subject, it may be serious harmed by

financing constraints. VC and stock market can play a role in softening this constraint. Role of VC and the stock market in supporting innovation is quite impressive. As per Frontier Economics Ltd (2013) reports innovation plays a key role in fostering economic development as it enables economies to make more out of their existing resources and thus improves productivity and competitiveness, and boosts economic growth.

## **2.2 Research and development**

Gornall, Will and Strebulaev, Ilya A., (2015) study shows that venture capital has become a dominant force in the financing of innovative American companies. From Google to Intel to FedEx, companies supported by venture capital have profoundly changed the U.S. economy. Venture capital backing company employ 4 million people and account for 1/5 of the market capitalization and 44% of the research and development spending of U.S. public companies. From research and development to employment to sheer revenue, the companies funded by venture capital are a major part of the U.S. economy. Astrid Romain, Bruno Van Pottelsberghe (2004) tested on 16 OECD countries from 1990 -2001, and the result shows that the social return of VC is significantly higher than the social return of business or public R & D. An increased VC intensity also makes it easier to absorb the knowledge generated by universities and firms. VC is similar in several respects to business R & D performed by large firms and therefore contributes to economic growth through two main channels: innovation (characterised by the introduction of new products, process or services on the market) and absorptive capacity (development of know-how and skills that induce an effective use of existing knowledge to improve the production system).

## **2.3 Capital formation**

Dr. Elsayed Elsiefy (2013) provides evidence from Egypt on the factors that may have had a bearing on VC investments during the period (1980-2010). Economic developments are proven in areas such as economic growth and value creation, innovation, and job creation. GDP growth, interest rates, tax rates, capital markets dynamisms, entrepreneurship culture, government policies and legal framework, among others, were proven to have a tremendous impact. An investigation has discovered that there is a positive significance relation between VC and GDP per capita, general government expenditure and labor participation rate.

## **2.4 Employment**

Sampsa Samila and, Olav Sorenson (2011) using a panel of U.S. metropolitan areas from 1993 to 2002, found that increases in the supply of venture capital positively affect firm starts, employment, and aggregate income. The venture capital stimulates the creation of more firms than it funds.

## **2.5 Internationalisation especially by Exports**

The study of Becsky-Nagy Patrícia (2014) states that Hungary could take advantage of benefits in some special fields of innovation. The increased efficiency of information flow between the venture capitalists and entrepreneurs would lead to more transactions and more Hungarian firms would reach international successes. It also highlights Hungarian firms could be internationally successful through venture capital financing. The venture capital backed small firms are more likely to create relatively higher economic growth. Rashmi Rai in her study says - India requires a strong, sustainable venture capital industry to support high-potential young businesses, to ensure that they are able to grow into globally competitive firms that drive job-creation, innovation and economic growth.

## **2.6 New business formation by improving entrepreneurial talent and business skills**

JYOTI (2014) in her study says VC is a remarkable catalyst of entrepreneurial activity in many developed countries. It is an important source of finance for small and medium sized firms which have very few avenues for raising funds. It provides financial support to entrepreneurial talent and business skills at the early stages of their life cycle. According to the study of Kristofer Makomaski, Mikael Johansson (2013) based on interviews with market professionals and existing research, the Swedish entrepreneurs are seeking not only capital in terms of funding but also capital in terms of knowledge which put pressure on the VC firms to become more professional. Syndications will benefit the entrepreneur since it becomes easier to raise capital for new ventures. After a panel debate Thillai Rajan (2010) reports VC funded companies show superior performance to non VC funded companies. Venture capitalists (VCs) select and fund only the best companies. The value addition effect dominates the selection effect in accounting for the superior performance of VC funded companies. Thomas Chemmanur, Karthik Krishnan ,Debarshi Nandy (2008)The overall efficiency of VC backed firms is higher than that of non-VC backed firms , this arises from both screening and monitoring. The efficiency gains arise from both an additional improvement in product market performance as well as from reductions in various input costs.

## **2.7 GDP**

Ritankar Sahu, Ananya Nath, Priyadarshi Banerjee (2009) reviewed and convey the GDP growth coming within striking range of double-digits. Annual growth rates of 7-9% are unheard of in mature western economies, and global investors want high returns. Several key sectors of the Indian economy (IT/BPO, telecom, pharma/healthcare, financial services, retail and automotive components) that are investment targets are experiencing even higher growth.

M Haritha, Ravi V, Maruthi Reddy (2012) show the study result for the period 2001-2010, which highlights agriculture, industry and services have respectively accounted for around 20%, 27% and 53% of India's GDP.

### **3 Data sources**

To analyse this issues, we covered all registered venture capital in India from 2006-07 to 2015-16. The empirical survey was based on published data;

- Hand book of statistics 2016 & 2010 , published by Securities exchange board of India, ( Venture capital details)
- Annual report 2015-16 and 2016-17, published by Ministry of Micro, Small and Medium enterprises, Government of India ( Employment, Number of entrepreneurs Memorandum- II filed)
- Annual Report 2008-09, 2011-12, 2015-16, published by office of the controller general of patents, design, trademarks and geographical indications ( for patents)
- Publication reports of Ministry of statistics and Programme implementation, central statistics office, Government of India, National Accounts Statistics ( GDP, Export and capital formation)

These data is for the period 2006-16 (annually) and it narrates the following measures:

- Employment (only MSME is considered due to lack of data)
- New firms started (Number of entrepreneurs Memorandum- II filed)
- Venture capital fund and number of VC(only registered with SEBI either as Venture Capital Fund, Foreign Venture Capital Investors or Alternative Investment Funds is considered in the study due to lack of reliable information on unregistered VC fund).

### **4 Research Methodology**

We have formulated a framework which pinpoint activities, consequences and footprints of VCI and its impact on economic growth. We analysed economic impact of VCI based on three key factors of economic growth: innovation, efficiency and competitive capacity. This can be explained as

Some Venture capital activities: It attracts investable funds, provide investors different investment option like pension funds, individual investment, funds of funds, insurance companies etc. It invest in companies (especially Micro, Small and Medium Enterprises) as an aid of for their growth cycle. It includes start-ups, growth (expand or access new markets) or continuity. And assist in managerial activities by providing managerial expertise and industry knowhow

Its Consequences are: Expanded capital investment which is the main engine of economic growth. VC impart economic growth by lubricating private sector investment. It provides appealing returns over the long term. It facilitates formation of new business and creating employment opportunity by providing funds to start-ups. This promotes entrepreneurship and start-ups encourages creations of jobs. It provide better management technique. VC have a positive impact on the operating capacity of investee companies in terms of corporate operations and profitability. Thus it contributes to enhance their productivity and continuity

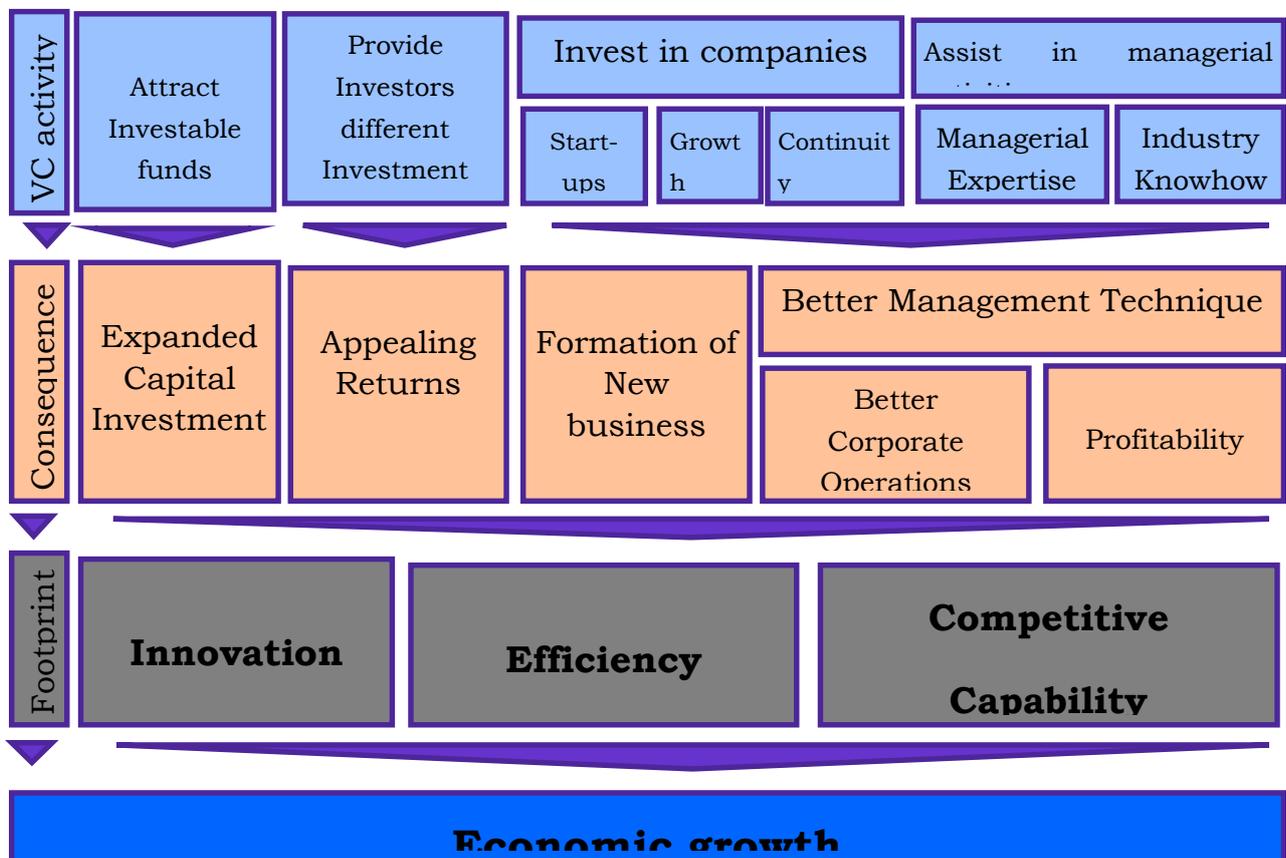
VC investment's footprints on economic growth:-

Innovation – A favourable foot print of VC activity (through improved management) is to promote greater innovation. VC backed firms can allocate more funds to research and development which tend to be more innovative than the non-backed up firm.

Increased efficiency– Developments in efficiency are directly related to economic growth as it promotes more productive resources utilisation. This boosts business profitability, labour productivity, create employment and thus long term economic growth.

Intensified competitive capability– Increased efficiency Intensifies competitive capability of the economy as a whole at domestic and international levels. This improves economic condition by promoting external trade.

**Figure 1: Analytical framework used for analysis**



To quantify the above model the survey employ regression and correlation analysis. Data series normality were also used for better comparison. Regression model coefficients were determined by least squares. With the help of correlation we found the relationship existing between the variables. This model enabled for estimating long-term influence of VC investment on Indian economy. Thus with this, results derived would be more significant.

## 5 Empirical Analysis

We examine Indian venture capital investment with its impact on economy and derived some noteworthy inference.

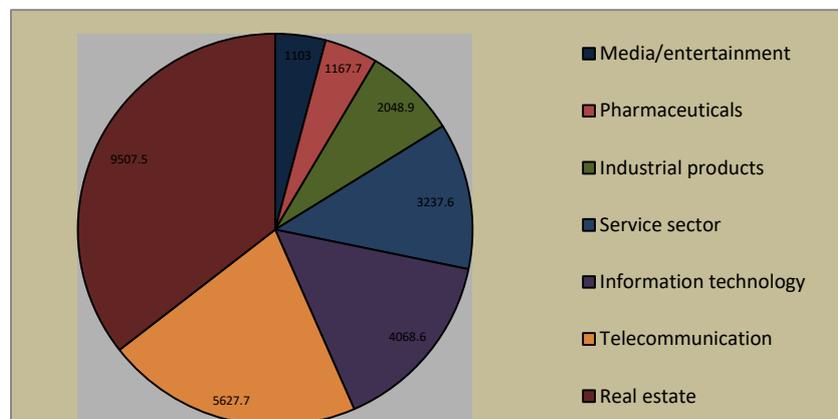
**Table 1: Showing Descriptive analysis of the variables considered for study**

	N	Mean	Std. Deviation
VC investment	10	52,132.40	18,430.63
GDP	10	83,64,088.32	33,92,545.38
Number of firms started	10	2,58,119.30	88,495.94
Employment	10	1,000.21	142.57
Exports of goods and services	10	19,29,412.00	7,71,940.69
Patent	10	39,414.60	5,504.07
Capital formation	10	26,92,441.64	13,14,171.17
R & D	6	51,457.17	14,286.01

Author’s calculations

The above table 1, is a summary, which describes the basic features (Mean and Std deviation) of the parameters in a study.

**Figure 2: Average investment of VC on different sectors.**



Authors’ calculations

The above figure 2, shows the major Sector of venture capital investment is on Real estate which stood high at Rs 9,507.5 crores, followed by investment of Rs 5,627.7 crores in telecommunication, Rs 4,068.6 crore in Information technology. Other sectors which received high investment are service sector, Industrial products and so on. These are the sectors of the economy which contribute to the capital formation leading to economic development.

**Table 2: Pearson Correlation matrix**

Variables	Independent variable						
	VC	Number of firms started	Employment	Exports of goods and services	Patent	Capital formation	R & D
VC	1.000	0.801	0.948	0.955	0.933	0.779	0.967
Number of firms started	0.801	1.000	0.720	0.841	0.653	0.669	0.997
Employment	0.948	0.720	1.000	0.964	0.908	0.85	0.997
Exports of goods and services	0.955	0.841	0.964	1.000	0.908	0.886	0.983
Patent	0.933	0.653	0.908	0.908	1.000	0.872	0.907
Capital formation	0.779	0.669	0.850	0.886	0.872	1.000	0.547
R & D	0.967	0.997	0.997	0.983	0.907	0.547	1.000

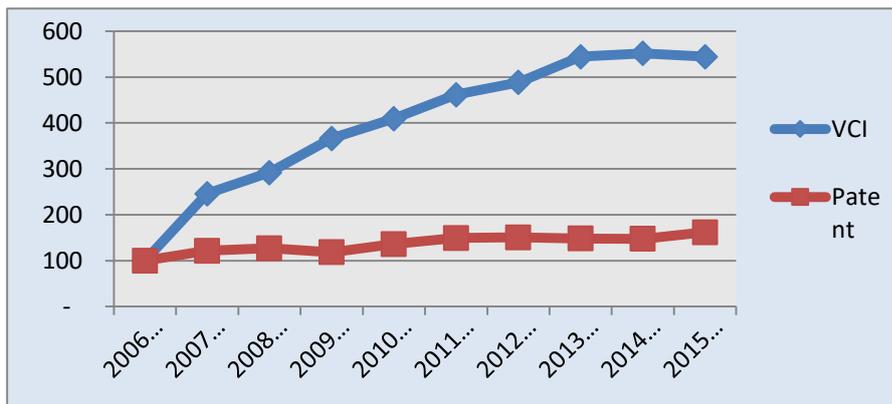
**Authors Calculation**

We analysed reliance between variations in VC investment and variations in other variables (Number of firms started, Employment, Exports of goods and services, Patent, Capital formation and R & D) with pair correlations. We found positive correlation among the variables chosen for the study (see table 2).

**5.1 VC supports innovation**

We set out an analysis to provide the evidence for, innovation as driver of Indian economic growth. We took different routes to verify correlation between VCI and innovation. First we normalised VCI and Patent for analysing the impact of VC on innovation. Second route used to analyse innovation effect on economic development is R & D.

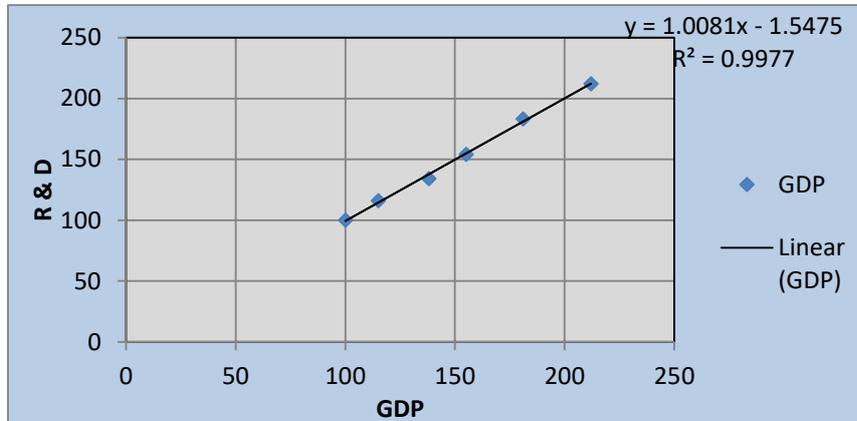
**Figure 3: VCI and Patent normalized**



Authors Calculation

In the findings of our analysis of normalized VCI and patent (see figure 3), we can notice that the waves of both VCI and patent is having an increased trend. But the trend of patent increase is very slow. In addition to patent promotion VC also provide funds for R&D and helps firms to prioritise their innovation efforts. So study analysed innovation effect on economic development through R & D.

**Figure 4: R & D investment and Economic recovery**



Authors Calculation

The above Plot (figure 4) shows that the relationship between GDP and R & D are highly correlated. Here we have considered GDP, as it is an economic indicator. We can also notice, values are increasing together, proving they are positively correlated. We have an equation  $y = 1.008x - 1.547$ ,  $R^2 = 0.997$ . In general, R & D activities reduce financial risks of investors (VC) and improve innovation tempo. It insures new product to the market, leading to development of economy as a whole.

**Table 3: Summary of Linear regression analysis of patent and R & D**

Variables	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin-Watson	F	Sig (p - value)	B	Beta	t
Patent	.933a	0.871	0.855	1.904	F(1,8) = 54.164	.000b	3.126	0.933	7.36
R & D	.967a	0.936	0.92	1.695	F(1,4) = 58.184	.002b	1.031	0.967	7.628

a. Predictors: (Constant), Patent and R & D

b. Dependent Variable: VC investment

Authors Calculation

**Patent:** Regression analysis of VCI and patent found (see table 3), R accounts for 93 % of the variance of VC investment. As the p- value (sig) is less than alpha, regression model was significant. Here we have  $F(1, 8) = 54.164$ ,  $p < .001$ ,  $R^2 = 0.871$ . Durbin- Watson shows 1.904, which means that there is a positive autocorrelation between VC and Patent. From the above analysis the study interpret Venture capital investment bring more patent, ultimately contributes to innovation.

**R & D:** A regression analysis of variance is made for R & D and VCI, and we found R account for 97% of the variance of Venture capital investment. As the p- value (sig) is less than .05, ( $p = .002$ ) regression model was significant. Here we have  $F(1, 4) = 58.184$ ,  $p = .002$ ,  $R^2 = 0.936$ . The Regression coefficient (b) is very low. Durbin- Watson shows 1.695, which means that there is a positive autocorrelation of VC and R & D.

We cannot be conclusive about the cause and effect relation, but we can sketch rough conclusions based on obtained proof which signify that there is an intense correlation between innovation and VC activity. In this part, study narrates the routes through which VC push innovation, which is crucial for promoting economic growth in India.

### 5.2 VC and Efficiency:

Given improvement in efficiency leads to economic growth. To verify relation between VCI and efficiency we considered the two main productivity indicators; employment and capital formation. VC investment generates employment opportunity in all sectors. In our study MSME data alone is considered for the analysis due to two reasons, one we assume venture capitalist invest in start-ups and new ventures. And the other reasons is lack of data on employment in other fields. As per Economic survey (2016-17) there is a lack of reliable estimates on employment in India. It poses a great challenge in terms of its structure which is dominated by informal, unorganised and seasonal workers, under employment, skill shortages.

**Table 4: Summary of Linear regression analysis of Employment and capital formation**

Variables	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin-Watson	F	Sig (p - value)	B	Beta	t
Employment	.948a	0.900	0.887	0.683	F(1,8) = 71.664	.000b	122.615	0.948	8.465
Capital formation	.779a	0.607	0.557	1.233	F(1,8) = 12.334	.008b	0.011	0.779	3.512

a. Predictors: (Constant), Employment, Capital formation

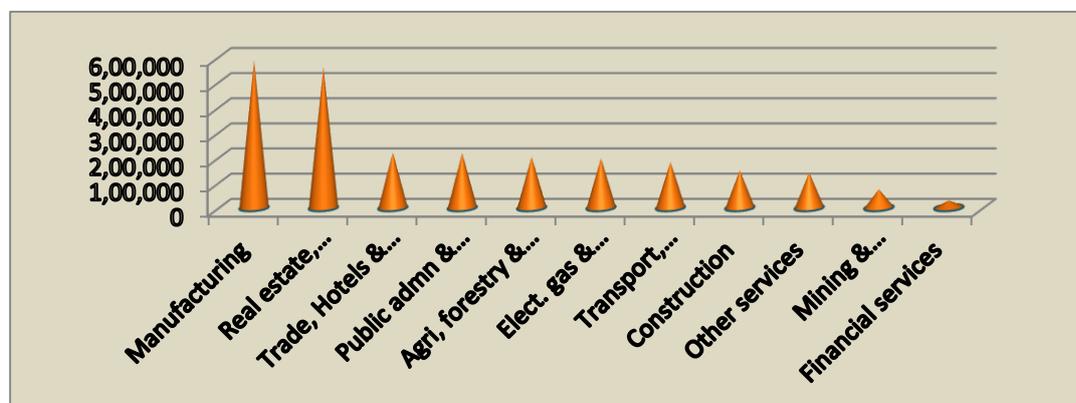
b. Dependent Variable: VC investment

Authors Calculation

**Employment:** While comparing the relation of VCI and Employment with a help of regression analysis, study found (see table 4) R<sup>2</sup> account for 90% of the variance of VC investment. As the p-value (sig) is less than alpha, regression model was significant. Here we have F (1, 8) = 71.664, p<.001, R<sup>2</sup> =.900, this is obvious because the employment generation capacity of the firm increases with growth and expansion of business with the funds provided by Venture Capitalist. The Regression coefficient stood at 122.615 this shows there is adequate effect of VC investment on Employment. Durbin- Watson shows 0.683, which means that there is a high positive autocorrelation between VC and Employment generation.

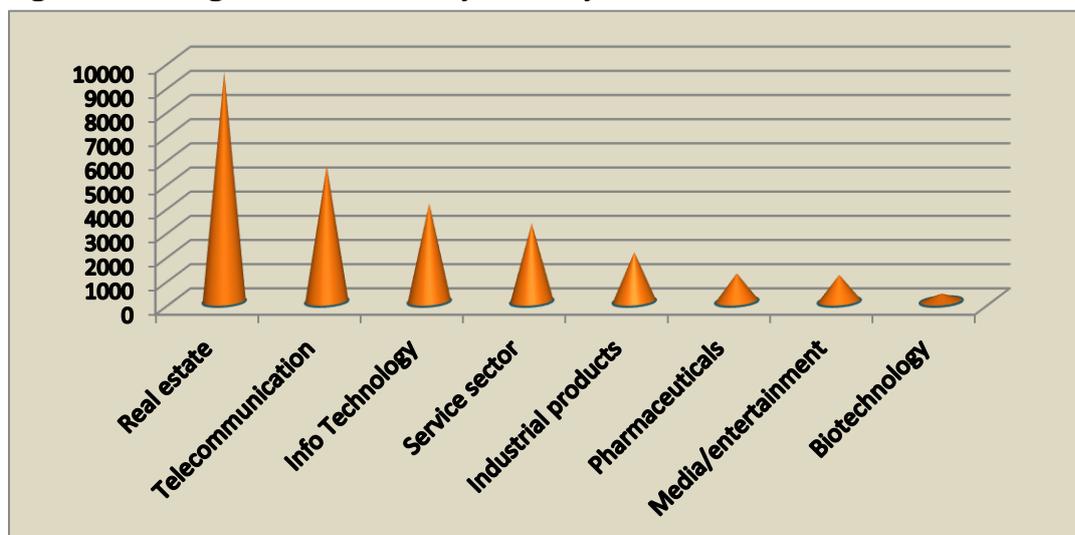
**Capital formation:** A regression analysis of variance is made for Capital formation and VCI, and we found R account for 78% of the variance of Venture capital investment. As the p- value (sig) is less than .05, (p= .008) regression model was significant. Here we have F (1, 8) = 12.334, p=.008, R<sup>2</sup> =.607. The Regression coefficient (b) is very low. It shows inadequate effect of VC investment on capital formation. Durbin- Watson shows 1.704, which means that there is a positive autocorrelation between VC and capital formation

**Figure 5: Average Capital formation by industry**



Sources: Ministry of statistics and Programme implementation

**Figure 6: Average VC investment by industry**



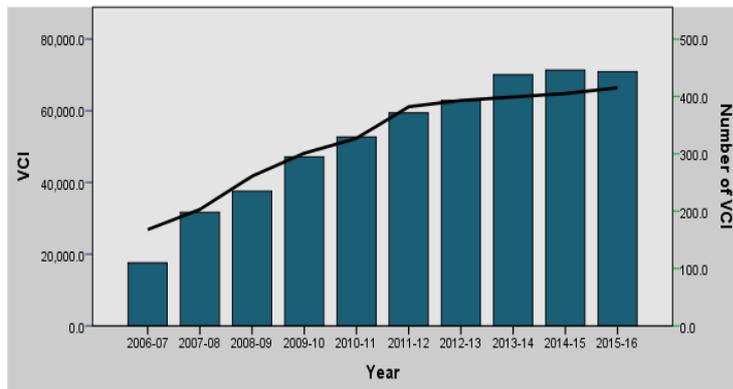
Sources: SEBI statistics

Figure 6 shows total VCI by sector in India between 2006 and 2016 as recognised by SEBI. As it appear in the figure, five of the top eight sectors invested by VC (Real estate, Telecommunication, Info Technology, Service sector, Industrial products) are sectors that incline to be capital intensive. These five sectors contribute for more than 70% of total VCI in India. Given the higher ratio of VCI in these sectors of the economy, we can theorize that VCI have impact on improving efficiency via extended investment in physical capital. Likewise, as shown in Figure 5, Sectors that receive higher levels of VCI tend to be sectors (Manufacturing, Real estate, Dwelling and professional Services, Trade, Hotels & restaurants, Public administration & Defence, Agriculture, forestry & fishing, Elect. gas & Water supply, Transport, Communication & storage, Construction, Other services) that experience proportionately the highest ratio of gross capital formation. These sectors accounts for more than 60% of total Capital formation in India

### 5.3 VC and Competitive Capacity

Improvement in yield of VC invested company either through innovation or increased efficiency, it further convert into economic growth. This influence on other factors of economic growth such as competitive capacity of the economy. Competitive capacity can be assessed with the availability of venture capital funding, because expansion and diversification of business depends on availability of funds.

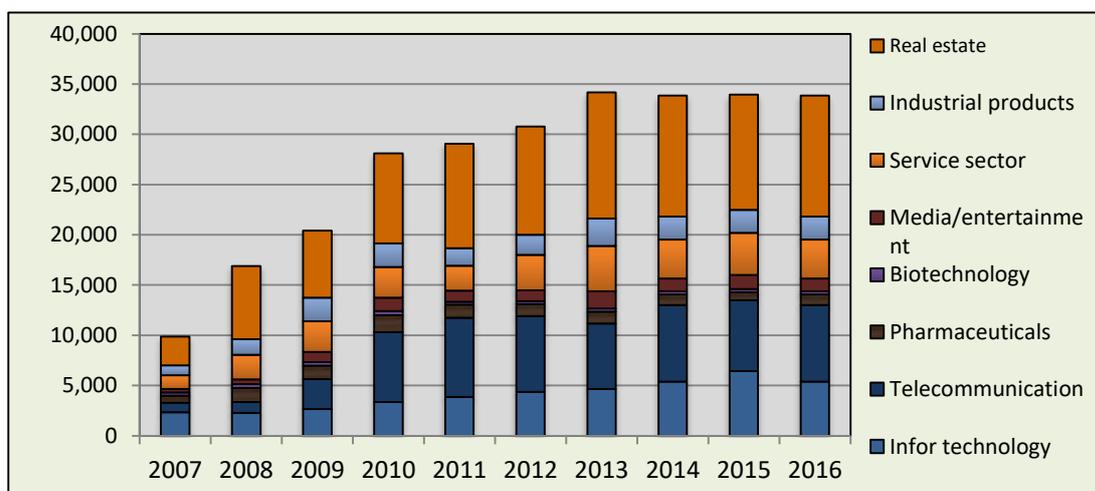
**Figure 7: VC by value of investment and the number of VC Fund registered in India**



Sources: SEBI statistics

The spread of the sectors that received VC investment, by size of the investment, is shown in figure 7. We can notice that there is increase of VCI and VC fund registered. Around 415 VC funds are registered and invested around Rs 70,903 crores in different sectors of the economy. With this we can infer VCI aids in internationalising firms, in turn contributing to economic growth.

**Figure 7: Top eight sectors of VCI by value of investments in India from 2006–16**



Sources: SEBI statistics

The sectors which attracts more VCI are listed by SEBI is considered for analysis. We can notice the main sectors are real estate followed by telecommunication, information technology and other service sectors. By developing these sectors VC industry is contributing for economic development. To verify relation between VCI and efficiency we considered the two main competitive capacity indicators other than availability of risky Funds; internationalising business (especially by Export) and formation of new business

**Table 5: Summary of Linear regression analysis of Number of firms started and Exports**

Variables	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin-Watson	F	Sig (p - value)	B	Beta	t
Number of firms started	.801a	0.642	0.598	1.303	F(1,8) = 14.363	.005b	0.167	0.801	3.79
Exports of goods and services	.955a	0.913	0.902	1.081	F(1,8) = 83.909	.000b	0.023	0.955	9.16

a. Predictors: (Constant), Number of firms started, Exports of goods and services

b. Dependent Variable: VC investment

Authors Calculation

**Exports of goods and services:** A result of regression analysis of VCI (Dependent Variable) and Exports of goods and services (independent variable) shows (see table 5), R accounts for 76% of the variance of Venture capital investment. As the p- value (sig) is less than .05, regression model was significant. Here we have  $F(1, 8) = 83.909$ ,  $p < .000$ ,  $R^2 = .913$ . The Regression coefficient (b) is very low. It shows inadequate effect of VC investment on exports of goods and services. Durbin-Watson shows 1.081, which means that there is a positive autocorrelation between VC and exports of goods and services. Thus we can interpret that the financial hurdle and human capital short fall can be solved by VC investment.

**Number of firms started:** The study considered formation of new business as a criteria for measuring competitive capacity based on the on the impression that sufficient funds availability leads to creation of new business. To be specific VC provides funds for riskier ventures. We used linear regression analysis for comparing the relation among VCI and Number of firm started, we found (see table 5) R<sup>2</sup> account for 64% of the variance of VC investment. As the p- value is .005, which is less than alpha, hence regression model was significant. Here we have  $F(1, 8) = 14.363$ ,  $p = .005$ ,  $R^2 = .642$ . Durbin- Watson shows 1.303, which means that there is a high positive autocorrelation between VC and number of firm started. This analysis help us to accept that there is indirect effect of venture capital on the formation of new business. With this we can infer that entrepreneurs anticipate the funds availability in the form of VC and would invest in the new business ideas. This also motivates the youngsters to form a new business. This will contribute to the growth of related industries.

## 6 Conclusion

In the analysis of the links between VC and economic growth we found positive result of VC activity. Our study noticed VC foster innovation and patenting in a successful way. This is possible as VCI supports and promotes R & D. Thus this elevates economic development through innovation. Our

second key finding of the study gives evidence of the extent VC can enhance the efficiency of the business they invest, which is directly related to economic growth. The higher ratio of VCI in some of the important sectors of the economy, has its impact on improving efficiency via extended investment in physical capital adding to capital formation and also creating employment opportunities. Enhancements in efficiency of business can lead to increased competitive capacity of the economy as a whole. It helps invested business to trade at domestic and international levels in the form of export. Similarly, VCI create new business. Improved competitive capacity of the economy contributes for economic growth.

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