

R&D Cost-An indicator of risk appetite for innovation

Are Indian IT software companies doing enough?

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Abstract

Purpose – The aim of this study is to identify whether Indian IT software companies are innovative. Are they taking enough risk to build new product of their own? Research and development expenses are one such indicator to know the risk appetite for being innovative.

Design/methodology/approach – This paper proposes study of ten year data of Five well know Indian IT software companies. Study limited to their Research and Development expenses and their total revenue. Regression analysis performed to know the depth of R&D expenses on the total revenue, as well as find the predictive model that fit the existing numbers. Also effort are made to compare it with the five IT software companies from other geography (i.e U.S)

Finding – This paper purpose was to find if IT software companies are taking risk to be innovative. It seems that Indian IT software companies are not spending enough compared to their peers from U.S. Most of the big IT software companies are from U.S, they are almost spending 10 times in R&D activities compared to Indian IT software companies.

Originality/value – Comparison performed in the study will allow Indian IT software companies to recognize that they are lagging in R&D investment. R&D is one of the key Pointer of risk affordability.

Keyword – Software, Regression analysis, Innovation

Paper Type- Research paper

1. Introduction

Management of innovation and investment by business today should be look upon as significant focus by the management in varied processes ,intended at implementing scientific and technical developments and innovative way to develop innovative products and improve its quality relative to competitors in the international market. The ability to create products that serve genuine customer needs is the foundation for successful innovation. In addition to making products people want, companies also need to develop good business models to support those products. Their work here is to figure out whether they can create and deliver customer value in a manner that is sustainably profitable.

A organization's expenditure on innovation activities, including R&D, yields new knowledge,practices and products that eventually add to its sales growth (Ahn et al., 2018;Xia and Roper, 2016; Schimke and Brenner, 2014).

2. Literature Review

Financial resources is a factor of competitive lead even though they are not unique or difficult to replicate.Firms with better financial resources can take advantage of new opportunities and are equipped to respond to threats business threats. Firms with

financial resources are therefore have the “access” to put into areas that can increase firms innovation capabilities. Santoro and Chakrabarti (2002) show that firms that are at good financial position can invest more in areas that will help them to create new products. As per (Gassmann and von Zedtwitz, 2003; Wischnevsky and Damanpour, 2005) firm innovation also indicate that organizations with greater financial resources invest more in innovative activities, because they can afford to take more risk and can absorb the cost of failure more easily . Financial resources mean more innovation because more financial resources mean more flexibility to experiment with new ideas, bringing in more and better qualified people to generate ideas, supporting more customer surveys, and more prototype testing which are all potentially draining financial resources. When the firm has more financial resources, it will have more leverage to put money into areas that in the short run potentially extract resources, such as innovation.

Firms' ability to innovate can play an important role in maintaining their competitive advantage, improving their performance or even ensuring their survival in a highly dynamic and uncertain market. In recent decades, there has been growing interest among scholars in deepening the understanding of the effects of innovation activities on firm performance (Audretsch et al., 2014; Hashi and Stojčić, 2013). To empirically test, this relationship Tidd (2001)

proposed some proxies. In the case of firm performance, he cited market value, profitability, return on investment and stock price, as well as market share and growth metrics. As for firm-level innovation, he suggested the use of indicators such as R&D spending, number of patents, introduction of new products and the proportion of employees dedicated to innovation activities.

3. Research Methodology

To make comparisons, we selected five well IT software companies from India as well as United States. Studied their last 10 years financial number (Research and Development expenses, Total revenue).

3.1 Investment trend of Indian IT companies and US companies

Investment feeds innovation, so here effort are made to find the investment made by Indian IT companies and other world companies. Total there are 10 companies ,5 from India and remaining 5 from Unites States. Revenue is collective reflection of all the innovative activities that are going within the organization.

Table 1. Five Indian IT companies and Five US companies for study

Indian IT companies	US IT companies
Infosys	Microsoft Corp
WIPRO	Adobe Systems,Inc
HCL Technologies	Oracle Corp
TCS	Salesforce
Tech Mahindra	IBM Corp

Research and development Investment – Pointer of risk affordability

Research and development (R&D) is imperious to tolerate competition, forces of disruption and obsolescence. R&D initiatives provide an edge of innovation to corporates for their products and services. R&D investments (expences in Profit and Loss statement) by organization is one way to measure the risk taking ability.Study has been made on five good IT companies from India (Infosys,WIPRO,HCL technologies,TCS and Tech-Mahindra).

Table2. Table of Indian IT companies and their R&D expenses relative to revenue for ten years (2012-2021)

Indian IT companies	R&D Investment (a)(In Crore Rs)	Total Revenue (b) (In Crore	% (a/b)
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		Rs)	
Infosys	7843	572939	1.4
WIPRO	3046	508264	0.6
HCL Technologies	2086	249629	0.5
TCS	12385	1105645	1.1
Tech Mahindra	115	249629	0.05

Source: Number are taken from annual report of respective company from their website

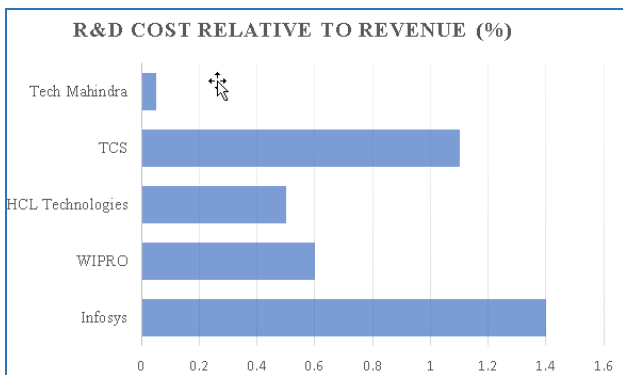


Figure-1 : R&D spending (percentage) relative to total revenue by Indian IT majors

Out of these major IT organizations from India, we see that Infosys has been contributing around 1.4 % of revenue in Research and Development activities that is highest among all. Infosys has been investing to develop and deploy new offerings leveraging next-generation

technologies. They have invested extensively in infrastructure and systems to enable learning and education across the enterprise at scale. These give them the ability to keep pace with ever-changing technology and how they apply to customer requirement.

On the other side Tech Mahindra has been spending only 0.05% of revenue on research and development, that is lowest among all. Tech Mahindra recently recognized need of taking risk in building new product powered by new technology. R&D is all about taking risk today for securing coming future. Indian IT companies traditionally been like contractor who execute IT project coming from overseas client. Most of the spending into building new infrastructure, process has been part of client planning and risk and funded by them. That's why we see R&D spending has been low as they don't own product. How many well know IT product in different domain are owned by Indian IT companies. The answer is negligible!.

Table3. Combined data(R&D expenses as % of total revenue) of all the five companies (Indian IT companies and US IT companies)

year	For Indian IT companies	For US IT companies)

2012	7.49	9.77
2013	6.78	10.06
2014	5.71	10.39
2015	5.39	10.93
2016	4.96	11.88
2017	4.77	12.23
2018	5.21	11.75
2019	5.13	12.25
2020	5.44	13.56
2021	5.52	13.07

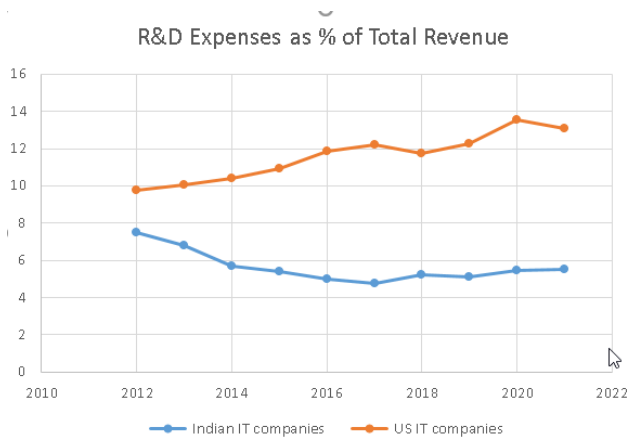


Figure-2 : R&D spending (%) relative to total revenue by Indian IT majors and US IT majors

3.2 Predictive analysis of relationship between R&D expenses and Total Revenue for Indian and US IT companies

Regression Analysis is performed to study dependence relationship between R&D expenses and annual revenue of firms. Combined data for Annual revenue and R&D cost for year from 2012 to 2021 was considered for the predicative analysis of the 5 US and 5 Indian IT companies under study. Amount of R&D expenses is the predictive variable and Annual revenue is the outcome variable. Linear, Quadratic and Cubic relationships are explored to study the nature of relationships between the above mentioned variables. In regression analysis, the P-values and coefficients work together to study, which all relationships are statistically significant in the model and their nature. The coefficients describe the mathematical relationship between each independent variable and the dependent variable. The p-values for the coefficients indicate whether these relationships are statistically significant. Predictive Analysis is performed using IBM SPSS version 21.

Table 4: Statistical Summary of Regression Analysis to Study Dependence Relationship between R&D expense (RE) and Total Revenue (TR) of Indian IT companies

Equation	Model Summary			Parameter Estimates			
	R	F	Sig.	Constant	b1	b2	b3
Linear	0.922	94.029	0.000	-39571.104	20.794	-	-

R Square is the coefficient of determination . It is a measure of strength of the regression model. R Square has range between 0-1. Value close to 1 indicate a strong and considerable model.

R&D expenses can explain 92.2 % of the variance of the dependent variable total revenue.



Figure-3: Curve fitting using regression analysis for Indian IT companies

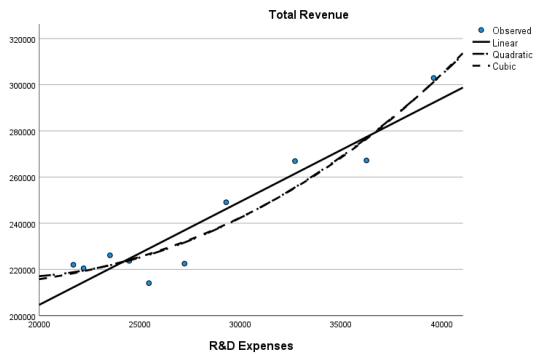
Linear Equation for total revenue from above model

Total revenue (TR) = -39571.104 + 20.74* (R&D Expenses)

Table 5: Statistical Summary of Regression Analysis to Study Dependence Relationship between R&D expense (RE) and Total Revenue (TR) of US IT companies

Equation	Model Summary			Parameter Estimates			
	R	F	Sig.	Constant	b1	b2	b3
Linear	0.888	63.618	0.000	115237.597	4.472	-	-

R&D expenses can explain 88.2 % of the variance of the dependent variable total revenue



Linear Equation for total revenue from above model

$$\text{Total revenue (TR)} = 11524 + 4.47 * (\text{R\&D Expenses})$$

4. Result

For both Indian and US IT companies ,R&D expenses has positive impact on total revenue.below table gives summary of result and observation. Indian IT companies are risk averse due to their business model.They are contractor who are executing It projects.

Table 6:Tale of Summary of observation form study

Parameter	Indian IT Companies	US IT Companies	Comment
R&D investment to Total revenue as	Range from 0.05% to 1.4 %	7% to 17%	US companies are spending almost 10x-15x than

percentage			Indian peers
R&D expenses Influence on Total Revenue	Moderate	Higher	R&D investment has more contribution in total revenue for US companies
Risk Taking Ability	Low	High	Indian IT companies are contractors executing IT project and earning revenue. Low Motivation for risk.
Status	Follower	Leading	US companies are leading new technology
IP ownership	Low	High	Majority of the Product

			Patent filling are coming from US companies.
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