What makes enterprises in auto component industry perform?
Emerging role of labour, information technology and knowledge management

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Auto component industry is an interesting variant of business that is located in the context of dynamic value chain. Whilst one end of the value chain is the sophisticated-oligopolistic Original Equipment Manufacturers (OEM), the other end has suppliers who are small and medium enterprises. In the whole length and breadth of this value chain, suppliers include small, medium, and large enterprises. Broadly, these enterprises are of two types: organised and unorgainsed. Unlike in the case of large multinational enterprises, auto component suppliers, in particular Small and Medium Enterprises (SMEs), are not so well endowed to invest in research development and exhaustive capability building endeavours. However, as elucidated in the extant literature on SMEs, a prudent option for these enterprises is to build and foster absorptive capacities that synergise labour, information technology, and knowledge management. To gauge these themes, we analyse four types of data. First, we examine recent time series of select variables that delineate the basic dynamics of performance and resources of organised auto component industry in India. Second, we lay focus on cross sectional enterprise data drawn from 2012-2013 Annual survey of Industries. Thirds, we analyse 67th round, for the year 2009-2010, of National Sample Survey, to examine unorganised auto component industry in India. Fourth, we use field data, collected in 2016, to discuss multi-dimensional aspects of knowledge management, technology, learning, labour, and outcomes, based on a survey conducted in Pune, Maharashtra, India. We conclude that auto component manufacturers seems to rely more on labour, information technology, and attainments like ISO to perform well in the business.

1 Introduction

We examine the basic patterns of what makes enterprises perform in auto component industry in India. This industry is positioned in the value chain that features polar opposites like highly sophisticated Original Equipment Manufacturers (OEM) who are buyers and many a suppliers who include small, medium and large enterprises. Like many intermediate producers, enterprises in auto component industry appear to be not so resourceful in endeavouring towards technological capability building. Perhaps, in view of the market structure they are in, many a suppliers selling to one or very few buyers, it is quite unlikely that technological capability building by these enterprises is immune to asset specificity. Drawing cues from the extant literature, for an SME, some basic resources such as labour, learning processes, management of knowledge may turn to be dynamic capacities that absorb the transformative power to perform sustainably. As Nonaka (1994, 2008) views managing knowledge by companies tends to be the primary catalyst to forming dynamic capabilities.

Although there is a vast literature on technology management and development in large enterprises, there appears to be obvious lacunae in understanding how small and Medium Enterprises (SME) organise technology, in particular its acquisition, maintenance, and development. Quite important, continuum of technology is incomplete without looking at the knowledge. There appears to be discernible gaps in the extant literature in unravelling symbiotic and organic interlinkages between technology and knowledge, in particular contexts such as SMEs that are part of a value chain and located in the developing world. While there seems to be abundant literature that examine technology and knowledge separately, presumably there is a need for new perspectives and empirically grounded insights to understand technology and knowledge in an integrated manner. Positing a technology-knowledge continuum, we delineate firm as a behavior-governance-social-technological system.

We use four types of data for the analysis. First, we examine the time series of select variables, drawn from Annul Survey of Industries that plots the basic pattern of performance and resources of organised auto component industry in India. Second, we examine cross sectional enterprise data drawn from 2012-2013 Annual survey of Industries. Next, we analyse 67th round of National Sample Survey (NSS), to study organised auto component industry in India. Finally, we use the field data, collected in 2016, to discuss multi-dimensional aspects of knowledge management, technology, learning, labour, and outcomes, based on a survey conducted in Pune, Maharashtra, India.

The paper is organised into six sections. Section 2 discusses SME, Knowledge and Absorptive Capacity. Section 3 examines orgnaised auto component industry in India. An analysis of unorganised sector is presented in section 4. Section 5 presents survey data. Section 6 concludes the paper.

2 SME, Knowledge and Absorptive Capacity

Small and Medium Enterprises (SME) are defined basically either in terms of number of employees working in the company or the turn over the company is making or the investment in the machinery and plant. Each criterion has its own logic and reason and serves different purposes. "Small and medium-sized enterprises (SMEs) are non-subsidiary, independent firms which employ less than a given number of employees" (OECD, 2005). As per the international standards, there are three criteria by which the nature of an enterprise is determined. These criteria are Staff headcount, Annual turnover, and Annual balance sheet (European Commission , 2005). Small and Medium Enterprises (SME) sector in India plays pivotal role in generating employment and creating backward and forward links that foster regional development. Moreover, SMEs often compliment the large industries as ancillary units. Indian SME employs over 80 million persons across of 36 million units, while it contributes to 8% of GDP, 45% to the total manufacturing output and 40% to the exports from the country. Thus, the SME sector may be viewed as potential player in spreading industrial growth across the country at one hand, and on the other as a major partner in the process of inclusive growth. Despite these advantages, factors such as small scale of operation, technological stagnation, inefficiencies in supply chain, introduction of Foreign Direct Investment (FDI) in the sectors, limited credit options, low levels of human capital of the labour force, change in manufacturing strategies and turbulent and uncertain market scenario seem to be salient features of this sector. However, SMEs that are innovative, inventive, and international in their business outlook tend to develop a strong technological base, and competitiveness (Small and Medium Business Development Chamber of India).

The Micro, Small and Medium Enterprises Development Act, 2006 classifies SME, on the basis of investments in plant and machinery, into Micro, Small and Medium level enterprises. However, there different yardsticks for Manufacturing Enterprises and Service Enterprises (Table 1).

Table 1: Type of Small and Medium Enterprises (SME)

	Investment in Equipment (Rupees)	
	Manufacturing	Services
Micro Enterprises	≤ Rupees 2.5 million	≤ Rupees 1 million
Small Enterprises	> Rupees 2.5 million & ≤ Rupees 50 million	> Rupees 1 million & ≤ Rupees 20 million
Medium Enterprises	> Rupees 50 million & ≤ Rupees 100 million	>Rupees 20 million & ≤ Rupees 50 million

Source: Government of India, Development Commissioner, Ministry of Micro, Small and Medium Enterprises (http://www.dcmsme.gov.in/ssiindia/defination_msme.htm)

In India, the automobile industry occupies a prominent place for its forward and backward linkages due to it multiplier effect, ranging from exports to improvement in basic transportation facility. In the Indian context, significant part of the automobile industry appears to have developed in industrial clusters. There are three major clusters in the automobile industry in India. The major automobile clusters are: Delhi-Gurgaon-Faridabad-Ghaziabad-Gautama Buddha Nagar in North India, Mumbai-Pune-Nasik-Aurangabad-Thane in West India, and Chennai-Bangalore-Dharmapuri-Vellore-Kanchipuram-Thiruvallore in South India. Auto component Industry is one of the fastest growing industry during the past two decades among the Clusters of SME in India. Whilst these SMEs play key roles in scaling up of auto component manufacturing, the sector also accounts for a significant share in the exports made by the Auto Components industry in India. However, many a SMEs in this sector are quite small, and account for sizeable informal employment.

SMEs in today's global value chain are situated in the middle of turmoil and have to continuously upgrade and alter its strategy to maintain or upgrade its position in the market. As technology and knowledge have become more volatile, with global buyers situated in the developed world dictating terms of governance, the survival of MSMEs depend on the continuous fine tuning with the global decision makers. Further amongst all this, firms have the pressure to be cost competitive. Any laxity on the cost competitiveness would have risks of running out of business. An important pattern is whilst SMEs participate in global value chains, these enterprises need to comply with standards of the big players such as transnational enterprises (Humphrey and Schmitz, 2001).

Gereffi (2001) classifies global value chains as being producer-driven, buyer-driven and internet-driven. While, in the producer driven value chains, transnational manufacturers are the main actors, the buyer-driven value chain has more focus on the retailers. In internet value chains, significant part of supply chain is built around the internet. In the context of value chains becoming global, a greater relevance is given to efficient supply chain management (SCM). Thakkar, Kanda and Deshmukh (2008a) trace the problems that SMEs might face in implementation of supply chain management (SCM) practices due to the improper role interactions. Factors such as insufficient support from the owner, role of vendor, OEMs, market, culture, competitiveness etc. matter in this regard. Finance forms a big part of the problem and which dictates whether enterprises would go for adoption of new technology and processes and henceforth for the development of new skills. However, a lot depends on the financial situation of the enterprise and the only way left for enterprises to go about the situation is to build careful alliances that would ease technology transfer. This forms a part of SME strategising which is necessary for its survival (Thakkar, Kanda and Deshmukh, 2008b).

However as pointed out by Pietrobelli and Rabellotti (2011) that governance structures in global value chains also influences learning mechanisms in enterprises. A greater recognition of complementary learning systems would foster intra firm learning. Also, the need to meet international standards and business compliances

motivates a closer connect between firms in the value chains. A more relational kind of governance structures would be predominant in these interactions.

Majumdar (2010) in his study of foundries in Western India has narrowed down on the two kinds of growth strategies that small enterprises use for growth- relationship based growth strategy and technology based growth strategy. While the relationship based strategy focuses more on the philosophy of sharing, the technology based strategy is more inclined towards gaining technological prowess for growth. Likewise for technology based growth strategy an able support from finance is crucial.

Meso and Smith (2000), while conceptualising knowledge as a strategic resource in a firm, posits that organisational knowledge management requires to be an exhaustive system that captures not just technological infrastructure but organizational infrastructure, in particular organisational management and philosophy, human resources and culture. Drawing cues from survey data of Small and Medium Enterprises (SME), Gray (2006) shows the pivotal role of 'absorptive capacity' in shaping knowledge management and innovation in SMEs; absorptive capacity is firm's learn and practice new knowledge, disseminating it internally and utilizing new resources. Plotting patterns from a sample survey of firms, Gopalakrishnan and Santoro (2004) shows knowledge transfer and technology transfer are not the same. While knowledge transfer is a narrower and more targeted construct. Put differently, while technology facilitates the change, knowledge explains the change.

Quite important, as pointed out by Edvardsson (2008), Human Resource Management practices such as recruitment, reward, performance management, training, and desired behavioural outcomes can be a catalyst to codification of explicit knowledge and personalization of tacit knowledge. However, SMEs with specialised HRM unit seem to be uncommon phenomena. As posited by Hutchinson and Quintas (2008), formal knowledge management appears to be more pertinent to the large firm, while most of SMEs tend to develop informal knowledge management systems that facilitate creation, communication and sharing, searching and sourcing, synthesizing, and applying and reusing of knowledge. As viewed by Wiig (1997), managing knowledge is not a quirky management tool but more a strategic vision that may be internalised by firms of diverse scales.

Drawing inferences from the multivariate analysis of a cross section collected from SMEs specialising in bio-technology, Alegre et al (2011) shows that knowledge management, as dynamic capabilities, positively impacts innovation practices. However, Durst & Wilhelm (2012) points to the critical issues of knowledge attrition or loss due to employees exit in SME, entailing strategic interventions to obviate such possibilities. Interestingly, as shown by Desouza and Awazu (2006), SMEs, depending upon the level of maturity, tend to cope with the issues of knowledge loss by resorting to practices like creating easy to internalise common knowledge. Emphasizing that knowledge management in SME is different from that of large organisations, Sparrow (2001), aided by indepth qualitative research, and identifies four components of KM in SMEs: appreciation of

individual and shared understanding, effective knowledge base and system, integrated and contextualized action, and effective learning processes.

Discussing the meta-content drawn from the extant literature, Durst and Edvardsson (2012) views that there is discernible lacunae in the literature on KM in SMEs, calling for more empirical research, in particular to capture heterogeneity of SMEs. Apart from internal processes such as learning, as shown by Uchikawa (2011) based on field study of SMEs in Indian Auto mobile clusters, there appears to be knowledge spill over from large assembly or original equipment manufacturing companies to SMEs through practices like collaborative mechanisms.

It is noteworthy that, positing the perspective of strategic knowledge management, Sanchez and Mohoney (1996) points to how important is to have flexible and self-ordered modular product and organizational design to reap dynamic efficiencies from the knowledge management. Drawing patterns from the field research conducted in Automobile clusters in Thailand, Chaminade and Vang (2008) presents scenarios of upgradation of technology and learning amongst SMEs that supply automobile components to transnational enterprises. Quite important, the study delineates that SME in the value chain tend to operate according to the expectations of MNEs. However, amongst lower tier SMEs that produce low value added goods, there are no discernible positive externalities like interactive learning.

Technology is considered to one of the vital parameter for a firm to remain competitive in the market. As stated by Porter (1983), technological attainment of firm is one of the important determinant which determines the competition among firms (Tapan et al, 2010). Extant literature links technology and strategy, in developed and developing nations (Jones and Smith 1997; Momaya and Ajitabh 2005; Tapan 2010). Innovation is one of the vital component for a firm to advance its growth and wealth in the market. Moreover, in a competitive environment, innovation becomes a crucial factor for a firm to sustain in the market (OECD, 2010). As defined by Oslo Manual definition (OECD,2005) " Innovation is the implementation of any new or significantly improved product (goods or services), operational processes (methods of production and service delivery), any new marketing methods (packaging, sales and distribution methods), or new organizational or managerial methods or processes in business practices, workplace organization or external relations".

Innovation is also about the development and exploitation of new ideas or invention. The innovation activity in an organisation can be product innovation or process innovation. The result of innovation process, the type of innovation created by the firm or the actual implementation of the new product or service business process or method can be considered as product innovation. The process of innovation refers to, " the temporal sequence of events that occur as people interact with others to develop and implement their innovation ideas within an institutional context" (van de Ven and Poole 1989, p. 32). Both of these activities can affect firms'

performance (Gronum et.al, 2012). Though Schumpeter highlights that large firms innovate more than Small and medium sized firms do, the recent research provide substantial evidences of innovation activities being carried out by Small and Medium sized enterprises (SMEs), too.

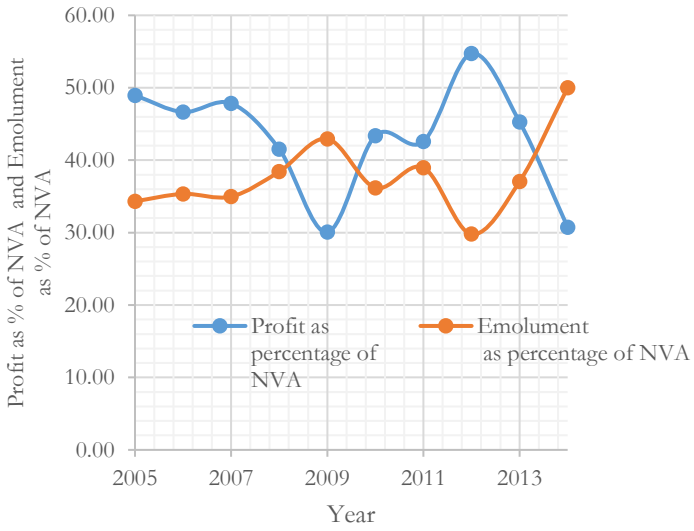
3 Organised Auto Component Industry

To capture the dynamics of organised auto component industry in India during 2004-05-2013-14, we plot the trend of Net Value Added (NVA) at constant prices, Persons Engaged, Fixed Capital at constant prices, NVA at constant prices per person, and Fixed Capital at constant prices per person (Table 2). Interestingly, While Fixed Capital at constant prices grew at a discernibly higher rate (26%) during this period, Persons Engaged grew at 12%. Presumably, fixed capital and persons employed culminate in NVA. During this period, NVA at constant prices grew at 17%. However, NVA per person employed grew at a measly rate of 4%. It appears, drawing cues from the patterns presented in Table 2, there had been perceptible deepening of capital in auto component industry the during this period. Corroborating this pattern, Fixed Capital at constant prices per person grew at 13%. As shown in Figure 1, during this period, share of profit in NVA fluctuated in the range of 30 % to 55%, while share of emoluments varied between 30% and 50%, clearly depicting a cyclic pattern.

Table 2: Net Value Added (NVA), Persons Engaged, and Fixed Capital in Auto component Industry (NIC-2008 4 digit 2930 & NIC-2004 4 digit 3430)

Year	Real Net Value Added (NVA) (at 2004-05 Prices) (Rupees Lakh)* $	Person Engaged $	Real NVA per Person Engaged (Rupees Lakh)	Real Fixed Capital (at 2004-05 Prices) (Rupees Lakh)** #	Real Fixed Capital per Person Engaged (Rupees Lakh)
2004-2005	723516	234463	3.09	1030452	4.39
2005-2006	742826	253003	2.94	1144923	4.53
2006-2007	869227	290339	2.99	1404031	4.84
2007-2008	962460	329362	2.92	1909125	5.80
2008-2009	914655	357401	2.56	2655154	7.43
2009-2010	1574780	463033	3.40	3980698	8.60
2010-2011	1903301	540007	3.52	5148340	9.53
2011-2012	2803137	565078	4.96	5003085	8.85
2012-2013	2376287	561405	4.23	6048965	10.77
2013-2014	1957898	566153	3.46	6788885	11.99
Trend Growth Rate (%)	16.74 ($p<0.01$)	11.92 ($p<0.01$)	4.31 ($p<0.05$)	26.17 ($p<0.01$)	12.73 ($p<0.01$)

*Real NVA is computed by dividing NVA at current prices by Wholesale Price Index (WPI) deflator of auto parts. ** Real Fixed Capital is computed by dividing Fixed Capital at current prices by Wholesale Price Index (WPI) deflators in respect of Industrial Machinery and Machine Tools.
Source: Office of the Economic Advisor, Government of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion, http://www.eaindustry.nic.in/home.asp
$ Source: Compiled from Annual Survey Industries (ASI), http://mospi.nic.in/mospi_new/upload/asi/ASI_main.htm



Source: Source: Compiled from Annual Survey Industries (ASI), http://mospi.nic.in/mospi_new/upload/asi/ASI_main.htm

Figure 1: Profit and Emolument as percentage of NVA in Auto component Industry (NIC-2008 4 digit 2930 & NIC-2004 4 digit 3430)

To delineate salient features of organized auto component industry in India, we use Annual Survey of Industries (ASI) micro data for the year 2012-2013. In the database, we filtered 845 units that fall in National Industrial Classification (NIC) 2008 4 digit code '2930'. As shown in Table 3, the industry is heterogeneous in location, type of organisation, type of ownership, scale of operation, number of persons employed, and attainment of International Organization for Standardization (ISO) standards. A whopping 55% of factories are located in three states Tamil Nadu (20%), Maharashtra (18%) and Haryana (17%). 57% of units are located in the urban. Corporate organizations form 86% of the whole distribution, consisting of private limited (63%) and public limited (86%). Close to four fifth of units are privately owned. Small and Medium Enterprises (SME) account for 55%, while three fourth of units employ at least 100 persons. Only 30% of enterprises have attained ISO standards.

Table 3: Characteristics of Factories- Auto component Industry (2012-2013)
(NIC-2008 4 digit 2930)

Sate	Percent	Type of Ownership	Percent
Tamil Nadu	20.1	Wholly State and/or Local Govt.	.1
Maharashtra	18.0	Joint Sector Public	3.3
Haryana	17.4	Joint Sector Private	19.0
Uttaranchal	6.9	Wholly Private Ownership	77.6
Uttar Pradesh	6.9	Total (N= 845)	100.0
Karnataka	5.7	**Scale of Enterprises#**	**Percent**
Punjab	4.7	Micro Enterprises	10.3
Gujarat	4.4	Small Enterprises	29.9
Rajasthan	3.3	Medium Enterprises	14.6
Madhya Pradesh	2.6	Large Enterprises	45.3
Other States	10.1	Total (N= 845)	100.0
Total (N= 845)	100.0	**Number of Persons Employed**	**Percent**
Location	**Percent**	Less than 10	3.1
Rural	43.2	More than 10 but less than 20	6.9
Urban	56.8	20 and above but less than 100	15.4
Total (N= 845)	100.0	At least 100	74.6
Type of Organisation	**Percent**	Total (N= 845)	100.0
Individual Proprietorship	5.4	**Having ISO**	**Percent**
Partnership	8.9	Yes	29.9
Public Limited Company	23.0	No	70.1
Private Limited Company	62.7	Total (N= 845)	100.0
Total (N= 845)	100.0		

#Table 1 defines scale of enterprises

Source: Annual Survey of Industries 2012-2013, Unit Records

Table 4 outlines median values of select variables –age of the firm, NVA, Profit, Employment, Fixed capital, value of Plant and Machinery, and value of Computer Hardware and Software- that are disaggregated with respect to type of organization for the year 2012-13. For the whole, median age of the firm is 16 years. Across type of organisations, there appears to be no discernible variation, ranging from 15 years (Private Limited) to 22 years (Partnership). Median value of NVA is Rs 119 million, while across type of organization value varies from Rs 4 million (Proprietorship) to Rs 27 million (Public Limited). Median profit for the whole set is Rs 33 million. However, there appears to be a large spread between the lowest value (0.85 million for Proprietorship based units) and the highest value (129 million for Public Limited units). Median value of average person employed in the industry is 255, while the highest and the lowest value are 496 (Public Limited) and 18 (Proprietorship run units), respectively. In the industry, average number of manufacturing days is 77315 days, located in the interval of 5040 days (Proprietorship) and 158418 days (Public Limited Units). Daily wage varies in the range of Rs 327 (Proprietorship) to Rs 761 (Public Limited Units), while the median is Rs 638. Quite

important, the median value of fixed capital is Rs 167 million, while, across the type of organisation, values range from 4.5 million rupees (Proprietorship) to 385 million rupees (Public Limited Units). Moreover, we look into two constituents of fixed capital: value of plant and machinery and value of computer hardware and software. The median of the value of plant and machinery is Rs 81 million, while the lowest and the highest values are Rs 1.5 million (Proprietorship) and Rs 237 million (Public Limited Units), respectively. In the industry, on an average firms own Rs 1 million worth computer hardware and software, showing a range of Rs 0.02 million (Proprietorship) to Rs 2.5 million (Public Limited Units). Except the case of enterprise's age, with respect to each variable we have discussed, so far, there is a Peking order that has public limited at the top and proprietorship at the bottom, while private limited and partnership are placed second and third, respectively. Further, the same Peking order is valid for NVA per person employed (Rs 0.2 million to Rs 0.8 million). However, Supervisors and Managers as percentage of Persons Employed varies in a narrow range (9%-11%), showing no perceptible variation across the distribution. Amongst categories of organization, the category 'Public Limited' reports the highest NVA per person employed (Rs 0.57 million), while Proprietorship reports the lowest (Rs 0.19 millions), and the Peking order discussed previously is valid here, as well. However, this Peking order breaks in the case of Fixed Capital per person employed, although the top slot remains the same (0.84 million in respect of public limited enterprises). In this case, partnership occupies the bottom (Rs 0.21 million). It is important to note that, unequivocally, profit as percentage of NVA and emolument as percentage of NVA move in opposite direction, conveying obvious tradeoff between profit and wage. Moreover, presumably it appears that capital intensity and scale that are the salient features of public limited and private limited organisations tend to push NVA to profit's share, while the counter pattern is tenable for proprietorship and partnership. Interestingly, the margin defined as profit as a percentage of gross sales is highest for public limited (10%), followed by private limited (7%), and 4% apiece for the rest.

Now, we move from a descriptive exercise to a simple inferential frame by deploying the analysis of variance (ANOVA) and the pearson correlation coefficient. For ANOVA, while we treat variables and derived percentages presented in Table 4 as dependent variables, type of organization, a nominal scale variable, is taken as the independent variable. Table 5 presents the results. Except three derived percentages-emolument and profit as percentages of NVA and profit as a percentage of gross sales- all variables significantly change within as we move from one category of the independent variable to the other, rejecting the null hypothesis of no variation. As shown in Table 6, we run pearson correlation between age of the firm, NVA, Profit, Manufacturing Days, Average Number of Persons Employed, Daily Wage Rate, Fixed capital, value of Plant and Machinery, and value of Computer Hardware and Software. It is important to note that there is hardly any strong correlation between age of the firm and other variables. Perhaps, this points to the pattern of no significant direct covariation between longevity of firm, competitiveness, and resources. On the other hand, amongst other variables that are either outcomes or resources–employment related, capital based, NVA, and

profit-, there exists statistically significant positive correlation coefficients, varying from 0.18 (between wage rate and average number of persons employed) to 0.98 (between NVA and profit). Quite important, there appears to be a plausible pattern of complementarity between capital and labour. There is a strong and significant positive correlation between Fixed Capital and alternate indicators of labour-manufacturing days (0.65) and average number of persons employed (0.62)-. Drawing cues from the neoclassical micro economics, this pattern points to the phenomenon of capital-labour complementarity due to the scale effects that have been crowding out the substitution effects[1]. This positive linkage between capital and labour appears to be tenable for constituents of capital such as plant and machinery (0.6) and computer hardware and software (0.4). It is noteworthy that there is a significant direct correlation between value of computer hardware and software and outcomes such as NVA (0.46) and profit (0.43).

Further, we examine pearson correlation coefficient between six ratios: emolument as a percentage of NVA, profit as a percentage of NVA, NVA as a percentage of average persons employed, fixed capital per person employed, profit as a percentage of gross sales, value of computer hardware and software as a percentage of persons employed. As shown in Table 7, out of 15 correlation coefficients, only six are statistically significant. Amongst these, correlation between emolument as a percentage of NVA and profit as a percentage of NVA is the highest (-0.96), confirming an obvious inverse relation between factor shares that represent diametrically opposite class interests (while the former is for the working class, the latter for the capitalist). However, other five statistically significant correlation coefficients are positive and weak. Notable amongst these is the positive correlation between value of computer hardware and software as a percentage of persons employed and profit as a percentage of gross sales, pointing to a presumably direct linkage between digital resources and firm's performance.

We visualise five core patterns that have been discussed previously. While Figure 2 portrays the relation between natural logarithm of NVA per person employed and natural logarithm of fixed capital per person employed, figure 3 presents the relation between natural logarithm of fixed capital per person and natural logarithm of ratio of emoluments to rent and interest. We depict a three dimensional relation between natural logarithm values of NVA, persons employed, and fixed capital (Figure 4). Figure 5 delineates the relation between natural logarithm of NVA and natural logarithm of profit. Except Figure 4, we segregate patterns with respect to type of organisation. Quite important, we found no discernible divergence between these figures and the results of descriptive and inferential analysis.

[1] While scale effects emanate from strategic choices like expsansion of scale, substitution effect tends to emerge from variations in factor/resource prices.

Table 4: Select Variables- Auto component Industry (2012-2013)
(NIC-2008 4 digit 2930)

Select Variables	Individual Proprietorship	Partnership	Private Limited Company	Public Limited Company	Total
(Median Value)	Type of Organisation				
Age of Firm (Years) (N=845)	16	22	15	19	16
Net Value Added (NVA) (Rupees) (N=826)	4061066	8660558	116902238	270380535	119102433
Profit (Rupees) (N=826)	855480	1160293	37041006	128838631	32841702
Total manufacturing days (N=844)	5040	12652	75124	148418	77315
Average number of persons worked (N=844)	18	44	251	496	255
Supervisors and Managers as percentage of Persons Employed (N=830)	10	11	10	9	10
Daily Wage Rate (Rupees) (N=843)	327	414	662	761	638
Fixed Capital (Rupees) (N=845)	4524906	10318897	176152573	384760511	167002394
Value of Plant and Machinery (Rupees) (N=844)	1488968	5064321	80928829	237532784	80719108
Value of Computer (Hardware and Software) (Rupees) (N=805)	19582	29766	1083309	2522490	1048204
NVA per person employed (Rupees) (N=826)	194182.82	225487.07	455521.12	571641.25	416532.14
Fixed Capital per person employed (Rupees) (N=827)	267459	211512	659137	837737	613265
Emolument as percentage of NVA (N=827)	53	59	39	37	42
Profit as percentage of NVA (N=826)	29	26	46	54	43
Profit as percentage of Gross sales (N=826)	4	4	7	10	7

Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Table 5: Analysis of Variance Select Variables- Auto component Industry with Type of Organisation
(NIC-2008 4 digit 2930)

Dependent Variable	Independent Variable	F	Sig.
Age of Firm	Type of Organisation	11.99	0.00
Net Value Added (NVA)	Type of Organisation	15.51	0.00
Profit	Type of Organisation	10.35	0.00
Total Manufacturing days	Type of Organisation	35.83	0.00
Average number of persons worked	Type of Organisation	35.90	0.00
Share of Supervisory/Managerial Staff	Type of Organisation	2.13	0.09
Daily Wage Rate	Type of Organisation	32.18	0.00
Fixed Capital	Type of Organisation	15.96	0.00
Plant & Machinery	Type of Organisation	14.86	0.00
Computer-Hardware and Software	Type of Organisation	15.05	0.00
NVA per person employed	Type of Organisation	8.359	.000
Fixed Capital per person employed	Type of Organisation	15.96	0.00
Emolument as percentage of NVA	Type of Organisation	.258	.855
Profit as percentage of NVA	Type of Organisation	.087	.967
Profit as percentage of Gross sales	Type of Organisation	.011	.998

Number of Responses as given in Table 4
Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Table 6: Correlation between Select Variables- Auto component Industry
(NIC-2008 4 digit 2930)

Variable	Firm Age	Net Value Added	Profit	Total Manufacturing days	Average number of persons worked	Daily Wage Rate	Value of Fixed Capital	Value of Plant & Machinery	Value of computer hardware & software
Firm Age	1	.114**	.078*	.192**	.189**	.016	.070*	.084*	.051
Net Value Added		1	.982**	.654**	.648**	.351**	.558**	.473**	.457**
Profit			1	.545**	.543**	.296**	.432**	.341**	.425**
Total Manufacturing Days				1	.995**	.183**	.653**	.622**	.370**
Average number of persons worked					1	.192**	.620**	.586**	.383**
Daily Wage Rate						1	.291**	.258**	.340**
Value of Fixed Capital							1	.963**	.371**
Value of Plant & Machinery								1	.316**
Value of Computer Hardware & Software									1

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

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

Number of Responses as given in Table 4

Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Table 7: Correlation between Ratios- Auto component Industry
(NIC-2008 4 digit 2930)

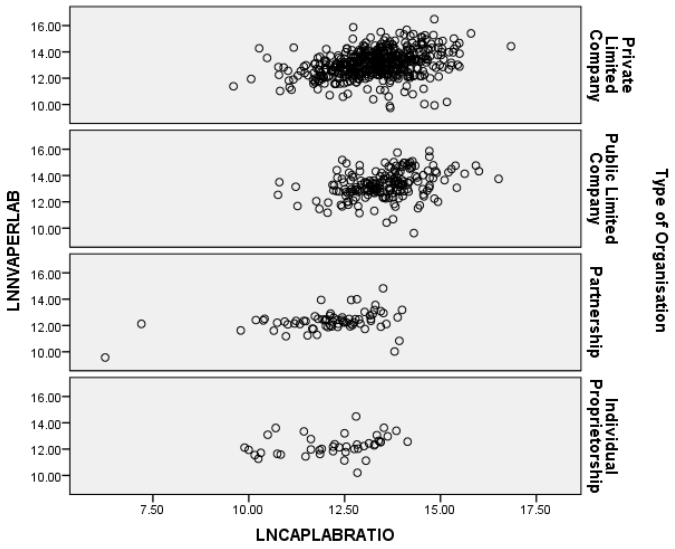
Variable	Emolument as percentage of NVA	Profit as percentage of NVA	NVA per person employed	Fixed Capital per person employed	Profit as percentage of Gross sales	Value of Computer-Hardware and Software per person employed
Emolument as percentage of NVA	1	**-.964****	-.048	-.029	.003	-.016
Profit as percentage of NVA		1	.047	.009	.002	.006
NVA per person employed			1	**.143****	**.069***	**.203****
Fixed Capital per person employed				1	**-.118****	**.269****
Profit as percentage of Gross sales					1	-.051
Value of Computer-Hardware and Software per person employed						1

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

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

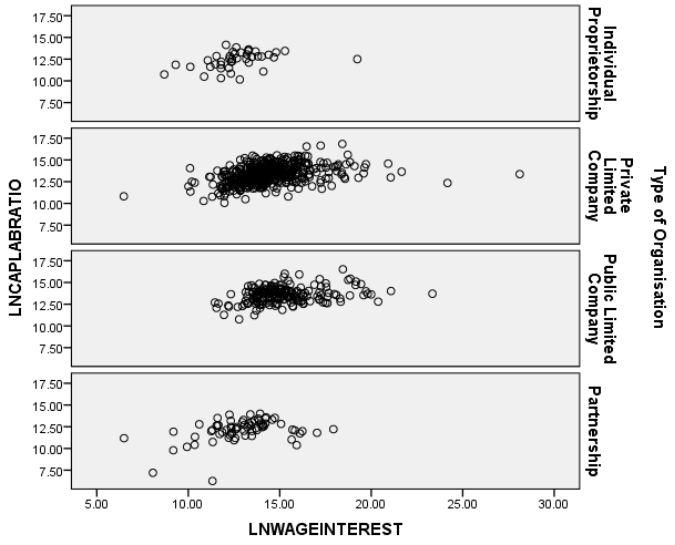
Number of Responses as given in Table 4

Source: Computed from Unit records of Annual Survey of Industries 2012-2013



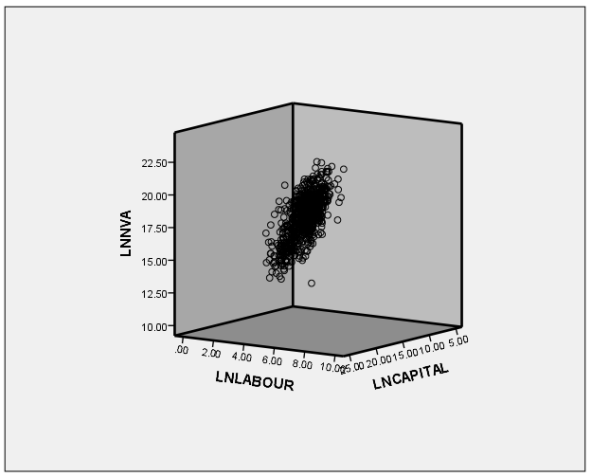
Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Figure 2: Logarithm of NVA per person employed (LNNVAPERLAB) and Fixed Capital per person employed (LNCAPLABRATIO) (NIC-2008 4 digit 2930)



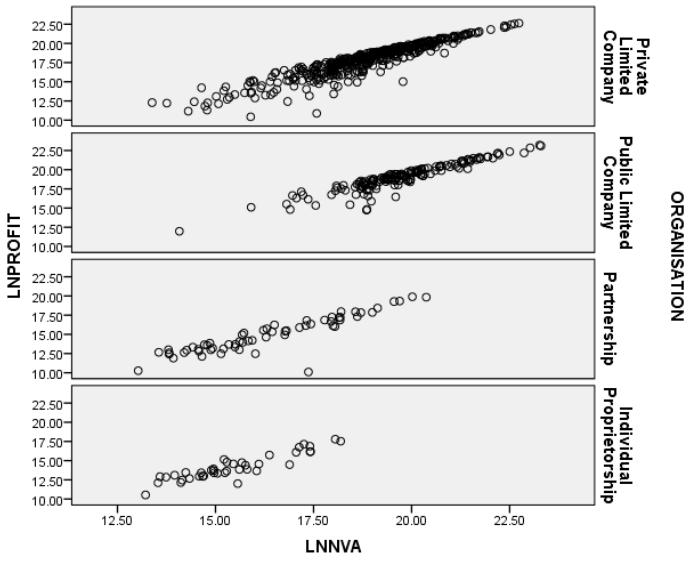
Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Figure 3: Logarithm of Ratio of Emoluments to interest and rent (LNWAGEINTEREST) and Fixed Capital per person employed (LNCAPLABRATIO) (NIC-2008 4 digit 2930)



Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Figure 4: Logarithm of NVA (LNNVA),
Logarithm of Fixed Capital (LNCAPITAL), and Logarithm of person employed (LNLABOUR)
(NIC-2008 4 digit 2930)



Source: Computed from Unit records of Annual Survey of Industries 2012-2013

Figure 5: Logarithm of NVA (LNNVA) and Logarithm of Profit (LNPROFIT)
(NIC-2008 4 digit 2930)

Next, we posit four functional relations. Model 1 puts Natural Logarithm of Output as a function of Natural Logarithm of Input, Natural Logarithm of Fixed Capital, Natural Logarithm of Employed Persons, having ISO certification, dummies to capture fixed effects that emanate from type of organisation, and for states, as well. Model 2 retains the same dependent variable in Model 1, 3 independent variables, and dummies to capture fixed effects. However, we drop Natural Logarithm of Fixed Capital. Instead, we bring Natural Logarithm of value of plant and machinery and Natural Logarithm of value of computer hardware and software. However, in models 3 & 4, we replace Natural Logarithm of Output as dependent variable by Natural Logarithm of NVA. Moreover, in both the models, we remove Natural Logarithm of Input. Except these changes model 3 retains the same independent variables in model 1, while model 4 retains the same indipedent variables in model 2. We began the analysis by applying Ordinary Least Square (OLS) regression to these models. The results were subject to post estimation analysis for variance inflation factor, testing the hypothesis of homoscedasticity, and testing the hypothesis of no omitted variables. We did not find any discernible violation of assumptions in the post estimation with an exception models 1 and 2 report heteroscedasticity. However, we found evidence, by plotting leverage[2] and normalized Residual Square, for perceptible impact of outliers in the distribution of variables. So, we adopted the robust regression[3] method that precludes leveraging power of outliers, to estimate these models. Across four models, constants are positive and statistically significant (Table 8). However, dummies for state and type of organisation are not statistically significant. However, across these models, not having ISO certificate, statistically significant at 0.01 level, pulls output and NVA down. The magnitude of relation between the dummy for ISO and NVA is relatively higher than the magnitude of relation between the dummy for ISO and output.

For models 1 and 2, input captures largest chunk of variation in output (elasticities of 0.88 and 0.87, respectively). What makes model 1 distinct from model 2 is while model 1 treats fixed capital as an aggregate, in model 2, we use two constituents of capital –plant and machinery and computer hardware and software-. Quite important, in models 1 and 2, leaving aside input, labour (i.e. employed persons) reports the second highest statistically coefficient (0.10 and 0.11, respectively). In model 1, however, coefficient of fixed capital is of lower magnitude (0.04), although the coefficient is statistically significant. In model 2, we retain the same

[2] "An observation with an extreme value on a predictor variable is a point with high leverage. Leverage is a measure of how far an independent variable deviates from its mean. High leverage points can have a great amount of effect on the estimate of regression coefficients." http://www.ats.ucla.edu/stat/stata/dae/rreg.htm.

[3] See Verardi, V., & Croux, C. (2009). Robust regression in Stata. *The Stata Journal*, *9*(3), 439-453. http://www.stata-journal.com/article.html?article=st0173

Peking order of coefficients as in the case of model 1. Interestingly, in model 2, coefficients in respect of plant and machinery and computer hardware and software turn out to be quite weak, however, statistically significant.

Now, we turn to models 3 & 4. In these models, we deduct inputs and depreciation from output, generating Net Value Added (NVA). This means we do not include input as an independent variable. Apart from this, model 1 is replicated as model 3 while model 2 as model 4. In models 3 and 4, natural logarithm of employed accounts for largest variation (reporting partial elasticities 0.79 and 0.78, respectively). While 1 unit proportionate change in fixed capital generates 0.32 unit proportional change in NVA (model 3), in model 4, plant and machinery and computer hardware and software report coefficients 0.16 and 0.14, respectively. In both these models, not having ISO adversely affects NVA (-0.3 apiece). Moreover, fixed effects that originate from identities like state and type of organisation are not statistically significant.

Interestingly, leaving aside the conventional logic of NVA as a function of labour (i.e persons employed) and fixed capital or plant machinery, quite interestingly, value of computer hardware and software and having ISO account for not an insignificant impact on NVA. Presumably, the inference points to that in auto component industry in India, across locations and type of organisation[4], while the labour plays pivotal role in explaining variation in NVA, corroborating the extant literature on small and medium enterprises, it appears processes like ISO and resources such as computer hardware and software contribute to 'absorptive capacity' that emerges as the growth driver.

[4]Type of organisation also captures the sacle of operation/employment. While public limited enterprises are larger units, the category of private limited captures medium to large. Other two types –proprietorship and partnership- are mainly formed by smaller eneterprises.

Table 8: Determinants of Output and NVA (Robust Regression)
(NIC-2008 4 digit 2930)

	Dependent Variable							
	Model 1		Model 2		Model 3		Model 4	
Independent Variables	Natural Logarithm of Output		Natural Logarithm of Output		Natural Logarithm of NVA		Natural Logarithm of NVA	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Constant	1.37**	0.13	1.64**	0.14	8.71**	0.5	10.3**	0.46
Natural Logarithm of Input	0.88**	0.01	0.87**	0.01			-	-
Natural Logarithm of Fixed capital	0.04**	0.01	-		0.32**	0.03	-	-
Natural Logarithm of Employed	0.1**	0.01	0.11**	0.01	0.79**	0.04	0.78**	
Natural Logarithm of the value of Plant and machinery	-	-	0.02	0.01	-	-	0.16**	0.03
Natural Logarithm of the value of computer hardware and software	-	-	0.02	0.00	-	-	0.14**	0.02
Having ISO Certification: No (Reference category: Yes)	(-) 0.07**	0.01	(-) 0.08**	0.02	(-) 0.3**	0.07	(-) 0.3**	0.07
Type of Organisation Dummies	Yes		Yes		Yes		Yes	
State Dummies	Yes		Yes		Yes		Yes	
Analysis of Variance	F(28,797)=2831.95**		F(29,752)=2347.79**		F(27,759)=132.01**		F(27,716)=132.01**	
Number of Responses	826		782		787		787	

** Significant at the 0.01 level (2-tailed).
Source: Computed from Unit records of Annual Survey of Industries 2012-2013

4 Unorganised Auto component Industry in India

Our previous discussion was delimited to the registered/organised manufacturing, while unorganised enterprises also play vital role in the value chain of auto component industry. We delineate patterns from National Sample Survey 67th unit records. To identify enterprises that are engaged in auto component manufacturing, we selected NIC 2008 4 digit code 2930 that captures auto component sector, generating the data of 182 unorganised enterprises. As shown in Table 9, while 86% of enterprises are located in the urban, 87% are owned by male proprietors. Two fifth of enterprise owners belong to Schedule Tribe (ST)/Scheduled Caste (SC)/Other Backward Classes (OBC) categories. 87% of enterprises exist with fixed premises and with permanent structure. Close to one fifth are own account enterprises. Two fifth of these units have faced same problem in recent times. Of these, three fifth faced problems due to erratic power supply, while for one sixth labour scarcity was a major problem. However, a measly 1.4% said they faced problems due to labour dispute. Only two fifth reported that they had been expanding. While 9% used computers, 7% used internet.

Table 9: Characteristics of Unorganised Enterprises in Auto component Industry (NIC-2008 4 digit 2930)

Area	**Percentage**	**Faced Problems**	**Percentage**
Rural	13.8	Yes	39.6
Urban	86.2	No	60.4
Total (N=181)	100	Total (N=182)	100.0
Type of Ownership	**Percentage**	**If faced problems, severe problems**	**Percentage**
Proprietor Male	87.4	erratic power supply/ power cuts	61.1
Proprietor Female	3.8	shortage of raw materials	4.2
Partnership with members of the same household	4.9	shrinkage /fall of demand	5.6
Partnership between members not all from the same household	3.8	non-availability / high cost of credit	6.9
Total (N=182)	100	non-recovery of financial dues	2.8
Social Category of Enterprise Owner/Partners	**Percentage**	non-availability of labour as and when needed	15.3
Scheduled Tribe	2.2	labour disputes and related	1.4
Scheduled Caste	5.5	Others	2.8
Other Backward Classes	32.4	Total (N=72)	100.0
Others	59.9	**Enterprise Status**	**Percentage**
Total (N=182)	100	Expanding	41.2
Location	**Percentage**	Stagnant	25.8
within household premises	12.6	Contracting	9.9
with fixed premises and with permanent structure	87.4	operated for less than three years	23.1
Total (N=182)	100	Total(N=182)	100.0
Type of Enterprise	**Percentage**	**Enterprise's Usage of Computer and Internet**	**Percentage**
Own Account Enterprise	18.7	Enterprise used computer (N=182)	9.3
Establishment	81.3	Enterprise used Internet (N=182)	7.1
Total (N=182)	100.0		

Source: Computed from Unit Records of NSS 67th Round

Next, we move to the inferential analysis of select variables: Gross value Added (GVA), Average Number Employed Persons, Fixed Capital, Net Surplus, Value of information, computer and telecommunications equipment, and Value of plant and machinery. Moreover, we transform these variables to natural logarithm scale[5]. We use three tools: analysis of variance (ANOVA), Pearson correlation coefficient, and regression. Table 10 presents ANOVA results. In ANOVA, all the select variables are treated as the dependent variables, while

[5] LNGVA = Natural Logaritham of GVA, LNLABOUR = Natural Logarithm of Employed Persons; LNCAPITAL = Natural Logarithm of Fixed Capital, LNSURPLUS = Natural Logarithm of Net Surplus, LNICT = Natural Logarithm of information, computer and telecommunications equipment, and LNPLANT = Natural Logarithm of Plant and Machinery

type of ownership is the independent variable. We accept the null hypothesis that as we change categories within type of ownership, there is no change in these variables.

Table 10: Analysis of Variance Select Variables- Auto component Industry with Type of Ownership (NIC-2008 4 digit 2930)

Dependent Variable	Independent Variable	F	Sig.
Gross Value Added (GVA) (Rupees) (N=182)	Type of Ownership	.064	.979
Value of Fixed Capital (Rupees) (N=182)	Type of Ownership	.052	.984
Value of Plant and Machinery (Rupees) (N=87)	Type of Ownership	1.354	.263
Value of information, computer and telecommunications equipment (Rupees) (N=39)	Type of Ownership	.072	.975
Net Surplus (Rupees) (N=181)	Type of Ownership	.066	.978
Employed Persons (N=182)	Type of Ownership	.058	.982

Source: Computed from Unit Records of NSS 67th Round

We run Pearson correlation for every pair of variables–LNGVA, LNLABOUR, LANCAPITAL, LNSURPLUS, LNICT, and LNPLANT-, generating 15 correlation coefficients (table 11). Of these, except one pair (LNICT and LNPLANT), all report positive strong correlation, ranging from 0.49 (LNCAPITAL and LNGVA) to 0.92 (LNGVA and LNSURPLUS). While LNGVA and LNSURPLUS are performance indicators, rests are resources with the enterprise. Amongst resources that co vary strongly with LNGVA, LNLABOUR reports highest magnitude of correlation (0.92), followed by LNICT (0.68). The same Peking order is valid for LNSURPLUS (correlation with LNLABOUR and LNICT are 0.66 and .61, respectively).

Table 11: Correlation between Select Variables (NIC-2008 4 digit 2930)

	LNGVA	LNLABOUR	LNCAPITAL	LNSURPLUS	LNICT	LNPLANT
LNGVA	1	.809**	.490**	.917**	.684**	.614**
LNLABOUR		1	.531**	.659**	.721**	.537**
LNCAPITAL			1	.508**	.513**	.693**
LNSURPLUS				1	.608**	.556**
LNICT					1	.232
LNPLANT						1

**. Correlation is significant at the 0.01 level (2-tailed).
LNGVA = Natural Logarithm of GVA, LNLABOUR = Natural Logarithm of Employed Persons
LNCAPITAL = Natural Logarithm of Fixed Capital, LNSURPLUS = Natural Logarithm of Net Surplus,
LNICT = Natural Logarithm of information, computer and telecommunications equipment,
LNPLANT = Natural Logarithm of Plant and Machinery
Number of Responses as given in Table 10
Source: Computed from Unit Records of NSS 67th Round

The third analysis we explore is the regression. We regress LNGVA on LNCAPITAL, LNLABOUR, dummies with respect to Usage of Computer by the enterprise and Usage of Internet by the enterprise. We have two models. In model 1, we regress regress LNGVA on LNCAPITAL, LNLABOUR, dummy with respect to Usage of Computer by the enterprise, while, in model 2, we retain all variables except the dummy. We replace dummy for Usage of Computer by the enterprise by dummy for Usage of Internet by the enterprise. We refrain from using both dummies together since phi correlation[6] of these dummies is strongly positive, thus paving way for multi collinearity. Akin to regression models shown in table 8, we first deployed an OLS model, and subjected results to the post estimation process. Although we did not find any significant departure from OLS assumptions, we used robust regression to overcome the leveraging power of outliers. As shown in Table 12, with respect to model 1, LNLABOUR accounts for highest chunk of variation in LNGVA, while usage of computer makes quite a discernible positive impact on LNGVA. We get more or less pattern for model 2, as well. In the case of model 2, leaving resources like labour, usage of internet appears to make strong positive impact on LNGVA.

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Table 12: Determinants of GVA (Robust Regression)
(NIC-2008 4 digit 2930)

	Dependent Variable			
Independent variables	LNGVA$		LNGVA$	
	Model 1		Model 2	
	Coeff.	Standard Error	Coeff.	Standard Error
LNCAPITAL$	0.06**	0.02	0.06**	0.02
LNLABOUR$	0.93**	0.07	0.92**	0.07
Usage of Computer by the enterprise (1= Yes, 0=No)	0.43**	0.17	-	-
Usage of Internet by the enterprise (1= Yes, 0=No)	-	-	0.55**	0.19
Constant	8.67**	0.25	8.20**	0.25
Analysis of Variance	F(3,178) =141 **		F(3,178) =143 **	
Number of Responses	182		182	

**Significant at the 0.01 level (2 tailed)
$ Variable names are explained below Table 11.
Source: Computed from Unit Records of NSS 67th Round

Quite unequivocally, what emerges from the descriptive and inferential analysis is that while linking resources with enterprise's performance, two resources stand out in impact: labour and information and communication technology. These two resources, along with technological upgradation, seem to play pivotal role in shaping absorptive capacity of enterprises in auto component industry in India, in particular Small and Medium enterprises.

[6] Phi correlation measures correlation between two nominal variables.

5 Field Study of Auto component Custer in Pune

Previous analysis and discussion unravels that it is crucial for enterprises in auto component industry, particularly SMEs, to envisage the creation and fostering absorptive capacities, primarily through synergising labour and information technology. This is a transformative questions, entailing organising knowledge and learning. To get some sense of how auto component enterprises practice these processes we did a sample survey of 92 firms during May-June, 2016.

Table 13 below present's data gathered from Pune automobile cluster which brings out firm characteristics which manufacture automobile parts and accessories. A sample size of 92 firms is accounted in this analysis. Of all the firms, forty per cent of the firms had web presence of some kind which provides them a better visibility. Further, majority of the firms (more than fifty per cent) were of recent origin i.e. established between the years 2000-2010. A meagre 7.2 per cent of firms were established prior to 1990s. The educational qualification of the owner of the firm was mostly found to be diploma holders (close to fifty per cent of the total owners). Close to twenty five per cent of the owners were also found to be undergraduates having technical background. The sample collected also reflects a majority of small proprietorship firms which largely falls within tier 3 of the value chain. In most instances, the number of workers in the firms was found to be less than twenty. Data was collected from different locations in Pune that included Bhosari, Chakan, Powna industrial area and Talawade. Of these different locations, majority of the firms were located in Bhosari.

Table 13: Characteristics of factories (Auto component Industry Pune) (2016)

Firm Characteristics	Percentage	Firm Characteristics	Percentage
Firm having website (n=90) (Variable Name : WEB)		Size of the Firm (n=92) (Variable Name : SCALE)	
Yes	40	Micro	16.3
Year of Establishment (n=83) (Variable Name : YEAR)		Small	68.5
Before 1990	7.2	Medium	15.2
1990-2000	9.6	Nature of the Firm (n=89) (Variable Name : TIER)	
2000-2010	56.6	Tier 1	25.8
After 2010	26.5	Tier 2	21.3
Educational Qualification of the Owner (n=89) (Variable Name : EDUCATION)		Tier 3	52.8
12th and below	7.9	Number of Workers (n=91) (Variable Name : EMP)	
Under Graduate Technical	23.6	Below 10	35.2
Under Graduate Non-technical	2.2	10 and below 20	35.2
Diploma	47.2	20 and below 100	25.3
Industrial Training Institute (ITI) Qualified	7.9	Above 100	4.4
Post Graduate Technical	9.0	Location of Firm (n=92) (Variable Name : LOCATION)	
Post Graduate Non-Technical	2.2	Bhosari	45.7
Type of Establishment (n=92) (Variable Name : ESTABLISH)		Chakan	18.5
Proprietorship	54.3	Powna industrial area	17.4
Partnership- Same Family	13.0	Talawade	18.5
Partnership- at least one member from outside the Family	15.2		
Private Limited Company	16.3		
Public Limited Company	1.1		

Source: Survey data

In table 14 below we interrogate the usage of technology which transfers into learning outcomes through various internalisation processes. It was found that more than half of the firms were using conventional devices in production. However, a few firms also showed investments done in using latest technological devices. A small portion of firms also used a mix of both conventional as well as latest technology to carry out production. These devices were largely known from the perspective of experiences of concerned persons, while other sources of learning were also found to be through education, customers, family and competitors. It was also observed that primarily the source of design had been customers which depict a strong interface between buyer and supplier. A large majority of the firms were satisfied with the devices that they used for production. Although it was found that they had the freedom to design products it was rarely such that firms actually took up designing new products. Part of the reason also lay that majority of the firms in the data belonged to tier 3

enterprises which has little expertise of the same[7]. It was also found that although the firms had knowledge of the latest technology in the market there was not much transference of this into practice. The sources of knowledge about different technology was found to be internet, exhibitions and by visiting companies.

Next we showcase, in table 15 below, data on labour and learning processes in firms. In terms of the availability of skilled labour it was found that although skilled labour was available, close to twenty five per cent of the employers found that skilled workers were deficient pointing to the gaps in the need for skill development. Related to this, it was also found that around 65 per cent of the employers have some kind of training for the workers. This training was mostly supervised and on the job training for the workers. Technology is also seen as advantageous for the firms where a large chunk of employers believed that usage of advanced technology would increase their production.

Inclusion of new technology also requires learning for the workers. It was found that the sources of learning for the workers were largely from their own experiences and education. These learning processes developed mostly in learning by doing fashion and to much lesser extent from formal and informal training. Only a meagre percentage of employers provide skill development training to its workers. The firms operate in a much standardised manner which is brought out by the fact that a large chunk of employers have never changed their method of production process. Also since the workers are not much skilled, most of the directions are provided by the employers themselves and there is not much scope for initiation by the worker. Close to 40 per cent of the firms provide manuals for the usage of technological devices and also document their technological process.

[7] Refer to table 13 above.

Table 14: Technology, Design and Knowledge in factories
(Auto component Industry Pune) (2016)

Variable	Percentage	Variable	Percentage
Devices used in Production (n=91) (Variable Name : DEVICES)		Research and Development (n=92) (Variable Name : RD)	
Conventional	54.9	Availability of R&D	13.2
Latest Technological Devices	30.8	Bought R&D	3.3
Both	14.3	Design (Variable Name : DESIGN)	
Source of learning about the Device used (n=91) (Variable Name : LERANING1)		Source of Design (n=90)	
Experience	64.0	Customers	74.4
Customer	7.9	We design our own products	12.2
Education	23.6	We design together	13.3
Family	3.4	Freedom in Design (n=91) (Variable Name : FDESIGN) (Yes/No)	48.4
Competitors	1.1	Developed New Product (n=91) (Variable Name : NEWPROD) (Yes/No)	1.1
Satisfaction in Devices (n=91) (Variable Name : SATISFACTION)		Links with training institute(n=91) (Variable Name : TRAINLINK) (Yes/No)	11.0
Strongly Agree	4.4	Awareness of Latest technology(n=91) (Variable Name : AWARETECH) (Yes/No)	90.0
Agree	61.5	Source of Knowledge about the Technology (n=88) (Variable Name : KNOWLEDGE)	
Neither Agree nor Disagree	7.7	Internet Variable Name : INTERNET) (Yes/No)	71.6
Disagree	24.2	Exhibition (Variable Name : EXHIBITION) (Yes/No)	50.0
Strongly Disagree	2.2	Visit Companies (Variable Name : VISITC) (Yes/No)	33.0

Table 15: Labour and Learning in factories (Auto component Industry Pune) (2016)

Variable	Percentage	Variable	Percentage
Adequate Skilled Labour (n=91) (Variable Name : SKILL)		**Source of Learning (n=90)** (Variable Name : LERANING2)	
Agree	69	Own Experience	61
Neither Agree nor Disagree	7	Education	2
Disagree	21	Education and Experience	33
Strongly Disagree	3	Family	3
Provide Training for Labour (n=91) (Variable Name : TRAINING)		**Learning Process (n=91)** (Variable Name : LEARNING3)	
Strongly Agree	1	Learning by doing	60
Agree	64	Formal Training	7
Neither Agree nor Disagree	1	Informal Training	33
Disagree	34	**Skill Development (n=91)** (Variable Name : SKILL)	19
Mode of Training (n=87) (Variable Name : MODE)		**Change in Production process** (Variable Name : CPP) **(n=91)**	**19**
Direct on job training	22	**Independence for workers (n=91)** (Variable Name : INDIPENDENCE)	
No training	6	Strongly Agree	1
Supervised Training	45	Agree	14
Job Training	14	Disagree	79
Hire only experienced workers	11	Strongly Disagree	5
Monthly training program	2	**Incentives for Workers for innovation (n=91)** (Variable Name : INCENTIVES)	
Use of advanced technologies is advantageous (n=91) (Variable Name : ADVTECH1)		Strongly Agree	2
Strongly Agree	13	Agree	14
Agree	81	Neither Agree nor Disagree	2
Neither Agree nor Disagree	3	Disagree	76
Disagree	2	Strongly Disagree	5
Use of advanced technologies increased production (n=88) (Variable Name : ADVTECH2)		**Manual for Technology(n=91)** (Variable Name : MANUAL) (Yes/No)	41
Strongly Agree	14	**Documentation of Technology (n=91)** (Variable Name : DOC) (Yes/No)	40
Agree	80		
Neither Agree nor Disagree	5		
Disagree	2		
Provision of information (n=91) (Variable Name : INFO)			
Strongly Agree	7		
Agree	81		
Neither Agree nor Disagree	4		
Disagree	8		

In table 16 below, it was found that a little less than half of the firms had ISO certification. With regard to the link between number of workers and usage of new technology, no clear views emerged with some firms agreeing while some others being unsure towards it. Around seventy six per cent of the firms reported that there has been an increase in the production to the tune of 5%-10% over a period of time. This has appeared with an increase in productivity and which has also reflected positively on the financial performance of the firm. On

probed over relationship with the customer and suppliers, a more or less amicable relation was found to exist between the same. Majority of the firms interrogated did not export their products but were to some extent involved in outsourcing of their activities.

Table 16: Core processes and outcomes in factories
(Auto component Industry Pune) (2016)

Variable	Percentage	Variable	Percentage
ISO Certification (n=91) (Variable Name : ISO) (Yes/No)	42.9	**Relationship with Customer (n=91)** (Variable Name : CUSTOMER)	
Increase in Number of Workers with New Technology (n=91) (Variable Name : COMPLI)		Very good	17.6
Strongly Agree	2.3	Good	70.3
Agree	40.9	Neither good nor bad	6.6
Neither Agree nor Disagree	39.8	Bad	5.5
Disagree	17.0	**Relationship with Supplier (n=91)** (Variable Name : SUPPLIER)	
Status of Production Process (n=91) (Variable Name : PROCESS)		Very good	16.5
Increased	76.9	Good	81.3
Decreased	7.7	Neither good nor bad	2.2
Remains the same	15.4	Bad	0.0
Increase in Production (n=88) (Variable Name : PROD)		**Increase in Productivity (n=91)** (Variable Name : PROD)	
0-5%	20.0	Increased	83.5
5-10%	61.3	Remains the same	16.5
more than 10%	18.7	Decreased	0.0
Status of Financial Performance (n=90) (Variable Name : FINANCE)			
Increased	80.7		
Decreased	5.7		
Remains the same	13.6		
Exporting (n=90) (Variable Name : EXPORT)	19.0		
Outsourcing (n=91) (Variable Name : OUTSOURCE)	45.0		

6 Conclusion

We gauge from the literature and multi-level data analysis confirm that in auto component industry, in India, enterprises, in particular SMEs, need to foster their absorptive capacity by prudently combining skilled labour and information and communication technologies, whilst capital-labour ratio is certain to grow in coming days. Quite important, whilst the auto component industry supplies to one of the world's most technologically sophisticated and business savvy buyers such as original equipment manufacturers (OEM), the state of technological artefacts may rather be determined by OEM driven value chains. However, auto component industry, even amidst a monopsonistic market structure, appears to have amazing possibilities of innovative management of skilling, learning, and knowledge.

In the paper, we used four types of data: recent time series of select indicators that pertinent to the organised auto component industry, cross sectional unit records of organised factories in auto component industry for the year 2012-2013, cross section unit records of unorganized enterprises in auto component industry for the year 2009-2010, and sample survey conducted in Pune auto-component cluster in 2016. While first type of analysis clearly brought out that whilst there is discernible class interest in wage profit allocation in the organised sector, irrespective of scale –plant and machinery or employment-, there has been consistent exponential growth in capital per employed. However, as per the recent cross section data (for the year 2012-2013), labour emerges to be the most impactful in explaining direct variation in net value added. Adding to this, investment in computers and ISO certification seem to be emerging as critical sources of growth for these enterprises. Interestingly, these findings appear to repeat in unorgainsed enterprises, as well. From our sample survey, primarily capturing unorganized enterprises in Pune cluster, unequivocally, enterprises seem to see creative synergy in organising skill, learning, knowledge and firm performance.

From a policy angle, to transform the auto component industry to an innovative and creative system, in particular those enterprises that are located in a cluster, it makes great sense if there are triadic stratagem, bringing enterprises, original equipment manufacturers, and the state, to synergise a shared system of knowledge, skill, learning and competitiveness. Unequivocally, clusters such as Pune remain, barring a few notable exception, averse to basic enterprise upgradation tools like ISO whilst keeping aloof from exploring the arena of international business. In this milieu, technological acquisition or upgradation alone may not work. What has to be forthcoming is building transformational systems through synergetic processes like learning, knowledge management and skilling. Ideally, cluster needs to envisage resources and facilities that are open to enterprises. Thus, enterprises can be redeemed from contractual complexities and specific assists that are required in building absorptive capacities in Indian auto component industry.

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