

CHAPTER FOUR

IMPACT OF INTELLECTUAL CAPITAL ON FINANCIAL PERFORMANCE OF SELECT LISTED INDIAN COMPANIES – CASE STUDY ANALYSIS

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4.1 Introduction

The present research endeavor has been carried with an intention to gauge the relationship between Intellectual Capital and financial performance of the select listed Indian firms. The second chapter reviewed research studies carried out by different researchers, professionals and social scientists in the field of Intellectual Capital across the globe, summarizing and revealing the relationship of intellectual capital with financial performance of the organisation. Different variables applicable to different research studies in valuation of intellectual capital have been identified in the literature review. It has been found that almost all researchers have considered Value Added Intellectual Co-efficient (VAICTM) to gauge the relationship of intellectual capital with financial performance with a few considering Calculated Intangible Value (CIV) and Knowledge Capital Earning (KCE). The outcome of literature review is that majority of the researchers have adopted VACITM model, few have adopted another methods of measurement, still, none of the methods are universally accepted due to the limitations of each methods, motivating the researcher to identify a model considering variables for valuation of Intellectual Capital, measuring intellectual capital and gauging relationship with financial performance. this

chapter has identified the variables for valuation of intellectual capital, developed the model and analysed its impact on financial performance deriving meaningful relationship.

The chapter has been divided into three parts, section one deals with finding out the impact of intellectual capital value using Value Added Intellectual Co-efficient (VAICTM) model on financial performance and studying the relationship with the financial performance variables:

1. Gross Value Added
2. Economic Value Added
3. Net Value Added
4. Market Capitalisation

Section two deals with framing the new model considering variables:

1. Employee Expenses
2. Managerial Remunerations

-and studying efficiency and effectiveness of proposed model using the financial performance variables. Section three compares the results of impact of Value Added Intellectual Co-efficient(VAICTM) and proposed model with financial performance recommending the better model of the two for quantification of Intellectual Capital.

Researcher has adopted case study approach to have the practical and real reflections of relationships between intellectual capital and financial performance. For case study purpose, two companies of manufacturing sector as well as service sector from the Nifty 50 listed companies have been considered.

✓ **Two manufacturing sector companies are:**

- **Associated Cement Companies Limited (ACC Ltd)**
- **Hindustan Unilever Limited (HUL Ltd)**

and

✓ **Two Service sector companies are:**

- **Infosys Ltd.**
- **Tata Consultancy Services Limited (TCS Ltd)**

Annual reports for fifteen years of all these four companies have been collected and required data has been procured, calculated and compiled for analysis.

Hypothesis has been framed to achieve the objective, by raising the following research questions

-

1) Does Intellectual Capital influence Financial Performance of the Indian Firms?

Addressing the above research question, a set of testable hypotheses has been proposed concerning the efficiencies of Intellectual capital and their effect on financial performance of companies. To measure the financial performance of the companies, different indicators have been discussed earlier. Some of those variables have been considered in previous study like Economic Value Added (EVA) and Market Capitalisation, while Gross Value Added (GVA) and Net Value Added (NVA) have been the new variables for present study.

The first section has been studied to measure the influence of Intellectual Capital (VAICTM) on financial performance by proposing the following hypothesis:

H1: Intellectual Capital (VAICTM) of a firm is positively related to its financial performance (Economic Value Added (EVA)).

H2: Intellectual Capital (VAICTM) of a firm is positively related to its financial performance (Gross Value Added (GVA)).

H3: Intellectual Capital (VAICTM) of a firm is positively related to its financial performance (Market Capitalisation (MCap)).

H4: Intellectual Capital (VAICTM) of a firm is positively related to its financial performance (Net Value Added (NVA)).

The above four hypotheses have been applied to all the four companies separately measuring the relationship between VAICTM and its components Intellectual Capital Efficiency (ICE) and Capital Employed Efficiency (CEE) on dependent variables namely EVA, GVA, NVA and Market Capitalizations by applying Pearson's correlation and simple and multiple regression.

Empirical investigation of the hypotheses has been carried out by framing following regression equation on VAICTM model and testing hypotheses H1, H2, H3 and H4 are:

$$\text{Performance (EVA; GVA; NVA; MCap)} = \alpha_i + \beta_i (\text{Value Added Intellectual Co-efficient}) + \epsilon_i$$

(where i = 1,2,3,4)

Where, i stands for performance parameter.

The components of VAICTM have been considered to frame another equation for testing the individual component impacts, as follows:

$$\text{Performance (EVA; GVA; NVA; MCap)} = \alpha(i, j) + \beta(i) (\text{Intellectual Capital Efficiency})$$

$$+ \beta(j) (\text{Capital Employed Efficiency}) + \varepsilon(i, j) \\ (i = 1, 2, 3; j = 1, 2, 3)$$

Where, i stands for Intellectual Capital Efficiency (ICE) ;

j stands for Capital Employed Efficiency (CEE)

Generally, in Linear regression model:

α stands for Intercept or constant term

B stands for Regression Coefficient of the independent term

ε stands for Residual or error term

4.2 VALUE ADDED INTELLECTUAL CO-EFFICIENT (VAIC™) MODEL

Value Added Intellectual Co-efficient (VAIC™) model had been proposed by Pulic 1993 (Pulic, 2004). It has measured the efficiency of Intellectual Capital and its components by using accounting data of the firm. In VAIC™, two components of Intellectual Capital has been envisioned – Human Capital and Structural Capital. Addition to it, efficiency of physical and financial capital of the firm have been estimated by considering capital employed in the model (VAIC™). In the model of VAIC™, ‘Value Added’ has been used as a benchmark and considered as the success of an entity. This indicator has been estimated as follows:

Value Addition = Net Operating Profit after tax + Employee benefit expenses
+ Depreciation + Amortization + Current Tax

The same method has been provided by Pulic (2000), where he had been talking about Operating profit. Researcher has already calculated Net Operating Profit After Tax for calculation of Economic value Added. To arrive at Value Addition as discussed above researcher has adjusted Net Operating Profit after tax and added back non-cash items as mentioned above have been considered as expenses, they are Depreciation and tax provisions, while Employee Benefit expenses have been added back with the reason that employee expenses have no more to be considered as an bought out expense and so they are the part of value addition to the firm, hence, that expenses are added back to Net operating profit..

Prior to Pulic, Return on Intellectual Capital has been considered as excess of profit earned by business over expected profit of the industry. Earnings above return of the industry has been the result of intellectual capital and so termed as Intellectual capital, considering paradigm shift from industry age to service age. Pulic, has suggested the modification in the calculation of profit or

return earned by intellectual capital. Total value addition has been the result of Intellectual Capital. A formula given by Pulic is:

Value Added = Operating Profit + Employee Cost + Depreciation + Amortisation.

Value Added has been the income earned before the contribution by tangible resources as well as tax liabilities, so depreciation and amortization have been added back and employee expenses have been no longer as revenue expenditure, so it has been added back. Labours have an active role in value creation, they should not be recognized as a cost, so they have been added back to operating profit. Employee cost has been considered as human capital (L. Edvinsson & Malone, 1997a) (Leif Edvinsson as cited by Gogan, 2014) and (K. E. Sveiby, 1997), resulting into employee remuneration and payroll as a proxy of Human Capital.

Leif Edvinsson, 'Intellectual Capital is a combination of Human Capital and Structural Capital' (Leif Edvinsson as cited by Pulic, 2000), Structural capital has been derived from the same equation. It has been the difference between Value Added and Human Capital. The same has been considered by Pulic. Value Added has been the profit earned by the total resources of the company including tangible and intangible resources owned by the organisation including human resources. Structural capital has been another intangible resource owned by the firm measured by the difference between Value Added and Human Capital.

Value Added (VA) = Human Capital (HC) + Structural Capital (SC).

Structural Capital (SC) = Value Added (VA) – Human Capital (HC)

Value Added has been the addition in value of the organisation due to the resources of the organisation, the resources include physical and intangible resources. Intangible resources have been considered as intellectual capital, the combination of Human Capital and Structural Capital and physical resources has been considered under capital employed of the organisation.

Capital Employed has been the total long-term fund utilised in the organisation and has been calculated by taking the average of opening and closing balance of capital employed.

Capital Employed = Shareholder's Fund + Non-current Liabilities.

Value Added has been the total value creation by all the resources. Value creation efficiency has been - how well these resources are managed by tangible and intangible resources and how they are measured with the help of VAICTM model?

$$\text{VAIC}^{\text{TM}} = \text{HCE} + \text{SCE} + \text{CEE} \quad (1)$$

Here Human Capital Efficiency (HCE) = Value Added / Human Capital

Where, Human Capital = Employee cost recorded under Employee Benefit Expenses.

The ratio of HCE has indicated the proportion of value added against one rupee of amount spent on human resources. This shows the contribution of human resources in generating value for the organisation.

Here, Structural Capital Efficiency (SCE) = Structural Capital / Value Added

Where Structural Capital = Value Added – Human Capital

Human Capital and structural capital are inversely related, that means when human capital is more structural capital will be less and vice versa. Hence, in structural capital efficiency, structural capital has been considered in numerator and value added in denominator. The efficiency formula has suggested the share of structural capital in value addition of the company.

Here, Capital employed efficiency (CEE) = Value Added / Capital Employed

Capital employed efficiency (CEE) has been considered to get full insight of value creating efficiency of all the physical and financial resources which have been employed in the firm. Efficiency ratio has suggested what value has been generated against one rupee invested in the long-term capital of the firm.

VAICTM has been the value created against one rupee invested by the firm in its tangible physical, financial and intellectual resources of the firm.

That shows the direct relation of efficiency with value creation or addition; higher the co-efficiency, higher the value creation by a particular resource (Pulic, 2008). Further, if the company wants to know only the efficiency of knowledge workers (Intellects) the another term named Intellectual Capital Efficiency (ICE) has been calculated. ICE is the summation of the efficiencies of Human Capital and Structural Capital.

ICE = HCE + SCE.....(2)

The VAICTM has been modified as

VAICTM = ICE + CEE.....(3)

VAICTM is the value added for every monetary unit invested in these resources. Value Added has been one of the distinguished features of efficiency models (Iazzolino and Laise, 2013), Firer and Williams (2003) enhanced this concept and compared it to other financial returns, arriving at the conclusion that Value Added is the better way of assessing the firm's performance (Firer and Williams, 2003). This emerged as the potential grounding to adopt VAICTM model for further

study with Value Added as a base for finding the efficiency of all the resources employed in the company. The same is presented in the below figure 4.1.

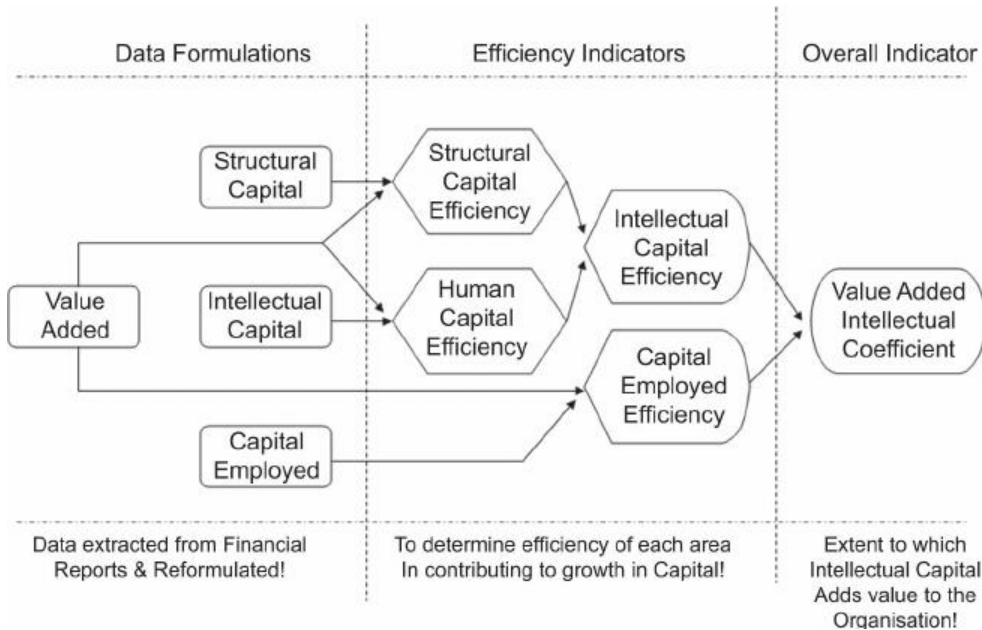


Figure 4.1 – Figure showing VAIC model from data formulations to overall indicators.

(Source: Laing, G., Dunn, J., & Hughes-Lucas, S. (2010))

As VAICTM has been the combined result of HCE, SCE and CEE these three components have been considered in calculation of Value Added Intellectual Coefficient(VAICTM), gauging the impact of each of these components on financial performance of the business. The present section of the study has been dealt with the application of correlation and regression analysis of VAIC and its components with financial indicators of the companies in terms of:

- **Economic value Added**
- **Market Capitalisation**
- **Gross Value Added**
- **Net Value Added**

-to gauge the relationship among them. The section has dealt with sector-wise, company wise data procurement, calculation and analysing separately for all variables including the company wise analysis.

➤ **Manufacturing Sector:** Researcher has adopted a case study approach in the present chapter and hence, each company of both the sectors has been studied separately. Researcher has collected the data for both the companies of Manufacturing sector separately and then collected

the data for both the of Service sector separately. Below is the collection of data of ACC Ltd. for VAIC model and later the same has been for HUL Ltd.

- ❖ **ACC Ltd:** The relationship between components of VAIC and VAIC with the performance indicators have been measured year wise for all the companies for 10 years from 2021-13 to 2021-22. ACC Ltd annual reports and financial statements have been prepared annually on calendar basis from 1st January to 31st December every year.

Table 4.1 shows calculated HCE, SCE, CEE, ICE and VAICTM of ACC Ltd.

Table 4.1

Table showing HCE, SCE, CEE, ICE and VAICTM of ACC Ltd

ACC Ltd.	HCE	SCE	CEE	ICE (HCE + SCE)	VAIC (HCE + SCE + CEE)
2012	4.717104	0.788006	0.382231	5.50511	5.887341
2013	4.084537	0.755174	0.351319	4.839711	5.19103
2014	3.673591	0.727787	0.341455	4.401378	4.742833
2015	3.091704	0.676554	0.28628	3.768258	4.054538
2016	2.897146	0.654833	0.26758	3.551979	3.819559
2017	3.326958	0.699425	0.300322	4.026383	4.326705
2018	3.339109	0.700519	0.296609	4.039628	4.336237
2019	4.066169	0.754068	0.319462	4.820238	5.1397
2020	4.093045	0.755683	0.284766	4.848728	5.133494
2021	4.655843	0.785216	0.289552	5.44106	5.730612
Average	3.794521	0.729727	0.311958	4.524247	4.836205

(Source: Calculated by Researcher)

Table no 4.1 represents Human Capital Efficiency, Structural Capital Efficiency, Capital Employed Efficiency, has been calculated for the period of study by considering the required information disclosed by a company in the published annual reports.

Human Capital Efficiency has been calculated by adding employee cost, depreciation and amortization to the operating profit as disclosed by Profit and Loss statement of the company.

In the first year of the study i.e. 2012-13, HCE has been calculated at 4.717104, progressively it decreased remarkably to 2.897146 in the year 2016-17 and again, it has been started increasing reaching 4.655843 by 2021-22. This has been due to a remarkable decrease in operating profit, over the years remarkable fluctuation in the amount of operating profit decreasing initially from 2012-13 to 2016-17 and again has started increasing. During the study period, the highest HCE was 4.1717104 in the first year and lowest was 2.89 in the year 2016-17. Even after increasing

from 2016-17, it reaches 4.65 in the year 2021-22, still, it has been lower than the first year of study, making it clear that ACC Ltd has passed through challenging times during the period of study and firm has made attempts to recover it.

Another important component in calculation of VAICTM has been Structural Capital Efficiency (SCE). In the first year of study i.e. 2012-13 SCE has been calculated at 0.788006, showing 78% shares in value addition, which progressively decreased to 0.654833 in the year 2016-17 showing 65% share in value addition due to increase in human cost resulting in decrease in SCE. SCE has shown a slight decline in the first half of the decade but remains relatively stable after 2016-17. This has thrown light that the company has been able to manage its shares of structural capital stable against value addition. The variation in value addition has been the result of the increase in the cost of employee and thereby increase in human capital while operating profit has not been increased in the same proportion. The stable share of structural capital has also been shown in the bar graph given below.

Intellectual Capital Efficiency (ICE), has been calculated by adding Human Capital Efficiency and Structural Capital Efficiency, this has shown the efficiency of knowledge workers of the company. Secondly, human capital and structural capital are the different components of Intellectual Capital; hence the efficiency of Intellectual Capital has been achieved by adding HCE and SCE. In the first year of study 2012-13, ICE has been calculated at 5.50511 showing efficiency of a knowledge worker against one rupee of value addition, progressively decreases to 3.551979 in the year 2016-17, value addition capacity decreases from 5.50 to 3.55 showing value destroyed by 1.5 times in these five years due to decrease in Value Added till this year. There has been an increase in ICE at 4.026383 from 2017-18 increased to 5.44106 in 2021-22, has indicated improved performance of knowledge workers of the company, primarily driven by the recovery in HCE as SCE remains stable for the year of study.

Intellectual Capital Efficiency (ICE) has been the combined result of Human Capital efficiency (HCE) and Structural Capital Efficiency (SCE). The analysis of HCE has revealed a remarkable decrease and has been struggling to reach the point where the journey started i.e. in 2012-13. HCE has decreased and has started increasing but, the ultimate result is, it decreased by 0.06 in 10 years. At the same time SCE has decreased during the period of study but, not substantially, and has revived to reach the level from where it started i.e. equal to 2012-13. Intellectual capital

efficiency is the result of human capital efficiency and structural capital efficiency. The result has summarized fluctuations in efficiencies as below:

Table No: 4.2
Year with Highest and Lowest of HCE, SCE and ICE

Year	HCE	SCE	ICE
2012-13	4.71	0.78	5.50
2016-17	2.89	0.65	3.55
2021-22	4.65	0.78	5.44

(Source: Compiled by Researcher)

Though ICE has been the results of both HCE and SCE, it has been influenced by HCE more than SCE.

Another important component in calculation of VAIC™ is Capital Employed Efficiency (CEE).

Value Added Intellectual Coefficient is the model developed to measure the efficiency of all the assets employed in the organisation, tangible, intangible assets and investments recorded in the books of accounts. Human capital efficiency and structural capital efficiency considers the efficiency of intellect employed in the organisation and which has not been disclosed as an assets in the books of accounts. To consider the assets recorded in the books, capital employed has been considered as another component of VAIC model other than Human Capital Efficiency and Structural Capital Efficiency. To verify the efficiency of the VAIC model the impact of capital employed on the financial results of the business. i.e. Value Addition has been carried out and the term given to this verification is Capital Employed Efficiency (CEE). Total long term investments, both in tangible as well as intangible resources in the name of capital employed have been assessed and the relationship of capital employed with financial outcome or value added by all the resources of the business i.e. Value Addition has been gauged. This process has been carried out with the following formula:

Capital employed Efficiency (CEE) = Value Added / Average Capital Employed

Here **Average Capital Employed =**

(Total Assets at the beginning of the year – Current Liabilities at the beginning of the year) +
(Total Assets at the end of the year – Current Liabilities at the end of the year) / 2

Table No: 4.3

Table showing Average Capital Employed of ACC Ltd for 10 years from 2012-13 to 2021-22 (Amount in Crores)

ACC Ltd.	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Average Capital Employed	7,625	7703	8048	8339	8552	9,099	9,947	11,024	12,091	13,445

(Source: Calculated by Researcher)

The above table has revealed the amount of capital employed i.e. total in long-term investment in the business during the period of study. In the first year of the study 2012-13 it has been Rs 7625 Cr. that has increased progressively. In the first year 2012-13, there has been long term debt amounted to Rs 85 Cr. It becomes zero from 2013-14 onwards. Thus, the increase in capital employed over the period has been the result of an increase in equity, which has increased every year with the addition of revenue profit. For the study, value addition has been considered as financial results or contribution by all the resources i.e. tangible and intangible and has been calculated by the following method:

Value Added = Net Operating Profit after Tax + Employee Cost + Depreciation + Amortisation + Current Year Tax.

Table No: 4.4

Table showing Value Addition of ACC Ltd from 2012-13 to 2021-22 (Amount in Cr.)

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Value Added	2,915	2706.21	- 2748.03	2387.29	2288.34	2,733	2,950	3,522	3,443	3,893

(Source: Calculated by Researcher)

Value Addition is Rs 2914 Cr. in the year 2012-13, which has been decreased to Rs 2706.21 Cr., in the year 2013-14, there has been decrease in Net Operating Profit After Tax and it has been increased to Rs 2748 Cr. due to increase in NOPAT in the year 2014-15. Progressively from 2015-16 till 2016-17, due to decrease in NOPAT, the Value Addition has been decreased to Rs 2288.24 Cr. From the year 2017-18, the company has regained revenue profit resulting in an increase in Value Addition from 2017-18 of Rs 2732Cr. to Rs 3898 Cr in the year 2021-22.

Further, the study has been dedicated to check the impact of capital employed on Value Addition and there by Capital Employed Efficiency which has been calculated for the period of study as presented in the following table.

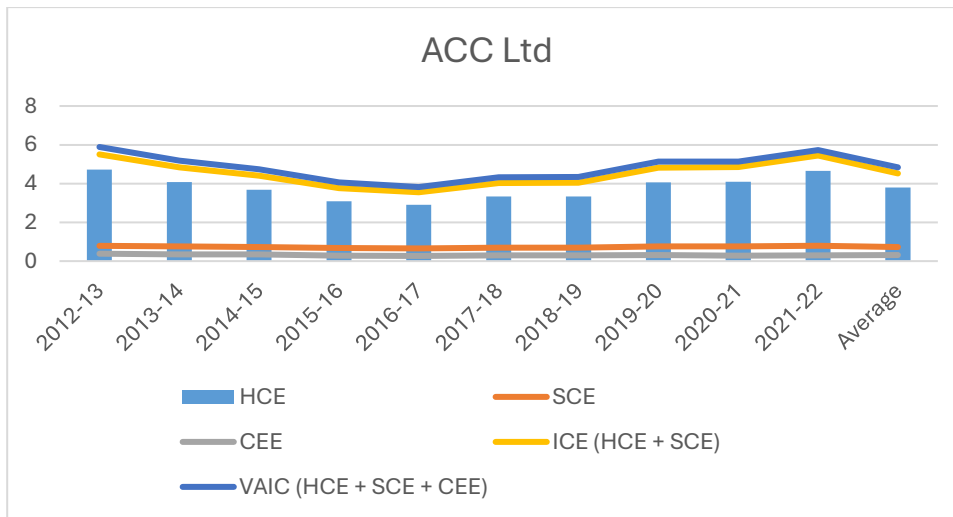
Table No: 4.5

Table Showing Capital Employed Efficiency of ACC Ltd

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
CEE	0.382231	0.351319	0.341455	0.28628	0.26758	0.300322	0.296609	0.319462	0.284766	0.289552

(Source: Calculated by Researcher)

CEE calculated at 0.382231 in the year 2012-13, has shown long term capital adds 0.38 against one rupee of capital employed, which progressively has decreased to 0.26758 in the year 2016-17. This decrease in efficiency has been due to a decrease in value addition and increase in long term capital of the company. From 2017-18, CEE has been improved marginally, indicating better utilization of capital employed but again has declined in the last two years of study where VA has been decreased and long term capital has increased due to addition of profit in reserve and surplus, results in decrease in CEE in the year 2021 – 22 to 0.289552.



Graph 4.1

Graph showing HCE, SCE, CEE, ICE and VAIC of ACC Ltd for the year of study.

VAIC™ has shown value addition of the company with its physical, financial and intellectual capital. In the first year 2012-13 it showed 5.887341 which progressively has decreased to 3.819559 in the year 2016-17 due to decline in HCE and CEE. The period from 2017-18 marked

a recovery phase, with VAIC reaching 5.730612 in 2021-22 from 4.326705 in 2017-18 due to increase in HCE, SCE and CEE till 2019-20. In the year 2020-21 CEE has decreased to 0.284766 from 0.319462, and HCE has increased to 4.093045 from 4.066169, resulting in slight decrease in VAIC from 5.1397 in the year 2019-20 to 5.1334 in the year 2020-21, while again it has regained to 5.7306 in the year 2021-22 due to increase in HCE to 4.6558 and CEE to 0.2895. This shows that the company has increased its value addition efficiency by increasing all human and fixed capital, but still not able to reach at the position which has been before a decade. It has been inferred that the company's future performance depends on its ability to maintain improvements in human and capital employed efficiency.

- ❖ **Hindustan Unilever Ltd. (HUL):** To measure the relationship between components of VAIC and VAIC with the performance indicators. The variable of HUL Ltd have been measured for 10 years from 2012-13 to 2021-22. HUL Ltd annual reports and financial statements have been prepared annually on financial year basis from 1st April to 31st March every year.

Table 4.6

Table showing HCE, SCE, CEE, ICE and VAICTM of HUL Ltd

HUL Ltd	HCE	SCE	ICE (HCE + SCE)	CEE	VAIC (HCE + SCE + CEE)
2012-13	4.452841	0.775424	5.228266	1.557342	6.785608
2013-14	4.389652	0.772192	5.161844	1.850578	7.012422
2014-15	5.000006	0.8	5.800007	1.819839	7.619845
2015-16	5.106789	0.804182	5.910971	1.435401	7.346372
2016-17	4.821011	0.792575	5.613585	1.441094	7.05468
2017-18	5.251638	0.809583	6.061221	1.580334	7.641556
2018-19	5.956476	0.832115	6.788591	1.674924	8.463515
2019-20	6.509368	0.846375	7.355743	1.639276	8.995019
2020-21	5.917167	0.831	6.748167	0.297562	7.045729
2021-22	5.992324	0.83312	6.825444	0.323405	7.148849
Average	5.339727	0.809657	6.149384	1.361976	7.51136

(Source: Calculated by Researcher)

The table presented above contains data for HUL Ltd. from 2012-13 to 2021-22, showcasing key metrics of intellectual capital performance: Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Capital Employed Efficiency (CEE), Intellectual Capital Efficiency (ICE), and

Value-Added Intellectual Coefficient (VAIC). The detailed analysis of all the efficiency ratios has been presented below:

In the first year of study i.e. 2012-13, HCE has been Calculated at 4.452841, progressively increased remarkably to 5.106789 in the year 2015-16 due to increase in Value Addition and increase in Human capital, proportionate change in Value Addition is more than proportionate change in Human capital resulted in increase in HCE till 2015-16. In the year 2016-17, VA and HC both increased but proportionate change in Human cost has been more than proportionate change in Value Addition resulting in decrease in HCE to 4.821011 in the year 2016-17. It increased to 6.509368 in the year 2019-20 due to increase in proportionate change in Value Addition compared to proportionate change in Human Cost. In the year 2020-21, proportionate change in Human capital has been more than proportionate change in Value Addition resulted in decrease in HCE. It has been recovered in the last year of study to 5.992324 in the year 2021-22. Hence, it has been inferred that the expenses done in the year resulted in increase in value addition in the next year and a decreased in expenditure results in a decrease in the proportionate change in value addition in the next year. Results of HCE have shown fluctuation due to proportionate change in value addition and human cost. This has indicated the effective utilization of human capital over the period presented in increase in efficiency ration.

In the first year of study the structural capital efficiency is 0.775424 showing 77% contribution is of structural capital and 33% is of human capital, progressively increased to 0.804182 in the year 2015-16 and decreased to 0.79 in the year 2016-17 due to proportionate decrease in Value Addition and HC. In 2017-18 it increased to 0.809583 and reached to 0.83312 in the year 2021-22 with the highest in the year 2019-20 at 0.846375. constant increase in structural capital presumes improved structural processes and knowledge management during the period of study. The fluctuation in SCE is due to fluctuations in HCE ratio.

Intellectual Capital Efficiency (ICE) has been the combined result of Human Capital efficiency (HCE) and Structural Capital Efficiency (SCE). The analysis of HCE has revealed that during the period of study it increased remarkably. HCE increased by 1.54 in 10 years. At the same time SCE has increased during the period of study by 0.07 in 10 years. Intellectual capital efficiency is the result of human capital efficiency and structural capital efficiency. The result has summarized fluctuations in efficiencies as below:

Table No: 4.7

Year with Highest and Lowest of HCE, SCE and ICE

Year	HCE	SCE	ICE
2012-13	4.452841	0.775424	5.228266
2015-16	5.106789	0.804182	5.910971
2019-20	6.509368	0.846375	7.355743
2021-22	5.992324	0.83312	6.825444

(Source: Compiled by Researcher)

Though ICE has been the results of both HCE and SCE, it has been influenced by HCE more than SCE.

Another important component in calculation of VAIC is Capital Employed Efficiency (CEE).

Capital employed Efficiency (CEE) = Value Added / Average Capital Employed

Here **Average Capital Employed =**

(Total Assets at the beginning of the year – Current Liabilities at the beginning of the year) +
(Total Assets at the end of the year – Current Liabilities at the end of the year) / 2

Table No: 4.8

Table showing Average Capital Employed of HUL Ltd for 10 years from 2012-13 to 2021-

22

ACC LTd.	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Average Capital Employed	4,018	3,715	4,338	5,664	5,831	6,181	6,668	7,227	46,890	47,156

(Source: Calculated and Compiled by Researcher)

The above table has revealed the amount of capital employed i.e. total in long term investment in the business during the period of study. In the first year of the study 2012-13 it has been Rs 4018 Cr. that has increased progressively till 2019-20 to Rs 7227 Cr. Thus, the increase in capital employed over the period has been the result of an increase in equity, which has increased every year with addition of revenue profit. Only in the year 2013-14 the capital employed has decreased due to declaration of special dividend in the year 2013-14, resulted in less amount of profit

transferred to general reserve, resulted in decreased capital employed. In the year 2020-21, there has been a merger of HUL Ltd with Glaxo Smith Kline (GSK) consumer Ltd (Pinto, 2018) resulted in increased capital employed from Rs 7,227Cr. in 2019- 20 to Rs 46,890 Cr. in the year 2020-21 and has reached to Rs 47,156 Cr. in 2021-22 due to increase in revenue of the company. For the study, value addition has been considered as financial results or contribution by all the resources i.e. tangible and intangible, and has been calculated by the following method:

Value Added = Net Operating Profit after Tax + Employee Cost + Depreciation + Amortisation + Current Year Tax.

Table No: 4.9

Table showing Value Addition of HUL Ltd from 2012-13 to 2021-22

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Value Added	6257.4	6874.898	7894.46	8130.11	8403.022	9768.047	11168.39	11847.05	13952.68	15250.47

(Source: Calculated and Compiled by Researcher)

Value Addition is Rs 6257.4 Cr. in the year 2012-13, which has been increased to Rs 15250.47 Cr. in the year 2021-22, there has been increase in Net Operating Profit After Tax each of the year of study.

Further the study has been dedicated to check the impact of capital employed on Value Addition and there by Capital Employed Efficiency which has been calculated for the period of study as presented in the following table.

Table No: 4.10

Table showing Capital Employed Efficiency of HUL Ltd

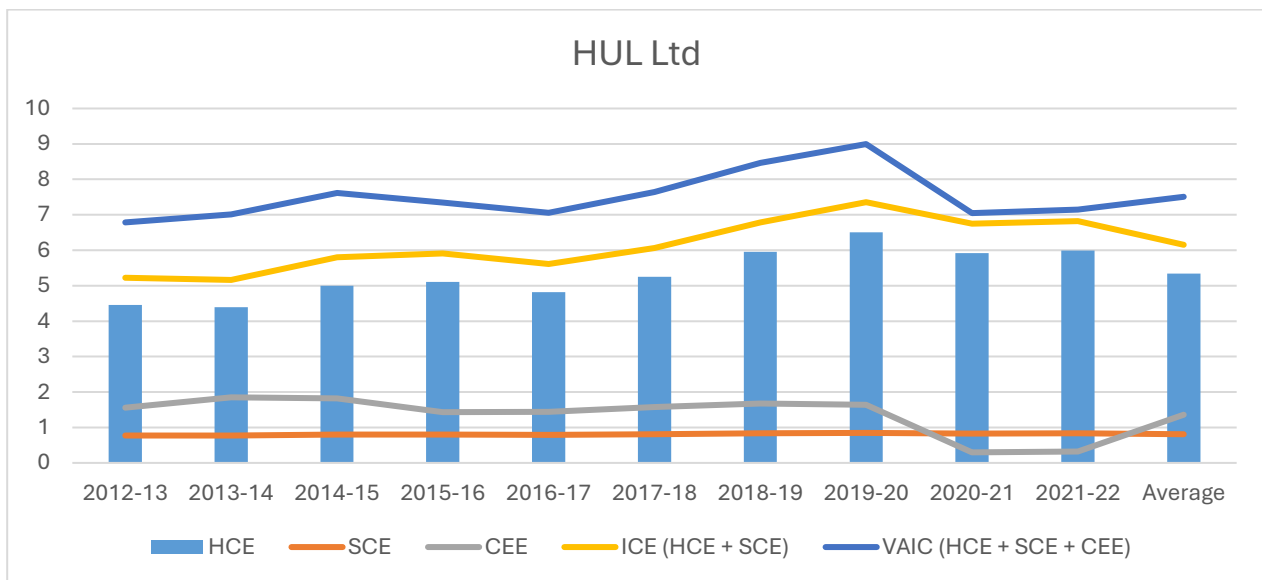
ACC Ltd.	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
CEE	1.557342	1.850578	1.819839	1.435401	1.441094	1.580334	1.674924	1.639276	0.297562	0.323405

(Source: Calculated and Compiled by Researcher)

CEE has demonstrated a volatile trend. It has been highest in 2013-14, has shown the value addition more than the amount invested in long term capital, decreased to 0.29 showing almost destroying value to 1.5 times over the years of study.

CEE has been calculated at 1.55732 in the year 2012-13, has shown long term capital adds Rs 1.55 value against one rupee of capital employed, which progressively has increased to 1.85058 in 2013-14 due to decreased capital employed. This has progressively decreased to 0.297562 in the year 2020-21. This decrease in efficiency has been due to the increase in long-term capital of the company due to merger, resulting in increase in equity of the company. In 2021-22, it recovered due to an increase in Value Addition compared to 2020-21.

The calculated components of VAIC model and VAIC has been presented in a combine graph No- 4.2



Graph: 4.2

Graph showing HCE, SCE, CEE, ICE and VAIC of HUL Ltd

VAICTM has shown value addition of the company with its physical, financial and intellectual capital. In the year 2012-13 it showed 6.785608 which is the lowest of the study period, progressively has increased to 7.619845 in the year 2014-15 and again it decreased to 7.05468 in the year 2016-17. Progressively it increased from 7.641556 in the year 2017-18 to 8.995019 in the year 2019-20. Due to decreased CEE in 2020-21, the VAIC has decreased to 7.045729 and recovered to 7.148849 in the year 2021-22. VAICTM demonstrated a steady upward trend from 2012-13 to 2019-20, reflecting growing intellectual capital efficiency. There has been a notable decline in 2020-21 and 2021-22, due to the decreased CEE during those years.

Conclusion:

The data has reflected a consistent growth in intellectual capital efficiency for HUL Ltd. from 2012-13 to 2019-20, driven primarily by human and structural capital improvements. A noticeable decline has investigated in 2020-21 and 2021-22, primarily due to a sharp decline in CEE, impacting VAICTM negatively. Continued focus on capital efficiency has been crucial for maintaining overall intellectual capital performance.

➤ Service Companies

Two service companies have been selected for a case study, Infosys Ltd and TCS Ltd. The required data have been collected from the annual reports of the respective company's website. The following has been calculated for Infosys Ltd and TCS Ltd.

Infosys Ltd: The annual reports and financial statement of Infosys Ltd. have been prepared annually on a financial year basis from 2012-13 to 2021-22. The required data for further analysis has been procured, calculated and presented in the below table.

Table 4.11

Table showing HCE, SCE, CEE, ICE and VAICTM of Infosys Ltd

Infosys	HCE	SCE	CEE	ICE (HCE + SCE)	VAIC (HCE + SCE + CEE)
2012-13	1.618081	0.381984	1.04784	2.000065	3.047906
2013-14	1.564705	0.360902	1.082679	1.925606	3.008286
2014-15	1.611503	0.379461	0.966318	1.990964	2.957282
2015-16	1.583125	0.368338	0.934197	1.951463	2.885661
2016-17	1.576462	0.365668	0.90731	1.942131	2.849441
2017-18	1.577816	0.366213	0.915719	1.944029	2.859748
2018-19	1.510824	0.33811	1.051465	1.848934	2.900399
2019-20	1.498897	0.332843	1.088872	1.83174	2.920612
2020-21	1.529922	0.346372	1.103529	1.876294	2.979823
2021-22	1.524117	0.343882	1.177953	1.867999	3.045951
Average	1.559545	0.358377	1.027588	1.917923	2.945511

(Source: Calculated and Compiled by Researcher)

The table no. 4.11 represents data Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Capital Employed Efficiency (CEE), Intellectual Capital Efficiency (ICE), and Value-Added Intellectual Coefficient (VAICTM), has been calculated for the period of study by considering required information disclosed by a company in the published annual reports.

Human capital efficiency has been calculated by adding employee cost, depreciation and amortization to the operating profit as disclosed by Profit and Loss Statement of the company. The calculated value of Human Capital Efficiency has been disclosed in the below table:

Table No: 4.12

Table showing Human Capital Efficiency of Infosys Ltd for the year of study

Infosys	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
HCE	1.618081	1.564705	1.611503	1.583125	1.576462	1.577816	1.510824	1.498897	1.529922	1.524117

(Source: Calculated and Compiled by Researcher)

In the initial year of study, i.e. 2012-13 HCE has been remarked at 1.618081, the highest of all the year. Progressively it decreased to 1.498897 in the year 2019-20, due to the increase in employee cost proportionately greater than increase in value addition. This shows an increase in human cost resulting in an increase in value addition in next year. The year 2020-21 when ratio of value addition succeeded ratio of employee cost, there has increased HCE to 1.529922. HCE has remained stable, with minor fluctuations over the years. The highest value of all the years has been observed in 2012-13, followed by a slight decline over the next few years. The lowest HCE occurred in 2019-20 (1.498897), but recovered in subsequent years and ended at 1.524117 in 2021-22. It has been inferred that, with an increase in employee cost, value added increased, showing stable efficiency of human capital in the organisation, making it clear that firm has been passing through challenging times during the period of study and has made attempts to recover it.

Table below represents calculated Structural Capital Efficiency (SCE) of Infosys Ltd for the year of study.

Table No: 4.13

Table showing Structural Capital Efficiency of Infosys Ltd

Infosys	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
SCE	0.381984	0.360902	0.379461	0.368338	0.365668	0.366213	0.338111	0.332843	0.346372	0.343882

(Source: Calculated and Compiled by Researcher)

Another important component in calculation of VAICTM has been Structural Capital Efficiency. In the first year of study i.e. 2012-13, SCE has been the highest at 0.381984, which progressively decreased to 0.332843 in the year 2019-20, again has increased to 0.343882 in the year 2021-22.

SCE has shown a slight decline from 2012-13, hitting its lowest point in 2019-20. It has improved in the following two years but has remained lower than the initial levels. This has shown the efficiency of management of the company to keep stable the share of structural capital against value addition. This stability has been due to increased value addition and human cost in different proportions. The variation in value addition is the result of an increased cost of employee, thereby increased human capital while operating profit has not been increased in the same proportion. Table no. 4.14 represents the calculated Intellectual Capital Efficiency (ICE) of Infosys Ltd for the year of study.

Table No: 4.14

Table showing Intellectual Capital Efficiency (ICE) of Infosys Ltd for the year of study

Infosys	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ICE (HCE + SCE)	2.000065	1.925606	1.990964	1.951463	1.942131	1.944029	1.848934	1.83174	1.876294	1.867999

(Source: Calculated and Compiled by Researcher)

Intellectual Capital Efficiency (ICE) has been calculated by addition of Human Capital efficiency (HCE) and Structural Capital Efficiency (SCE), this has shown the efficiency of knowledge workers of the company. The analysis of HCE revealed that it has decreased remarkably and has been struggling to reach the initial year of study i.e. in 2012-13. HCE decreased in the initial year and increased, but the ultimate result is; it decreased by 0.09 in 10 years. At the same time SCE has decreased during the period of study but not much and has started driving to reach the level from where it started i.e. equal to 2012-13, but not reached. The summarized HCE, SCE and ICE showing fluctuations in efficiencies has been presented in the table below:

Table No: 4.15

Year with Highest and Lowest of HCE, SCE and ICE

Year	HCE	SCE	ICE
2012-13	1.618081	0.381984	2.000065
2019-20	1.498897	0.332843	1.83174
2020-21	1.529922	0.346372	1.876294

(Source: Compiled by Researcher)

Though ICE has been the result of both HCE and SCE, it has been influenced by HCE more than SCE.

Another important component in calculation of VAIC is Capital Employed Efficiency (CEE).

Capital employed Efficiency (CEE) = Value Added / Average Capital Employed

Here Average Capital Employed =

(Total Assets at the beginning of the year – Current Liabilities at the beginning of the year) + (Total Assets at the end of the year – Current Liabilities at the end of the year) / 2

Table Showing Calculated Average Capital Employed of Infosys Ltd from the year 2012-13 to 2021-22.

Table No: 4.16

Table showing Average Capital Employed of Infosys Ltd for 10 years from 2012-13 to 2021-22

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Average Capital Employed (Rs. In Crores)	34845	41667	49700	58326	65433	67014	65112	70049	77001.5	82789.5

(Source: Calculated and Compiled by Researcher)

Three events have happened in Infosys Ltd during the year of study from 2012-13 to 2021-22,

1) Bonus issues occurred in the ratio of 1:1 twice in the company in the year 2014-15 and 2015-16, resulted in double of the equity, resulted in increase in Average capital employed. 2) In 2017-18 the company has undergone a buyback of 4.5% shares from the public, results in the decreased equity, further, resulted in decrease in Average Capital Employed in the year 2018-19.

The above table shows the amount of capital employed i.e. total in long term investment in the business during the period of study. In the first year of the study 2012-13 it has been Rs 34845 Cr. that has increased progressively due to issue of bonus shares in 2014-15 and 2015-16. In the year 2017-18 the average capital employed has been increased not due to buyback of shares, but the difference has been covered by the current year profit, hence, the Average capital employed increased in the year of buyback i.e. 2017-18 and decreased in 2018-19 to Rs 65112 Cr from Rs

67014 Cr. in 2016-17 due to decreased current year profit. The buyback effect has been reflected in opening and closing capital employed and hence in 2018-19 it decreased to Rs 65112 Cr., again recovered by the company gradually to Rs 82789.5 Crores in 2021-22. Thus, the increase in capital employed over the period has been the result of an increase in equity which increased every year with the addition of revenue profit. For the study value addition has been considered as financial results or contribution by all the resources i.e. tangible and intangible and has been represented in the table below:

Table No: 4.17

Table Showing Value Addition of Infosys Ltd from the year 2012-13 to 2021-22

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Value Added (Rs. In Crores)	36512	45112	48026	54488	59368	61366	68463	76274.39	84973.39	97522.12

(Source: Calculated and Compiled by Researcher)

Value Addition is Rs 36512 Cr. in the year 2012-13, which has been increased to Rs 97522.12 Cr. in the year 2021-22, due to increased Net Operating Profit After Tax.

Further the study has been dedicated to check the impact of capital employed on Value Addition and there by Capital Employed Efficiency which has been calculated for the period of study as presented in the following table no 4.17.

Table No: 4.18

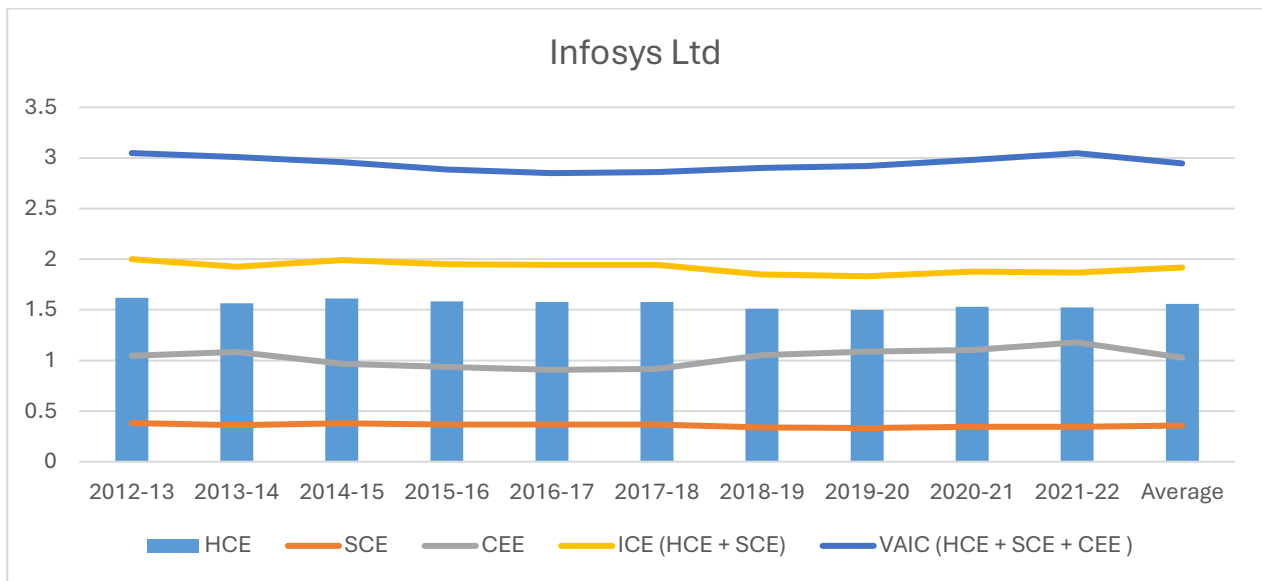
Table showing Capital Employed Efficiency of Infosys Ltd for the year of study.

Infosys Ltd.	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
CEE	1.04784	1.082679	0.966318	0.934197	0.90731	0.915719	1.051465	1.088872	1.103529	1.177953

(Source: Calculated and Compiled by Researcher)

CEE calculated at 1.04784 in the year 2012-13, has shown long term capital adds to 1.04 against one rupee of capital employed, which progressively decreased to 0.90731 in the year 2016-17. This decrease in efficiency has been due to the increase in capital employed and the increase in capital employed has been due to issued bonus shares. Further CEE has increased due to increase

in value addition, while buy back of shares has affected decrease in proportionate increase of capital employed resulting in increase in CEE to 1.177953 in the year 2021-22. From 2017-18, CEE has improved drastically, indicating better utilization of capital employed and reached out above the efficiency of 2012-13. In the year of study CEE has been increased absolutely by 0.13Cr. due to increased value addition proportionately more than increase in capital employed over the year of study. Graph no 4.3 represents the calculated components of VAIC and VAIC of Infosys Ltd.



Graph 4.3 – Graph showing HCE, SCE, CEE, ICE and VAIC of Infosys Ltd

VAIC has shown value addition of the company with its physical, financial and intellectual capital.

In the first year of 2012-13 HCE has been calculated at 3.047906, reported the highest of the study period, decreased progressively to 2.859748 in the year 2017-18, it recovered from 2.900399 in the year 2018-19 to 3.045951 in the year 2021-22. VAIC remained relatively stable, with some fluctuations. It started at 3.047906 in 2012-13, and gradually declined to its lowest point in 2015-16. Post-2016-17, VAIC has shown a slight recovery, reaching 3.045951 in 2021-22, almost returning to its 2012-13 levels.

Conclusion:

Infosys has shown a relative stability in its intellectual capital performance across the years, with minor fluctuations in HCE and SCE. The CEE has experienced more volatility, with a significant recovery in recent years, contributing to improved VAIC. While the company's intellectual

capital efficiency has declined slightly from its peak in 2012-13, it shows resilience and recovery by 2021-22, mainly driven by improved Capital Employed Efficiency.

TCS Ltd:

In TCS Ltd the annual reports and financial statement have been prepared annually on financial year basis from 1st April to 31st March every year, for the study period from 2012-13 to 2021-22..

The following table shows the calculated data for TCS LTd and below is the detailed analysis:

Table 4.19

Table showing Human Capital Efficiency TCS Ltd

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
HCE	1.814946	1.898273	1.726046	1.809798	1.475444	1.53076	1.548219	1.548002	1.541996	1.530038

(Source: Calculated and Compiled by Researcher)

In the first year of study i.e. 2012-13 HCE has been calculated at 1.814946, progressively it increased to 1.898273 in the year 2013-14, the highest of all the year in the study period. It decreased to 1.726046 in the year 2014-15 and simultaneously increased to 1.809798 in the following year, showing remarkable fluctuations in the HCE due to fluctuations in the increase of employee cost proportionately to increase of value addition. In the year 2016-17 the human cost increased by 50% compared to last year, while value addition increased to 20% compared to last year hence, hence, resulted in decline of HCE in 2016-17, but it recovered to 1.548002 in 2019-20. The decreased has been due to decrease in the growth of both value addition and human cost in the year 2020-21 and human cost recovered to 17 % in 2021-22 against increased value addition by 16%, resulted in decreased HCE to 1.53 in 2021-22. It has been summarized that, with increased employee cost, value added increased, showing stable efficiency of human capital in the organisation.

Table No: 4.20

Table showing Structural Capital Efficiency of TCS Ltd

TCSE	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
SC	0.44902	0.473205	0.420641	0.447452	0.322238	0.34673	0.354097	0.354006	0.35149	0.346421

(Source: Calculated and Compiled by Researcher)

Though ICE has been the result of both HCE and SCE, but has been influenced more by HCE than SCE.

In the first year of study i.e. 2012-13, SCE has been calculated at 0.44902, showing 44% shares in value addition which progressively increased to 0.473205 in the year 2013-14 showing 47% shares in value addition due to decrease in human capital resulting in increase in structural capital. In the subsequent year it has shown a slight decrease in SCE to 0.322238 till 2016-17, due to decrease in share of structural capital and it increased in the coming years from 2017-18. SCE has shown an increase in the second last year of study to 0.35149 and again decreased to 0.346421 in the year 2021-22, due to proportionate increase in structural capital less than proportionate increase in value addition. This has thrown light that the company has been able to manage its shares of structural capital stable against value addition, but it has not reached its earlier peak. The variation in value addition has been the result of the increase in the cost of employees, thereby increase in human capital, while value addition, results of operating cost has not been increased in the same proportion. The trend had shown some volatility, but it has not reached pre-2015 levels again. The stable share of structural capital has also been shown in the bar graph given below.

Table No: 4.21

Table showing Intellectual Capital Efficiency of TCS Ltd

TCS	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ICE (HCE + SCE)	2.263966	2.371478	2.146687	2.257251	1.797682	1.87749	1.902316	1.902009	1.893486	1.876459

(Source: Calculated and Compiled by Researcher)

Intellectual Capital Efficiency(ICE), has been calculated by adding Human Capital Efficiency and Structural Capital Efficiency, this has shown the efficiency of knowledge workers of the company. Secondly, human capital and structural capital are the different components of Intellectual Capital; hence the efficiency of Intellectual Capital has been achieved by adding HCE and SCE. In the first year of study 2012-13, ICE has been calculated at 2.263966 showing

efficiency of a knowledge worker against one rupee of value addition, progressively decreases to 1.797682 in the year 2016-17, value addition capacity decreases from 2.26 to 1.79 showing value destroyed by 0.25 times in these five years due to decrease in Value Added till this year. There has been an increase in ICE at 1.87749 from 2017-18 increased to 1.902316 in 2018-19, has indicated improved performance of knowledge workers of the company, primarily driven by the recovery in HCE as SCE remains stable for the year of study. There has been a decrease in ICE from 2019-20 from 1.902009 to 1.876459 in the year 2021-22, has indicated the proportionate increase in human cost more than proportionate increase in Value addition.

Intellectual Capital Efficiency (ICE) has been the combined result of Human Capital efficiency (HCE) and Structural Capital Efficiency (SCE). The analysis of HCE has revealed a remarkable decrease and has been struggling to reach the point where the journey started i.e. in 2012-13. HCE has decreased and has started increasing but, the ultimate result is, it decreased by 0.29 in 10 years. At the same time SCE has decreased during the period of study but, not substantially, and has revived to reach the level from where it started i.e. equal to 2012-13. Intellectual capital efficiency is the result of human capital efficiency and structural capital efficiency. The result has summarized fluctuations in efficiencies as below:

Table No: 4.22

Year with Highest and Lowest of HCE, SCE and ICE

Year	HCE	SCE	ICE
2012-13	1.814946	0.44902	2.263966
2016-17	1.475444	0.322238	1.797682
2021-22	1.530038	0.346421	1.876459

(Source: Compiled by Researcher)

Though ICE has been the result of both HCE and SCE, but has been influenced more by HCE than SCE. Further Capital Employed Efficiency of TCS Ltd has been calculated and presented below, the component of VAICTM.

The following table presents the Average Capital Employed of TCS.

Table No: 4.23

Table Showing Average Capital Employed of TCS Ltd from the year 2012-13 to 2021-22

TCS	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Avg Capital Employed	44419.22	50785.09	54283.17	64390.13	79600	86620	87618	93983	92062.5	94726

(Source: Calculated and Compiled by Researcher)

Major events happened in the year of study are as follows:

1. In the year 2013-14, there has been a redemption of preference shares, which resulted in decreased capital employed of that year.
2. In the years 2017-18, 2018-19, 2020-21 and 2021-22 company has gone for buy back of shares, having impact on decreased capital employed.
3. The company issued bonus shares in the year 2018-19 at the ratio of 1:1, resulting in increased capital employed of the company.
4. Effect in the capital employed has been due to addition of current year profit as retained earnings.

The above table has revealed the amount of capital employed i.e. total in long-term investment in the business during the period of study. In the first year of the study 2012-13 it has been Rs 44419.22 Cr. that has increased progressively till the year 2020-21. The increase in capital employed over the period has been the result of an increase in equity, which has increased every year with the addition of revenue profit, this addition has been nullified by the effect of buy back of shares. Thus, increase in capital employed over the period has been the result of an increase in equity, which has increased every year with the addition of net revenue profit which is retained in the business after utilizing it for buy back. For the study, value addition has been considered as financial results or contribution by all the resources i.e. tangible and intangible and has been calculated by the following method:

Value Added = Net Operating Profit after Tax + Employee Cost + Depreciation + Amortisation + Current Year Tax.

Table No: 4.24

Table Showing Value Addition of TCS Ltd. from the year 2012-13 to 2021-22

TCS	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Value Addition	43631.24	56682.44	66799.95	75593.61	90918.34	101636.4	121142	133053.9	141576.8	164561.7

(Rs. in Crores)										
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(Source: Calculated and Compiled by Researcher)

Value Addition is Rs 43631.24 Cr. in the year 2012-13, which has been increased to Rs 164561.7 Cr. in the last year of study 2021-22, due to an increase in Net Operating Profit After Tax.

Further, the study has been dedicated to check the impact of capital employed on Value Addition and there by Capital Employed Efficiency which has been calculated for the period of study as presented in the following table.

Table No: 4.25

Table showing Capital Employed Efficiency (CEE) of TCS Ltd. from the year 2012-13 to 2021-22

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
CEE	0.98226	1.116124	1.230583	1.173994	1.14219	1.173359	1.382615	1.415723	1.537834	1.737239

(Source: Calculated and Compiled by Researcher)

CEE calculated at 0.98226 in the year 2012-13, has shown long term capital adds 0.98 against one rupee of capital employed, which progressively has decreased to 1.230583 in the year 2014-15 due to proportionate increase of Capital employed is more than proportionate increase in Value Addition. Progressively started increasing with slight fluctuation in the year when the company has gone for buy back. The effect of buy back of share has decreased capital employed with the effect of the same from the next year of study, hence from 2017-18 CEE starts increasing from 1.17 to 1.73 in the year 2021-22. From 2017-18, CEE has improved drastically, indicating better utilization of capital employed. The firm has made attempts to recover it and bring it like the year 2012-13. CEE absolutely has increased by 0.75 due to the increase in value addition is proportionately more than increase in capital employed over the year of study.

Table showing Calculated VAIC of TCS Ltd for the year of study.

Table No: 4.26

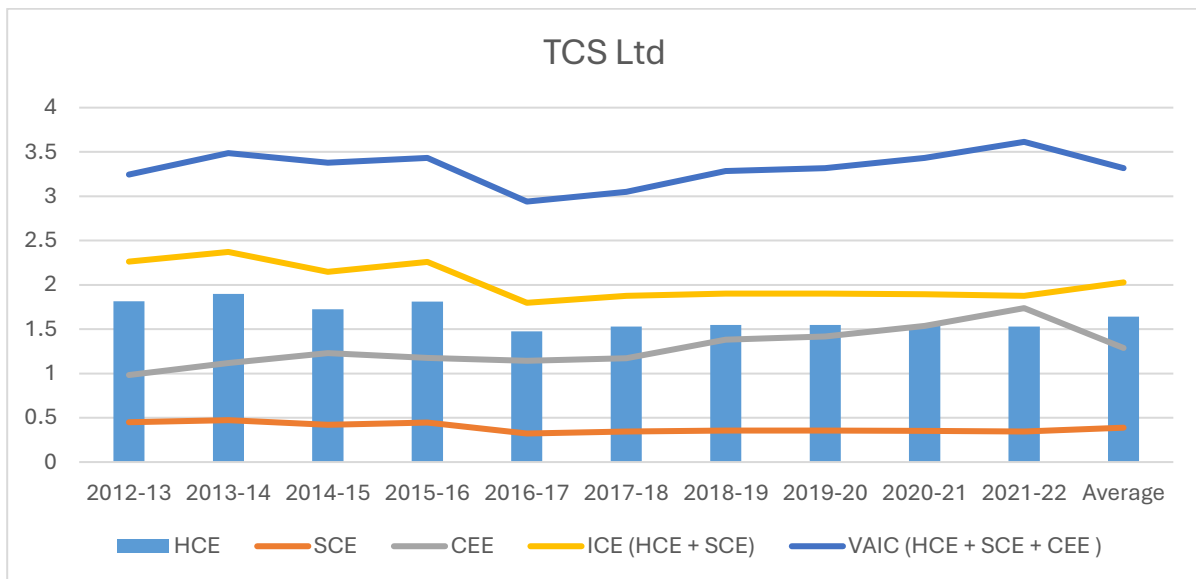
Table showing VAIC of TCS Ltd for the year of study

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
VAIC	3.24626	3.487602	3.37727	3.431244	2.939872	3.05085	3.284931	3.317732	3.43132	3.613698

(Source: Calculated and Compiled by Researcher)

VAIC™ has shown value addition of the company with its physical, financial and intellectual capital. In the first year of study i.e. 2012-13 it showed 3.246226 which has increased to 3.387602 in the year 2013-14, due to increase in all the efficiency ratio. From 2013-14 till 2017-18 the VAIC showed fluctuating trend, i.e. in one-year VAIC is increased and in the subsequent year it decreased till 2017-18. Further it followed an increasing trend in from 2018-19 at 3.284931 to 3.613698 in the year 2021-22 3.613698, giving the highest VAIC of TCS Ltd for the period of study. VAIC has demonstrated an increasing trend over the years. It started at 3.246226 in 2012-13, experiences a dip in 2016-17 (2.939872), and the highest in 2021-22 (3.613698). The steady increase in CEE has significantly driven upward trend despite some fluctuations in HCE and SCE. This shows that the company has increased its value addition efficiency by increasing all human and fixed capital.

The presentation of all the calculated data shown in the table above are presented in graph below.



Graph 4.4 Graph showing HCE, SCE, CEE, ICE and VAIC of TCS Ltd

Year-wise Observations:

In the year 2012-13 it showed VAIC with 3.246226 due to HCE 1.814946, SCE 0.44902, and CEE 0.98226. The best year was 2013-14, as VAIC was second highest and HCE 1.898273, SCE 0.473205, and ICE 2.371478, resulted in 3.487602.

In the years 2014-15 and 2015-16 there has been a decline in HCE and SCE, while CEE improves, leading to a negligible improvement in VAIC, while the worst year is 2016-17 for ICE 1.797682 and for VAIC 2.939872, due to decrease in VAIC. Covering it in the years 2017-18 to 2021-22 there has been a significant recovery in CEE, with improvements in HCE and SCE, resulting in a steady increase in VAIC, reaching at 3.613698 in 2021-22.

Conclusion:

TCS showed stability in its intellectual capital performance with notable fluctuations in HCE and SCE. The sharp dip in 2016-17 reflected a difficult year for the company, but regular improvements in CEE, predominantly from 2017-18 onwards, has showed recovery. By 2021-22, VAIC has reached its highest level, indicating effective capital utilization. To sustain its intellectual capital performance, TCS must continue optimizing its human and structural capital alongside improving its capital employed efficiency. It has been inferred that the company's future performance depends on its ability to maintain improvements in human and capital employed efficiency.

In this part of the study, we intend to check the relationship (impact) of Value Added Intellectual Co-efficient (VAICTM) and financial performance indicators to arrive at its relation and impact. Hence, in the following part, dependent financial indicators selected for the study are discussed in detail.

Dependent Variables:

Measures of financial performance have been taken as a dependent variable for regression equations. In accordance with the existing research studies on VAICTM, the stated measures of the firm's performance have been considered. These are: Economic Value Added (EVA), Market Capitalisation (MCap), Gross Value Added(GVA) and Net Value Added(NVA).

The detailed descriptive statistics and its relationship with VAICTM are discussed in detail below:

4.3 Economic Value Added (EVA)

Economic Value Added is considered as performance measurement variable and is based on the concept that a company should earn more than its cost of capital. Firms that earn higher returns than financing costs will benefit its shareholders on account of increased shareholder value. In its simplest form, EVA can be expressed in the following way:

$$EVA = NOPAT - (WACC \times CE)$$

Where:

NOPAT = Net operating profit after tax

(operating profits before Interest & Deferred Tax but after Income Tax)

WACC = Weighted average cost of capital

CE = Total capital employed

Weighted average cost of capital of the company has been calculated based on the capital structure of the company and the weights are assigned to the source of finance considering proportionate amount financed by a particular source.

$$WACC = \frac{K_d(1-T)D}{V} + \frac{K_eE}{V} + \frac{K_pP}{V}$$

Where:

WACC = Weighted Average Cost of Capital

K_d = Cost of Debt (Coupon Rate)

T = Corporate Tax Rate

V = Total Debt + Total Preference Share Capital + Market Value of Equity Capital (D+MVE+P)

D = Total Debt Capital

K_e = Cost of Equity calculated using CAPM model

E = Market Value of Equity Capital (as on 31st March)

K_p = Cost of Preference Capital (Coupon Dividend)

P = Preference Capital

The cost of equity is measured based on capital asset pricing method for calculating WACC and Cost of debt is taken as after-tax cost. Under the Capital Asset Pricing Model, cost of equity (*K_e*) is calculated as:

$$K_e = R_f + \beta * R_{mp}$$

Where-

1. ***K_e*** = Cost of Equity
2. ***R_f*** = Risk-Free Rate of Return.
3. ***R_{mp}*** = Market Risk Premium
4. ***β*** = Risk coefficient

For objectivity purpose Risk free rate of return and market risk premium is considered from the annual report of each year of Hindustan Unilever company as a base for calculating Cost of Equity for TCS and Infosys company.

Market risk premium is the difference between the expected return of the market and risk free rate of return. Hence, it is assumed to be the same for all companies. It is the additional return over and above the risk-free-rate, which is required to compensate investors for investing in a riskier assets class. With a more volatile market, market risk premium is also higher.

β is the measure of stock's risk reflected in the change in the stock price with relation to change in the overall market. In short it is said as the stock's sensitivity to market risk. β is calculated collecting the data of the adjusted daily closing share price of companies for each year of study and adjusted daily closing price of Nifty daily for each year of study.

Formula for

$$\beta = \text{Cov}(r_i, r_m) / \text{Var}(r_m)$$

where-

B = market beta of asset i

Cov = covariance

Var = variance

r_m = average expected rate of return on the market

r_i = expected return on an asset i

EVA is positive if NOPAT exceeds the cost of financing. The authors of EVA state that, in this case, the company has created shareholder value. On the other hand, when EVA is negative, the company is destroying the value of the shareholder. The computed EVA for all the selected companies is annexed.

When talking about measuring the value of Intellectual Capital, there is a need to measure such ratios or method that helps to explain the reason for changes in shareholders wealth and for this purpose it is already been confined by Behera, 2019, who agrees the statement (***Stewart, 1994, pp.75 cited by Behera, 2019***), “EVA stands well out from the crowd as the single best measure of wealth creation on a contemporaneous basis and is almost 50% better than its closest accounting based competitor [Earning per share (EPS), Return on Equity(ROE) and Return on

Investment(ROI)] in explaining changes in shareholder wealth” (Stewart, 1994), added by Dr. Mahesh U. Daru(2016) ‘The purpose of EVA is to assess company and management Performance’ (Daru, 2016). EVA presents value generated from the funds invested over the cost incurred to collect funds for the organization due to the intellect of the organization. It is not only the method to measure the performance, but it is also the method to measure Intellectual Capital. here in the study as it is better performance indicator it is selected for further analysis. The determination of adjustments to accounting data to arrive at EVA figures may involve subjective judgments, potentially introducing bias and reducing the method’s objectivity.

The following table shows the EVA calculated for the sample companies under study for the selected study period, where EVA for the manufacturing company is directly taken from their respective annual reports while, for service companies it is calculated by the researcher for each year separately.

Table 4.27

Table showing EVA for the ACC LTd, HUL Ltd, Infosys Ltd and TCS Ltd
(Rs. In Crores)

Company	ACC Ltd	HUL Ltd	Infosys Ltd	TCS Ltd.
Years				
2012-13	400	2926	6569.912	10060.43
2013-14	83	3147	7011.73	14189.87
2014-15	131	3380	8521.275	15175.03
2015-16	-382	3438	9069.996	19483.61
2016-17	-318	3533	9854.826	13736.91
2017-18	-191	4258	10973.5	18330.57
2018-19	-338	5291	10553.32	24604.67
2019-20	-66	6085	12496.68	26950.79
2020-21	128	3810	14883.06	28168.4
2021-22	208	4435	14864.92	29934.17
Average	-34.5	4030.3	10479.92	20063.45
Industry Average	1997.9		15271.68	

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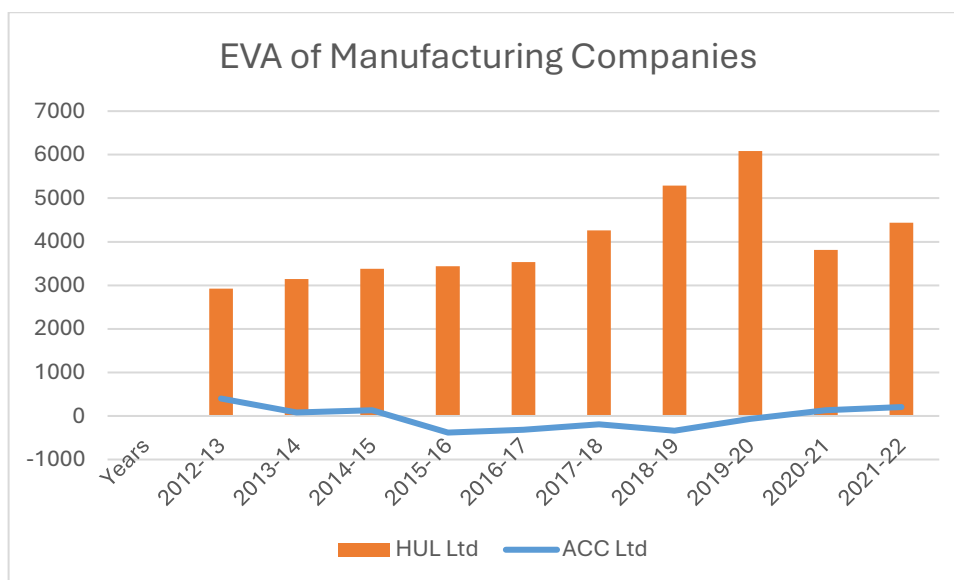
(Source: ACC Ltd and HUL Ltd - Annual Reports

and Infosys and TCS Ltd – Calculated by Researcher)

HUL Ltd and ACC Ltd show the above value in their annual report, while the information required for calculating EVA for other service companies are taken from the annual report of HUL Ltd and EVA of Infosys and TCS is calculated.

Manufacturing Sector Companies

The calculated data is presented in the graph below for different industries.



Graph 4.5- Graph showing Economic Value Addition Graph of Manufacturing sector

Analysis of EVA (Economic Value Added) for all the sample companies separately

Table No: 4.28

Table showing Economic Value Added(EVA) of ACC Ltd

Company	Years	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
ACC Ltd	EVA (Amount in Cr.)	400	83	131	-382	-318	-191	-338	-66	128	208

(Source: Annual Reports of ACC Ltd)

In the initial year of study, 2012, the company recorded the highest Economic Value Added (EVA) at Rs 400 crores, indicating it earned profits exceeding its cost of capital. However, this figure

gradually declined to Rs 83 crores in 2013-14, primarily due to a decrease in Net Operating Profit After Tax (NOPAT) driven by reduced revenue from operations compared to 2012 and an increase in the Weighted Average Cost of Capital (WACC) from 12.05% in 2012 to 13.2% in 2013, stemming from a decrease in the company's debt. In 2014, EVA rebounded to Rs 131 crores, attributed to an increase in both NOPAT and revenue from operations, alongside a reduction in WACC to 12.9% due to lower finance costs.

However, in 2015, EVA turned negative at Rs -382 crores due to a significant drop in NOPAT, impacted by exceptional items in the profit and loss statement and rising employee expenses and depreciation from new tangible assets. NOPAT fell to Rs 692 crores from Rs 1,169 crores in 2014, even though WACC remained relatively stable at 12.88%, reflecting the company's inability to generate profits sufficient to cover its cost of capital. This year marked the lowest EVA in the study period.

In 2016, while EVA improved to Rs -318 crores, it remained negative as NOPAT continued to decline due to decreased revenue from operations, despite a decrease in WACC. The trend of increasing EVA continued into 2017 with rises in both NOPAT and revenue. In 2018, although NOPAT increased due to higher revenue, EVA fell again to Rs -338 crores because of an uptick in WACC.

From 2019 onward, the company began to recover, increasing its revenue from operations, which led to an improvement in NOPAT and a decrease in WACC, thus reducing its cost of capital. As a result, EVA demonstrated a positive trend, ultimately reaching Rs 208 crores in 2021. Nevertheless, the company continued to struggle to return to the EVA levels achieved in 2012.

Table No: 4.29

Table showing Economic Value Added (EVA) of HUL Ltd

Com pany	Years	2012- 13	2013- 14	2014- 15	2015- 16	2016- 17	2017- 18	2018- 19	2019- 20	2020- 21	2021- 22
HUL Ltd	EVA (Amo unt in Cr.)	2926	3147	3380	3438	3533	4258	5291	6085	3810	4435

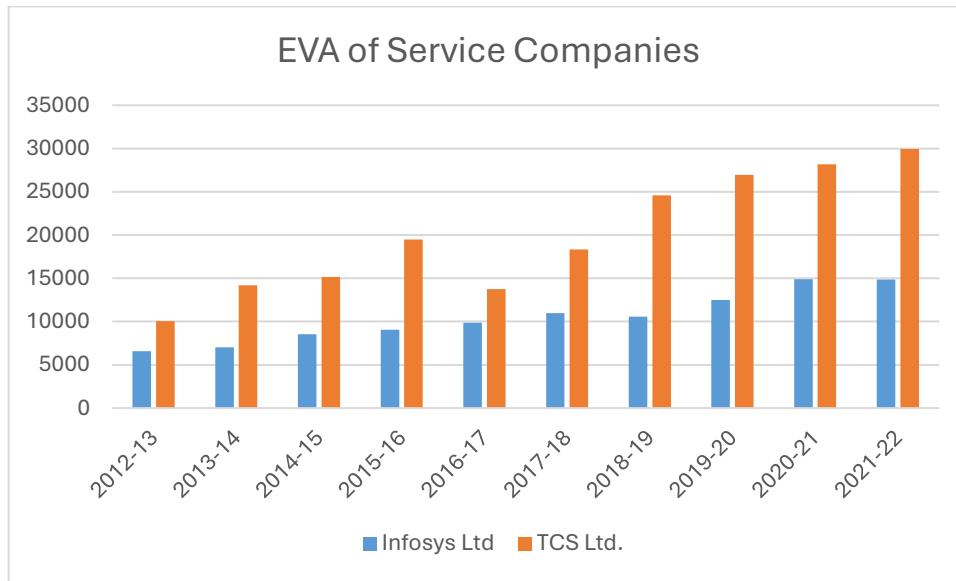
(Source: Annual Report of HUL Ltd.)

HUL Ltd experienced a steady rise in Economic Value Added (EVA) from 2012-13 to 2014-15 has increased from ₹2,926 crore to ₹3,380 crore, continued till 2019-20, with highest EVA

recorded at ₹6,085 crore, indicating its strong and consistent value creation efficiency, primarily driven by increased Net Operating Profit After Tax (NOPAT).

In 2020-21, EVA declined to 3,810 crore due to increased capital employed due to merger of HUL Ltd with GlaxoSmithKline Consumer Ltd, which resulted in increased cost of capital and decreased EVA. Despite this setback, HUL Ltd. has managed to improve its EVA to ₹4,435 crore in 2021-22, due to increased NOPAT.

Service Sector Companies



Graph 4.6- Graph showing Economic Value Addition Graph of Service sector

Table No: 4.30

Table showing Economic Value Addition of Infosys Ltd for the year of study

(Figures in Cr.)

Years	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
EVA (Amount in Cr.)	6569.91	7011.73	8521.28	9070	9854.83	10973.5	10553.3	12496.7	14883.1	14864.9

(Source: Calculated and Compiled by Researcher)

Infosys has verified robust growth in Economic Value Added (EVA) from ₹6,569.91 crores in 2012-13 to ₹10,973.5 crores in 2017-18, reflecting constant value creation driven by an increased Net Operating Profit After Tax (NOPAT). However, this figure gradually declined to ₹10,553.32 crores in 2018-19, primarily due to decrease in deferred tax resulting to lower profit after tax and consequently decreased NOPAT. The company has remained debt-free, which implies that its

weighted average cost of capital (WACC) is solely of cost of equity till 2019-20 and then due to introduction of debt, WACC is the combination of cost of equity and cost of debt. In the subsequent years from 2019-20, it showed a lower WACC and increased EVA, which rose from ₹12,496.68 crores in 2019-20 to ₹14,883.06 crores in 2020-21. In 2021-22, EVA decreased marginally to ₹14,864.92 crores due to further increase in debt resulting in increased WACC. EVA recorded its highest in 2020-21 and remained stable in 2021-22, indicating a sustained level of financial performance.

Table No: 4.31

Table showing Economic Value Added of TCS Ltd (Figures in Cr.)

Years	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
EVA (Amount in Cr.)	9940.555	13932.69	14531.07	17122.78	17178.7	16279.2	22561.8	24770	25911.1	30275.2

(Source: Calculated by Researcher)

In the initial years of study, i.e. from 2012-13 to 2016-17 period, EVA showed a significant rise from Rs. 9,940.6 Cr to Rs. 17,178.7 Cr, almost twice. This growth has largely been driven by an increase in NOPAT, fueled by higher revenue from operations. However, in 2017-18, EVA has fallen to Rs. 16,279.2 Cr. Decline has been due to a rise in employee costs more than revenue, leading to decrease in NOPAT and consequently a decrease in EVA.

In the succeeding year 2018-19, EVA has recovered, showing consistent growth, ascending from Rs. 22,561.8 Cr to Rs. 30,275.2 Cr by 2021-22. Increase has been again driven by higher NOPAT. Despite some fluctuations along the way, EVA has remained strong, ultimately reaching Rs. 30,275.2 Cr by 2021-22, indicating solid financial growth and ongoing value creation for shareholders.

Key Insights:

- **ACC Ltd** has experienced recovery in following years of study after a period of all negative EVA.
- **HUL Ltd** has demonstrated stable and consistent value creation throughout the period.
- **Infosys Ltd** has maintained strong EVA growth, especially from 2017 onwards.
- **TCS Ltd** has showed the highest EVA across all years, indicating its strong dominance in value creation among the companies analyzed.

Hypothesis Testing

To achieve the objective “Gauge the relationship of Intellectual capital with the financial performance of selected companies” the further part of the study deals with Pearson’s Correlation and Linear Regression of VAIC and financial performance indicators.

4.3.1 Correlation Analysis of EVA with VAICTM

The relationship between VAIC and EVA is based on the shared focus on value creation. VAIC measures the efficiency of a firm’s intellectual capital considering human, structural and physical capital in generating value. While EVA reflects the firm’s ability to generate higher returns than the cost of capital. So, firms’ efficiency generating value positively impacts the higher return of the firm. Hence, the relationship between EVA and VAIC is studied.

Correlation of EVA with VAIC and its components Intellectual Capital Coefficient and Capital Employed Efficiency of all the companies.

Manufacturing Industry:

The relationship of VAIC and its components with EVA is studied with the help of Pearson’s correlation.

Table 4.32

Table showing Correlation Results of EVA and VAICTM in Manufacturing companies.

		ACC LTd	ICE	CEE	VAIC TM	HUL Ltd	ICE	CEE	VAIC TM
EVA	Pearson Correlation		.912**	.674*	.919**		.881**	-0.039	.896**
	Sig. (2- tailed)		.000	.033	.000		.001	.916	.000

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

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

Correlation of EVA with both the components and VAICTM provides the results that all the components have significant correlation with EVA. This shows that Intellectual Capital Efficiency and Capital Employed Efficiency both contribute to generating profit above the cost of capital. The year in which there is a negative EVA efficiency of Intellectual Capital also decreases. That shows with a decrease in Intellectual capital Efficiency, the value addition also decreases.

Correlation of EVA with all the components and VAIC in HUL provides similar results as ACC but only capital employed efficiency does not provide significant correlation with EVA of HUL Ltd. Capital employed considers long term capital of the firm including debt, while in EVA the required return on this long-term capital and debt have been considered. There is no significant relation between EVA and CEE. While rest all other efficiencies relating to the intellectual capital of the firm show the positive and significant relation with EVA. The results are consistent in accordance with study made by (Joorbonyan et al., 2015).

4.3.2 Simple Regression Analysis of Components of VAICTM on EVA

Further the impact of VAICTM on EVA is studied with the help of Regression Analysis. The below is the analysis for hypothesis 1 – there is no significant impact of VAICTM and its components on EVA.

Manufacturing Companies:

Table 4.33
Table showing Regression Results of ICE and CEE and
financial performance of Manufacturing Companies (EVA) (H1)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	EVA	0.864	22.293**	0.001	Constant	5.848**	0.001
					ICE	4.599**	0.002
					CEE	1.297	0.236
HUL Ltd	EVA	0.934	49.867**	0.000	Constant	-5.764**	0.001
					ICE	9.979**	0.000
					CEE	4.100**	0.005

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

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

The table shows the results of multiple regression analysis of both independent variables. The expectation was that the components ICE and CEE should be positively related to EVA. In case of ACC Ltd, only Intellectual Capital Efficiency (ICE) is having significant t-value and having significant positive relationship, thereby it can be said that both the dimensions are having significant relationship together, only capital employed efficiency as an individual component will not have a significant relationship in ACC Ltd.

In HUL Ltd, both the dimensions have significant and positive t-value and have significant positive relationships, hence, in HUL Ltd., the regression model fits the data with both the significant individual dimensions. The negative constant in HUL Ltd says that when both the variable ICE and CEE are zero then only EVA can be negative but in the real situation as it shows efficiency, efficiency can never be zero.

Table 4.34

Table showing Regression Results of VAIC and financial performance of Manufacturing Companies (EVA) (H1)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	EVA	0.844	43.329**	0.000	Constant	-6.655**	0.000
					VAIC TM	6.582**	0.000
HUL Ltd	EVA	0.803	32.616**	0.000	Constant	-3.294**	0.011
					VAIC TM	5.711**	0.000

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

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

The impact of Efficiency of total resources on EVA is calculated where both the companies have significant and positive t-value with high R2 value. For total efficiency the data supports H1, where it can be said that there is a significant and positive impact of VAICTM on EVA in manufacturing companies.

The variable, VAICTM, has positive and statistically significant t-values for EVA. Both the companies show a positive and significant impact of VAICTM on EVA. A higher VAICTM indicates better utilization of these resources, which can lead to higher EVA, reflecting the firm's ability to generate returns above its cost of capital (Stewart, 1997). The regression model shows that variability in EVA is maximum due to the efficiency of the firm's Value Added Intellectual Co-efficient. The t-value is positive and significant, thereby supporting H1. Hence, it can be said that Intellectual Capital (VAICTM) has positive significant relationship with the performance variables EVA. The positive relation says if efficiency of all the assets, tangible and intangible increases then, EVA will increase by 80% to 84% due to efficiency of the intellects.

Service Industry

The relationship of VAIC and its components with EVA is studied for service sector companies and the result of Pearson's correlation and Simple regression has been presented below for Infosys Ltd and TCS Ltd. separately.

Table 4.35

Table showing Correlation Results EVA and VAICTM in Service Companies.

Infosys LTd:		ICE	CEE	VAICTM	TCS Ltd	ICE	CEE	VAICTM
EVA	Pearson Correlation	-0.729*	.466	-0.001		-.659	.969**	.411
	Sig. (2-tailed)	.017	.175	.999		.038	.000	.239

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

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

In the service industry, Infosys provides the results that there is a significant negative relationship between EVA and intellectual efficiency ratio, but VAIC as a whole is not having significant relationship with EVA, as it includes intellectual capital efficiency. It has shown that with decrease in the efficiency of human capital and structural capital, EVA increased. The results are consistent in accordance with study made by Arabsalehi M. et al. 2013 who have conducted their study on insurance and banking companies listed in Tehran Stock Exchange.

TCS provides the results that there is a significant positive relationship between EVA and Capital Employed Efficiency ratio, but VAIC shows that there is no significant relationship of VAICTM with EVA as VAIC is a combination of Intellectual capital Efficiency and Capital Employed Efficiency, both are interrelated. The efficiency of both together has failed to bring growth in the value addition of the company. It can be inferred that the efficiency of human capital against value addition has decreased over the years, resulting in rise of the structural capital, but the efficiency of structural capital has been decreased. Hence, there is no significant relationship between EVA and Intellectual Capital Efficiency of TCS Ltd.

Simple Regression Analysis of Components of VAICTM on EVA

Further the impact of VAICTM on EVA is studied with the help of Regression Analysis. The below is the analysis for hypothesis 1 – there is no significant impact of VAICTM and its components on EVA.

Table 4.36
Table showing Regression Results of ICE and CEE and
financial performance of Service Companies (EVA) (H1)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	EVA	0.533	3.993	0.07	Constant	1.996	0.086
					ICE	-2.175	0.066
					CEE	0.143	0.890
TCS Ltd	EVA	0.955	74.799**	0.00	Constant	-0.331	0.750
					ICE	-1.597	0.154
					CEE	9.027**	0.000

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

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

The different results are obtained in service companies.

The table shows the results of multiple regression analysis of both independent variables. The expectation was that the components ICE and CEE should be positively related to EVA. In case of Infosys Ltd, Intellectual capital efficiency is having negative t-value with no significant relation with EVA. Capital Employed efficiency is having positive t-value (0.143) but having no significant relation with EVA. Hence it can be said based on the statistical results, there is no significant relationship of ICE and CEE with EVA.

In case of TCS ltd, Physical capital efficiency is having t-value positive and significant with EVA, supporting positive and significant relationship with EVA due to the debt the company is having in the earlier years of study, which was not in Infosys Ltd. Infosys ltd is having debt in last three years of study period. In TCS due to the impact of CEE, the regression line fits the model showing a positive and significant relations with EVA with both the components together, not individual.

The data does not support Intellectual Capital Efficiency as it is having negative t-value and the relation is also not significant with EVA.

Table 4.37

Table showing Regression Results of VAICTM and financial performance of Service Companies (EVA) (H1)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	EVA	0.000	0.000	0.999	Constant	0.255	0.805
					VAIC TM	-0.002	0.999
TCS Ltd	EVA	0.169	1.622	0.239	Constant	-0.700	0.504
					VAIC TM	1.273	0.239

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

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

When the efficiency of all the resources is considered, the results supported no significant relationship of VAICTM with EVA.

In case of Infosys Ltd, the variable VAIC, has positive and statistically insignificant relationship EVA. The R2 is 0.00, shows that model explains 0% variation in EVA., i.e. the VAIC has no predictive power for change in EVA of Infosys Ltd due to negative t-value and p-value greater than 0.05. The reason behind this insignificant relationship is the relationship between its components, ICE and CEE. In Infosys both the components show opposite relationships. When CEE is increasing ICE is decreasing due to change in managerial remunerations. While employee expenses are positively correlated with value addition. This relationship results in an insignificant impact on EVA. For total efficiency the data does not support H1 for Infosys Ltd, showing insignificant relationship of Intellectual Capital (VAIC) with financial performance variable (EVA).

In case of TCS Ltd, the regression results for TCS Ltd show the relationship between the Value-Added Intellectual Coefficient (VAICTM) and Economic Value Added (EVA). The model explains 17% of the variation in EVA, as indicated by the R² value of 0.169, suggesting that

VAICTM has limited predictive power. The F-value of 1.622, with a p-value of 0.239, shows that the overall model is not statistically significant, meaning there is no strong evidence that VAIC significantly influences EVA. The constant term (-0.700) and VAICTM coefficient (1.273) are both statistically insignificant ($p = 0.504$ and $p = 0.239$, respectively), indicating that neither the baseline level of EVA nor the effect of VAICTM on EVA is statistically meaningful. The positive VAICTM coefficient has suggested that an increase in VAICTM may lead to an increase in EVA, the lack of statistical significance implies that this relationship cannot be reliably confirmed based on the current model. The data doesn't support H1 as it is not showing any significant positive relationship with EVA. These results are consistent in accordance with study made by Gianpaolo Iazzolino (2014).

Hence, the researcher supports H1 for ACC Ltd and HUL Ltd. - there is a significant positive relationship of VAIC with EVA for companies from manufacturing sector and does not support H1 for Infosys Ltd and TCS ltd. - that there is no significant positive relationship of VAIC with EVA for companies from service sector.

4.4 Gross Value Added (GVA)

Gross Value addition is evaluated as value added in the product other than bought out items of the company used in the production. This variable is considered as financial performance measurement variable on the concept of Gross Value Addition, calculated by adding back all non-bought items in the operating profit.

The initial definition of Gross Value Addition is:

$$\text{Gross Value Addition} = \text{Net Profit after tax} + \text{Employee Cost} + \text{Depreciation} + \text{Taxes on Production} - \text{Subsidies}$$

The above is the value addition by the contribution of both fixed assets and human assets. Hence it has been argued by Sinha that 'like equity share capital and preference share capital, there should human capital also' (Sinha, 2023). Hence, for the present study Gross Value Addition is evaluated as a financial performance indicator by considering the contribution made by human assets equal to the expenses incurred by the firm, to be added back in the operating profit earned by the company. The contribution by human assets includes not only employee cost but also

manager's remuneration as managers are the key part of human resource and the key contributors in earning profit of the firm. The expenses made should no more be considered as an expense and hence to be added back to operating profit to arrive at Gross Value Addition.

Below is the modified Gross Value Added method developed by the researcher:

Gross Value Added (GVA) =

Net Operating Profit After Tax + Employee Cost + Manager's Remuneration

Net Operating profit after tax has been calculated for EVA purposes, while employee benefit expenses and management remuneration taken directly from the respective companies' annual financial statements. Employee Cost has been taken from Profit and Loss Statement, while manager's remuneration presented in the Corporate Governance report of all the listed companies, hence taken from the Corporate governance report of respective companies. Expenses incurred for human resources have assumed to be the minimum return generated by the knowledge assets and hence in total net operating profit after tax, employee expenses and management remuneration are added back to arrive at Gross Value Addition (GVA) of the company.

Gross Value Addition (GVA) has been calculated by extracting the data from the respective company's annual report presented in an electronic form.

The table below shows the calculated value by the researcher based on the figures collected from the annual financial statements.

Table 4.38

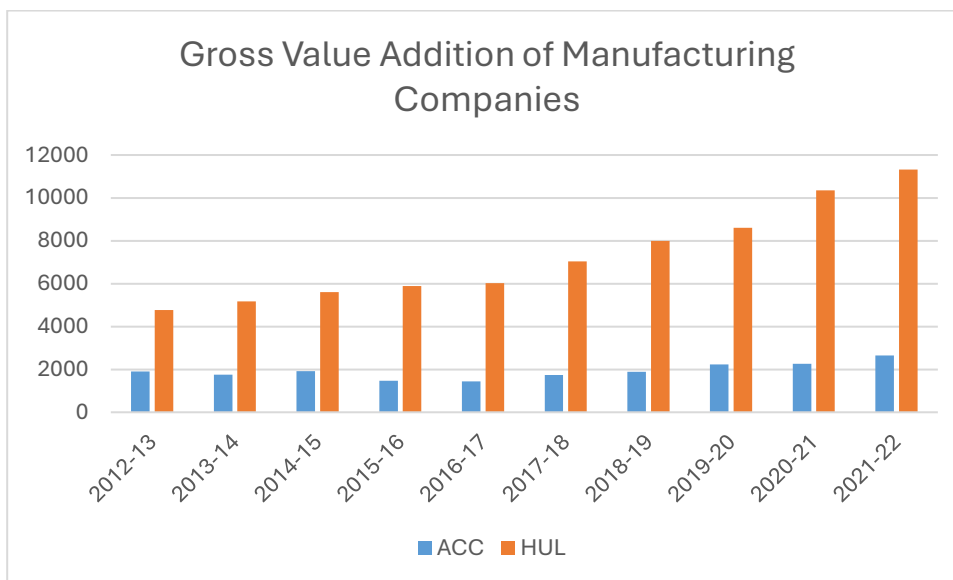
Table showing Gross Value Addition of all sample companies (Figures in Crores.)

Gross Value of Addition (GVA)	ACC	HUL	INFOSYS	TCS
2012-13	1944.3643	4757.46	31956.74	38,181.6182
2013-14	1770.7592	5166.2878	39519.27	49,258.0306
2014-15	1933.3527	5467.2799	42206.15	58,675.7921
2015-16	1479.236	5736.2301	48000.4	66,215.4116
2016-17	1448.7956	6024.0219	52053.67	88,073.3944

2017-18	1744.9888	7032.0471	54964.54	92,357.3724
2018-19	1904.8246	7993.392	60771.64	110,003.9687
2019-20	2237.6661	8602.0494	67666.082	119,146.8997
2020-21	2269.4339	10358.6791	75113.016	126,114.8401
2021-22	2665.3919	11319.4656	86374.74	146,644.6986
Average	1939.8813	7245.69129	55862.6248	89,467.2026

(Source: Calculated and Compiled by Researcher)

TCS and Infosys performed relatively well in terms of sustained growth with respect to GVA, particularly in the service sector, whereas **ACC** and **HUL** faced greater volatility, particularly in earlier years in the manufacturing sector.



Graph 4.7- Graph showing Gross Value Addition of Manufacturing sector

The data represents the Gross Value of Addition (GVA) for four companies (ACC, HUL, Infosys, and TCS) over the years 2012-2022. The values are analyzed below separately for each company:
Table showing calculated Gross Value Addition of ACC Ltd for the years of study:

Table No 4.39**Table showing Gross Value Addition of ACC Ltd.**

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Gross Value Addition (GVA)	1944.3643	1770.7592	1933.3527	1479.236	1448.7956	1744.9888	1904.8246	2237.6661	2269.4339	2665.3919	1939.8813

(Source: Calculated and Compiled by Researcher)

1. ACC: In the first year it showed Gross Value Addition is at Rs 1944.36 Cr., which has decreased to Rs 1770.7 Cr. in the year 2013-14 due to decrease in Value Addition and increased to Rs 1933.35 Cr. due to increase in value addition in the year 2014-15. It decreased in 2015-16 due to decreased value addition and operating profit of the company. The decrease has been supported by a decrease in managerial remuneration for the year 2015-16. The same trend is seen in the year 2016-17, showing decreased GVA due to decrease in NOPAT and Managerial remuneration. In the following year 2017-18, the company recovered NOPAT due to an increase in revenue profit resulting in an increase in GVA. The fluctuation trend continued till the last year of study i.e. 2021-22, owing to an increase in revenue from operation, value addition, and employee expenses and has reached its maximum at Rs 2665.39 Cr. The average GVA over the period is **1939.8813**. ACC's GVA has shown moderate growth but a lack of consistent upward trajectory, with notable variations.

Table No: 4.40**Table showing Gross Value Addition of HUL Ltd (Figures in Crores.)**

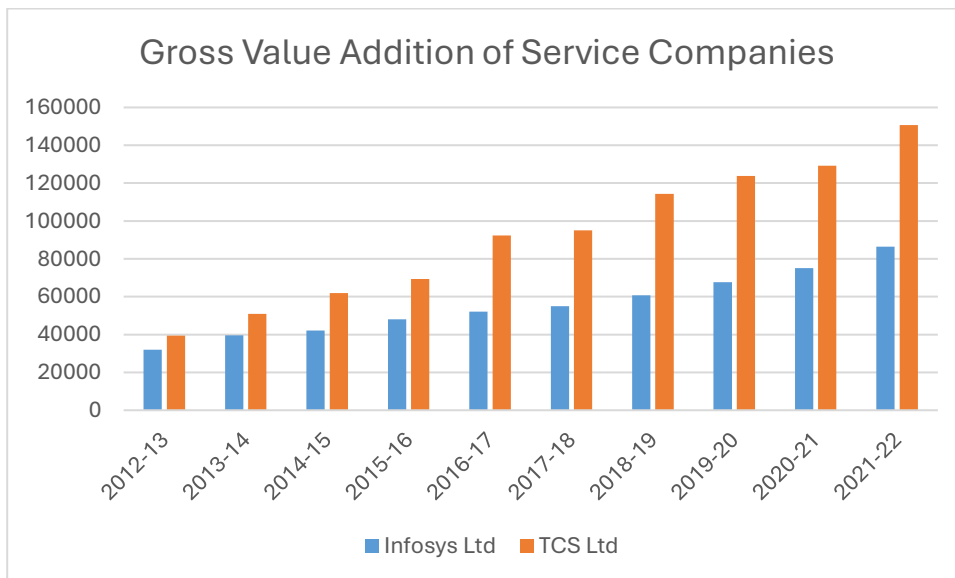
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Gross Value Addition (GVA)	4757.46	5166.2878	5467.2799	5736.2301	6024.0219	7032.0471	7993.392	8602.0494	10358.6791	11319.4656	7245.69129

(Source: Authors own calculations)

HUL Ltd demonstrated a consistent growth from 2012-13 at Rs. 4757.46 Cr. to Rs 11319.4656 Cr. in the year 2021-22, owing to constant growth of revenue profit over the years with an increase in employee expenses constantly over the year. The GVA grew steadily, reaching a maximum of Rs **11319.4656 Cr.** in 2021-22. The average GVA over the period is Rs. **7245.69129 Cr.**

In manufacturing companies, ACC Ltd. showed fluctuating results for GVA, while HUL Ltd showed an increasing trend. In the years 2014-15 and 2015-16, both companies are showing different trends, i.e. ACC Ltd GVA has been decreased while HUL Ltd increased. In the rest of the year HUL Ltd., has shown increasing trend and ACC Ltd shows stability in GVA. As in the years of negative EVA, operating profit of ACC Ltd is less compared to earlier years, but due to increase in employee expenses and remuneration of managers the GVA shows a steady trend. To summarise, HUL Ltd., showed an increasing trend for the period of study, while even the company is facing critical phases as EVA was negative, due to employee expenses and managerial remuneration, GVA remains stable with little fluctuations in decrease trend. Still ACC Ltd., showed rise in the GVA in 2021 compared to 2012.

Service Companies



Graph 4.8- Graph showing Gross Value Addition of Service sector

Infosys Ltd : the following table shows the calculated Gross value Addition of Infosys Ltd.

Table No 4.41

Table showing Gross Value Addition of Infosys Ltd (Figures in crores)

Years	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Gross Value Addition (GVA)	31956.74	39519.27	42206.15	48000.4	52053.67	54964.54	60771.64	67666.082	75113.016	86374.74	55862.6248

(Source: Calculated by Researcher)

Infosys showed a robust growth throughout the years, increasing from Rs 31956.74Cr. in 2012-13 to Rs. 86374.74 Cr. in 2021-22. A steady rise in GVA has been due to steady increase in the value addition, employee expenses and managerial remuneration over the years, with a peak at 2021-22. The average GVA is Rs. **55862.6248Cr.**, reflecting strong gross performance of the company.

Table No 4.42

Table showing Gross Value Addition of TCS Ltd (Figures in Crores)

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Gross Value Addition (GVA)	38,181.62	49,258.03	58,675.79	66,215.41	88,073.39	92,357.37	110,003.97	119,146.90	126,114.84	146,644.70	89,467.20

(Source: Calculated by Researcher)

TCS exhibited the most significant growth among the companies, starting from Rs. 38181.618 cr. in 2012-13 and reaching Rs. 146644.7 Cr. in 2021-22 among all the sample companies under study. GVA growth has shown consistent upward trend, with the highest value of Rs. **146644.7 Cr.** in 2021-22. The average GVA is Rs. **88788.498 Cr.**, indicating the highest performance in the data set. GVA increased almost 5 times in the 10 years of study. The growth has been due to

an increase in Net Operating Profit after tax and an increase in employee expense, while managerial remuneration remains almost stable in 10 years of study.

Year-wise Analysis

- 2012-13: ACC and HUL started with relatively lower GVAs, while Infosys and TCS have higher figures.
- 2015-16: A significant dip in ACC's GVA and moderate increases in HUL, Infosys, and TCS.
- 2016-17 to 2021-22: All companies, especially Infosys and TCS, have shown strong growth, with the technology companies (Infosys, TCS) outpacing ACC and HUL significantly.

Conclusion

In service companies, Infosys Ltd., has shown increasing trend but the growth ratio is not in higher percentage as compared to TCS Ltd. It shows steady growth. TCS Ltd., the GVA is increasing in higher ratios. GVA of TCS becomes three times in the year of study, while the knowledge assets expenses become five times and that shows the three fold increase in GVA. While for Infosys, knowledge assets expense become three times and NOPAT is two fold, hence the GVA only increases nearly three times. HUL Ltd., shows steady and consistent growth, while ACC Ltd., shows volatility in its GVA figures. This has revealed that the GVA is affected more by the Knowledge assets expenses in the service company than in the manufacturing companies. VAICTM evaluates the efficiency of the firm's intellectual capital in generating value, which influenced the overall profitability and performance of the company. GVA has represented the profit earned from the core, excluding finance cost and non-operating items and adding the cost of employees and management. Effective utilization of VAIC has translated into an increase in profitability of the company. It resulted in better financial performance, including higher NOPAT showing contribution of intellectual capital to generate higher value from intangibles (Pulic, 1998; Chen et al., 2005). The same relationship has been analysed below with the help of Pearson Correlation Coefficient.

4.4.1 Correlation Analysis of GVA with VAICTM

This relationship of GVA with VAICTM is shown by correlation coefficient. The results is as follows:

Correlation of GVA with VAICTM and its components Intellectual Capital Coefficient and Capital Employed Efficiency of all the companies.

Manufacturing Industry

Table No. 4.43

Table showing Correlation Results of VAICTM and GVA of Manufacturing Companies

ACC Ltd		ICE	CEE	VAIC ^T _M	HUL Ltd	ICE	CEE	VAIC TM
GVA	Pearson Correlation	.774*	-.057	.754*		.840**	-.817**	.224
	Sig. (2-tailed)	.009	.875	.012		.002	.004	.534

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

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

Correlation of GVA with both the components and VAIC provides the mixed results. In ACC Ltd ICE and VAIC have significant correlation with GVA. This shows that ICE and VAIC both contributed to generating value addition including human resource cost. In HUL Ltd. both components have significant correlation but ICE is having positive correlation while CEE is having negative correlation, resulting in no significant correlation of VAIC with GVA.

The p-value is below 0.05 for ICE and VAIC in ACC Ltd, the correlation between variables shows true association between variables. While capital employed efficiency is negative, this shows with an increase in capital employed efficiency gross value addition decreases, showing an inverse relationship. This has shown that when the company increase its employee expenses and managerial remuneration, tangible assets share decreases showing an inverse relationship with GVA.

HUL ltd is a manufacturing company, where tangible assets and financial assets have a significant impact on gross value addition, but the relationship is negative showing that with increase in GVA, physical and financial capital efficiency is decreasing, but for intellectual capital efficiency it shows positive significant relationship, which shows with increase in intellectual capital efficiency, GVA also increases. This has shown that there is a significant relationship between all components and GVA separately, but when we compare the total efficiency of all tangible and

intangible assets i.e. VAIC, then there is no significant correlation. As the significance is more than 0.05, correlation is due to random variation and not a true association between variables.

4.4.2 Regression Analysis of Components of VAICTM and VAICTM on GVA

Table no 4.44

**Table showing Regression Results of ICE and CEE and
GVA of Manufacturing Companies**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	GVA	0.828	16.824**	0.002	Constant	2.020	0.83
					ICE	5.789**	0.001
					CEE	- 3.044**	0.019
HUL Ltd	GVA	0.949	65.140**	0.000	Constant	-0.427	0.682
					ICE	6.220**	0.000
					CEE	- 5.784**	0.001

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

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

The table shows the results of multiple regression analysis of both independent variables. The expectation was that the components ICE and CEE should be positively related to GVA. In case of ACC Ltd, both the components have significant relationship with GVA with ICE positive and CEE negative relation, resulting into significant R2 with 82%. HUL Ltd gave the similar results with positive and significant relationship of ICE with GVA with t-value positive and significant and negative and significant relationship of CEE with GVA with t-value negative and significant. It has inferred that no positive significant relationship of CEE on GVA. In ACC ltd 82.8% variance in GVA is explained by both components together, while in HUL ltd, 94% of variance in GVA is explained by both independent variables together.

Thus, the regression equation for framed for ACC Ltd. is:

$$GVA = 2.020 + (5.789 \times ICE) - (3.044 \times CEE)$$

Thus, the regression equation for HUL Ltd. is:

$$GVA = -0.427 + (6.220 \times ICE) - (5.784 \times CEE)$$

For **ACC Ltd. And HUL Ltd**, the coefficients for ICE and CEE are significant, with ICE having a strong positive influence and CEE having a negative influence on GVA.

Table No. 4.45

Table showing Regression Results of VAICTM and GVA (H2)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	GVA	0.568	10.520	0.012**	Constant	-0.882	0.994
					VAIC	3.234	0.012**
HUL Ltd	GVA	0.050	0.423	0.534	Constant	0.223	0.829
					VAIC	0.650	0.534

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

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

The impact of Efficiency of total resources on GVA is calculated where ACC Ltd., has significant and positive t-value with high R2 value. For total efficiency the data supports H2, where it can be said that there is a significant and positive impact of VAIC on GVA of ACC Ltd., In HUL Ltd., efficiency of total resource on GVA has no significant t-value and f-value showing no significant and positive impact of VAIC on GVA of HUL Ltd., and the data doesnot support H2.

ACC Ltd: R2 indicates that 56.4% variance in GVA has been explained by VAICTM, suggesting a moderate fit of the model. F-value indicates that the overall model is statistically significant with a p-value of 0.012, showing a significant contribution of VAIC in explaining the variability in GVA. The intercept has not been statistically significant (t-value = 0.404), indicates no significant contribution when VAIC is zero. The positive coefficient for VAIC, which is statistically significant (p = 0.012), suggests that VAICTM has a positive and significant impact on GVA. The support of t-value further showed the importance of VAIC in predicting GVA.

The regression equation for ACC Ltd. is:

$$\text{GVA} = -0.882 + 3.234 \times \text{VAIC}^{\text{TM}}$$

HUL Ltd: R2 indicates that only 5 % of the variance in GVA is explained by VAICTM, suggesting a relatively weak model. The F-value indicates that the model is not statistically significant at conventional levels (p = 0.059). This suggests that the explanatory power of VAICTM on GVA is not strong. The intercept is not statistically significant (t-value = 0.223), explaining no meaningful impact when VAIC is zero. The coefficient for VAICTM is positive and but not

statistical significant ($p = 0.534$). This suggests that VAICTM may have a positive impact on GVA, but the evidence is not strong enough to confirm this with high confidence.

$$GVA = 0.223 + 0.650 \times VAIC^{TM}$$

For ACC Ltd, VAICTM is a significant and positive predictor of GVA, as indicated by the moderate R², significant F-value, and positive coefficient for VAICTM suggesting that intellectual capital played a substantial role in the company's value-added creation. It supports H2.

In contrast, for HUL Ltd, the impact of VAICTM on GVA is weaker, as shown by the lower R² and a non-significant p-value for the model. Although VAICTM has positive coefficient, the lack of strong statistical significance indicated its impact on GVA less certain. The regression is only 5%, which says 5% prediction of changes in GVA is due to changes in VAIC indicating no very weak relation. Hence it does not support H2.

For **ACC Ltd.**, the model is significant, indicating a positive relationship between VAICTM and GVA. For ACC Ltd hypothesis is supported by the t-value and significance value and conclude that there is a significant positive relationship of VAIC with GVA.

For **HUL Ltd.**, the model is not significant, suggesting that VAICTM does not have a meaningful impact on GVA in this case. For HUL Ltd we failed to support hypothesis and conclude that there is no significant and positive relationship of VAIC with GVA.

Service Industry

Table showing Pearson Correlation of VAIC with GVA of Service Companies.

Table No. 4.46

Table showing Correlation Results of VAICTM and GVA of Service Companies.

	Infosys Ltd	ICE	CEE	VAIC TM	TCS Ltd.	ICE	CEE	VAIC TM
	Pearson Correlation	-0.802**	0.548	0.044	Pearson Correlation	-0.816**	0.918**	0.192
GVA	Sig. (2-tailed)	.005	.101	.905	Sig. (2-tailed)	.004	.000	.595

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

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

(Author's Own Calculation)

Infosys Ltd., is a knowledge based service company, where the share of knowledge assets will be more compared to tangible assets. Human capital efficiency in Infosys Ltd has shown a

downward trend while GVA has shown an increasing trend, resulted in a negative correlation but is significant, means with decrease in efficiency of human capital, there is an increase in GVA. While Capital employed efficiency shows increasing trend and having positive correlation between both the variables. Negative and positive relation between components shows no significant relation of VAICTM with GVA.

TCS Ltd., is a knowledge based service company, where the share of knowledge assets will be more compared to tangible assets. Human capital efficiency has shown a downward trend while GVA has shown an increasing trend, resulting in a negative correlation, but the correlation is significant, that means with decrease in efficiency of human capital, there is an increase in GVA. The opposite is with Capital employed efficiency, which shows an increasing trend and having significant relation with GVA. Due to negative and positive relation of both the components overall VAICTM is not having any significant relation with GVA.

Further the impact of VAICTM on GVA is studied with the help of Regression Analysis. Below is the analysis for hypothesis 2 – there is no significant impact of VAICTM and its components on GVA.

Service Industry

Table No 4.47

Table showing Regression results of ICE and CEE and GVA (H2)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	GVA	0.650	6.504	0.025**	Constant	2.327	0.053
					ICE	- 2.645**	0.033
					CEE	0.381	0.715
TCS Ltd	GVA	0.968	105.270	0.000*	Constant	2.524	0.040
					ICE	- 5.222**	0.001
					CEE	8.109**	0.000

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

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

Infosys Ltd

R^2 0.650 indicated that 65% of the variance in GVA has been explained by the model, suggesting a good fit. F-value (6.504) interprets overall model is statistically significant ($p = 0.025$), implying that the independent variables ICE and CEE collectively explain GVA variation and collectively can predict the value of GVA. Coefficient of constant 2.327 is not statistically significant (t-value = 0.053), indicating that it does not significantly impact GVA when the independent variables are zero, that means it does not meaningfully contribute to the model's prediction. Coefficient of ICE (-2.645) is negative and is marginally non-significant ($p = 0.033$), suggesting that higher ICE may have a negative effect on GVA and the evidence is strong. Negative ICE contribute in predicting GVA. CEE (0.381) coefficient is not statistically significant ($p = 0.715$), indicating that CEE does not have a significant impact on GVA. Hence the data fails to support the hypothesis H2 and H2, that there is no significant positive relationship of ICE and CEE with the financial performance (GVA).

The regression equation of Infosys Ltd is:

$$\text{GVA} = 2.327 - (2.645 \times \text{ICE}) + (0.381 \times \text{CEE})$$

TCS Ltd

R^2 has indicated that 96.8% of the variance in GVA is explained by the model, showing an excellent fit. F-value 105.270 shows that the model is highly significant ($p < 0.05$), indicating strong explanatory power of the independent variables. Coefficient of constant is statistically significant (t-value = 2.524), suggesting the impact of constant term when ICE and CEE are zero. The negative coefficient of ICE is highly significant ($p = 0.001$), indicating a strong negative impact of ICE on GVA, but as it is negative, it fails to support H2a. The positive coefficient of CEE is highly significant ($p = 0.000$), showing a strong positive impact of CEE on GVA, hence data support H2b, and has been inferred that Capital employed efficiency have significant positive relationship with Gross value added.

The regression equation for TCS Ltd. is:

$$\text{GVA} = 2.524 - (5.222 \times \text{ICE}) + (8.109 \times \text{CEE})$$

In both companies, **ICE** has a negative impact on GVA, while **CEE** has a positive effect. The **constant** is not significant ($p\text{-value} > 0.05$) in Infosys model, while it is significant in TCS model indicating that the intercept is not reliably different from zero in Infosys Ltd. This does not affect the interpretation of ICE and CEE.

Table No 4.48

Table showing Regression Results of VAICTM and financial performance of Service Companies (GVA) (H2)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	GVA	0.002	0.015	0.905	Constant	0.110	0.915
					VAIC TM	0.124	0.905
TCS Ltd	GVA	0.037	0.306	0.595	Constant	-0.117	0.910
					VAIC TM	0.553	0.595

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

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

Infosys

R² is 0.002 is very low, indicating that only 0.2% of the variance in GVA is explained by VAICTM, suggesting a poor fit. F-value 0.015 is not statistically significant (p = 0.905), indicating that VAICTM does not significantly explain GVA. The variation is random and not due to the VAIC. Coefficient of constant is not statistically significant (t-value = 0.110), showing it has no meaningful impact on GVA. The coefficient of VAICTM is positive but not significant (p = 0.905), indicating VAICTM does not have a significant impact on GVA. Hence data fails to support H2.

The regression equation for Infosys Ltd. is:

$$\text{GVA} = 0.110 + 0.124 \times \text{VAIC}$$

TCS R² (0.037) is low, suggesting only 3.7% of the variance in GVA is explained by VAICTM, which indicates a poor fit. F-value (0.306) is not statistically significant (p = 0.595), showing VAICTM does not significantly explain the variation in GVA. Coefficient of constant (-0.117) is not statistically significant (t-value = 0.910), indicating minimal impact on GVA. VAICTM (0.553) coefficient is not significant (p = 0.595), showing no significant impact of VAICTM on GVA. Hence based on data measured, the researcher fails to support H2.

The regression equation for TCS Ltd. is:

$$\text{GVA} = -0.117 + 0.553 \times \text{VAIC}$$

Both models (Infosys and TCS) show **low R² values**, indicating that VAICTM explains very little of the variance in GVA for service sector companies (ACC Ltd and HUL Ltd.,. Lower t-value indicates stronger evidence towards null hypothesis that the variable has no significant impact

on dependent variable. The **F-values** and **p-values** has suggested no model is statistically significant, meaning VAIC is not a reliable predictor of GVA for either company. The **coefficients** for VAICTM are positive for both Infosys (0.124) and TCS (0.670), but the relationships are not significant, as indicated by the high **p-values** (0.905 for Infosys, 0.522 for TCS). In both cases, the t-values are small, and the p-values are greater than 0.05, suggesting that neither the constant nor VAICTM has a statistically significant impact on GVA for Infosys or TCS.

Hence it can be summarised that researcher support H2 hypothesis for manufacturing firm due to positive significant relationship of Intellectual Capital (VAICTM) with Gross Value Added(GVA) for both manufacturing companies while researcher fails to support hypothesis i.e. there is no positive significant relationship of Intellectual Capital (VAICTM) with Gross Value Added(GVA) for service companies.

4.5 Market Capitalisation (MCap)

Market Price of the company reflects the performance of the company. The effect of decisions taken, policy framed and the performance in the terms of profit earned annually and quarterly is reflected in the share price of the company, hence market capitalization variable is selected for measuring the performance of the company. Decision taken by key management personal will have immediate impact on the market price and that will change market capitalisation of the company. Pulic 1998 supported by giving the opinion that firm with efficient intellectual capital management measured by VAIC are in a better position to generate value and enhance their market valuation (Pulic, 1998). Hence to measure the impact of Intellectual Capital, Market capitalization has been selected as one of the financial performance matrix which is to be considered in the present study.

It is calculated by taking the average market price of the company's share, considering number of outstanding shares of the company for year. For market price the closing market price of each day will be considered and taking the average of the whole year has been the average market price of the company, outstanding shares of the company will be taken from the balance sheet of each year of all the companies under study from the issued and paid up capital part of the share capital. The researcher has calculated considering both i.e. Number of Outstanding Shares and Average Closing price of the share for the whole year, the market capitalization has been measured accordingly for the all the years of study.

Market Capitalisation: Average Closing Price of the share x No. of Shares Outstanding

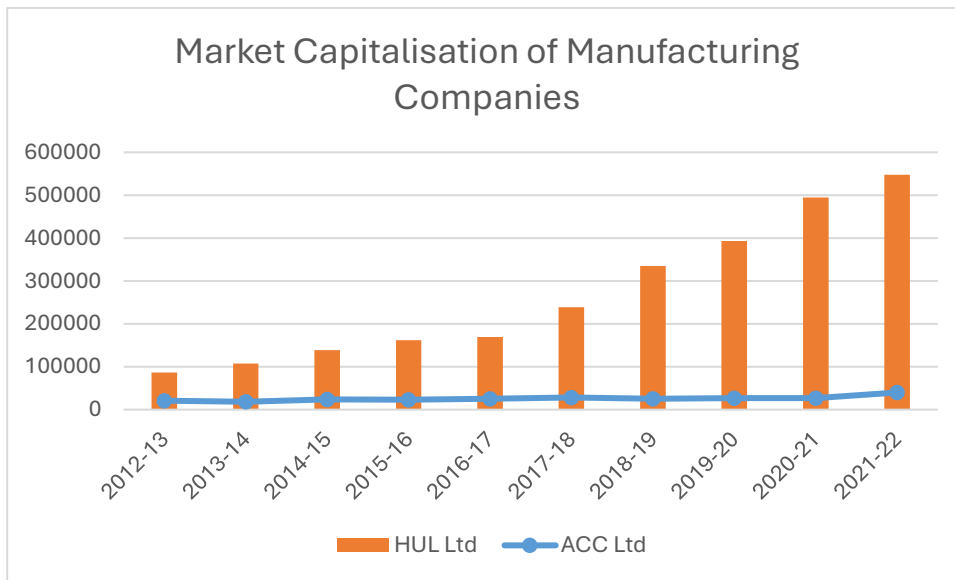
Below is the calculated Market capitalization of the sample companies presented in crores.

Table No. 4.49

**Table showing Market Capitalization(MCap) of all the sample companies.
(Amount in Crores)**

Year	ACC	HUL	INFOSYS	TCS
2012-13	20525.92937	86843.06	13972.97	102663.1369
2013-14	18234.73843	107078	17455.08	184292.8936
2014-15	23797.00373	138635.8	43631.57	202590.8515
2015-16	22815.68238	162183.9	102623.93	209520.52
2016-17	24957.87426	169649.6	103305.42	209583.8074
2017-18	28635.37271	238688.9	94502.43	222746.1847
2018-19	25312.68477	334769.9	259840.03	648759.1023
2019-20	26526.04932	392973.1	290312.25	738910.3797
2020-21	26942.89161	494406.8	410905.78	889774.9278
2021-22	39898.50376	547642.4	674284.24	1237686.135

(Source: Calculated and Compiled by Researcher)



Graph 4.9 Graph showing Market Capitalisation of manufacturing sector

Table No. 4.50

Table showing calculated Market Capitalisation of ACC Ltd (Figures in Crores)

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Mcap(in Cr.)	20525.929	18234.738	23797.004	22815.682	24957.874	28635.373	25312.685	26526.049	26942.891	39898.504

Source: Calculated and Compiled by Researcher)

The above calculated Market Capitalisation of ACC Ltd., inferred that it remains steady till 2020-21, even though the company's earnings decreasing with negative EVA in three subsequent years. It shows a decrease from Rs 23797 Cr. to Rs 22815 Cr in 2015-16 . Later the company is able to recover the market capitalisation even in the years of negative EVA till 2017, but when EVA falls in 2018, there is a fall in market capitalisation. So it can be explained that for ACC Ltd, market capitalization has a direct impact of EVA for the company, while EVA is having the component of operating profit of the company showing effect in market capitalisation due to the profit earned by the company.

Table No. 4.51

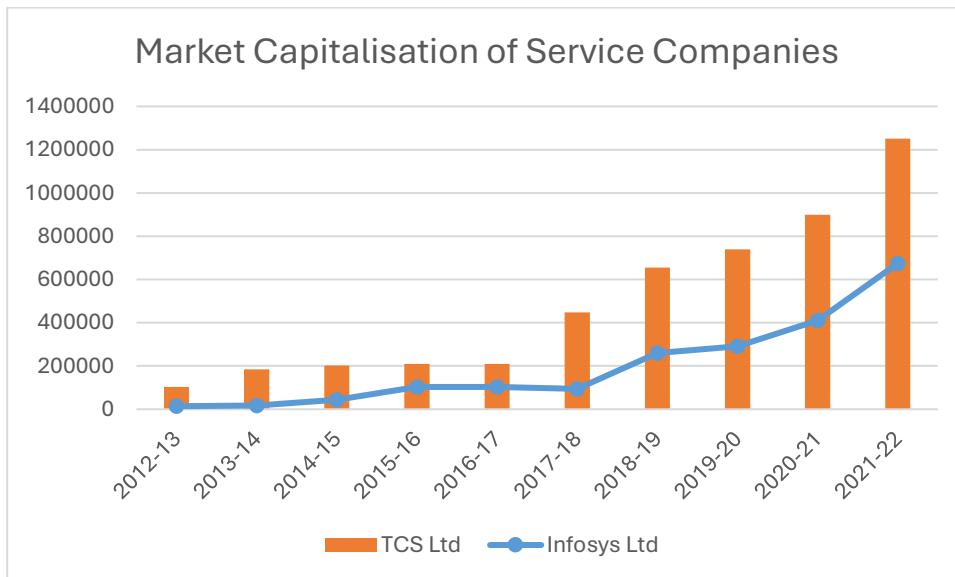
Table showing calculated Market Capitalisation of HUL Ltd

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
MCa p	86843.0 6	10707 8	138635. 8	162183. 9	169649. 6	238688. 9	334769. 9	392973. 1	494406. 8	547642. 4

(Source: Calculated and Compiled by Researcher)

HUL Ltd., showed an increasing trend over the years of study. It is due to the constant increase in operating profit of the company. Market Capitalisation increases from Rs 86843.06 Cr in the year 2012-13 to Rs 547642.4 Cr in 2021-22 showing almost 7 fold increase in market capitalization due to constant increase in Net Operating profit of the company.

Service Companies



Graph 4.10 Graph showing Market Capitalisation Infosys Ltd., and TCS Ltd.,

Table No. 4.52**Table showing Calculated Market Capitalisation of Infosys Ltd**

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
MCap (Figures in Cr.)	13972.97	17455.08	43631.57	102623.93	103305.42	94502.43	259840.03	290312.25	410905.78	674284.24

(Source: Calculated and Compiled by Researcher)

Infosys Ltd showed a steady growth in Market capitalisation with a steady growth of Average Market price per share in the year of study. Infosys Ltd., has been regularly issuing Employee Stock Option shares to its employees resulting in a steady increase in number of outstanding shares of Infosys, while Infosys Ltd., has issued Bonus shares in the ratio of 1:1 in the years 2014-15, 2015-16 and 2018-19. Infosys Ltd. has gone for buyback of shares in the year 2017-18, 2018-19, 2019-20 and 2021-22. In all the years of study, only in the year 2017-18, Infosys Ltd has shown a fall in Market Capitalisation in absolute terms in relation to the year 2016-17 from 103305.42 to 94502.43. In the year 2017-18 the company has gone for buy-back of shares which decreases the number of outstanding shares and the average market price of shares, resulting in decrease of Market Capitalisation. Rest of the year Average Market price per shares increases compare to previous year average market price per share which resulted in increased market capitalization of Infosys Ltd. This shows a steady growth of Market Capitalisation of Infosys Ltd.

Table No 4.53**Table showing Market Capitalisation of TCS Ltd for the year of study**

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
MCap (Figure s in Cr.)	102663.1	184292.9	202590.9	209520.5	209583.8	222746.2	648759.1	738910.4	889774.9	1237686

(Source: Calculated and Compiled by Researcher)

TCS Ltd showed Market capitalisation at Rs 102633.1 Cr. in the first year of study i.e. 2012-13, which increases steadily year to year and reaches to Rs 1237686 Cr. in the year 2021-22, i.e. almost 10 times in 10 years of study. The company issued new shares in the years 2013-14 and 2015-16 resulting in an increase in number of shares outstanding, while company had also gone for buy back of shares in the year 2017-18, 2018-19, 2020-21 and 2021-22. The company issued

bonus shares in the year 2018-19, resulting in an increase in number of shares outstanding and thereby increase in market capitalization, while buyback of shares resulted in decrease in number of shares outstanding. The effect of buy-back of shares has decreased due to the issue of equity shares in the year 2018-19 in the form of bonus shares. The result of these events made Market capitalization threefold from Rs 222746.2 Cr in the year 2017-18 to Rs 648759.1 Cr. in the year 2018-19. As the company has gone for buy-back of shares, the outstanding equity shares decreased but the average market price of shares increases, resulting in an increase of market capitalization of company. TCS Ltd has shown growth in market capitalization over the years of study, but till 2017-18 it showed steady growth but after the bonus issue there is an increasing trend in TCS Ltd.

4.5.1 Correlation Analysis of Market Capitalization with VAICTM and its components.

Table 4.54

Table showing Correlation results of VAIC and Market Capitalisation of Manufacturing Companies

	ACC Ltd	ICE	CEE	VAIC	HUL Ltd	ICE	CEE	VAIC
MCap	Pearson Correlation	0.228	-0.518	0.194		0.875**	-0.789**	0.283
	Sig. (2-tailed)	0.527	0.125	0.591		0.001	0.007	0.427

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

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

Correlation of GVA with both the components and VAIC provides the results that all the components of ACC Ltd., does not have significant correlation between them but in HUL Ltd., there data reveals significant correlation between components of VAIC and GVA and no significant correlation between VAIC and GVA. For ACC Ltd, it showed a weak positive correlation between MCap and ICE (0.228) and VAIC (0.194), and a moderate negative correlation with CEE (-0.518). However, none of these correlations are statistically significant ($p > 0.05$). In contrast, for HUL Ltd, there is a strong positive correlation between MCap and ICE (0.875, $p = 0.001$) and a strong negative correlation with CEE (-0.789, $p = 0.007$), both of which are statistically significant. The correlation with VAIC (0.283) is positive but not statistically

significant ($p = 0.427$). This suggests that intellectual capital (ICE) has a more significant impact on market capitalization for HUL Ltd compared to ACC Ltd.

4.5.2 Regression Analysis of Market Capitalization with VAICTM and its components.

Table 4.55

**Table showing Regression results of ICE and CEE and
Market Capitalisation of Manufacturing Companies (MCap)**

Company	Dependent Variable	R ²	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	MCap	0.685	7.594	0.018**	Constant	3.974**	0.005
					ICE	3.039**	0.019
					CEE	-3.747**	0.007
HUL Ltd	MCap	0.964	92.682	0.000*	Constant	-3.352**	0.012
					ICE	8.100**	0.000
					CEE	-6.172**	0.000

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

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

The table shows the results of regression analysis of both, one dependent variable market capitalization (MCap) and two independent variables, ICE (Intellectual Capital Efficiency) and CEE (Capital Employed Efficiency) for ACC Ltd and HUL Ltd. In case of ACC Ltd, the model explains 68.5% of the variance in MCap ($R^2 = 0.685$) and is statistically significant ($F = 7.594$, $p = 0.018$). The constant and both independent variables, ICE ($t = 3.039$, $p = 0.019$) and CEE ($t = -3.747$, $p = 0.007$), significantly influence MCap, with ICE having a positive impact and CEE a negative one.

For HUL Ltd, the model shows a much stronger fit, explaining 96.4% of the variance in MCap ($R^2 = 0.964$), and the overall model is highly significant ($F = 92.682$, $p = 0.000$). Like ACC Ltd, ICE has a positive significant effect on MCap ($t = 8.100$, $p = 0.000$), while CEE has a significant negative effect ($t = -6.172$, $p = 0.000$). The stronger explanatory power in HUL Ltd indicated a more robust relationship between intellectual capital and market capitalization compared to ACC Ltd due to an increase in value addition which results in increase in market capitalisation.

Table 4.56

**Table showing Regression results of VAIC and
Market Capitalisation of Manufacturing Companies (MCA) (H3)**

Company	Dependent Variable	R ²	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	MCA	0.038	0.313	0.591	Constant	1.261	0.243
					VAIC	0.559	0.591
HUL Ltd	MCA	0.080	0.699	0.427	Constant	-0.386	0.709
					ICE	0.836	0.427

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

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

The table showed the results of a regression analysis for the impact of VAIC (Value Added Intellectual Co-efficient) on market capitalization (MCA) for ACC Ltd and HUL Ltd. For ACC Ltd, the model explained only 3.8% of the variation in MCA ($R^2 = 0.038$), and the overall model is not statistically significant ($F = 0.313$, $p = 0.591$). Neither the constant ($t = 1.261$, $p = 0.243$) nor VAIC ($t = 0.559$, $p = 0.591$) has a significant impact on MCA.

Similarly, for HUL Ltd, the model explains only 8% of the variation in MCA ($R^2 = 0.080$) and is also not statistically significant ($F = 0.699$, $p = 0.427$). Both the constant ($t = -0.386$, $p = 0.709$) and ICE ($t = 0.836$, $p = 0.427$) failed to show a significant effect on market capitalization. In summary, the analysis suggests that neither VAIC nor ICE has a meaningful influence on MCA for these companies.

These results supported to infer that aggregate measure may not capture the precise drivers for the market capitalization as its components can. Hence components have more power to predict compared to VAIC. This shows that the researcher failed to reject null hypothesis and so, it can be said that there is no significant impact of Intellectual Capital Efficiency (VAIC) on Market Capitalisation(MCA) for manufacturing companies.

Service Industry

Table 4.57

Table showing Correlation results of VAIC and Market Capitalisation of Service Companies

Infosys Ltd		ICE	CEE	VAIC	TCS Ltd	ICE	CEE	VAIC
MCap	Pearson Correlation	-0.723**	0.702**	0.298		-0.563**	0.977**	0.519
	Sig. (2-tailed)	0.018	0.024	0.403		0.090	0.000	0.124

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

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

The table shows the Pearson correlation between Market Capitalization (MCap) and three variables—ICE (Intellectual Capital Efficiency), CEE (Capital Employed Efficiency), and VAIC (Value Added Intellectual Co-efficient)—for Infosys Ltd and TCS Ltd.

For Infosys Ltd, there has been a strong negative correlation between MCap and ICE (-0.723, $p = 0.018$), meaning as ICE decreases, MCap tends to increase. There has been a strong positive correlation with CEE (0.702, $p = 0.024$), indicating that when capital is being used more efficiently, market capitalization increases. However, the correlation with VAIC (0.298, $p = 0.403$) is weak and not statistically significant.

For TCS Ltd, there is a very strong positive correlation between MCap and CCE (0.977, $p = 0.000$), showing that higher capital employed efficiency leads to a significant increase in market capitalization. On the other hand, there has been a moderately strong negative correlation between MCap and ICE (-0.623, $p = 0.054$), although it is not quite statistically significant. The correlation with VAIC (0.519, $p = 0.126$) is positive but not statistically significant.

In summary, intellectual capital efficiency(ICE) plays a significant role in influencing market capitalization for both companies, but the direction of the relationship differs. The same is the result of manufacturing companies.

Table 4.56

**Table showing Regression results of ICE and CEE
and Market Capitalisation of service sector (H3)**

Company	Dependent Variable	R ²	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	MCap	0.636	6.114**	0.029	Constant	1.018	0.343
					ICE	-1.660	0.141
					CEE	1.472	0.185
TCS Ltd	MCap	0.955	73.541**	0.000	Constant	-3.156**	0.016
					ICE	-0.047	0.964
					CEE	9.916**	0.000

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

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

The table presents regression analysis results for the impact of ICE (Intellectual Capital Efficiency) and CEE (Capital Employed Efficiency) on market capitalization (MCap) for Infosys Ltd and TCS Ltd.

In case of Infosys Ltd, the model explains 63.7% of the variation in MCap ($R^2 = 0.636$) and is statistically significant ($F = 6.114$, $p = 0.029$). However, neither ICE ($t = -1.660$, $p = 0.141$) nor CEE ($t = 1.472$, $p = 0.185$) shows a statistically significant effect on MCap, indicating that while the model fits, the individual contributions of ICE and CEE are not strong predictors of market capitalization due to the bonus shares issued by the company in this study period. Due to bonus shares there is a big impact in market capitalization, but in relation to it intellectual capital efficiency and capital employed efficiency is not increasing in that proportion, resulting in no significant impact on Market Capitalisation of both the efficiencies individually, but together model shows a statistically significant relationship with Market Capitalisation.

In case of TCS Ltd, the model has a much stronger fit, explaining 94.3% of the variation in MCap ($R^2 = 0.943$) and is highly significant ($F = 57.762$, $p = 0.000$) when both tangible and intellectual capital are combined in the model. Individually, CEE has a significant positive effect on MCap ($t = 9.916$, $p = 0.000$), showing that more efficient use of capital strongly drives market capitalization. In case TCS Ltd. ICE, however, does not have a significant impact ($t = -0.047$, $p = 0.964$) same as Infosys Ltd., as TCS has also announced bonus shares in 2018-19, which results

in increase in the market capitalization in last 4 years. Hence both the companys' individual components is not having impact on the market capitalization of the company.

In summary, capital employed efficiency (CEE) played a critical role in influencing TCS Ltd's market capitalization, while in case of Infosys Ltd, neither ICE nor CEE showed significant individual effects, despite the overall model fits in case of market capitalisation.

Table 4.59

**Table showing Regression results of VAIC and
Market Capitalisation of Service sector companies (H3)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	MCAp	0.089	0.778	0.403	Constant	-0.812	0.440
					VAIC	0.883	0.403
TCS Ltd	MCAp	0.178	2.955	0.124	Constant	-1.476	0.178
					VAIC	1.719	0.124

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

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

The table shows the result of regression analysis for the effect of VAIC (Value Added Intellectual Co-efficient) on market capitalization (MCAp) in case Infosys Ltd and TCS Ltd.

In case Infosys Ltd, the model explains only 8.9% of the variance in MCAp ($R^2 = 0.089$) and is not statistically significant ($F = 0.778$, $p = 0.403$). Neither the constant ($t = -0.812$, $p = 0.441$) nor VAIC ($t = 0.882$, $p = 0.403$) has a significant impact on market capitalization, indicating that VAIC failed to predict meaningfully MCAp in case of Infosys Ltd.

In case TCS Ltd, the model explains 17.8% of the variation in MCAp ($R^2 = 0.178$) but is not statistically significant ($F = 2.955$, $p = 0.124$). Similarly, both the constant ($t = -1.476$, $p = 0.178$) and VAIC ($t = 1.719$, $p = 0.124$) failed to show significant effects on MCAp.

In summary, VAIC does not have a significant influence on market capitalization for either Infosys Ltd or TCS Ltd based on these results. Hence the researcher fails to reject null hypothesis and so it can be said that, there is no significant impact of Intellectual Capital Efficiency (VAIC) on Market Capitalisation (MCAp) for service companies.

In conclusion, VAIC does not have a significant influence on market capitalization for all the sample companies supported by the data and the above results.

4.6 Net Value Added:

These variable measures the performance of the company by calculating net income earned by the company. The formula for net income earned- derived is as follows and given the term Net Value Addition(NVA):

Net Value Addition: Net Operating Profit After Tax + Other Income

NVA considers operating profit earned after tax, which has already been calculated during calculation of Economic Value Added and other income disclosed in Profit and loss statement under revenue is to be added. Net value addition showed the total income earned by company including non-operating income. The income includes operating income from regular business activities and non-operating income, the income earned from other sources such as investments in mutual funds, stocks and debentures. The income earned from both the sources has been with the help of all the resources, tangible and the intangible of the company. Other income earned is against the investment of the organisation which has not been considered under operating profit. Hence non-operating profit is to be added to Net operating profit to arrive at total net profit earned to measure the performance of the company against the total resources of the organisation. NVA is considered under financial performance indicators for the present study.

The table below shows the Net Value Addition earned by all sample companies:

Table 4.60

Table showing Net Value Addition of all sample companies.

(Figures in Crores)

Net Value Addition				
	ACC	HUL	INFOSYS	TCS
2012-13	1582.28	3854.03	11695	15291.65
2013-14	1319.13	4149.98	13320	20998.84
2014-15	1425.63	4420.65	15802	23163.82
2015-16	811.78	4514.32	16617	27454.74
2016-17	767.81	4616	17433	30602.45
2017-18	1043.86	5519	19222	28561.48
2018-19	1148.66	6630	18292	36023.36
2019-20	1677.43	7375	19522.39	37748.82
2020-21	1631.74	8373	21694.39	37388.06
2021-22	2026.71	8982	24553.12	43050.22

The table above shows the calculated Net Value Added of ACC Ltd, HUL Ltd, Infosys Ltd and TCS Ltd for the year of study. Below is the detailed explanation of the calculated Net value Added of all the companies separately.

In the case of ACC Ltd, NVA starts with Rs 1582.28 Cr. in the year 2012 which progressively decreased till 2016 due to a decrease in NOPAT to Rs 767.81 in the year 2016, but later as NOPAT increases from 2017, and increase in other income the Net Value Added also increases and supersede the NVA of 2012 and reaches to Rs 2026.71 Cr.

In the case of HUL LTD, NVA showed an increasing trend due to increase in NOPAT over the years of study.

In the case of Infosys Ltd, NVA shows an increasing trend from Rs. 13320 Cr. in the year 2012-13 to Rs 19222 Cr. in the year 2017-18 due to increase in NOPAT and other income. While in the year 2018-19, NOPAT and other income decreased, resulting in NVA to Rs 18292 Cr and recovering again from 2019-20 at Rs 19522.39 Cr. to Rs 24553.12 Cr. in the year 2021-22 due to increase in NOPAT and other income and this year shows the highest NVA over the year of study and reaches almost twice of 2012-13.

In case of TCS Ltd, NVA showed an increasing trend from Rs 15291.65 Cr in the year 2012-13 to Rs 30602.45 Cr. in the year 2016-17 due to increase in NOPAT and Other Income. In the year 2017-18, there has been a decrease in NOPAT and Other Income resulting in fall of NVA to Rs 8561.48 Cr. again from 2018-19, TCS started recovering NVA and reaching at the highest in the year 2021-22 to Rs 43,050 Cr which is almost three fold of 2012-13.

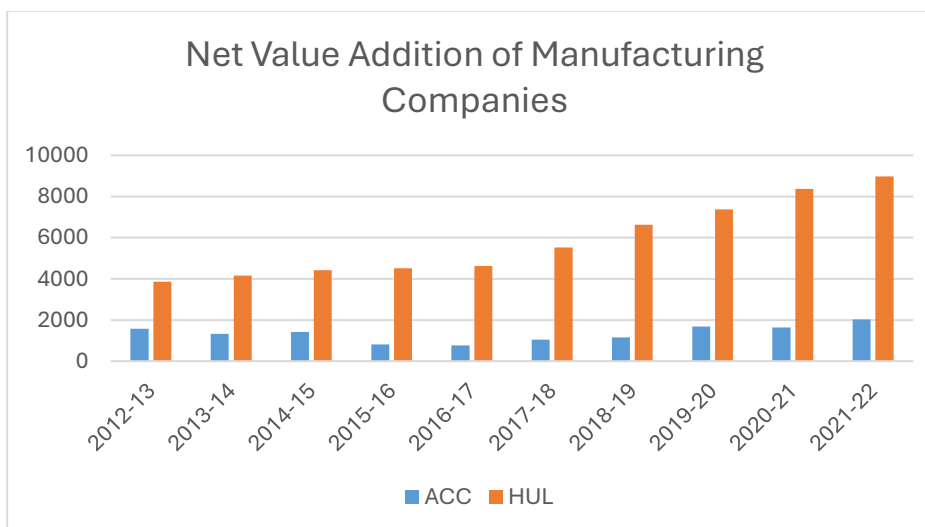


Table 4.11 Graph showing Net Value Addition of Manufacturing sector

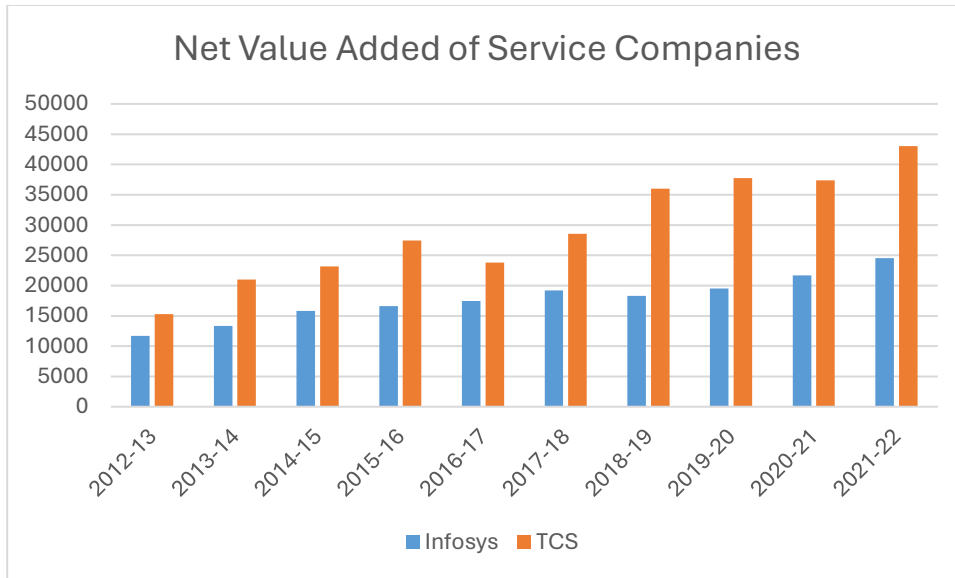


Table 4.12 Graph showing Net Value Addition of Service sector

To analyse the fourth hypothesis Net Value Addition will be compared with the VAIC and its components, correlation and regression techniques are applied to find the relationship.

4.6.1 Correlation Analysis of Net Value Addition with VAICTM and its components.

The relationship between VAIC and NVA is based on the shared focus on value creation. VAIC measures the efficiency of a firm's intellectual capital considering human, structural and physical capital in generating value. While NVA reflects the firm's ability to generate revenue from all the resources whether operating or non-operating. So, it can be inferred that firms' efficiency generating revenue positively impacts the higher return of the firm. Hence, the relationship between NVA and VAIC is studied.

Table No. 4.61

Table showing Correlation results of VAIC and NVA of Manufacturing Companies

ACC Ltd		ICE	CEE	VAIC	HUL Ltd	ICE	CEE	VAIC
NVA	Pearson Correlation	0.912**	0.331	0.901**		0.879**	-0.772**	0.301
	Sig. (2-tailed)	0.000	0.350	0.000		0.001	0.009	0.398

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

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

The table presents Pearson correlation coefficients evaluating the relationships between net value added (NVA) and three variables: intellectual capital efficiency (ICE), capital employed efficiency (CEE), and value-added intellectual coefficient (VAIC) for ACC Ltd and HUL Ltd.

Correlation of NVA with both the components and VAIC provides different results for both the companies. In the case of ACC Ltd, NVA shows a strong and significant positive correlation with ICE ($r = 0.912$, $p = 0.000$) and VAIC ($r = 0.901$, $p = 0.000$), indicating that higher intellectual capital and VAIC are strongly associated with higher NVA. However, CEE shows a weak and non-significant correlation with NVA ($r = 0.331$, $p = 0.350$), suggesting minimal influence.

In the case of HUL Ltd, NVA is strongly and positively correlated with ICE ($r = 0.879$, $p = 0.001$), while it has a significant negative correlation with CEE ($r = -0.772$, $p = 0.009$). VAIC, however, showed a weak and non-significant correlation with NVA ($r = 0.301$, $p = 0.398$). This implies that ICE positively impacts NVA, while CEE has a negative association, and VAIC has a little influence for HUL.

4.6.2 Regression Analysis of Net Value Addition with VAICTM and its components.

Further the impact of VAICTM on NVA is studied with the help of Regression Analysis. The below is the analysis for hypothesis 3 – there is no significant impact of VAICTM and its components on NVA.

Table No. 4.62
Table showing Regression results of ICE and CEE and
NVA for Manufacturing Companies (H4)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	NVA	0.890	28.254**	0.000	Constant	-1.218	0.263
					ICE	7.039**	0.000
					CEE	-1.911	0.098
HUL Ltd	NVA	0.952	69.687**	0.000	Constant	-1.414	0.200
					ICE	7.218**	0.000
					CEE	-5.134**	0.001

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

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

The table presents the regression results examining the impact of Intellectual Capital Efficiency (ICE) and Capital Employed Efficiency (CEE) on the financial performance (measured as Net Value Added or NVA) of two manufacturing companies, ACC Ltd and HUL Ltd.

In the case of ACC Ltd, the model explains 89% of the variance in NVA ($R^2 = 0.890$), with a significant F-value of 28.254 ($p < 0.01$), indicating the model's overall significance. ICE has a

highly significant positive coefficient (7.039, $p < 0.01$), suggesting a strong positive relationship between ICE and NVA. However, the CEE coefficient (-1.911) is not statistically significant ($p = 0.098$), implying no substantial impact on NVA.

In the case of HUL Ltd, the model has an even higher explanatory power with an R^2 of 0.952, and the F-value (69.687, $p < 0.01$) further demonstrated its significance. ICE remains a strong positive predictor (coefficient = 7.218, $p < 0.01$), while CEE has a significant negative effect on NVA (coefficient = -5.134, $p < 0.01$), indicating that higher CEE is associated with lower financial performance for HUL Ltd.

Thus, the findings suggested that ICE consistently contributes positively to financial performance across both companies, while the role of CEE varies, being non-significant for ACC Ltd and negative for HUL Ltd.

Table No. 4.63
Table showing Regression results of VAIC and
NVA of Manufacturing Companies (H4)

Company	Dependent Variable	R ²	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	NVA	0.812	34.657**	0.000	Constant	-2.729	0.026
					VAIC	5.887**	0.000
HUL Ltd	NVA	0.091	0.796	0.398	Constant	-0.020	0.985
					VAIC	0.892	0.398

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

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

The table presents regression results assessing the relationship between the Value Added Intellectual Co-efficient (VAIC) and financial performance, measured by Net Value Added (NVA), for two manufacturing companies, ACC Ltd and HUL Ltd.

In the case of ACC Ltd, the model explains 81.2% of the variance in NVA ($R^2 = 0.812$), with a highly significant F-value of 34.657 ($p < 0.01$), indicating that the model is statistically robust. The VAIC coefficient is significant and positive (5.887, $p < 0.01$), demonstrating that VAIC has a strong positive effect on ACC Ltd's financial performance.

In contrast, the model for HUL Ltd shows a very low explanatory power with an R^2 of 0.091, indicating that only 9.1% of the variation in NVA is explained by the model. The F-value (0.796)

and p-value (0.398) indicate that the model is not statistically significant. The coefficient for VAIC (0.892) is also not significant ($p = 0.398$), suggesting no meaningful relationship between VAIC and NVA for HUL Ltd.

In summary, while VAIC significantly enhances financial performance for ACC Ltd, it does not have a significant impact on HUL Ltd's performance.

Service Industry

Table No. 4.64

Table showing Correlation results of VAIC and NVA of Service Companies

Infosys Ltd		ICE	CEE	VAIC	TCS Ltd	ICE	CEE	VAIC
NVA	Pearson Correlation	-0.689*	0.377	-0.079		-0.777**	0.909**	0.222
	Sig. (2-tailed)	0.028	0.283	0.827		0.008	0.000	0.538

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

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

The table presents the correlation coefficients between Intellectual Capital Efficiency (ICE), Capital Employed Efficiency (CEE), and the Value Added Intellectual Co-efficient (VAIC) with the financial performance, measured by Net Value Added (NVA), for two service industry companies: Infosys Ltd and TCS Ltd.

In Infosys Ltd, ICE shows a significant negative correlation with NVA ($r = -0.689$, $p = 0.028$), indicating that as ICE increases, NVA tends to decrease. CEE, on the other hand, has a positive but non-significant correlation with NVA ($r = 0.377$, $p = 0.283$), suggesting no substantial relationship between CEE and NVA. VAIC exhibits a very weak and non-significant negative correlation with NVA ($r = -0.079$, $p = 0.827$), indicating no meaningful connection between VAIC and financial performance in Infosys Ltd.

For TCS Ltd, like Infosys ICE shows a significant negative correlation with NVA ($r = -0.664$, $p = 0.036$), indicating an inverse relationship between ICE and financial performance. CEE, however, has a highly significant positive correlation with NVA ($r = 0.943$, $p < 0.01$), suggesting a strong positive relationship. VAIC shows a weak, non-significant positive correlation with NVA ($r = 0.376$, $p = 0.284$).

In summary, ICE negatively correlates with financial performance for both companies, while CEE has a significant positive impact only in TCS Ltd's performance but no significant effect on

Infosys Ltd. VAIC does not show a meaningful correlation with financial performance for either company.

This shows that in knowledge intensive companies, intellectual capital efficiency have no significant correlation with the total revenue earned with the help of operating and financial assets.

Further Regression analysis is carried out to examine the impact of Intellectual efficiency ratios on NVA of sample firms.

Table No. 4.65
Table showing Regression results of ICE and CEE and
NVA of Service Companies (H4)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	NVA	0.476	3.179	0.104	Constant	2.094	0.075
					ICE	-2.112	0.073
					CEE	-0.161	0.877
TCS Ltd	NVA	0.925	43.2**	0.000	Constant	1.872	0.103
					ICE	-0.382	0.019
					CEE	5.474**	0.001

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

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

The table represented regression results assessing the impact of Intellectual Capital Efficiency (ICE) and Capital Employed Efficiency (CEE) on the financial performance, measured by Net Value Added (NVA), for two companies of service sector- Infosys Ltd and TCS Ltd.

In Infosys Ltd, the model explains 47.6% of the variance in NVA ($R^2 = 0.476$), but the overall model is not statistically significant (F-value = 3.179, $p = 0.104$). Neither ICE (coefficient = -2.112, $p = 0.073$) nor CEE (coefficient = -0.161, $p = 0.877$) shows a significant effect on financial performance, though ICE has a marginal negative impact. The constant is also not significant, indicating that the model does not reliably predict NVA for Infosys Ltd.

For TCS Ltd, the model explains 92.5% of the variance in NVA ($R^2 = 0.925$), and the overall model is highly significant (F-value = 43., $p < 0.05$). ICE, however, is a significant predictor (coefficient = -0.382, $p = 0.019$) but having a negative relationship, while CEE has a highly significant positive effect on financial performance (coefficient = 5.474, $p < 0.000$). This

suggested that CEE is a key driver of financial performance for TCS Ltd, while ICE plays a less important role.

In summary, the financial performance of Infosys Ltd is not significantly influenced by either ICE or CEE, whereas for TCS Ltd, CEE is a strong positive contributor to financial success. Compared to it HUL Ltd and ACC Ltd also have CEE as a strong contributor but it has been a negative contributor. Hence it can be inferred that the company having debt as a part of capital employed will have major impact on Net Value Addition.

Table No. 4.66
Table showing Regression results of VAIC and
NVA for companies of Service sector (H4)

Company	Dependent Variable	R ²	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	NVA	0.006	0.051	0.827	Constant	0.559	0.592
					VAIC	-0.225	0.827
TCS Ltd	NVA	0.049	0.415	0.538	Constant	-0.032	0.975
					VAIC	0.664	0.538

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

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

The table represented the regression results analyzing the impact of the Value Added Intellectual Co-efficient (VAIC) on the financial performance, measured by Net Value Added (NVA), for two service companies: Infosys Ltd and TCS Ltd.

In Infosys Ltd, the model explains only 0.6% of the variation in NVA ($R^2 = 0.006$), with a very low and non-significant F-value (0.051, $p = 0.827$). The coefficient for VAIC is also not significant (coefficient = -0.225, $p = 0.827$), indicating that VAIC has no meaningful impact on Infosys Ltd's financial performance. The constant term is likewise non-significant, suggesting that the overall model does not reliably predict NVA.

In TCS Ltd, the model explains just 4.9% of the variance in NVA ($R^2 = 0.049$), with a non-significant F-value (0.415, $p = 0.538$). VAIC also has no significant effect on NVA (coefficient = -0.032, $p = 0.975$), and the constant term is not significant. Based on this result it can be inferred

that the researcher failed to reject null hypothesis and so it can be said that Intellectual Capital (VAICTM) has no significant impact on Net Value Added of service companies.

VAICTM has a significant impact on the financial indicator of ACC Ltd., but not with HUL Ltd. in the manufacturing sector, while in the service sector VAICTM does not have a significant impact on financial performance of both the companies, indicating that Value Added Intellectual Co-efficient (VAIC), is not a key driver of financial performance in these companies.

The impact of efficiency of Intellectual capital gives mixed results with performance variables.

This raises the second question-

Is there a scope of developing such a model that predicts the value of intellectual capital in more subjective manner and having better results than VAICTM?

To answer the above question, there is a need to develop a model that predicts the value of Intellectual Capital.

The second objective of the study is to develop a methodology for measuring Intellectual Capital which can prove objectivity in measurement. There is a need to identify such a variable that can have an impact on market capitalisation. The above correlation matrix shows a positive and significant correlation of VAICTM with EVA and not with Market Capitalisation. EVA is calculated by deducting cost of capital from NOPAT, while in GVA Employee benefit expense with managerial remuneration is added to NOPAT. Employees are human assets for the organisation but are treated as revenue expense for the company. Employees' competence and the Manager's attitude are given more importance by the respondents when the questionnaire for the study purpose is filled.

The same is supported by many researchers. According to Kianto et al. (2018), knowledge is inherently tied to human action and application, positioning employees as the core of intellectual capital and the most valuable source of knowledge within an organization. However, this knowledge only becomes valuable when it is actively used to achieve organizational goals and create value. Therefore, it is crucial not just to measure knowledge as a static asset but to assess how it contributes to achieving the organization's objectives. The latter part of the study deals with the variables to be considered for determining new methodology of measurement.

4.7 Method to measure the Value of Intellectual Capital

This section of the chapter is dedicated to the development of an innovative method for measuring intellectual capital value from financial statements. Value derived from the financial

statements also satisfies the objectivity of the method and value. It notably incorporates respondent's opinions, a fact that distinguishes it from preceding studies. The ensuing analysis centers around four sample companies, where the intellectual capital is assessed using innovative methods. Subsequently, the impact of these methodologies on financial performance, evaluated through specific ratios, is comprehensively examined.

The outcome of present research work indicates that the present tools for performance measurement of intellectual capital are inefficient. At the same time the present research endeavor has also tried to identify and summarize the variables influencing intellectual capital and the result has been presented in the form of new valuation model for intellectual capital which is discussed below.

4.7.1. Intellectual Capital Value (ICValue) model to measure Intellectual Capital:

The following variables are considered for the model

1. Employee Benefit Expenses: Expenses incurred on the human resources of the organisation is all together presented under the heading Employee Benefit Expense. These are the amount spent by the organisation to provide benefits to its employees over the basic salary given to them. It includes mandatory expenses and the other fringe benefits like statutory benefits, voluntary benefits, health insurance benefits etc. Such expenses are incurred to provide a positive work environment, employee engagement and overall job satisfaction to employees, so that they will be motivated to work in the organisation and will create value for the organisation. Their expenses should not be considered as the revenue expense but need to be capitalized as they are the important assets for the organisation. They are creating value for the organisation considering the cost of capital for the company.

Managerial Remuneration: The expenses done for managers by way of providing them sitting fees, remuneration for professional services, commission on profits, fees for attending the meeting and another other benefit given to them is considered. The total of managerial remuneration from 2007-08 till 2021-22 is collected for each year separately and added to employee benefit expenses.

Total Human Cost = Employee benefit expenses + Managerial Remuneration

This human cost is to be averaged. Average human cost helps the researcher to get less distorted results, and it is simple and easy to calculate. These expenses have been averaged for five years.

It has been presumed that with the fast-changing technological dynamics, business has been revolutionized three sixty degrees to influence the factors for its survival and sustainability, resulting in technification of Intellectual Capital. Technology keeps reinventing itself every four to five years impressing the dire need to upskill not only the infrastructure but also human resources including their intellectual capacity. The implication of which can be assumed in the form of reassessment of human cost every four to five years resulting in adoption of Weighted Average method. Weighted average method has been applied with the assumption that human cost is increasing every year due to inflation, resulting in assigning weights. If, in any year the expenses have not increased but decreased, then researcher analyses the reason for the decrease in expense. If the decrease has been due to a reduction in the number of employees, the expenses are adjusted to the number of employees of previous year or else, that year will be excluded and the year before that year will be considered to assign weights. The average human cost has to be capitalized in the sixth year with an intention to show its capitalized value in the financial statement as the value of intellectual capital of the firm.

Say for example if Intellectual Capital value of 2012-13 is to be calculated then the employee benefit expense from 2007-08 to 2011-12 will be collected, and weights will be assigned as it is assumed that the expenses due to inflation will always increase.

$$\begin{aligned}
 \textbf{Weighted Average Human Cost} &= [\text{Human Cost (2007)} * 1] + [\text{Human Cost (2008)} * 2] + \\
 &\quad [\text{Human Cost (2009)} * 3] + [\text{Human Cost (2010)} * 4] + \\
 &\quad \underline{[\text{Human Cost (2011)} * 5]} \\
 &\quad 1+2+3+4+5 \\
 &= \text{Total weighted Human Cost} / 15
 \end{aligned}$$

$$\textbf{Intellectual Capital Value (2012)} = \text{Weighted Average Human Cost (2007-2011)} / \text{WACC (2012)}$$

For five years weights are assigned and in the sixth year say 2012-13 this weighted average human cost is capitalized with the help of weighted average cost of capital, calculated for Economic Value Addition of companies. The weighted average cost of capital is the average rate that a business pays to finance its assets, tangible or intangible assets. Human resources are intangible assets, expenses done for human resources against their services are as good as investment from the company's finance, hence their expenses be capitalized considering

weighted average cost of capital. These capitalized expenses are termed as Intellectual Capital Value for the firm.

Intellectual Capital Value: – Weighted Average Human Cost/Weighted Average Cost of Capital

The Intellectual Capital Value is calculated by the researcher with the same formula and weighted average cost of capital is calculated by the researcher for measuring Economic Value Added (EVA) for Infosys and TCS is considered while for manufacturing company Weighted average cost of capital is already disclosed in the annual reports. The same is considered for calculation. The table below presents the value calculated by the researcher.

The required data of employee benefit expense including Manager's remuneration has already been collected for finding Gross Value Addition.

The following table discloses the information of both the variables collected from respective Annual Report.

Table No. 4.67

Table showing Employee benefit expenses and Manager's remuneration for all companies.

(Figures in Crores)

Year	ACC		HUL		Infosys		TCS	
	Employee benefit expenses	Manager's remuneration	Employee benefit expenses	Manager's remuneration	Employee benefit expenses	Manager's remuneration	Employee benefit expenses	Manager's remuneration
12-13	616.65	7.5043	1,405.26	21.2	22565	30.87	24039.96	28.2381
13-14	661.68	8.2092	1,566.16	21.1278	28831	32.27	29860.01	35.924
14-15	746.59	16.3027	1,578.89	34.3899	29802	32.15	38701.15	40.7355
15-16	772.16	15.076	1,592.02	27.2101	34418	93.4	41769.08	45.4569
16-17	789.86	13.9356	1,743	34.0219	37659	41.67	61,621	70.9464
17-18	818.95	8.6288	1,860	37.0471	38893	42.54	66,396	41.894
18-19	881.06	15.2446	1,875	38.392	45315	46.64	78,246	45.6075
19-20	864	12.5561	1,820	39.0494	50887	59.69	85,952	38.0829
20-21	839	13.2239	2,358	37.6791	55541	78.63	91,814	46.7847
21-22	834	9.2319	2,545	50.4656	63986	130.62	107554	58.481

(Source: Annual Report of all sample companies)

Both, the employee expenses and manager's remuneration show an increasing trend but in one of the years both the companies- Infosys and TCS have paid higher remuneration, showing a

fluctuation in giving remuneration to manager. Both the variables are considered as the human resource for the organisation, hence there is a need to identify the relation of both the expenses together with performance variables. Before identifying the relation, both the expenses are to be capitalized and a new value of Intellectual Capital is measured and named IC Value (Intellectual Capital Value).

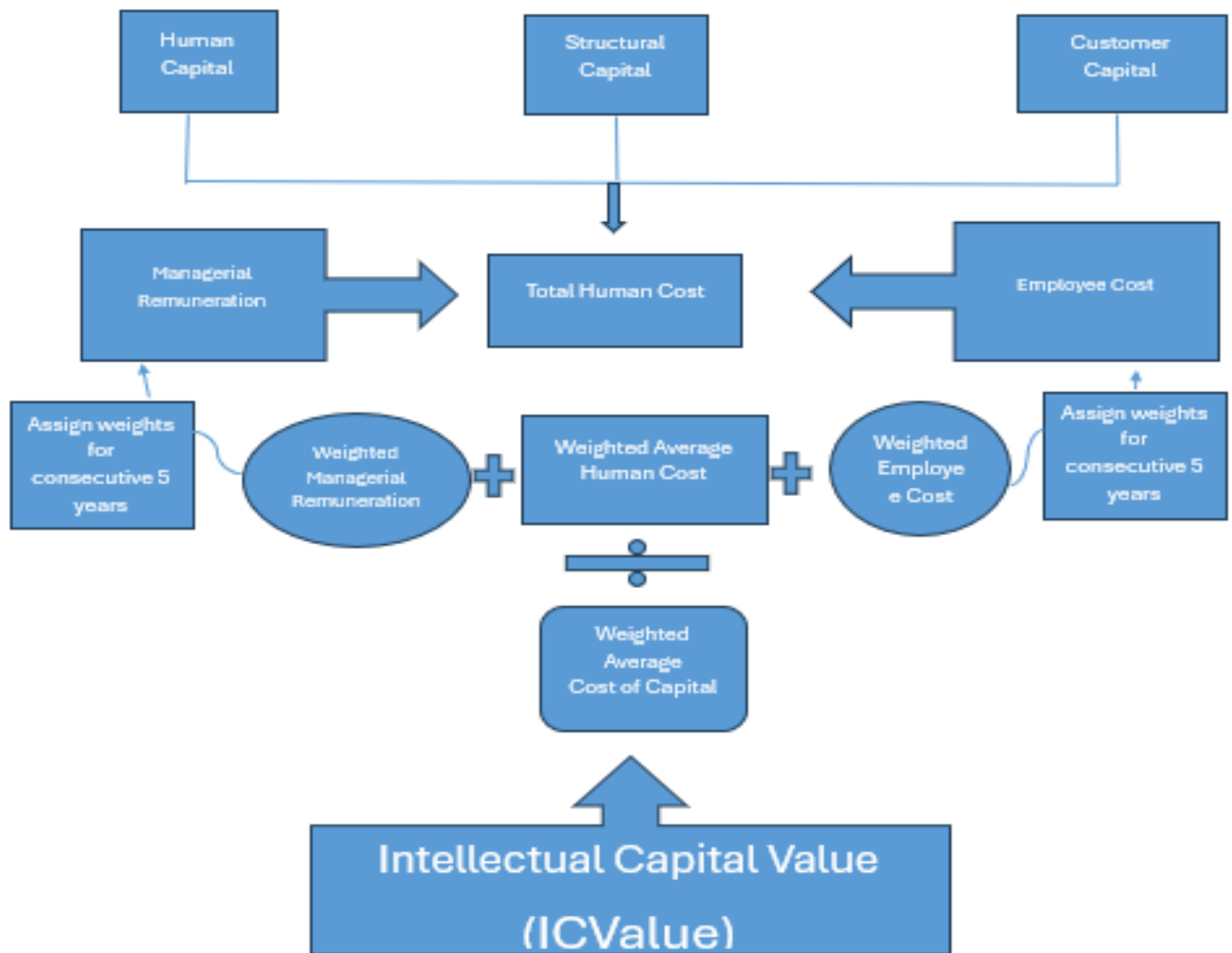


Figure 4.2 – Intellectual Capital Value (ICValue) Model

(Source – Prepared by Researcher)

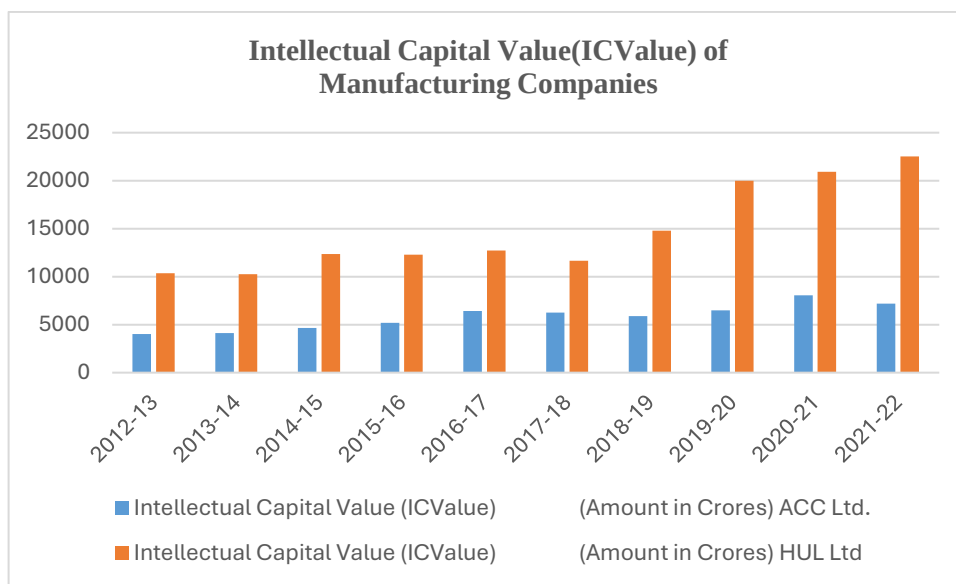
The following table shows calculated ICValue for all the four companies.

Table No. 4.68

Table showing calculated Intellectual Capital Value (ICValue) for all sample companies

Intellectual Capital Value (ICValue)		(Figures in Crores)		
Year	ACC Ltd.	HUL Ltd	Infosys Ltd	TCS Ltd
2012-13	4027.775	10366.96	151982.3	148326.6
2013-14	4137.751	10254.11	167820.1	167154.5
2014-15	4667.914	12371.38	228186.1	227855.6
2015-16	5191.077	12304.77	199558.5	257489.1
2016-17	6411.498	12715.64	235919.3	300120.5
2017-18	6265.276	11652.76	232631.2	404815.8
2018-19	5885.171	14788.77	318886	518189.8
2019-20	6478.108	20005.82	437760.4	720661.9
2020-21	8066.054	20927.94	495501.6	814825.5
2021-22	7198.822	22534.57	547519.2	888956.3

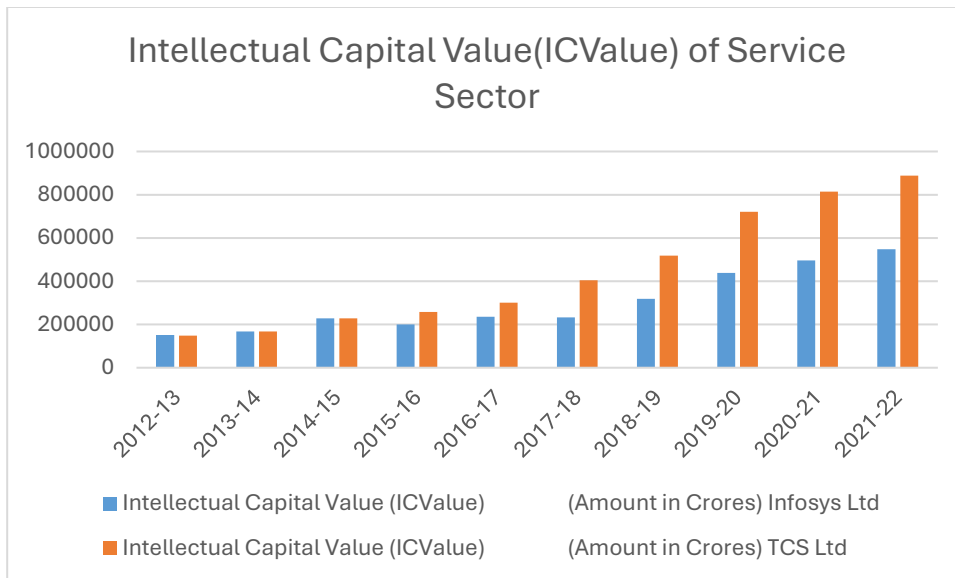
(Source: Calculated and Compiled by researcher)



Graph 4.13 – Graph showing ICValue of Manufacturing Sector

ICvalue in Manufacturing companies are increasing.

Considering ACC Ltd., ICValue becomes two times in HUL Ltd., but ACC Ltd shows stability in this value as its EVA has been negative and its operating profit decreases in the year 2014, 2015 and 2016.



4.14- Graph showing ICValue of Service Sector

For the companies of service sector, both the companies have similar amount of ICValue in the initial year of the study. Gradually TCS shows a higher increase in ICValue as compared to Infosys Ltd. Here Infosys Ltd employee expenses have increased but not in the same proportion as in case of TCS. In Infosys employee expenses increase three times while in TCS 5 times an increase is noticed. Hence the value of TCS is more than Infosys. This shows that TCS Ltd is spending more on their human resources in absolute terms compared to Infosys.

After measuring the value of Intellectual capital, the question arises-

Is this newly proposed model practically applicable?

If the answer to this question is yes, then another question arises, ***will it produce meaningful results?***

If the answer to the above question is no, then the researcher will not try to develop an innovative model to measure the value of Intellectual capital.

The answer of the above questions can be achieved by finding out the relationship between newly proposed model and the financial indicators.

Hence the following question can be raised to judge the relationship:

How does the value of Intellectual Capital impact financial performance of firms?

The answer to the above question helps to achieve the second objective of the present study, ***‘to measure the impact of value of intellectual capital on the performance of companies in India’.***

To answer the above question, the following hypotheses are framed:

H5: Intellectual Capital Value (ICValue) is positively related to financial performance (Economic Value Added (EVA)).

H6: Intellectual Capital Value (ICValue) is positively related to financial performance (Gross Value Added (GVA)).

H7: Intellectual Capital Value (ICValue) is positively related to financial performance (Market Capitalisation (MCap)).

H8: Intellectual Capital Value (ICValue) is positively related to financial performance (Net Value Addition (NVA)).

In the present study, the above four hypotheses are independently applied to all the four companies separately.

To measure the relationship between variables and impact of independent variable ICValue on dependent variables EVA, GVA, NVA and Market Capitalisation, the researcher has applied regression technique.

4.3.2 Making the variables operational

For empirical investigation of the hypotheses, regression equations have been applied on proposed ICValue Model.

Corresponding regression equations for H5, H6, H7 and H8 are:

$$\text{Performance (EVA; GVA; NVA; MCap)} = \alpha_i + \beta_i (\text{Intellectual Capital Value}) + \varepsilon_i$$

(where i = 1,2,3,4).

To address the research hypotheses H9 to H12, a comparative analysis between proposed model (ICValue) and VAIC has been done. The resultant equation is: -

$$\text{Performance (EVA; GVA; NVA; MCap)} = \alpha_{(i,j)} + \beta_i (\text{Intellectual Capital Value}) + \beta_j (\text{VAIC}) + \varepsilon_{(i,j)}$$

(i = 1,2,3,4 and j=1,2,3,4).

Where i stands for Intellectual Capital Value(ICValue) and j stands for Efficiency of Intellectual Capital(VAIC).

Generally speaking, α = intercept or constant term

β = Regression Coefficient of the independent variables.

ε = Residual or Error term

4.8 Data Analysis

To achieve the above hypotheses the data are analysed by correlation analysis and regression analysis.

4.8.1 Economic Value Added

4.8.1.1 Correlation Analysis of EVA with ICValue: The following table shows the correlation coefficient of all the companies selected under study.

Table No. 4.69

Table showing Correlation results of EVA and ICValue in all companies.

EVA	ACC Ltd	ICValue	HUL Ltd	ICValue	Infosys Ltd	ICValue	TCS Ltd	ICValue
Pearson Correlation		-0.167		0.594		0.952		0.965
Sig. (2-tailed)		0.645		0.070		0.000*		0.000*

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

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

The table presents the Pearson correlation coefficients and their significance values (Sig. (2-tailed)) between Economic Value Added (EVA) and ICValue, for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd. In **ACC Ltd**, Pearson correlation coefficient is -0.167, indicating a weak negative relationship between EVA and ICValue. The significance value (0.645) is greater than 0.05, suggesting that this correlation is not statistically significant and so it cannot conclude that there is a meaningful relationship between EVA and ICValue for ACC Ltd. In **HUL Ltd** Pearson correlation coefficient is 0.610, indicating a moderate positive relationship between EVA and ICValue. The significance value (0.061) is slightly above the conventional threshold of 0.05, implying that the correlation is not statistically significant at the 5% level, though it is close to being significant. In **Infosys Ltd** Pearson correlation coefficient is 0.952, indicating a very strong positive relationship between EVA and ICValue for Infosys Ltd. The significance value (0.000) is less than 0.05, suggesting that this correlation is statistically significant. In **TCS Ltd**, Pearson correlation coefficient is 0.965, indicating a very strong positive relationship between EVA and ICValue. The significance value (0.000) is less than 0.05, indicating that this correlation is statistically significant. Thus, there is a highly significant positive relationship between EVA and ICValue for both Infosys Ltd and TCS Ltd.

In summary, both Infosys Ltd and TCS Ltd show a strong and statistically significant positive relationship between EVA and ICValue. In contrast, the relationships between ACC Ltd and HUL Ltd are not statistically significant, with ACC Ltd showing a weak negative correlation and HUL Ltd showing a moderate positive but not significant correlation. This shows that in the service industry the intellectual capital value shows a strong impact on generating economic value for the company compared to manufacturing company.

4.8.1.2 Regression Analysis of ICValue and EVA

Manufacturing Companies:

Table No. 4.70

**Table showing Regression results of ICVALUE
And EVA of Manufacturing Companies(H5)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	EVA	0.028	0.230	0.645	Constant	0.386	0.709
					ICValue	-0.479	0.645
HUL Ltd	EVA	0.352	4.351	0.070	Constant	2.209	0.058
					ICValue	2.086	0.070

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

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

The table provides results of a regression analysis, with EVA (Economic Value Added) as the dependent variable and ICValue as the independent variable for two companies: ACC Ltd and HUL Ltd:

In ACC Ltd, R^2 is 0.028, indicating a very weak model fit while p-value 0.645 shows the relationship between EVA and ICValue is not statistically significant. So it can be said that ICValue does not significantly explain EVA for ACC Ltd. The regression model shows that ICValue is not a significant predictor of EVA, given the very low R-squared value, low F-value, and high p-value. The results indicate no meaningful relationship between ICValue and EVA. Here it seems that intellectual capital is negligible or has almost no impact on financial performance, this is because of higher Weighted Average Cost of Capital. Value of Intellectual capital is result of capitalization employee cost and benefits at a capitalizing factor which is equal to Weighted Average Cost of Capital. capitalized by applying WACC. For this purpose, employee cost and benefits and managerial remuneration are divided by Weighted Average cost of capital

in %. Hence higher WACC inflates value of Intellectual Capital and thereby mathematically it adversely affects calculation of financial performance.

In HUL Ltd, R^2 is 0.373, indicating a moderate model fit while p-value: 0.061, close to 0.05, suggesting a borderline significance. So it can be said that ICValue moderately explains EVA for HUL Ltd, with a potential positive relationship that is close to being significant. The regression model suggests that ICValue explains a moderate portion of the variation in EVA, but the relationship is not statistically significant at the 5% level. It is, however, close to being significant, indicating a potential, though not definitive, positive relationship between ICValue and EVA.

Amongst manufacturing companies, HUL Ltd shows better relationship of ICValue with EVA while ACC Ltd shows poor relationship, but both the company fails to provide significant t-value, hence data fails to support the H5 and concluded that ICValue is not having positive significant relationship with EVA of manufacturing companies.

Service Industry

Table No. 4.71
Table showing Regression Results of ICVALUE and
financial performance of Service Companies (EVA) (H5)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	EVA	0.906	77.018*	0.000	Constant	6.261*	0.000
					ICValue	8.776*	0.000
TCS Ltd	EVA	0.931	108.382*	0.000	Constant	8.529*	0.000
					ICValue	10.411*	0.000

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

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

In Infosys Ltd, R^2 0.906, indicates a very strong model fit. This means that 90.6% of the variation in EVA is explained by ICValue while **F-value** 77.018 indicates a highly significant regression model supported by **p-value** which is less than 0.05, showing that the relationship

between EVA and ICValue is statistically significant. **Coefficients** of constant with a t-value of 6.261 and of **ICValue** with a t-value of 8.776 is significant. Hence it can be said that ICValue is a highly significant predictor of EVA for Infosys Ltd, indicating a strong positive relationship.

In TCS Ltd, R^2 0.931 indicates a very strong model fit, means that 93.1% of the variation in EVA is explained by ICValue while **F-value** is 108.382, indicating a highly significant regression model supported by **p-value** which is less than 0.05, showing that the relationship between EVA and ICValue is statistically significant. **Coefficients of Constant** with a t-value of 8.529 and of **ICValue** with a t-value of 10.411 is significant.

Hence for both Infosys Ltd and TCS Ltd, ICValue is a highly significant predictor of EVA, with over 90% of the variation in EVA explained by ICValue. Both companies exhibit a strong positive relationship between EVA and ICValue, as indicated by significant coefficients and p-values. The data supports H5 hypothesis and concluded that ICValue is positive significantly related with EVA. Hence it can be said that ICValue is a highly significant predictor of EVA in service companies and partly in manufacturing companies. This shows that new model is s better predictor for EVA compared to VAIC.

4.8.2 Gross Value Added

4.8.2.1 Correlation Analysis

Correlation of GVA with ICValue of all the companies.

Table No. 4.72

Table showing Correlation Results of GVA and ICValue in all companies.

	ACC LTd	ICValue	HUL Ltd	ICValue	Infosys Ltd	ICValue	TCS Ltd	ICValue
GVA	Pearson Correlation	0.482		0.952**		0.962**		0.964**
	Sig. (2-tailed)	0.158		0.000		0.000		0.000

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

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

The table presents Pearson correlation coefficients and their significance values between Gross Value Added (GVA) and ICValue for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd. In ACC Ltd, Pearson Correlation is 0.494, indicates a moderate positive relationship between GVA and ICValue for ACC Ltd while the p-value is greater than 0.05, suggesting that

the correlation is not statistically significant. Therefore, it is concluded that there is no strong evidence of a meaningful relationship between GVA and ICValue for ACC Ltd.

In HUL Ltd, Pearson Correlation is 0.954, indicates a very strong positive relationship between GVA and ICValue for HUL Ltd supported by, p-value that is less than 0.05, indicating that the correlation is statistically significant. This suggests a strong and significant positive relationship between GVA and ICValue for HUL Ltd.

In Infosys Ltd, Pearson Correlation is 0.962, indicates a very strong positive relationship between GVA and ICValue for Infosys Ltd supported by p-value which is less than 0.05, indicating that the correlation is statistically significant. This means there is a strong and significant positive relationship between GVA and ICValue for Infosys Ltd.

The same is with TCS Ltd where Pearson Correlation is 0.9764 indicating a very strong positive relationship between GVA and ICValue for TCS Ltd supported by the p-value which is less than 0.05, indicating that the correlation is statistically significant. This suggests a strong and significant positive relationship between GVA and ICValue for TCS Ltd.

Summary of correlation of all companies in study

- For ACC Ltd, the correlation between GVA and ICValue is moderate and not statistically significant, indicating no strong evidence of a meaningful relationship.
- For HUL Ltd, Infosys Ltd, and TCS Ltd, there are very strong positive correlations between GVA and ICValue, all of which are statistically significant. This indicates that as ICValue increases, GVA also increases significantly for these companies.

4.8.2.2 Regression Analysis of ICValue and GVA

Manufacturing Companies :

Table No. 4.73

**Table showing Regression Results of ICValue and
GVA Manufacturing Companies (H6)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	GVA	0.232	2.422	0.158	Constant	2.206	0.058
	ICValue					1.556	0.158
HUL Ltd	GVA	0.906	76.973*	0.000	Constant	0.396	0.702
	ICValue					8.773*	0.000

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

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

The table presents results from a regression analysis, with Gross Value Added (GVA) as the dependent variable and ICValue as an independent variable for ACC Ltd and HUL Ltd.

In ACC Ltd R^2 is 0.232, indicating 23.2% of the variation in GVA is explained by ICValue, suggesting a relatively weak fit of the model and the same is supported by low F-value 2.422 indicating that the model is not a good fit overall for ACC ltd., p-value 0.158 is greater than 0.05, indicating that the relationship between GVA and ICValue is not statistically significant. Coefficients of constant is 2.206 and for ICValue is 1.556 are not statistically significant as p-value > 0.05 indicating that changes in ICValue do not significantly predict GVA for ACC Ltd. The regression model for ACC Ltd shows that ICValue is not a significant predictor of GVA. The data fails to support H6. Therefore, it is concluded that there is no strong evidence of a meaningful relationship between GVA and ICValue for ACC Ltd. The model's fit is weak, and the relationship between GVA and ICValue is not statistically significant.

In HUL Ltd, R^2 0.910 indicates that 90.6% of the variation in GVA is explained by ICValue, suggesting a very strong fit of the model. High F-value 80.685 indicates that the overall model is highly significant which is supported by p-value that is less than 0.05, indicating that the relationship between GVA and ICValue is statistically positive significant.

Coefficients of constant 0.182 is not statistically significant, which is common when the focus is on the slope coefficient. Coefficient of ICValue is 8.982 is highly significant and indicates a strong positive relationship between ICValue and GVA. The regression model for HUL Ltd shows that ICValue is a highly significant predictor of GVA, with a very strong positive relationship. The data support H6. The model explains a large portion of the variation in GVA, and the relationship is statistically significant.

ACC Ltd: The model shows a weak and statistically insignificant relationship between GVA and ICValue, with the model explaining only a small portion of the variance in GVA.

HUL Ltd: The model shows a strong and statistically significant relationship between GVA and ICValue, with the model explaining a large portion of the variance in GVA. ICValue is a significant predictor of GVA for HUL Ltd.

Service Companies

Table No. 4.74

**Table showing Regression results of ICValue and
EVA of Service Companies (H6)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	GVA	0.926	100.324*	0.000	Constant	5.678*	0.000
					ICValue	10.016*	0.000
TCS Ltd	GVA	0.928	103.871*	0.000	Constant	5.271*	0.001
					ICValue	10.192*	0.000

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

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

In Infosys Ltd, R^2 0.926 indicates that 92.6% of the variation in GVA is explained by ICValue, suggesting a very strong fit of the model. High F-value 100.324 indicates that the overall model is highly significant which is supported by p-value that is less than 0.05, indicating that the relationship between GVA and ICValue is statistically significant. Coefficients of constant 5.678 and Coefficient of ICValue is 10.016 is highly significant and indicates a strong positive relationship between ICValue and GVA. The regression model for Infosys Ltd shows that ICValue is a highly significant predictor of GVA, with a very strong positive relationship. The data support H6. The model explains a large portion of the variation in GVA, and the relationship is statistically significant.

In TCS Ltd, R^2 0.928 indicates that 92.8% of the variation in GVA is explained by ICValue, suggesting a very strong fit of the model. High F-value 103.871 indicates that the overall model is highly significant which is supported by p-value that is less than 0.05, indicating that the relationship between GVA and ICValue is statistically significant. Coefficients of constant 5.271 and Coefficient of ICValue is 10.192. the data support H6, it indicates that the relationship is highly significant and indicates a strong positive relationship between ICValue and GVA.

Conclusion: The regression model for TCS Ltd shows that ICValue is a highly significant predictor of GVA, with a very strong positive relationship. The model explains a large portion of the variation in GVA, and the relationship is statistically significant.

Summary: Both companies exhibit a strong positive relationship between GVA and ICValue, as indicated by significant coefficients and p-values. Hence it can be said that ICValue is a highly significant predictor of GVA in service companies and partly in manufacturing companies. This also shows that ICValue is better predictor than VAIC.

4.8.3 Market Capitalisation

4.8.3.1 Correlation of Market Capitalisation with ICValue of all companies

Table No. 4.75

Table showing Pearson's Correlation of Market Capitalisation and ICValue in all companies.

		ACC Ltd (ICValue)	HUL Ltd (ICValue)	Infosys Ltd (ICValue)	TCS Ltd (ICValue)
Market Capitalisation	Pearson Correlation	0.685**	0.963*	0.952*	0.961*
	Sig. (2-tailed)	0.029	0.000	0.000	0.000

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

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

The table presents the Pearson correlation coefficients and their significance values (Sig. (2-tailed)) between Market Capitalisation and ICValue for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd. In ACC Ltd, Pearson Correlation 0.685 indicates a strong positive relationship between Market Capitalisation and ICValue for ACC Ltd with significance(2-tailed) at 0.029. The p-value is less than 0.05, indicating that the correlation is statistically significant. This suggests that there is a significant positive relationship between Market Capitalisation and ICValue for ACC Ltd. In HUL Ltd, Pearson Correlation 0.963 indicates a very strong positive relationship between Market Capitalisation and ICValue for HUL Ltd supported by Significance (2-tailed) at 0.000, p-value is less than 0.05, indicating that the correlation is statistically significant. This suggests a very strong and significant positive relationship between Market Capitalisation and ICValue for HUL Ltd.

In Infosys Ltd, Pearson Correlation 0.976, and in TCS Ltd., Pearson Correlation 0.940 indicating a very strong positive relationship between Market Capitalisation and ICValue for Infosys Ltd supported by Significance (2-tailed) at 0.000, p-value is less than 0.05, indicating that the

correlation is statistically significant. This suggests a very strong and significant positive relationship between Market Capitalisation and ICValue for Infosys Ltd and TCS Ltd.

Summary:

- For ACC Ltd, there is a strong positive and statistically significant relationship between Market Capitalisation and ICValue, suggesting that as ICValue increases, Market Capitalisation also increases significantly.
- For HUL Ltd, Infosys Ltd, and TCS Ltd, the correlations are very strong and statistically significant, indicating that ICValue is a highly significant predictor of Market Capitalisation for these companies. In these cases, increases in ICValue are strongly associated with increases in Market Capitalisation.

Summary:

- For ACC Ltd, there is a strong positive and statistically significant relationship between Market Capitalisation and ICValue, suggesting that as ICValue increases, Market Capitalisation also increases significantly.
- For HUL Ltd, Infosys Ltd, and TCS Ltd, the correlations are very strong and statistically significant, indicating that ICValue is a highly significant predictor of Market Capitalisation for these companies. In these cases, increases in ICValue are strongly associated with increases in Market Capitalisation.

The results shows that ICValue is having better predictor than VAIC for Market capitalization. Hence it can be said that variation in market capitalization is due to employee and managerial expenses.

4.8.3.2 a)Regression Analysis of Manufacturing Companies

Table No. 4.76

**Table showing Regression results of ICValue and
MCap of Manufacturing Companies (H7)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	MCap	0.469	7.071**	0.029	Constant	3.007**	0.017
					ICValue	2.659**	0.029
HUL Ltd	MCap	0.928	103.383*	0.000	Constant	-4.859*	0.001
					ICValue	10.168*	0.000

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

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

In ACC Ltd, R^2 0.469 indicates that 46.9% of the variation in Market Capitalisation is explained by ICValue, suggesting a moderate fit of the model. F-value 7.071 indicates that the overall model is highly significant which is supported by p-value 0.029, less than 0.05, indicating that the relationship between Market Capitalisation and ICValue is statistically significant.

Coefficients of constant 3.007 and Coefficient of ICValue is 2.659 is highly significant, support H7 and indicates a strong positive relationship between ICValue and Market Capitalisation.

In HUL Ltd, R^2 0.928 indicates that 92.8% of the variation in Market Capitalisation is explained by ICValue, suggesting a very strong fit of the model. High F-value 103.383 indicates that the overall model is highly significant which is supported by p-value less than 0.05, indicating that the relationship between Market Capitalisation and ICValue is statistically significant.

Coefficients of constant -4.859 the negative constant coefficient might indicate a baseline level of market capitalization. The t-value suggests statistical significance at conventional levels. Coefficient of ICValue is 10.168 is highly significant, support H7 and indicates a strong positive relationship between ICValue and Market Capitalisation.

Both ACC Ltd show a positive, and statistically significant relationship and HUL Ltd show a strong, positive, and statistically significant relationship between intellectual capital value and market capitalization. HUL Ltd demonstrates a slightly stronger model fit compared to ACC Ltd, as evidenced by the higher R^2 and F-values. This suggests that intellectual capital is a significant determinant of market capitalization for both companies of manufacturing industry. The regression model for both the company shows that ICValue is a highly significant predictor of Market Capitalisation with a a very strong positive relationship. The model of HUL Ltd, explains a large portion of the variation in Market Capitalisation, and the relationship is statistically significant.

4.4.3.3 b) Regression Analysis of Service Industry

Table 4.77: Regression Results of ICValue and MCap of Service Companies (H7)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	MCap	0.907	78.210*	0.000	Constant	-4.276*	0.003
					ICVALUE	8.844*	0.000
TCS Ltd	MCap	0.924	97.5*	0.000	Constant	-1.933	0.089
					ICVALUE	9.874*	0.000

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

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

The table presents the results of regression analyses for two companies, Infosys Ltd and TCS Ltd, using market capitalization (MCap) as the dependent variable and intellectual capital value (ICVALUE) as the independent variable.

In Infosys Ltd, R^2 0.907 value indicates that 90.7% of the variance in market capitalization is explained by the intellectual capital value. This suggests a very strong relationship. High F-value 78.210 and p-value 0.000 indicate that the overall regression model is statistically significant. Constant Coefficient (-4.276) is negative and t-value (0.003), the exact interpretation would depend on the units and scale of the data. Coefficient ICValue 8.844 and t-value 0.000 positive coefficient, indicates that as the intellectual capital value increases, market capitalization also increases. The extremely low p-value (0.000) suggests this relationship is statistically significant. The data support H7, and can be said that ICValue of a firm is positively related with GVA for Infosys Ltd.

In TCS Ltd, R^2 0.924 value shows that 88.4% of the variance in market capitalization is explained by the intellectual capital value, indicating a strong relationship, though slightly less than that for Infosys Ltd. High F-value 97.5 and p-value 0.000 again indicate that the overall regression model is statistically significant. Constant Coefficient -1.933 and t-value 0.089, the negative constant coefficient might indicate a baseline level of market capitalization. ICValue Coefficient 9.874 and t-value 0.000, positive coefficient implies a positive relationship between intellectual capital value and market capitalization. The p-value 0.000 indicates a highly significant relationship. It

supports H7, it can be inferred as that ICValue of a firm is positively related with GVA for TCS Ltd.

Both Infosys Ltd and TCS Ltd show a strong, positive, and statistically significant relationship between intellectual capital value and market capitalization. Infosys Ltd demonstrates a slightly stronger model fit compared to TCS Ltd, as evidenced by the higher R^2 and F-values. This suggests that intellectual capital is a significant determinant of market capitalization for both companies of service industry. The regression model for both the company shows that ICValue is a highly significant predictor of Market Capitalisation with a a very strong positive relationship. The model explains a large portion of the variation in Market Capitalisation, and the relationship is statistically significant.

Summary

Summary:

- For ACC Ltd, there is a strong positive and statistically significant relationship between Market Capitalisation and ICValue, suggesting that as ICValue increases, Market Capitalisation also increases significantly.
- For HUL Ltd, Infosys Ltd, and TCS Ltd, shows the strong, positive and statistically significant relationship between intellectual capital value and market capitalisation, indicating that ICValue is a highly significant predictor of Market Capitalisation for these companies. In these cases, increases in ICValue are strongly associated with increases in Market Capitalisation.

Hence it can be said that ICValue is a better predictor for MCap compare to VAIC as this variable is having significance with all the companies Market Capitalisation.

4.8.4 Net Value Addition

4.8.4.1 Correlation of Net Value Addition(NVA) and ICValue of all companies.

Table No. 4.78

Table showing Pearson's Correlation of NVA and ICValue of all companies.

	ACC LTd	ACC LTd (ICValue)	HUL LTd (ICValue)	Infosys LTd (ICValue)	TCS LTd (ICValue)
Net Value Added	Pearson Correlation	0.245	0.962**	0.901**	0.926**
	Sig. (2-tailed)	0.495	0.000	0.000	0.000

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

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

The table presents the Pearson correlation between Net Value Added (NVA) and Intellectual Capital Value (ICValue) for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd.

For ACC Ltd, the correlation between NVA and ICValue is relatively weak ($r = 0.245$) and statistically insignificant ($p = 0.495$). This indicates that there is a minor and non-significant relationship between NVA and ICValue for ACC Ltd. For HUL Ltd, there is a very strong positive correlation between NVA and ICValue ($r = 0.962$), which is statistically significant ($p = 0.000$). This suggests a strong and meaningful positive association where increases in ICValue are closely linked to increases in NVA for HUL Ltd.

Infosys Ltd also shows a strong positive correlation ($r = 0.901$) between NVA and ICValue, with a statistically significant p-value of 0.000. This indicates that ICValue is significantly and positively related to NVA, reflecting a substantial impact on Net Value Added. Similarly, TCS Ltd exhibits an even stronger positive correlation ($r = 0.926$) with a statistically significant p-value of 0.000. This suggests an exceptionally strong and significant relationship where higher ICValue is closely associated with higher NVA.

In summary, while ACC Ltd shows a weak and statistically insignificant relationship between ICValue and NVA, HUL Ltd, Infosys Ltd, and TCS Ltd display strong and statistically significant positive correlations. This indicates that ICValue has a substantial positive impact on Net Value Added in these companies, with particularly strong associations observed in TCS Ltd.

4.8.4.2 a) Regression Analysis of Manufacturing Companies.

Table No. 4.79

**Table showing Regression Results of ICValue and
NVA of Manufacturing Companies (H8)**

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	NVA	0.060	0.510	0.495	Constant	1.450	0.185
					ICVALUE	0.710	0.495
HUL Ltd	NVA	0.926	100.283**	0.000	Constant	0.117	0.910
					ICVALUE	10.014**	0.000

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

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

The regression results illustrate the relationship between Net Value Added (NVA) and Intellectual Capital Value (ICValue) for ACC Ltd and HUL Ltd.

ACC Ltd

For ACC Ltd, the R^2 value is 0.060, indicating that only 6% of the variation in NVA is explained by ICValue. The F-value is 0.510, with a p-value of 0.495, showing that the model is not statistically significant. The coefficient for ICValue is 0.710, suggesting a weak positive relationship between ICValue and NVA. However, the t-value of 0.710 and p-value of 0.495 confirm that this relationship is not statistically significant. The constant term also shows no significance ($t = 1.450$, $p = 0.185$). The data fails to support H8. Therefore, it is concluded that ICValue does not have a significant impact on NVA for ACC Ltd.

HUL Ltd

In contrast, the regression results for HUL Ltd show a very high R^2 value of 0.926, meaning that 92.6% of the variation in NVA is explained by ICValue. The F-value of 100.283, with a p-value of 0.000, indicates that the model is highly statistically significant. The coefficient for ICValue is 10.014, demonstrating a strong positive relationship between ICValue and NVA. The t-value for ICValue is 10.014, with a p-value of 0.000, confirming the significance of this relationship. The constant term, however, is not significant ($t = 0.117$, $p = 0.910$), but this does not affect the overall model's validity. The data support H8. Thus, it is concluded that ICValue has a substantial and significant positive impact on NVA for HUL Ltd.

In summary, while ICValue has no significant effect on NVA for ACC Ltd, it plays a crucial role in driving NVA for HUL Ltd, where the relationship is both strong and statistically significant.

4.8.4.2 b) Regression Analysis of Service Companies

Table No. 4.80

Table showing Regression results of ICVALUE and financial performance of Service Companies (NVA) (H8)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys	NVA	0.812	34.574**	0.000	Constant	7.857**	0.000

					ICVALUE	5.880**	0.000
TCS LTd	NVA	0.857	47.951**	0.000	Constant	7.906**	0.000
					ICVALUE	6.925**	0.000

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

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

The regression results illustrate the relationship between Net Value Added (NVA) and Intellectual Capital Value (ICValue) for Infosys Ltd and TCS Ltd.

Infosys Ltd

For Infosys Ltd, the R^2 value is 0.812, meaning that 81.2% of the variation in NVA is explained by ICValue. The F-value of 34.574, with a p-value of 0.000, indicates that the model is highly statistically significant. The coefficient for ICValue is 5.880, showing a strong positive relationship between ICValue and NVA. The t-value of 5.880 and p-value of 0.000 confirm that this relationship is statistically significant. Additionally, the constant term is significant, with a t-value of 7.857 and p-value of 0.000. The data support H8. Therefore, ICValue has a significant positive effect on NVA for Infosys Ltd.

TCS Ltd

For TCS Ltd, the R^2 value is even higher at 0.857, indicating that 85.7% of the variation in NVA is explained by ICValue. The F-value of 47.951, with a p-value of 0.000, demonstrates that the model is highly statistically significant. The coefficient for ICValue is 6.925, indicating a very strong positive relationship between ICValue and NVA. The constant term is also significant, with a t-value of 7.906 and p-value of 0.000. The data support H8. Thus, ICValue has a substantial and significant positive impact on NVA for TCS Ltd.

In summary, ICValue has a strong and statistically significant positive effect on NVA for both Infosys Ltd and TCS Ltd, with the model explaining a large portion of the variation in NVA for both companies. Hence it can be said that ICValue is the better predictor model for Net Value Added as except ACC ltd, ICValue is having significant impact of HUL Ltd, Infosys Ltd and TCS Ltd Net Value Added.

The above results will help to give the answer to the following questions:

whether this newly proposed model is practically applicable?

If yes, then, will it produce meaningful results?

The answer of the above question can be achieved by finding out the relationship between newly proposed model and the financial indicators.

Hence the following question can be raised to judge the relationship:

How does the value of Intellectual Capital impact financial performance of firms?

To get the answer of the above question, simple linear regression is applied for all the companies individually and the result is:

- ACC Ltd: The proposed model is significantly and positively related with Market Capitalisation as its R^2 is more than 50%, but for rest indicators it is not significantly related.
- HUL Ltd: The proposed model is significantly related with Gross Value Added, Net Value Added and Market Capitalisation as its R^2 is more than 90%.
- Infosys Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R^2 is more than 90%.
- TCS Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R^2 is more than 90%.

Hence it can be said that value of Intellectual Capital significantly impact Market Capitalisation of all the companies while GVA and NVA for HUL Ltd., Infosys Ltd., and TCS Ltd. It is having significant impact with EVA only for service sector companies. Hence it can be said that value of Intellectual Capital significantly impacts financial performance indicators as it produces meaningful results with financial indicators and so it can be applied practically.

In this part of the study, we have checked relationship of intellectual capital efficiency as per (VAICTM) and tried to find out the impact of Intellectual Capital as calculated by applying newly proposed model on financial performance of the firm.

- ACC Ltd: The VAICTM model is significantly and positively related with Gross Value Added, Net Value Added and Economic Value Added as its R^2 is more than 50%, but not significantly related with Market Capitalisation.
- HUL Ltd: The VAICTM model is significantly related with Economic Value Added as its R^2 is more than 80% and not significantly related with Gross Value Added, Net Value Added and Market Capitalisation as its R^2 is below 10%.

- Infosys Ltd : The VAICTM model is not significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is below than 10%.
- TCS Ltd : The VAICTM model is not significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is below than 10%.

Above result indicates that Intellectual capital efficiency as measured by VAICTM does not produce meaningful and consistent results and it produces mixed results, sometime may not be useful.

Now let us check the outcome of relationship establish to find out the impact of Intellectual capital value on financial performance which is summarized as under:

- ACC Ltd: The proposed model is significantly and positively related with Market Capitalisation as its R² is more than 50%, but for rest indicators it is not significantly related.
- HUL Ltd: The proposed model is significantly related with Gross Value Added, Net Value Added and Market Capitalisation as its R² is more than 90%.
- Infosys Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is more than 90%.
- TCS Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is more than 90%.
- The proposed model demonstrates significant relationships across various indicators for all companies. For ACC Ltd, it is significantly related to Market Capitalization ($R^2 > 50\%$) but not to other indicators. In contrast, for HUL Ltd, it is significantly related to Market Capitalization, Gross Value Added and Net Value Added ($R^2 > 50\%$).
- Infosys Ltd, and TCS Ltd, the model shows strong significance across all the variables, namely Economic Value Added, Gross Value Added, Net Value Added, and Market Capitalization, with R² exceeding 90% for these indicators.

Let us validate this comment by considering VAIC and ICValue as independent variables and Economic Value Added(EVA), Gross Value Added(GVA), Market Capitalisation(MCap) and Net Value Added(NVA) as dependent variables.

Multiple Linear regression.

4.9 Comparative Study

As investigated and discussed in the earlier part, Intellectual Capital measured by the proposed model has more significance with financial indicators compared to model, that is adopted commonly by the researchers. This relationship is established by using simple linear regression model. But in the proposed model, ICValue does not have positive significant relationship with Economic Value Added in manufacturing sector and has positive and significant relationship with all the financial indicators of service sector and other financial indicators of manufacturing sector. VAIC does not have positive significant relationship with all the financial indicators in service sectors and with Mcap of manufacturing sector.

Hence, there is a need to undertake comparative study between VAIC model and ICValue model, which is proposed in this thesis and also to analyse the combined effect of both the models.

The third research question related to comparative study between VAIC model and ICValue model proposed in this thesis is-

Is capitalisation of intellectual expense improves its explanatory power?

To test the efficiency of the proposed model, the result of this model is compared with the VAIC model. For this purpose, the following question is raised:

How is the predictability of the value of Intellectual Capital model better than the original VAIC model?

To answer the above question, the assumption is: “In comparison to VAIC model, the Intellectual Capital Value(ICValue) proposed in this study is a better predictor of relationship between Intellectual Capital and firm performance”. Since four performance variables have been selected as a dependent variable, the corresponding hypothesis have been proposed:

H9: In comparison to VAIC model, ICValue model is a better predictor of relationship between Intellectual Capital and Economic Value Added(EVA).

H10: In comparison to VAIC model, ICValue model is a better predictor of relationship between Intellectual Capital and Gross Value Added(GVA).

H11: In comparison to VAIC model, ICValue model is a better predictor of relationship between Intellectual Capital and Market Capitalisation(MCap).

H12: In comparison to VAIC model, ICValue model is a better predictor of relationship between Intellectual Capital and Net Value Added(NVA).

In this study, the above hypotheses have been independently applied on ACC Ltd, HUL Ltd, Infosys Ltd and TCS Ltd. If the Regression result of ICValue is better than VAIC and has significance at 5%, i.e. if p-value < 0.05, researcher can conclude that ICValue model is a better predictor for relationship between Intellectual Capital and financial performance indicator selected for study, or else the hypotheses will be rejected.

4.9.1 Comparative Analysis of proposed model (ICValue) and VAICTM with reference to financial performance of sample companies in India.

Table No. 4.81

Table showing the result of all financial indicators for all the companies together

Hypothesis	Manufacturing sector				Service Sector			
	ACC Ltd		Hindustan Unilever Ltd		Infosys Ltd		TCS Ltd	
	VAIC TM	ICValue	VAIC TM	ICValue	VAIC TM	ICValue	VAIC TM	ICValue
H1 & H5 Intellectual Capital of a firm is positively related to its financial performance (EVA)	✓	X	✓	X	X	✓	X	✓
H2 & H6 Intellectual Capital of a firm is positively related to its financial performance (GVA)	✓	X	X	✓	X	✓	X	✓

H3 & H7 Intellectual Capital of a firm is positively related to its financial performance (MCap)	x	✓	x	✓	x	✓	x	✓
H4 & H8 Intellectual Capital of a firm is positively related to its financial performance (NVA)	✓	x	x	✓	x	✓	x	✓
H9 In comparison to VAIC™ model, ICValue model is a better predictor of relationship between Intellectual Capital and Economic Value Added(EVA).	Rejected		Rejected		Not Rejected		Rejected	
H10 In comparison to VAIC™ model, ICValue model is a better predictor of relationship between Intellectual Capital and Gross Value Added (GVA).	Rejected		Not Rejected		Not Rejected		Not Rejected	
H11 In comparison to VAIC™ model, ICValue model is a better predictor of	Not Rejected		Not Rejected		Not Rejected		Not Rejected	

relationship between Intellectual Capital and Market Capitalisation (MCap)				
H9 In comparison to VAIC TM model, ICValue model is a better predictor of relationship between Intellectual Capital and Net Value Added(NVA).	Rejected	Not Rejected	Not Rejected	Not Rejected

ICValue model is a better model to predict the relationship between Intellectual Capital and Financial Performance for HUL Ltd., Infosys Ltd and TCS Ltd. Knowledge assets are more significant in knowledge based companies, and this can be proved by the above analysis that knowledge assets' values are more significantly related with performance indicators in service based companies. This model also adds to the above significance, as the same model is more significantly related to the performance indicators of Hindustan Unilever Co., even though it is a manufacturing company.

The above discussion clarifies that the newly proposed model produces reliable and useful results as far as gauging the relationship of Intellectual capital with financial performance of the firm. Hence, researcher strongly recommends valuing intellectual capital using the proposed new model and disclose it as part of annual reports.

Further researcher has analysed the combine effect of both the models on the financial performance indicators. The next part of the study shows the combined effect of the models on the financial performance for all the companies separately.

4.9.2 Multiple Regression Analysis

As there are two different variables under study, multiple regression analysis will be applied, where ICValue and VAICTM are independent variables together and financial indicators are dependent variables. The result of combined effect is as follows

4.9.2.1 Combined Effect of ICVlaue and VAICTM on EVA

Table No. 4.82

Table showing Multiple Regression Results of ICVALUE and VAICTM on financial performance of Service Companies (EVA) (H9)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	EVA	0.853	20.375**	0.001	Constant	-4.849**	0.002
					ICVALUE	-0.665	0.527
					VAICTM	6.278**	0.000
HUL Ltd	EVA	0.930	46.471**	0.000	Constant	-5.244**	0.001
					ICVALUE	3.562**	0.009
					VAICTM	7.598**	0.000
Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	EVA	0.953	71.764**	0.000	Constant	3.142**	0.016
					ICVALUE	11.980**	0.000
					VAICTM	-2.671**	0.032
TCS Ltd	EVA	0.937	52.049**	0.000	Constant	0.120	0.908
					ICVALUE	9.240**	0.000
					VAICTM	0.798	0.451

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

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

The table presents the results of a regression analysis assessing the impact of intellectual capital value (ICVALUE) and value-added intellectual coefficient (VAICTM) on economic value added (EVA) for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd.

For ACC Ltd, the model explains 85.3% of the variation in EVA ($R^2 = 0.853$) and is statistically significant (F-value = 20.375, $p = 0.001$). The coefficient for ICVALUE is not significant (t-value = -0.665, $p = 0.527$), while VAICTM is highly significant (t-value = 6.278, $p = 0.000$), indicating its strong positive effect on EVA.

For HUL Ltd, the model has an R^2 of 0.930 and is statistically significant (F-value = 46.471, $p = 0.000$). ICVALUE has a significant positive effect on EVA (t-value = 3.562, $p = 0.009$), and VAICTM is also significant (t-value = 7.598, $p = 0.000$).

For Infosys Ltd, the model explains 95.3% of the variation in EVA ($R^2 = 0.953$) with a highly significant F-value of 71.764 ($p = 0.000$). Both ICVALUE (t-value = 11.980, $p = 0.000$) and VAICTM (t-value = -2.671, $p = 0.032$) are significant, with ICValue having a strong positive impact, while VAICTM has a negative effect.

For TCS Ltd, the model explains 92.3% of the variance in EVA ($R^2 = 0.923$) and is significant (F-value = 42.188, $p = 0.000$). ICVALUE has a positive and significant impact on EVA (t-value = 8.016, $p = 0.000$), while VAICTM is not significant (t-value = 1.377, $p = 0.211$).

The models are highly significant across all companies, with VAICTM having a notable positive influence in ACC and HUL, while ICVALUE is a strong predictor of EVA for Infosys and TCS. But all together, the model is significantly fit to the company financial performance, and it can be said that when value and efficiency ratio are combined together, the company can predict its Economic Value Added.

4.9.2.2 Combined Effect of ICValue and VAICTM on GVA: Multiple regression model is applied to identity the effect of multiple independent variables, namely ICValue and VAICTM on Gross Value Added indicator. The following tables shows the result of multiple regression model

Table 4.83

Table showing Multiple Regression Results of ICValue and VAICTM on GVA for all the Companies (H10)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	GVA	0.862	21.833**	0.001	Constant	-2.243	0.060

					ICVALUE	3.858**	0.006
					VAICTM	5.647**	0.001
HUL Ltd	GVA	0.908	34.495**	0.000	Constant	0.490	0.639
					ICVALUE	8.073**	0.000
					VAICTM	-0.393	0.706
Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	GVA	0.957	77.678**	0.000	Constant	2.619**	0.034
					ICVALUE	12.452**	0.000
					VAICTM	-2.226	0.061
TCS Ltd	GVA	0.953	71.390**	0.000	Constant	2.583	0.060
					ICVALUE	11.716**	0.000
					VAICTM	-1.926	0.095

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

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

The table presents regression results evaluating the impact of intellectual capital value (ICVALUE) and value-added intellectual coefficient (VAICTM) on gross value added (GVA) for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd.

For ACC Ltd, the model explains 86.2% of the variance in GVA ($R^2 = 0.862$) and is statistically significant (F-value = 21.833, $p = 0.001$). Both ICVALUE (t-value = 3.858, $p = 0.006$) and VAICTM (t-value = 5.647, $p = 0.001$) have significant positive effects on GVA, showing a strong relationship between intellectual capital components and firm performance.

For HUL Ltd, the model is significant with an R^2 of 0.908 (F-value = 34.495, $p = 0.000$). ICVALUE has a strong and significant positive impact on GVA (t-value = 8.073, $p = 0.000$), while VAICTM shows no significant effect (t-value = -0.393, $p = 0.706$), suggesting that intellectual capital value is a key driver of GVA for HUL.

For Infosys Ltd, the model explains 95.7% of the variance in GVA ($R^2 = 0.957$), with a significant F-value of 77.678 ($p = 0.000$). ICVALUE has a substantial positive effect on GVA (t-value =

12.452, $p = 0.000$), while VAICTM is not significant (t -value = -2.226, $p = 0.061$), though it approaches significance with a negative relationship.

For TCS Ltd, the model explains 95.9% of the variation in GVA ($R^2 = 0.959$) and is highly significant (F -value = 82.098, $p = 0.000$). ICVALUE has a significant positive impact on GVA (t -value = 12.454, $p = 0.000$), while VAICTM is not significant (t -value = -1.560, $p = 0.163$).

In summary, the results indicate that ICVALUE consistently has a strong and significant positive effect on GVA across all companies. VAICTM shows a significant positive impact in ACC Ltd, while its effect is either negative or insignificant in the other companies. This suggests that ICVALUE is a more reliable predictor of GVA compared to VAICTM.

4.9.2.3 Combine Effect of ICValue and VAICTM on Market Capitalisation

Table 4.84

Table showing Multiple Regression Results of ICVALUE and VAICTM on MCap for all the Companies (H11)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	MCap	0.572	4.676*	0.051	Constant	-0.269	0.796
					ICVALUE	2.956**	0.021
					VAICTM	1.011	0.346
HUL Ltd	MCap	0.927	44.218**	0.000	Constant	-1.477	0.183
					ICVALUE	8.987**	0.000
					VAICTM	0.134	0.897
Infosys Ltd	MCap	0.915	37.676**	0.000	Constant	-1.039	0.334
					ICVALUE	8.829**	0.000
					VAICTM	0.801	0.449
TCS Ltd	MCap	0.962	87.591**	0.000	Constant	-2.873*	0.024
					ICVALUE	11.227**	0.000
					VAICTM	2.610*	0.035

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

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

The table presents the regression analysis results examining the impact of intellectual capital value (ICVALUE) and value-added intellectual coefficient (VAICTM) on market capitalization (MCap) for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd.

For ACC Ltd, the model explains 57.2% of the variance in MCap ($R^2 = 0.572$) and is marginally significant (F-value = 4.676, $p = 0.051$). ICVALUE has a significant positive impact on MCap (t-value = 2.956, $p = 0.021$), indicating its influence on market value, while VAICTM is not significant (t-value = 1.011, $p = 0.346$), suggesting a weak association with market capitalization.

For HUL Ltd, the model explains 92.7% of the variance in MCap ($R^2 = 0.927$) and is highly significant (F-value = 44.218, $p = 0.000$). ICVALUE shows a strong and significant positive impact on MCap (t-value = 8.987, $p = 0.000$), while VAICTM is insignificant (t-value = 0.134, $p = 0.897$), indicating that intellectual capital value plays a critical role in determining HUL's market capitalization, with VAICTM having no noticeable effect.

For Infosys Ltd, the model explains 91.6% of the variance in MCap ($R^2 = 0.916$) and is significant (F-value = 37.957, $p = 0.000$). ICVALUE has a significant positive effect on MCap (t-value = 8.280, $p = 0.000$), while VAICTM shows no significant impact (t-value = 0.801, $p = 0.449$), similar to the other companies.

For TCS Ltd, the model explains 96.2% of the variance in MCap ($R^2 = 0.962$) and is highly significant (F-value = 87.567, $p = 0.000$). ICVALUE has a strong and significant positive effect on MCap (t-value = 11.784, $p = 0.000$), while VAICTM is not significant (t-value = 1.490, $p = 0.180$).

In summary, ICVALUE is consistently a significant and positive predictor of MCap across all four companies, while VAICTM has no significant impact. This highlights the importance of intellectual capital value in influencing market capitalization, whereas VAICTM's role remains minimal.

4.9.2.4 Combine Effect of ICValue and VAICTM on EVA

Table No. 4.85

Table showing Multiple Regression Results of ICValue and VAICTM on NVA for all the Companies (H12)

Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
ACC Ltd	NVA	0.912	36.319**	0.000	Constant	-4.672	0.002
					ICVALUE	2.817	0.026
					VAICTM	8.238**	0.000
HUL Ltd	NVA	0.927	44.539**	0.000	Constant	-0.263	0.800
					ICVALUE	8.965**	0.000
					VAICTM	0.314	0.763
Company	Dependent Variable	R2	F-value	p-value	Coefficients	t-value	Significance
Infosys Ltd	NVA	0.895	29.677**	0.000	Constant	2.895**	0.023
					ICVALUE	7.677**	0.000
					VAICTM	-2.338	0.052
TCS Ltd	NVA	0.869	23.285**	0.000	Constant	1.655	0.142
					ICVALUE	6.628*	0.000
					VAICTM	-0.812	0.443

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

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

The table presents regression analysis results assessing the influence of intellectual capital value (ICVALUE) and value-added intellectual coefficient (VAICTM) on net value added (NVA) for four companies: ACC Ltd, HUL Ltd, Infosys Ltd, and TCS Ltd.

For ACC Ltd, the model explains 91.2% of the variance in NVA ($R^2 = 0.912$) and is statistically significant (F-value = 36.319, $p = 0.000$). ICVALUE has a positive but borderline significant effect (t-value = 2.817, $p = 0.026$), while VAICTM shows a highly significant positive impact (t-

value = 8.238, $p = 0.000$), indicating that both intellectual capital components are important predictors of NVA for ACC Ltd.

For HUL Ltd, the model explains 92.7% of the variance in NVA ($R^2 = 0.927$) and is highly significant (F-value = 44.539, $p = 0.000$). ICVALUE has a strong positive effect on NVA (t-value = 8.965, $p = 0.000$), while VAICTM does not significantly influence NVA (t-value = 0.314, $p = 0.763$). This suggests that ICVALUE is the primary determinant of NVA for HUL, with VAICTM playing a negligible role.

For Infosys Ltd, the model explains 89.5% of the variance in NVA ($R^2 = 0.895$) and is significant (F-value = 29.677, $p = 0.000$). ICVALUE has a strong positive effect on NVA (t-value = 7.677, $p = 0.000$), while VAICTM has a borderline negative impact (t-value = -2.338, $p = 0.052$). This suggests that ICVALUE is a positive contributor to NVA, while VAICTM's negative association is almost significant.

For TCS Ltd, the model explains 90.1% of the variance in NVA ($R^2 = 0.901$) and is significant (F-value = 31.811, $p = 0.000$). ICVALUE is a significant positive predictor (t-value = 7.323, $p = 0.000$), while VAICTM is not significant (t-value = 0.381, $p = 0.715$), indicating that ICVALUE drives NVA for TCS, whereas VAICTM has no significant impact.

In conclusion, ICVALUE consistently shows a significant positive impact on NVA across all companies, while VAICTM's influence is strong only for ACC Ltd, with minimal or no impact in the other companies. This highlights ICVALUE as a key driver of NVA, with VAICTM having a more limited or variable role

By combining both efficiency and capitalized value of intellectual capital, the result shows that model using both value is more significantly related with the all the performance indicators for all the companies.

4.10 Findings and Conclusions

The shift from production based economy to knowledge based economy increased importance of intellect in organisations. Over a period of time Measurement of intellectual capital and its impact on financial performance has become more crucial. For this purpose, this study developed ICValue model and compared it with an existing VAICTM model, also studied the impact of these models on financial performance by undertaking selected samples companies, two from manufacturing sectors -ACC Ltd and HUL Ltd and two from service sectors -Infosys Ltd and TCS Ltd.

The result of regression analysis shows: significant relationship of VAICTM with following financial performance indicators

1. ACC Ltd :

- a. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship more than 80%, that indicates that EVA is much influenced by VAIC.
- b. Gross Value Added : The result of regression shows that VAIC has statistically positive relationship more than 50% but less than 60%, indicating that GVA is significantly influenced by VAIC.
- c. Market Capitalisation: The result of regression shows that VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so market capitalisation is not much influenced by VAIC
- d. Net Value Added: The result of regression shows, VAIC has statistically positive relationship more than 80%, that indicates NVA is much influence by VAIC.

➤ HUL Ltd:

1. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship more than 80%, that indicates that EVA is much influenced by VAIC.
2. Gross Value Added : The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so GVA is not much influenced by VAIC

3. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so market capitalisation is not much influenced by VAIC
4. Net Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so NVA is not much influenced by VAIC.

➤ Infosys Ltd:

1. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so is not much influenced by VAIC.
2. Gross Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so GVA is not much influenced by VAIC
3. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so market capitalisation is not much influenced by VAIC.
4. Net Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so NVA is not much influenced by VAIC.

➤ TCS Ltd.:

1. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so is not much influenced by VAIC.
2. Gross Value Added : The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so GVA is not much influenced by VAIC
3. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so market capitalisation is not much influenced by VAIC.

4. Net Value Added: The result of regression shows, VAIC has statistically positive relationship less than 10%, which indicates very poor relationship and so NVA is not much influenced by VAIC.

The above findings confirmed that VAIC fails to establish relationship with the financial performance indicators of all the sample companies whereas the new model is developed with an objective to measure the impact of Intellectual Capital on financial performance. Hence, new model proposed and developed is Intellectual Capital Value (ICValue). Intellectual Capital is measured for all the sample companies and relationship is analyzed with financial performance. The relationships of all the companies are as follows:

- ACC Ltd: The proposed model is significantly and positively related with Market Capitalisation as its R2 is more than 50%, but for rest indicators it is not significantly related.
 1. Gross Value Added : The result of regression shows, ICValue has statistically positive relationship more than 30% but less than 40%, that indicates that GVA is much influence by ICValue.
 2. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of market capitalisation with ICValue and can be said that it is much influenced by VAIC.
 3. Net Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of Net Value Added with ICValue and can be said that it is much influenced by VAIC.
- HUL Ltd: The proposed model is significantly related with Gross Value Added, Net Value Added and Market Capitalisation as its R2 is more than 90%.
 - a. Economic Value Added: The result of regression shows, ICValue has statistically positive relationship less than 40% but more than 30%, showing poor relationship, that indicates EVA is not much influenced by ICValue.
 - b. Gross Value Added : The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of GVA with ICValue and can be said that it is much influence by ICValue.

- c. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of market capitalisation with ICValue and can be said that it is much influenced by VAIC.
- d. Net Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of Net Value Added with ICValue and can be said that it is much influenced by VAIC.

Infosys Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is more than 90%.

- a. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of EVA with ICValue and can be said that it is much influence by ICValue.
- b. Gross Value Added : The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of GVA with ICValue and can be said that it is much influence by ICValue.
- c. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of market capitalisation with ICValue and can be said that it is much influenced by VAIC.
- d. Net Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of Net Value Added with ICValue and can be said that it is much influenced by VAIC.

TCS Ltd : The proposed model is significantly related with Economic Value Added, Gross Value Added, Net Value Added and Market Capitalisation as its R² is more than 90%.Economic Value Added: The result of regression shows, ICValue has statistically positive relationship less than 10%, that indicates EVA is not much influenced by ICValue.

- a. Economic Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of EVA with ICValue and can be said that it is much influence by ICValue.
- b. Gross Value Added : The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of GVA with ICValue and can be said that it is much influence by ICValue.

- c. Market Capitalisation: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of market capitalisation with ICValue and can be said that it is much influenced by VAIC.
- d. Net Value Added: The result of regression shows, VAIC has statistically positive relationship more than 90%, showing a strong relationship of Net Value Added with ICValue and can be said that it is much influenced by VAIC.

The above findings confirmed that ICValue is significantly related with all the variables in companies of service sector while in manufacturing sector it is significantly related with Mcap, GVA and NVA. Hence the significant relationship between ICValue and Financial indicators supports researcher to propose ICValue model for measurement of Intellectual Capital of companies.

On comparison of VAIC and ICValue, study observed strong relationship with financial indicators - Economic Value Added, Gross Value Added, Market Capitalisation and Net Value Added in service sector companies according to ICValue, while in manufacturing sector - Hindustan Unilever Ltd's, ICValue is having strong relationship with Gross Value Added, Market Capitalisation and Net Value Added and ACC Ltd's ICValue is having strong relationship with Market Capitalisation, while for rest variable it is having poor relationship. Hence, the study concludes that ICValue is a better predictor model for valuing Intellectual Capital as it shows strong relationship above 85% with all financial performance indicators based on financial statements of companies of service sector and market capitalization of companies of manufacturing sector.

Today's economy, which is knowledge based economy, where information, knowledge and other intangible assets are considered to be more valuable than physical commodities, such intangible assets termed as intellectual capital are showing strong relationship in service sector companies compared to manufacturing sector companies, hence it is strongly recommended that this model named Intellectual Capital Value (ICValue) should be adopted measured by all the companies and should be disclosed in the annual report of the company as an additional information. The same is proved in the result also, that value of intellectual capital are more significantly related with book value performance and market value performance.

It is also been analysed that ICValue shows strong relationship with Market Capitalisation and this strong relationship can be seen in both service sector and manufacturing sector. Hence this

model helps the stakeholders to take informed decisions due to the strong influence of ICValue on Market Capitalisation of the company supported by the study.

Intellectual Capital Value Model: –

Weighted Average Human Cost/Weighted Average Cost of Capital (WACC)

Where,

Human Cost = Employee benefit expenses + Managerial Remuneration

Weighted Average Human Cost = $HC(Y1) * 1 + HC(Y2) * 2 + HC(Y3) * 3 + HC(Y4) * 4 + HC(Y5) * 5 / 1+2+3+4+5$

Weighted Average cost of Capital = Cost of Debt + Cost of Equity

Lastly by applying multiple regression, a model is developed where both the models are combined and the researcher examined relationship. In this combined model, all companies has shown best fit model which can help stakeholders to predict and take decisions for the organisation. Hence when both the model are combined, it can be predicted that value model and efficiency model, both together gives a better model to forecast the financial performance of the company based on financial statements and market capitalization.

Hence it is strongly recommended that the new model should be adopted by the company to measure and disclose the intellectual capital in the books, as the value is derived considering knowledge assets and it is measured considering historical data of knowledge assets of the company.

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