CHAPTER 4

DATA ANALYSIS

In this chapter the data analysis and interpretation is presented along the lines of the earlier framed research questions. The main objective of the study was to explore the business information needs of the Indian corporate sector. As described in the earlier chapter, the total sample consisted of 303 responses out of 315 received responses from the total of 500 mailed questionnaires. The total number of respondents was 303 working in 185 companies out which 174 were working in 111 services sector companies and 129 in the 74 manufacturing sector companies.

The data collected was analyzed using statistical tools that included percentages, mean, standard deviation, coefficient of variation and test statistic z for the data wherever appropriate. The data is presented in tables, pie charts, bar graphs and line graphs with description of the data analyzed.

4.1. BACKGROUND OF THE MANAGERS

In this section the data was collected on the background of the respondents and the data collected was on the variables of gender, age, education and work experience under the category heading of Personal Profile. In this category, information on the work profile was also collected but majority of the respondents did not respond to this. The reasons for this was that when contacted personally (respondents) they

revealed that their work profile was too generalist in nature and difficult to mention. Another problem faced during the data collection was that the companies were not comfortable in providing this data officially due to the human resource issue of rampant poaching of employees by HR consultants in the market. Hence this variable was dropped. It is also appropriate to mention here that data collection with regard to educational qualifications and past (specific) experience was also very difficult but personal contacts in these organizations facilitated the responses.

Gender: The 303 respondents consisted of both female and male genders. Figure 4.1 depicts the gender distribution and reveals that 40 of the 303 were female and 263 were male respondents. In terms of percentages it reflected about 13 % female and 87 % male distribution in the sample population.

Figure 4.1: Gender Distribution

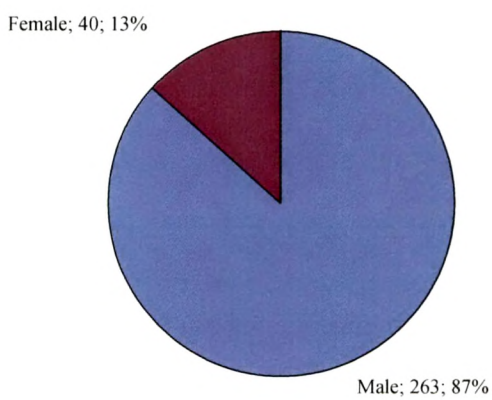


Table 4.1: Gender distribution

Gender	Age: 20-29 (in years)	Age: 30-39 (in years)	Age: 40 + (in years)	Sample
Male	162	69	32	263
Female	32	8	0	40
Total	194	77	32	303

Table 4.1 provides a clear picture on the age profile distribution within the gender division.

Table 4.1 and Figure 4.2 reveal that among males the largest group was in the age group between 20 years and 29 years and they included 162 respondents, i.e., 53 % of the entire population (303 respondents) and 62 % of the male population (263) of the sample. The other group represented this sample was in the age range of 30 years to 39 years and they added up to 69, i.e., 23 % of the total sample population (303) and about 26 % of the male population (263) in the sample. The last group identified was in the age group of 40 years and above and consisted of 32 managers in number and that was about 11 % of the total sample population and about 12 % of the male population in the sample. The eldest participant in the group was 61 years old and was vice president of a leading Indian company and the youngest was 20 years old and working as a sales executive in a leading multinational bank.

The data revealed that in the female population segment, the youngest was 21 years of age working as a manager in a private marketing company and the eldest was 36 years old working as Assistant General Manager in a leading Information Technology consultancy firm with global operations. Figure 4.3 clearly shows the age-wise

distribution in this group and in the age group of 20 years to 29 years the number of female respondents was 32, i.e., about 11 % of the total sample population and about 80 % of the female population in the sample. In the age group of above 30 years were 8 respondents and that amounted to about 3 % of the total sample population and about 20 % of the female population in the sample.

Figure 4.2: Male Age-wise distribution

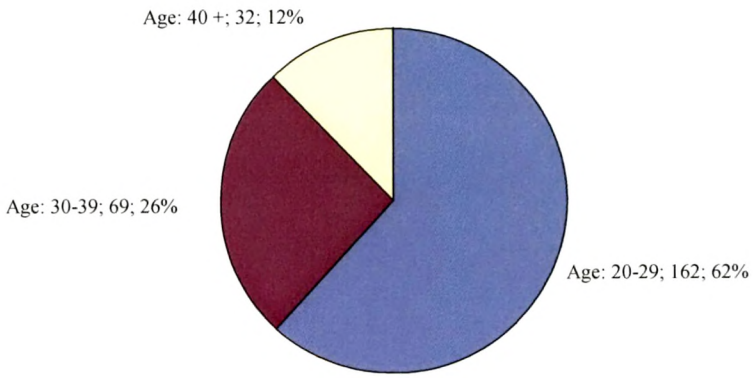


Figure 4.3: Female Age-wise distribution

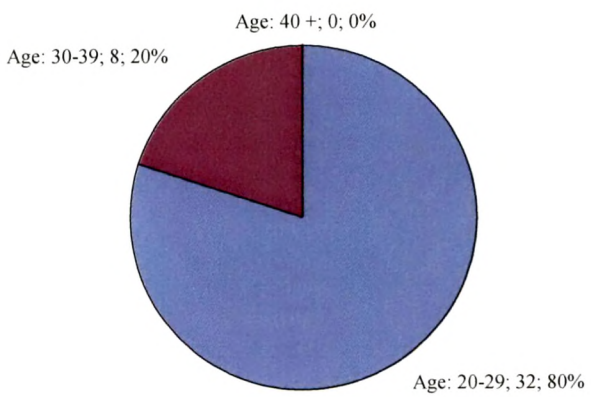


Figure 4.4: Age-wise distribution

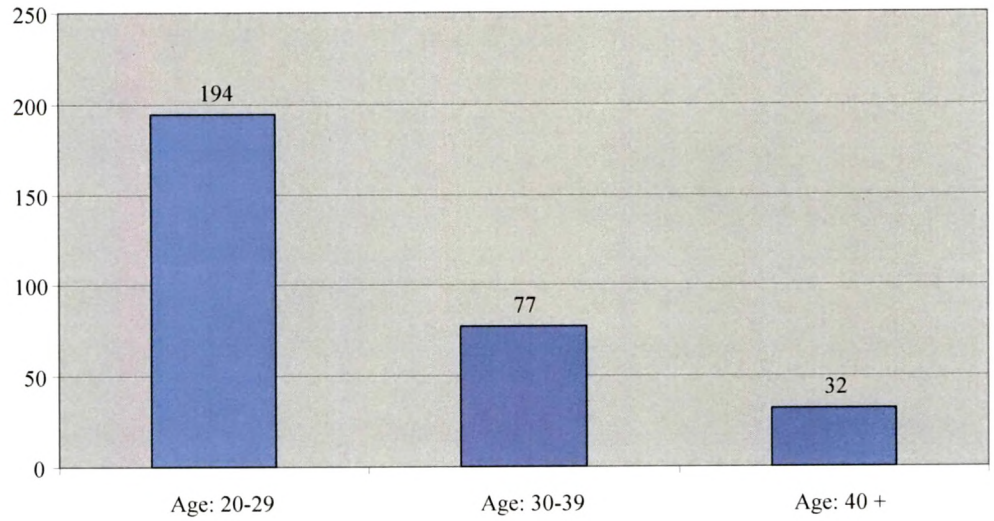


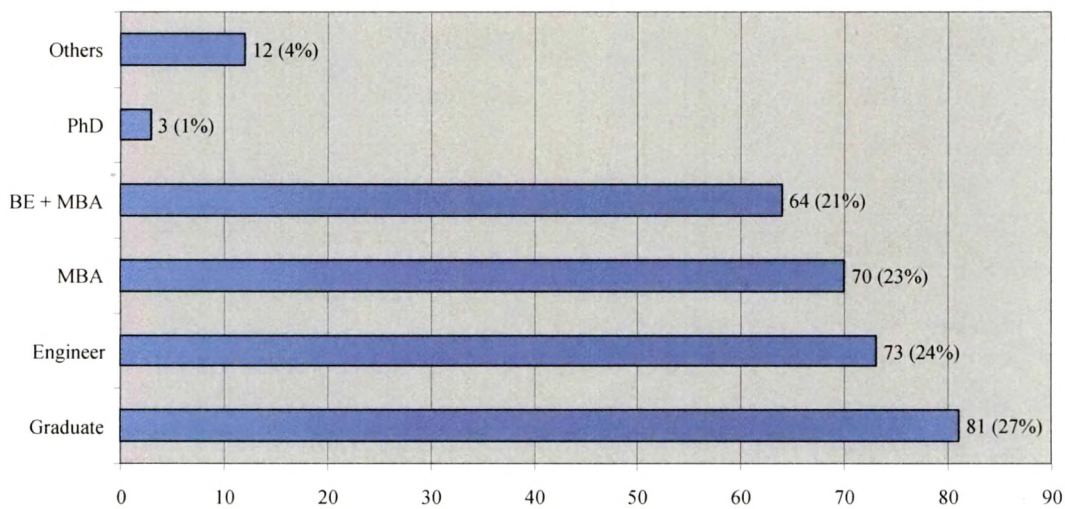
Table 4.1 and Figure 4.4 gives the age-wise distribution of the sample and clearly indicates that the age group 20-29 is the majority with 194 respondents and that makes more than 64 % of the total sample population. The age group 30-39 is represented by 77 respondents (25%) and above 40 consists of 32 respondents (11%).

Table 4.2 and Figure 4.5 provide the picture of educational qualification background of the respondents. It is clear that the major segment of the sample had Master in Business Administration (MBA) qualifications, i.e., about 134 (44%) and another angle to this data is that Bachelor of Engineering (B.E) with MBA respondents were 64 in number representing about 21 % of the sample population. The group with MBA and without BE was 70 in number and represented 23% of the sample population.

Table 4.2: Qualification-wise distribution

Education	Respondents	Percentage
Graduate	81	27
Engineer	73	24
MBA	70	23
BE + MBA	64	21
PhD	3	1
Others	12	4
Total	303	100

Figure 4.5: Qualification-wise distribution



Respondents with only engineering qualification were 73 in number (24%) and all respondents with BE degree were 137 in number representing 45% of the sample. Graduates were 81 in number representing 27% of the sample population. Incidentally there were about 3 with doctoral degrees and about 12 had other

qualifications like Bachelor of Pharmacy, Master of Philosophy, Master of Commerce and so on.

Table 4.3: Experience-wise distribution

Experience in years	Respondents	Percentage
less than 2	58	19
2 to 5	116	38
5 to 10	66	22
10 to 15	34	11
Above 15	29	10
Total	303	100

Figure 4.6: Experience-years-wise distribution

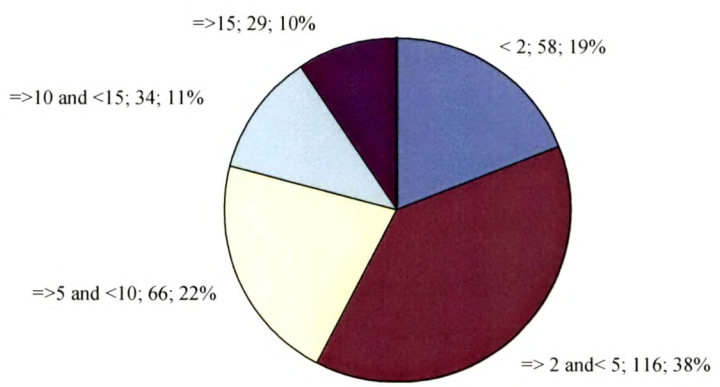


Table 4.3 and Figure 4.6 depict the experience profile of the sample and the range of experience starts from one year to more than 15 years. For better understanding, the sample was divided into five groups that include below 2 years, equal to and more

than 2 years and less than 5 years, equal to or more than 5 years to less than 10 years, equal to or more than 10 years and less than 15 years and more than 15 years. The majority of the respondents, about 116 (38%) were in the second group of equal to and more than 2 years and less than 5 years. About 66 (22%) respondents were having experience between 5 and 10 years. The next highest number was 58 respondents with less than 2 years experience and they constituted 19% of the sample. The group with experience between 10 and 15 were 34 in number and 11 % of the sample. About 29 (10%) respondents in the sample had more than 15 years experience. The data also reveals that about 43 % of the sample had more than 5 years of experience and about 81% of the respondents had more than 2 years experience. The respondents above 10 years experience were 63 in number and represented 21 % of the sample population.

Table 4.4: Sample distribution by number of employees reporting to

No. of Employees reporting to	Respondents	Percentage
Less than 5	191	63
5 to 9	51	17
10 to 24	27	9
25 to 50	15	5
More than 50	19	6
Total	303	100

Table 4.4 and Figure 4.7 reveal the sample distribution of respondents by the number of employees that were reporting to them. Less than 5 employees was a major chunk of the sample with 191 respondents representing 63 % of the total sample. The next biggest group of managers was of people having 5 to 9 employees reporting to them and they were 51 in number and 17 % of the sample. Respondents having about 10 to

24 employees were 27 in number (about 9%), 25 to 50 people reporting to had 15 members (5%) and more than 50 employees reporting to had 19 members representing 6% of the sample. The number of respondents in the sample who had less than 10 employees reporting to represented about 80% of the sample and were about 242 in number.

Figure 4.7: Distribution of respondents by number of people reporting to them

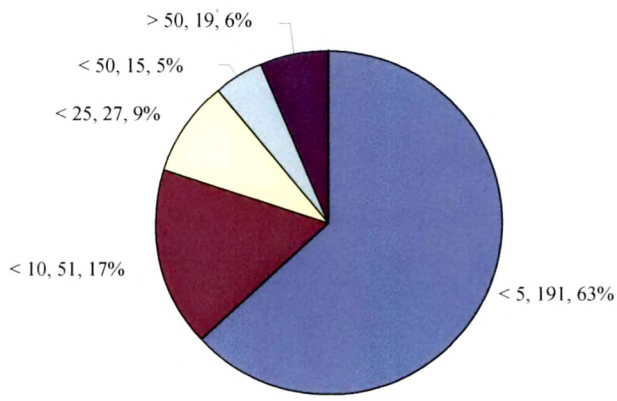


Table 4.5: Regional distribution of the respondents

Regions (India)	Numbers	Percentage
North	30	10
East	8	3
South	62	20
West	203	67
Total	303	100

Table 4.5 and Figure 4.8 provide us with the data on sample distribution across various regions of India. West had the most number of respondents, 203 in number

and represented 67% of the sample. South was the next to follow with 62 respondents and 20% of the sample population. North had 30 (10%) and East had the lowest response with 8 members representing only 3% of the sample population.

Figure 4.8: Geographical distribution of sample

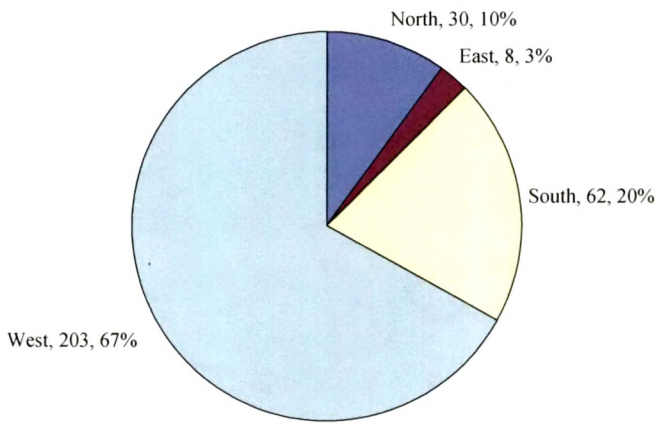


Table 4.6: Respondents by ownership and forms of business

Types of Businesses	Number	Percentage
Govt./ Assn / Federation	9	3
Indian Private Ltd	64	21
Private/SME/FB	45	15
Public Ltd	163	54
MNC	22	7
	303	100

Table 4.6 and Figure 4.9 show that public limited companies are the majority with 163 respondents working in these companies representing about 54% of the sample. Respondents in private limited companies were about 64 representing 21 % of the sample and the third largest chunk constituting about 15% of respondents (45 in number) were in the privately owned, family businesses and small and medium businesses. Respondents in multinational companies were about 22 (7%) and there was a small group of 9 respondents in organizations of government, trade association and federation representing 3% of the sample.

Figure 4.9: Sample distribution by ownership and forms of business

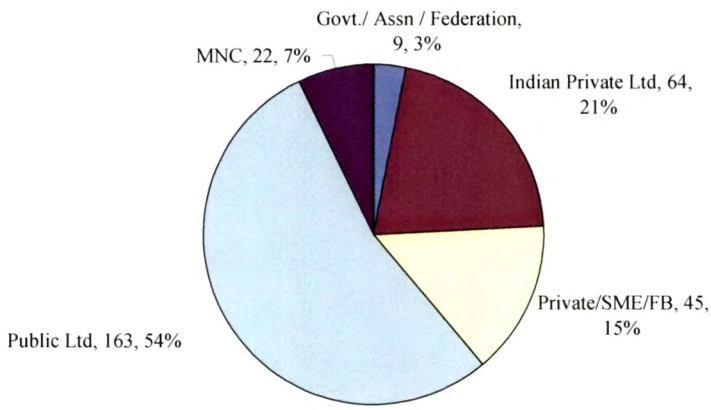


Table 4.7: Respondents by broad sectors

Broad Sectors	No. of respondents	Percentage
Manufacturing	129	43
Services	174	57
Total	303	100

Figure 4.10: Sample distribution across manufacturing & services sectors

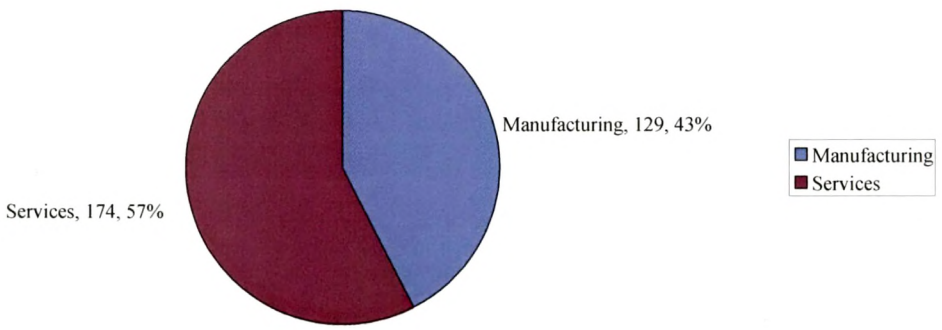


Table 4.7 and Figure 4.10 indicate the distribution of respondents by the sectors they are associated with. The service sector has an edge over the manufacturing with 174 respondents, representing 57% and the manufacturing sector has 129 respondents representing 43%.

Table 4.8, Figure 4.11 and Figure 4.111 indicate the distribution of respondents by specific industry sectors in the manufacturing and services groups. The largest group of respondents was from the financial services companies with 39 respondents representing about 13% of the total sample and 22% in the services segment. This was followed closely by respondents in the ITES (Information Technology Enabled Services) with 38 numbers and similar percentages as with financial services. The third highest representation was from consulting sector and this group consisted of 32 respondents presenting 11% of the sample. This was followed by respondents in the dealers, traders and other such services sector where the respondents were 23 in

number representing 8% of the total sample. In the manufacturing sector the respondents from industrial products group were about 20 in number and this represented about 7% of the total sample.

Table 4.8: Respondents distribution in the manufacturing and services sectors

	Respondents	**Percentage**	**Percentage of total**
Manufacturing		**n=129**	**n=303**
General / Groups	17	13	6
Electronics	3	2	1
Iron, Steel & Metals	6	5	2
Construction & real estate	7	5	2
Furniture & Consumer Durables	3	2	1
Automobile	15	12	5
Chemicals	8	6	3
Oil & Gas	2	2	**1**
Engineering, Welding	14	11	5
Power	6	5	2
Textiles	4	3	1
Retail	6	5	2
Transportation	1	1	0
Food & Beverage	11	9	4
Industrial products	20	16	7
Pharma	6	5	2
Total	**129**	**100**	**43**
Services		**n= 174**	**n= 303**
ITES	38	22	13
Consulting	32	18	**11**
BPO / KPO	9	5	3
Telecom	11	6	**4**
Media/Entertainment	11	6	4
Financial Services	39	22	13
Education / Research	11	6	4
Others / Dealers /Traders	23	13	8
Total	**174**	**100**	**57**

Figure 4.11: Respondents distribution in the manufacturing sectors

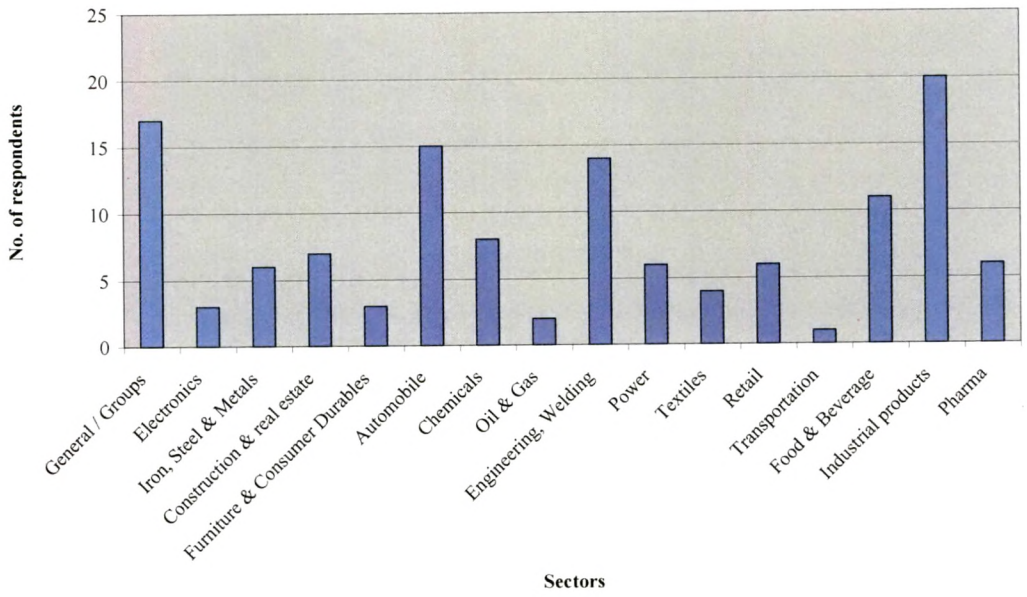


Figure 4.111: Respondents distribution in the services sectors

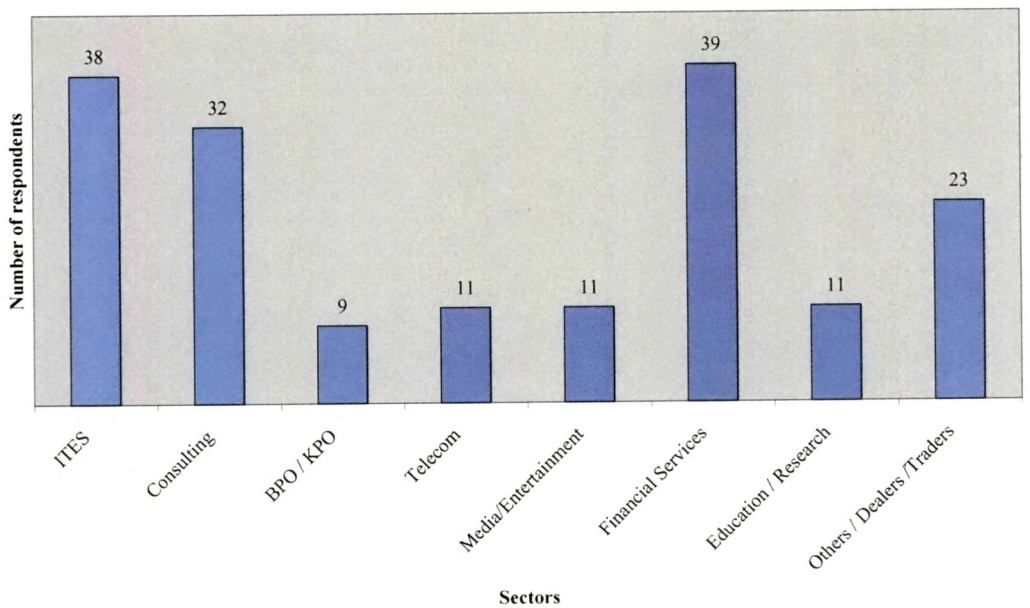


Figure 4.12: Respondents distribution by companies' turnover

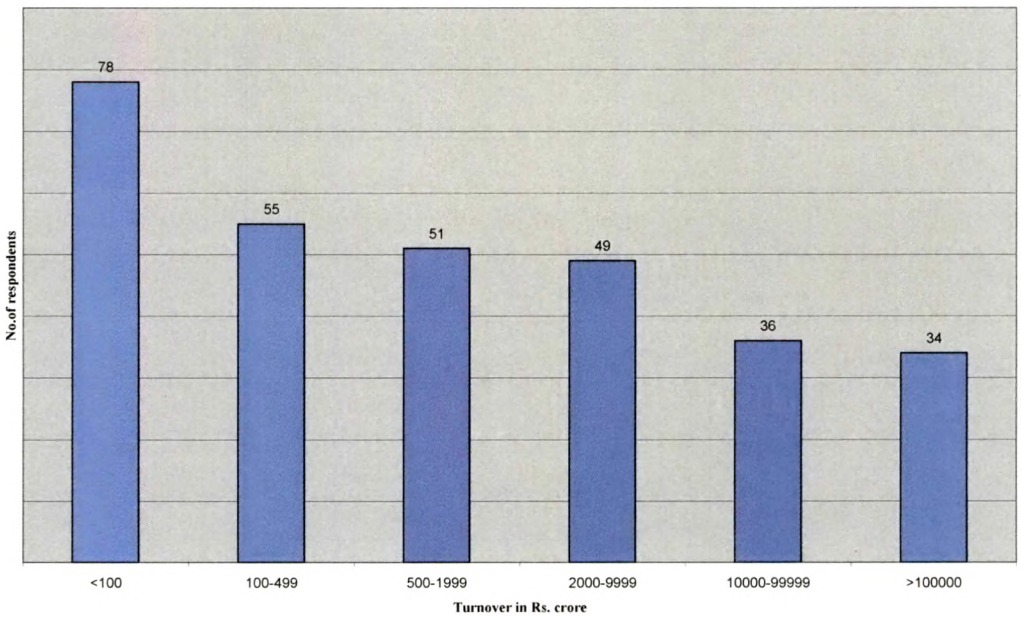


Table 4.9: Respondents distribution by turnover of companies

Turnover in Rs. Crores	Respondents	Percentage
<100	78	26
100-499	55	18
500-1999	51	17
2000-9999	49	16
10000-99999	36	12
>100000	34	11
Total	303	100

Table 4.9 and Figure 4.12 depict the distribution of respondents by the turnover of the companies they are associated with. The largest group of 78 managers' works in

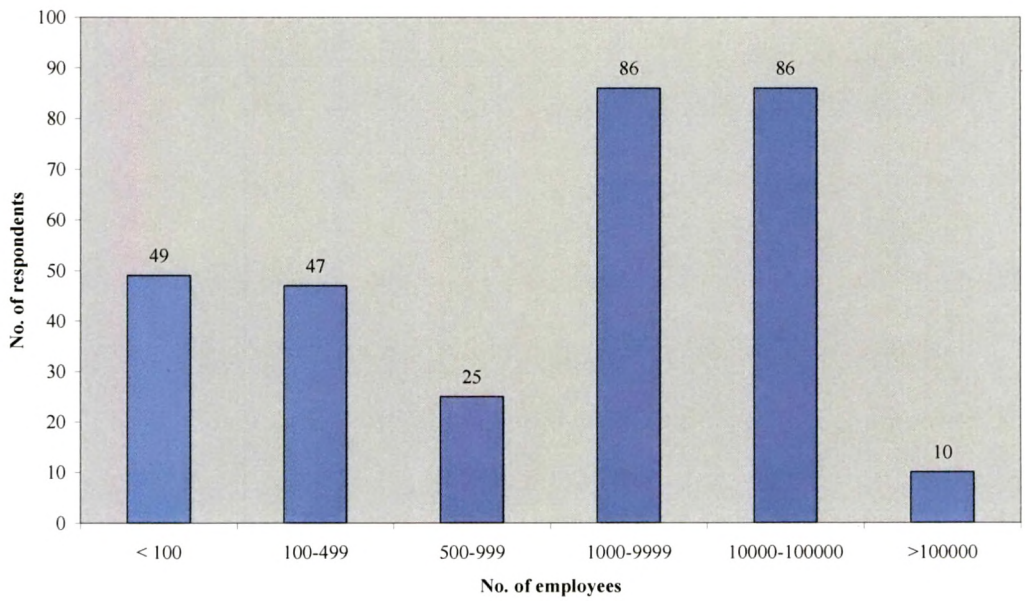
companies with turnover less than Rs. 100 crores and represent about 26% of the sample. This is followed by respondents (55 in number) working in companies with turnover between Rs. 100 crores and Rs. 499 crores and they form 18% of the sample. 17% of the sample is represented by 51 respondents working in companies that have turnover between Rs. 500 crores and Rs. 1,999 crores. 49 respondents were in companies with annual turnover between Rs. 2000 crores and Rs. 9,999 crores and represent 16% of the sample. Respondents in companies with annual turnover between Rs. 10,000 crores and Rs. 99,999 crores were 36 (12%) and above Rs. 1,00,000 crores were 34 (11%). Respondents working in companies below Rs. 2000 crores annual turnover were about 184, representing about 61% of the sample.

Table 4.10 and Figure 4.13 reveal the distribution of respondents by the total number of employees working in their companies. As shown in the Table 4.10 and Figure 4.12, respondents from companies with employee strength between 1,000 and 9,999 were 86 in number and their percentage of total sample was 28% and these figures were similar for the respondents working in companies with employee strength between 10,000 and 1,00,000. The other sets that almost matched were respondents, 49 in number and 16 % of total sample, in the companies with employee strength below 100 and respondents, 47 in number and almost same percentage of total sample, working in companies with employee strength between 100 and 499. Respondents in the companies with employee strength between 500 to 999 were 25 in number and about 8% of the total sample. The respondents in the companies with employee strength above 1,00,000 were only 10 representing 3% of the sample.

Table 4.10: Respondents distribution by employee strength in their companies

No. of employees	No. of Respondents	Percentage
< 100	49	16
100-499	47	16
500-999	25	8
1000-9999	86	28
10000-100000	86	28
>100000	10	3
Total	**303**	**100**

Figure 4.13: Respondents distribution by employee strength in their companies



4.2. TECHNOLOGY USED AT WORK

The next aspect of data analysis was to explore the type of technology that was used at work where the respondents worked. The options given in the questionnaire were

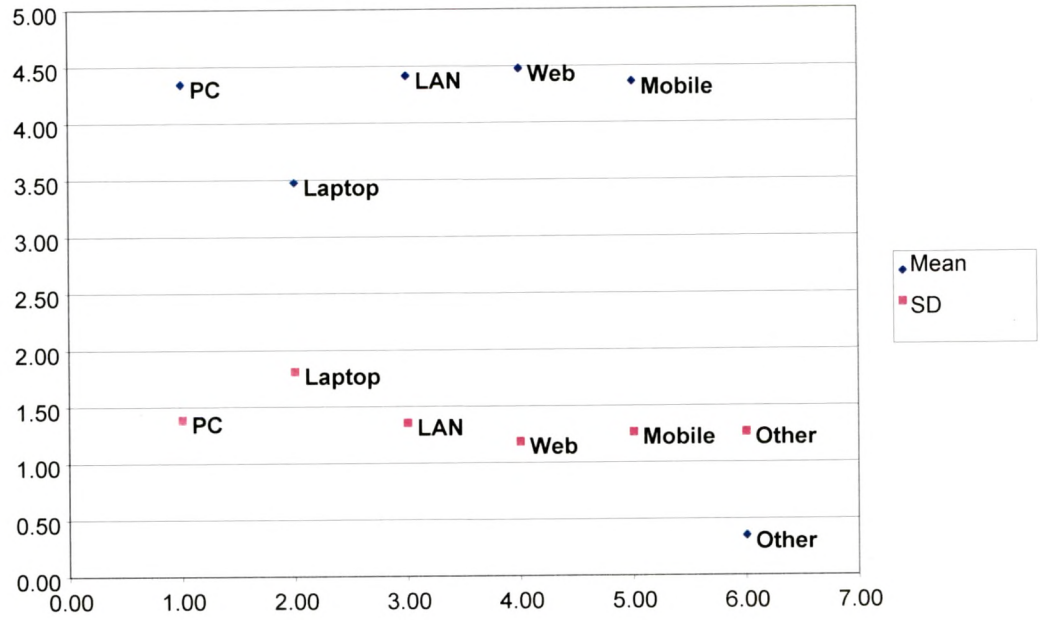
Personal Computer, Laptop, Local Area Network, Web and Internet and Mobile. A provision for mentioning other technologies was also given. The data collection revealed very less technologies being added to the list and the few that were indicated were VOIP and Video Conferencing and these could be easily identified with the listed technologies and hence we can say that there was no significant technology missed in the list. All the technologies were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful.

Table 4.11: Technology at work

Technology	Mean	Standard Deviation	Coefficient of Variation
PC	4.3465	1.3890	31.9554
Laptop	3.4785	1.8157	52.1967
LAN	4.4158	1.3588	30.7713
Web	4.4752	1.1871	26.5254
Mobile	4.3564	1.2679	29.1046
Other	0.3465	1.2668	365.5508

Table 4.11 and Figure 4.14 show that the highest rating was for Web technologies with a mean value of 4.4752 and interestingly this variable had the lowest standard deviation (SD) of 1.1871. This was followed by LAN with mean of 4.4158 and SD of 1.3588. The variable of mobile was rated high with a mean value of 4.3564 and SD of 1.2679. PC was rated at a mean value of 4.3465 and SD of 1.3890. Surprisingly Laptop was rated lowest with a mean value of 3.4785 and high SD of 1.8157. The coefficient of variation (C.V) calculated for all the technologies reflected that responses for web and mobile had least variations in that order.

Figure 4.14: Technology at work



4.3. TYPE OF INFORMATION REQUIRED AT WORK

Data was collected on perception of respondents on different information types used by them and they include government and environment, administrative, market and sector information. All the options were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful. The mean and SD was calculated without considering the option 'other' for all group calculations as the data provided for other was insignificant and this was reflected in the mean and SD of 'other' in all groups and is reflected in the Table 4.12.

The Table 4.12 shows that in government and environment category, policies information was rated high with a mean of 3.6997 with SD of 1.4869 and coefficient of variance at 40.19, followed by procedures with mean of 3.5809, SD of 1.5222 and coefficient of variation (C.V) at 42.51, projects / programmes are rated with a mean of 3.4620, SD of 1.4640 and C.V at 42.29, followed by regulatory / monitoring agencies information with a mean value of 3.2772, SD of 1.5745 and C.V at 48.04. Demographic information with mean of 2.7756, SD of 1.5427 and C.V of 55.58 was followed by tenders / notices (mean 2.5644, SD 1.5785, C.V 61.55), socio-cultural with mean rating of 2.5314, SD of 1.4619 and C.V 57.75, political information was rated with a mean value of 2.4719, SD of 1.3732 and C.V 55.553 and finally government postings was rated at 2.2970 mean, 1.4204 SD and C.V 61.83. In all the information types the data on "Other" category was insignificant and hence the low mean and SD values.

For the types under administrative information the highest rating was given to internal office memos (mean 3.5545 and SD 2.7325), followed by human resources information (mean 3.5116, SD 1.5090), financial information like exchange rates, etc (mean 3.4917, SD 1.4780), legal information (mean 3.2970, SD 1.4435), travel information (mean 3.1914, SD 1.4771), health care information was rated 3.0099 mean and the SD was found to be 1.5472 and media information like advertisement rates, etc was rated lowest with a mean value of 2.9571 and SD was 1.5054.

In terms of variance, the coefficient of variance showed lowest variation in responses for finance and HR information. Though the internal office memos was rated high on mean and also on standard deviation, the C.V reflected a high variance in responses with 76.87, in fact this was the highest among all in the entire section.

Table 4.12: Information types used

Information Type	Mean	Standard Deviation	Coefficient of variation	Mean	Standard Deviation	Coefficient of Variation
Government & Environment				2.9622	1.4916	50.35
Policies	3.6997	1.4869	40.18967			
Projects	3.4620	1.4640	42.28838			
Procedures	3.5809	1.5222	42.50957			
Regulatory	3.2772	1.5745	48.04493			
Postings	2.2970	1.4204	61.83493			
Tenders	2.5644	1.5785	61.55594			
Socio-cultural	2.5314	1.4619	57.75317			
Political	2.4719	1.3732	55.55314			
Demographic	2.7756	1.5427	55.58132			
Other	0.2244	0.8665	386.0945			
Administrative				3.2876	1.6704	50.81
Health	3.0099	1.5472	51.4049			
Travel	3.1914	1.4771	46.28302			
Legal	3.2970	1.4435	43.78156			
Internal Memo	3.5545	2.7325	76.87452			
HR Inf.	3.5116	1.5090	42.97343			
Finance	3.4917	1.4780	42.32884			
Media	2.9571	1.5054	50.90958			
Other	0.1881	0.7896	419.7234			
Market				3.7804	1.4532	38.44
Competitor	4.1914	1.3845	33.03211			
Product	4.2442	1.3371	31.50401			
Customer	4.2805	1.3287	31.04030			
Consultant	3.6073	1.4308	39.66487			
Market Trends	4.1551	1.3418	32.29215			
Supplier/Buyer	3.7954	1.5174	39.97898			

Technology Trends	3.9439	1.4851	37.65507			
Patent	3.1881	1.6197	50.80432			
M&A	3.1584	1.5826	50.1074			
Company News	3.8317	1.4029	36.61442			
Exec. Posting	3.1881	1.5550	48.77597			
Other	0.1914	0.8591	448.8115			
Sector				2.7334	1.6674	61.00
Telecom	2.9769	1.7781	59.73069			
Oil	2.4785	1.6812	67.83114			
Chemical	2.2310	1.5694	70.34429			
Cement	2.1518	1.5017	69.78633			
Power	2.7327	1.6691	61.07961			
Construction	2.4521	1.6468	67.15946			
Media	2.5611	1.6383	63.97145			
Automobile	2.5446	1.7293	67.96172			
Consult	3.0033	1.6826	56.02476			
Banking	3.3267	1.7038	51.21446			
Agribased	2.1155	1.5936	75.32977			
IT	3.4488	1.6588	48.09636			
Education	3.1650	1.7222	54.41439			
Engineering	3.0792	1.7681	57.42041			
Other	0.2556	0.9895	387.1854			

In the market segment of information type the highest rating was to customer information with a mean rating of 4.2805 and SD of 1.3371 (one of the lowest SD values in the segment). A similar rating was found on product information with a mean value of 4.2442 and SD of 1.3371 and competitor information was rated with a mean of 4.1914 and SD of 1.3845. Market trends was also rated high with a mean vale of 4.1551 and SD of 1.3418. The other ratings included technology trends (mean 3.9439, SD 1.4851), company news (mean 3.8317, SD 1.4029), supplier / buyer information (mean 3.7954, SD 1.5174), consultants information (mean 3.6073, SD 1.4308) and other variables of patents, mergers & acquisitions and executive posting were rated low with mean below 3.2 and SD above 1.55.

The coefficient of variance in the market heading under information type required reflected a low 31.04 and 31.05 for customer and product responses followed by market trends (32.29) and competitor (33.032).

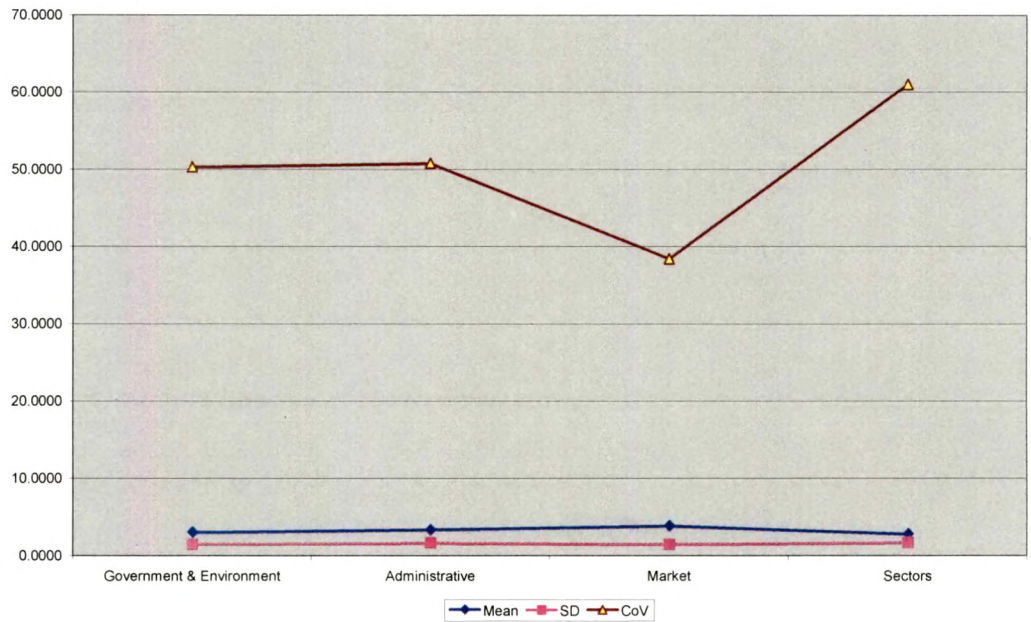
In the sector information type, the highest was information technology with mean score of 3.4488 and SD was 1.6588, closely followed by banking & financial services with mean score of 3.3267 and SD of 1.7038. The other mean scores above 3 were for information on education, engineering and consultancy with mean and SD scores of 3.1650 / 1.722, 3.0792 / 3.0033 / 1.6826. The other sectors were rated less and is shown in Table 4.12. When C.V was calculated IT had lowest C.V among all and scored 48.09, banking had 51.21 and this implied low variance in responses.

A comparison of group mean scores and standard deviation of these four groups of types of information, i.e., government & environment, administrative, market and sector is depicted in the Figure 4.15. Clearly, in comparison, market information scores over others with high mean score of 3.7804 and a low SD of 1.4532. Figure 4.15 also shows that government and environment information has low SD value of 1.4916 and also low mean score of 2.9622.

However the lowest mean was given to sector information with 2.7334 and a high SD value of 1.6674. Administrative information was given a score of 3.2876 and highest SD of 1.6704. When the C.V for these four parameters was calculated, the lowest variance of responses was found in market category (38.44) followed by government

and environment (50.35), administrative (50.81) and the highest variance was reflected in the responses under the sector category with C.V of 61.

Figure 4.15: Information type requirements



4.4. INFORMATION SOURCES PREFERRED

In this section various information sources used by them for work were rated by the respondents. All the sources were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful.

Table 4.13 reveals the rating of these various information sources and it is clear that newspapers (Indian and foreign) were rated highest with a mean score of 4.2310 and lowest SD of 1.1592. The two other highly rated sources were own files and documents and magazines / newsletters / bulletins with mean / SD scores of 4.1023 / 1.3952 and 4.0198 / 1.2606 respectively.

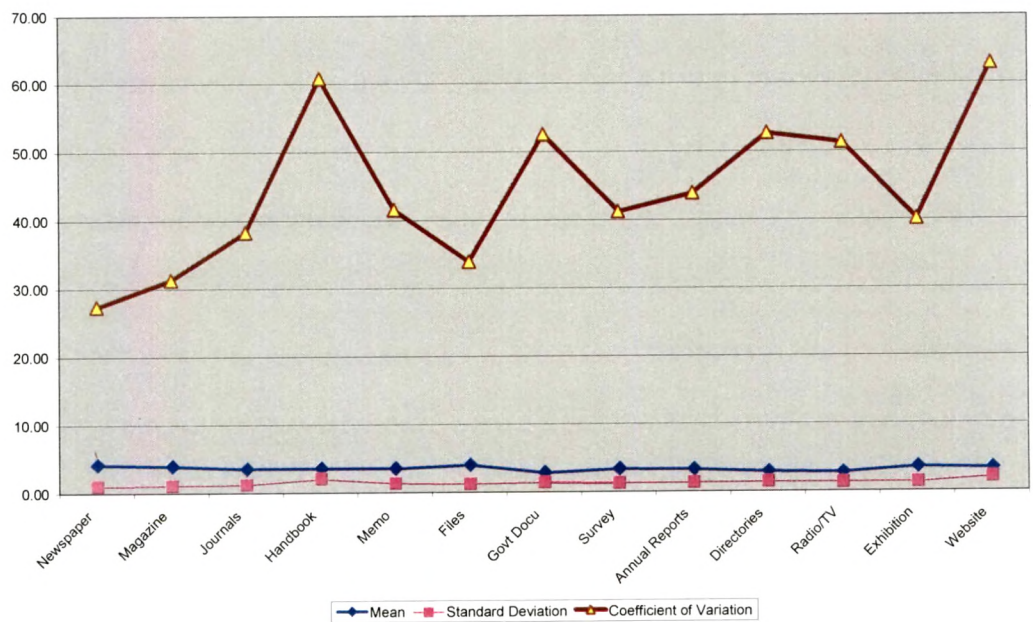
Table 4.13: Information sources used

Information Source	Mean	Standard Deviation	Coefficient of Variance
Newspaper (Indian / Foreign)	4.2310	1.1592	27.39822
Magazine / newsletters / bulletins	4.0198	1.2606	31.35875
Subject and trade Journals	3.5776	1.3713	38.33154
Handbook / manuals	3.6106	2.1973	60.85657
Internal office memos and circulars	3.6139	1.5026	41.5777
Own files and documents	4.1023	1.3952	34.00896
Govt. publications	2.9106	1.5300	52.56563
Surveys / reports	3.4290	1.4145	41.24989
Annual Reports	3.3300	1.4637	43.95406
Directories	2.9802	1.5716	52.73346
Radio/TV programmes	2.8218	1.4493	51.36254
Exhibitions /conferences / seminars	3.6403	1.4623	40.17065
Internet / websites	3.4356	2.1627	62.94799
Other	0.1914	0.9042	472.3563

Figure 4.16 shows that in addition to these sources, the highly rated sources were exhibitions / conferences / seminars (mean 3.6403, SD 1.4623), internal office memos and circulars (mean 3.6139, SD 1.5026), handbooks / manuals (mean 3.6106, SD 2.1973) and subject and trade journals (mean 3.5776, SD 1.3713). As reported in earlier sections the head of "others" did not have any significant data and hence the the low scores of mean and SD were reflected. The source under the head 'Other' was provided as option for the respondents to list if any important source that was missing from the options given. However no significant responses were provided by the managers. This is clearly reflected in the coefficient of variation.

Table 4.13 and Figure 4.16 also show that the C.V when calculated for all the sources, it was found that newspaper ratings had least variation with 21.39, followed by magazine / newsletters / bulletins with 31.35, own files and documents with 34 and subject and trade journals with 38.33. The responses for internet / websites as sources also had a high variation with the C.V being 62.94.

Figure 4.16: Information sources used



4.5. INFORMATION MEDIA DEALT WITH

This section was used to seek data on media used for information and this included printed, electronic and oral media. In electronic media the formats were online databases (intranet / internet) and off line databases (CDs / DVDs / Floppies) and in the oral segment, telephone and face to face were rated by the respondents. The respondents were also given option of mentioning and rating any other media and as in the case of earlier sections no significant data was provided. The options were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful.

Table 4.14 and figure 4.17 show that oral – telephone was rated high (mean score of 4.2310 and SD of 1.2473) along with oral face-to–face (mean 4.0726, SD 1.3302). The print and off line media were rated low where as online media was rated highest in the section with a mean score of 4.2706 and SD of 1.2605. It is also clearly shown that the coefficient of variation was lowest for oral telephone with a score of 29.47954 and for online databases the C.V was 29.51473. The highest variation was found for offline databases with almost a value of 50.

In the comparison of formal media (print and electronic) over informal media (oral) it was found that the oral media had a mean score of 4.1518 and a low SD of 1.2908 as compared to formal media where the mean was 3.8152 and SD was 1.5117. It is also

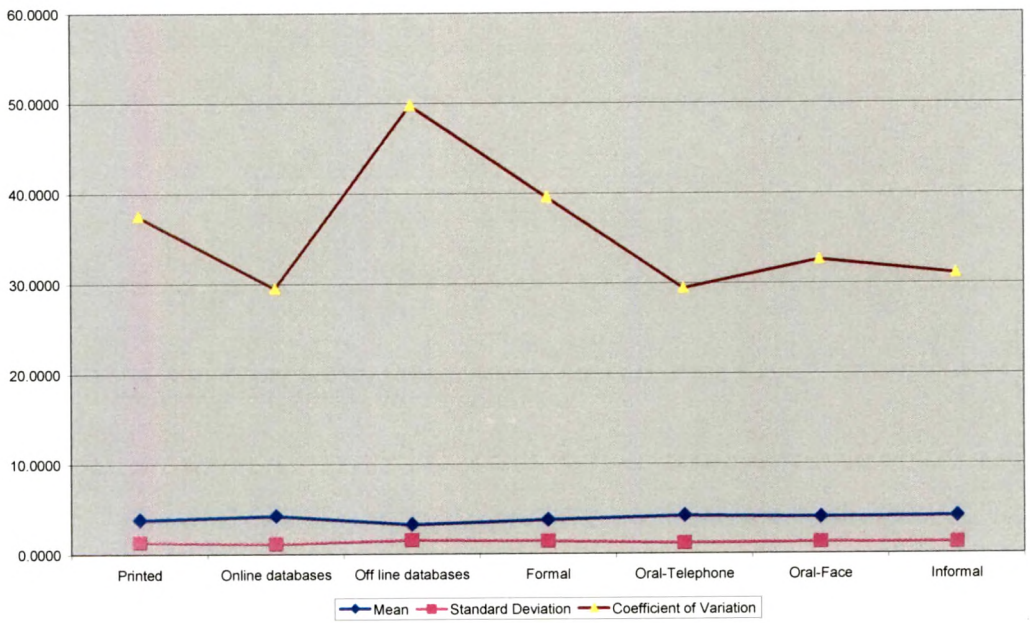
clearly shown that the coefficient of variation was about 31 for informal media and about 40 for the formal ones.

Table 4.14: Information media used

Information media	**Mean**	**Standard Deviation**	**Coefficient of Variation**
Printed	3.8614	1.4491	37.52831
Online databases	4.2706	1.2605	29.51473
Off line databases	3.3135	1.6490	49.76612
Formal	3.8152	1.5117	39.62309
Oral-Telephone	4.2310	1.2473	29.47954
Oral-Face	4.0726	1.3302	32.66317
Informal	4.1518	1.2908	31.09013

Figure 4.17 clearly depicts the picture of high scores for online, oral telephone and oral face-to-face media formats for information use among the respondents in the survey. It is also clearly depicted in the figure the low coefficient of variation values for all these three due to low variation in responses for these three – online, oral telephone and oral face-to-face. Overall the informal media has significantly lower variation when compared to formal media and this is clearly plotted in the Figure 4.17.

Figure 4.17: Information media used



4.6. INFORMATION SEARCH

In this section data was collected on two broad areas, the first being - information search conducted by self or was it facilitated by others. The second area that was used to collect data was on various sources, individuals and institutions from where information was gathered during the search.

All the options were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful. In the second area

option for providing 'other' data was given to the respondents but data analysis revealed that there was very insignificant response and hence can be ignored.

Table 4.15 and Figure 4.18 depict the data collected under the first category of information search conducted by, and Table 4.16 and Figure 4.19 talk about the information gathered from under the section of information search.

Table 4.15: Information search conducted by

Information Search by	Mean	Standard Deviation	Coefficient of Variation
Self	4.3432	1.1937	27.48434
Facilitated by others	3.505	1.5608	44.53067

Table 4.15 shows the pattern that among the respondents the information search by self was rated high with a mean value of 4.3432 and SD of 1.1937. For information search facilitated by others, the rating was reflected in the mean score of 3.5050 and SD of 1.5608. The coefficient of variation showed that there existed low variance in responses with a value of 27 for information search by self.

Figure 4.18 also clearly substantiates that information search by self was most preferred or followed and this was rated high with a mean score of 4.3432 and a low SD of 1.1937 as compared to information search facilitated by others, which was rated with a mean score of 3.505 and SD of 1.5608.

Figure 4.18: Information search conducted by

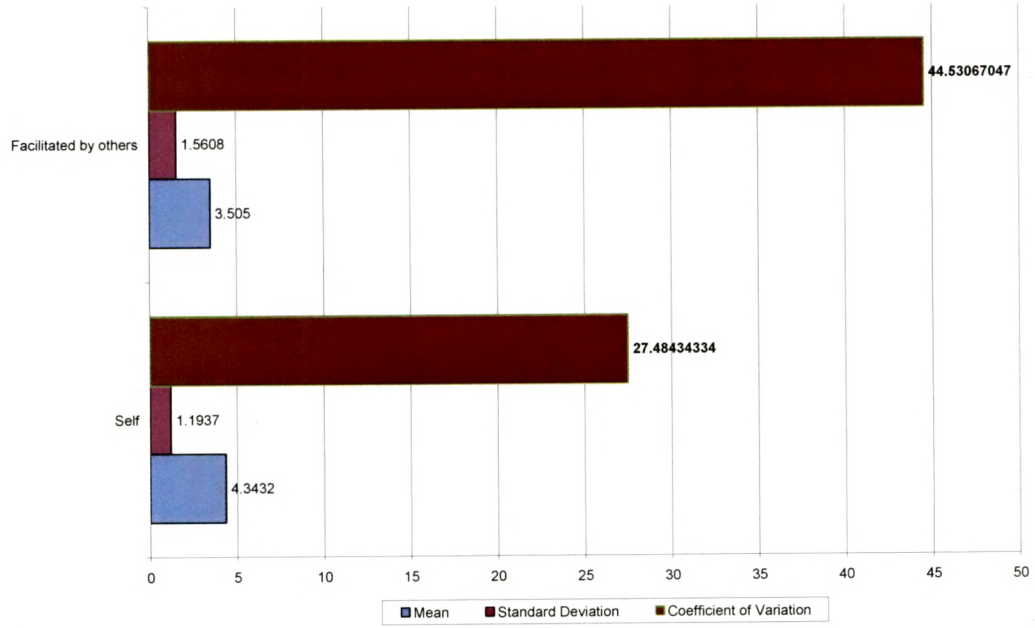


Table 4.16 reveals the rating of sources which were useful for gathering information during their information search. None of the options scored a mean of above 4 and among the best rated source was customers with a mean score of 3.8449 with SD of 1.5308. Boss as a source was also rated among the highest with a mean score of 3.7360 and SD of 1.5493. Colleagues also was rated high with a mean score of 3.6832 and SD of 1.4711. As reported earlier the option of 'Others' was mainly provided for additional sources to be added by respondents but this did not yield any significant responses and hence the low scores of mean and SD for 'Other'.

When the coefficient of variation was calculated for the various information providers from where the information was gathered, it was found that the lowest variation in data was for customers (39.81), followed by colleagues (39.94) and boss (41.47). The

highest C.V was for trade associations (64.31) and chambers of commerce (64.20). The variation was also less for suppliers (46.18) and vendors (46.92).

Table 4.16: Information gathered from

Information gathered from	Mean	Standard Deviation	Coefficient of Variation
Chambers of commerce	2.3366	1.5002	64.20
Trade associations	2.5017	1.6089	64.31
Government departments	2.5974	1.5620	60.14
Libraries	2.8647	1.6229	56.65
Institutes	2.8746	1.6590	57.71
Information Service providers	3.1254	1.7024	54.47
Friends	3.0396	1.6107	52.99
TV	2.9901	1.6707	55.87
Consultants	3.1980	1.6072	50.26
Colleagues	3.6832	1.4711	39.94
Boss	3.7360	1.5493	41.47
Customers	3.8449	1.5308	39.81
Supplier	3.4653	1.6003	46.18
Vendor	3.4719	1.6291	46.92
Others	0.2970	1.0723	361.04

Figure 4.19 provides the picture of various options and their scores (mean and SD) in this section on information gathered from. Chambers of Commerce was the lowest rated with a mean score of 2.3366 and SD of 1.5002. The other lower rated ones are trade associations (mean 2.5017, SD 1.6089), government departments (mean 2.5974, SD 1.5620), libraries (mean 2.8647, SD 1.6229) and Institutes (mean 2.8746, SD 1.6590). Among the ones in the middle range of rating were information service providers with mean of 3.1254 and SD of 1.7024, consultants with mean of 3.1980 and SD of 1.6072 and friends with means score of 3.0396 and SD of 1.6107.

Suppliers and vendors were rated relatively high with mean scores of 3.4653, 3.4719 and SD of 1.6003 and 1.6291 respectively.

Figure 4.19: Information gathered from

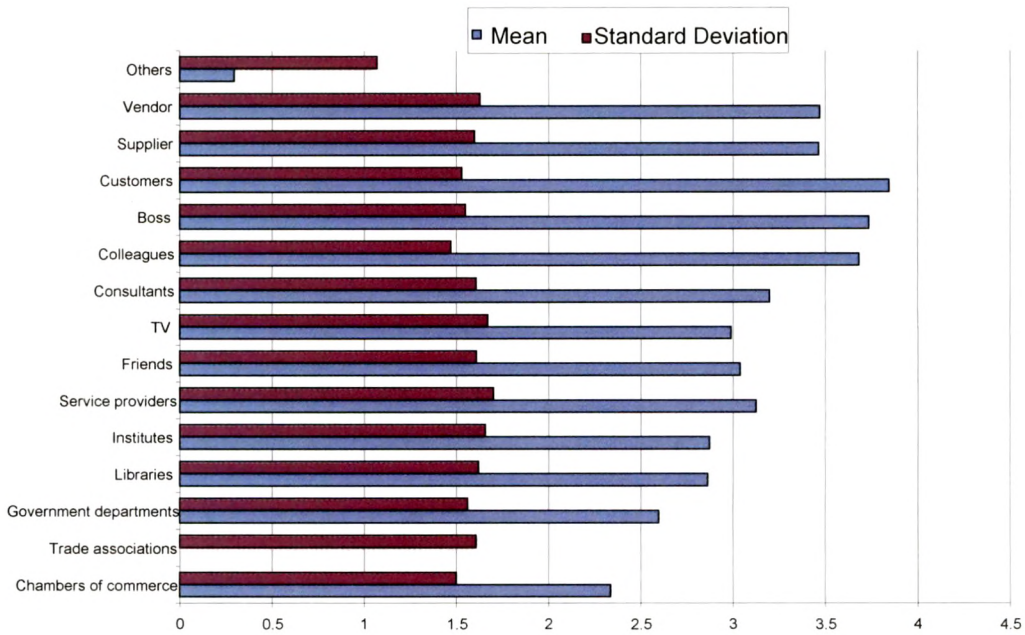


Figure 4.20: Information gathered from - Variation

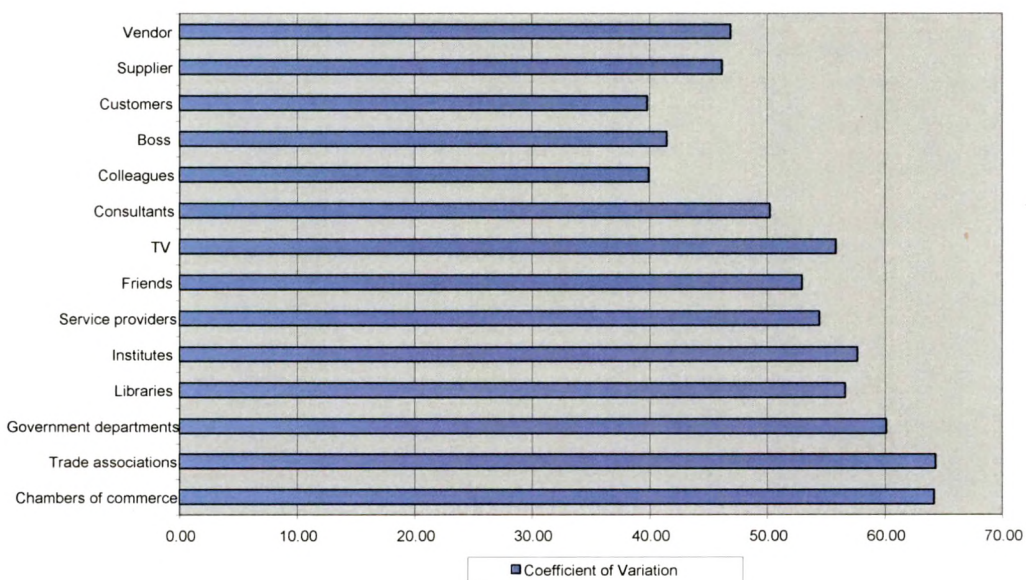


Figure 4.20 shows the variance of data collected across all the information providers or information gathered from. The top three on this count were trade associations, chambers of commerce and government departments.

4.7. PURPOSE OF INFORMATION SEARCH

This section was used to collect the important data on purpose of information search. The options given were decision making for routine jobs, planning and strategy, implementation & execution, skill development, to help others (boss / colleagues), enhancement of knowledge and finally the option of 'Other' was provided to gather data on important options that may have been missing in the questionnaire. All the purposes were to be rated on a five point scale that indicated: 1- Irrelevant, 2- Not Useful, 3–Somewhat Useful, 4 – Useful, 5 – Very Useful.

Table 4.17 shows that the four purposes were rated high with mean scores above 4. Enhancement of knowledge was rated highest with mean score of 4.2343 and lowest SD of 1.1798. Decision making and help others were rated low with mean scores of 3.8911 and 3.6964 respectively. However the SD for decision making was 1.4065 and for help others it was 1.3835.

Table 4.17: Purpose of information search

Purpose of information search	Mean	Standard Deviation	Coefficient of Variation
Decision making	3.8911	1.4065	36.15
Planning & strategy	4.2112	1.2402	29.45
Implementation & execution	4.0660	1.3131	32.29
Skill development	4.0000	1.3786	34.47
Help others	3.6964	1.3835	37.43
Enhancement of Knowledge	4.2343	1.1798	27.86
Other purposes	0.0430	0.3842	892.63

Figure 4.21: Purpose of information search

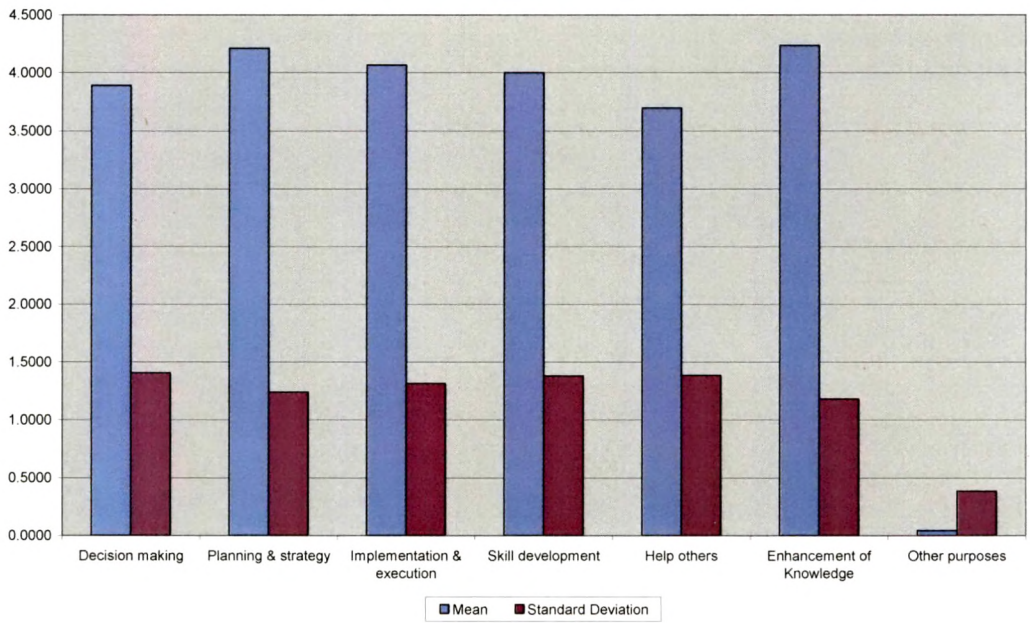


Figure 4.21 depicts that planning and strategy was also rated high with mean of 4.2112 and SD of 1.2402 along with implementation & execution that was rated with a mean score of 4.0660 and SD of 1.3131 and skill development was rated with a mean of 4.000 and SD of 1.3786.

Figure 4.22: Purpose of information search – variation diagram

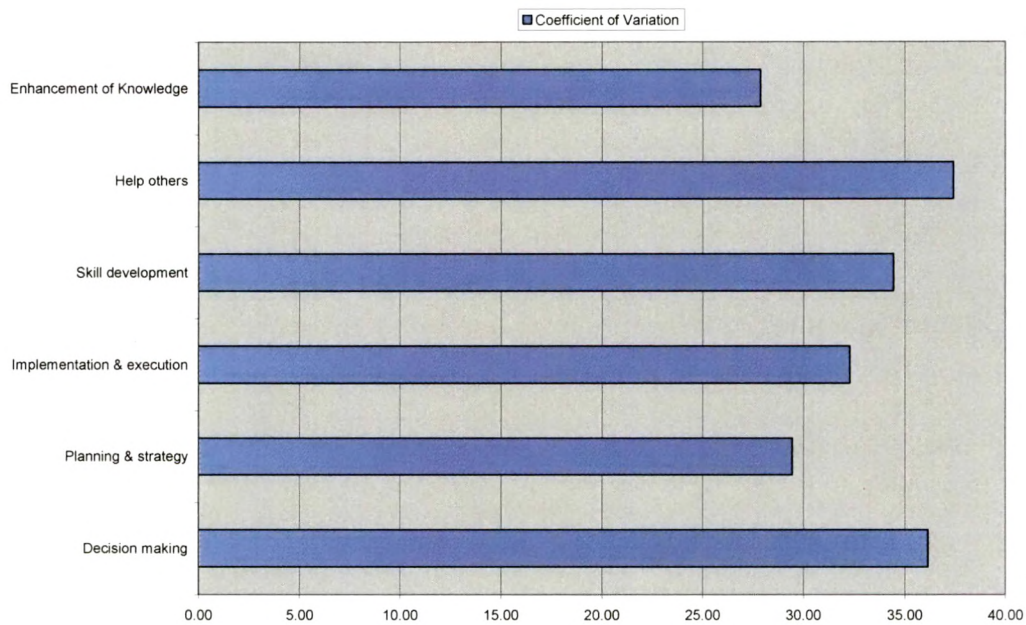


Table 4.17 and Figure 4.22 clearly show the picture on variation of data that was collected in this section. Information search for the purpose of helping others has the maximum variance in data with coefficient of variation being above 37. The coefficient of variation was quite high for decision making also with the value above 36. In terms of lowest variance, enhancement of knowledge had a coefficient of variation of 27.86 followed by strategy and execution with 29.45 coefficient of variation. Implementation & execution and skill development also had variation

levels around 32 and 34 respectively and were below the decision making and help others coefficients of variation.

4.8. INFORMATION ATTRIBUTES

This section was included mainly to collect data on what is important for fulfilling information needs in terms of qualities or attributes of information. The qualities that were included in the survey were accessibility (ease of identifying and acquiring), appropriate amount of information, reliability / credibility, completeness, concise representation of information, current and updated information, ease of use or manipulation, accuracy, provision in preferred media like paper and digital, cost effectiveness, affordability, timeliness, professionalism of the provider, relevant to purpose, discovered new purpose, refreshed memory of details or facts and substantiated prior knowledge. All the attributes were to be rated on a five point scale that indicated: 1 - Irrelevant, 2 - Not Useful, 3 – Somewhat Useful, 4 – Useful, 5 – Very Useful.

Table 4.18: Information attributes

Information Qualities	Mean	Standard Deviation	Coefficient of Variation
Accessibility	4.0462	1.3561	33.51
Appropriate quantity	4.1419	1.3234	31.95
Reliability / Credibility	4.1551	1.3442	32.35
Completeness	4.0891	1.3330	32.60
Concise representation	3.7261	1.4469	38.83
Current & updated	4.1650	1.3927	33.44
Ease of use	3.3762	1.4706	43.56
Accuracy	4.1353	1.4065	34.01
Provision in preferred media	3.3564	1.6107	47.99
Cost effectiveness	3.5578	1.5036	42.26
Affordability	3.3333	1.6002	48.01
Timeliness	3.9241	1.4997	38.22
Professionalism of provider	3.7822	1.5264	40.36
Relevant to purpose	3.7459	1.5434	41.20
Discovered new purpose	3.4389	1.5469	44.98
Refreshed memory	3.4092	1.5238	44.70
Substantial prior knowledge	3.4587	1.5063	43.55

Table 4.18 and Figure 4.23 clearly indicate that out of 17 attributes that were rated on a five point scale all the attributes were rated with a mean score above 3.3. The highest rating was given to current and updated attribute with a mean of 4.1650 and SD of 1.3927, followed by reliability / credibility with a mean of 4.1551 and SD of 1.3442, appropriate quantity with mean of 4.1419 and SD of 1.3234 and accessibility was rated with a mean of 4.0462 and SD of 1.3561.

The lowest rating was given to affordability (mean 3.3333 and SD 1.6002), provision in preferred media (mean 3.3564, SD 1.6107) and ease of use (mean 3.3762, SD 1.4706).

Figure 4.23: Information attributes

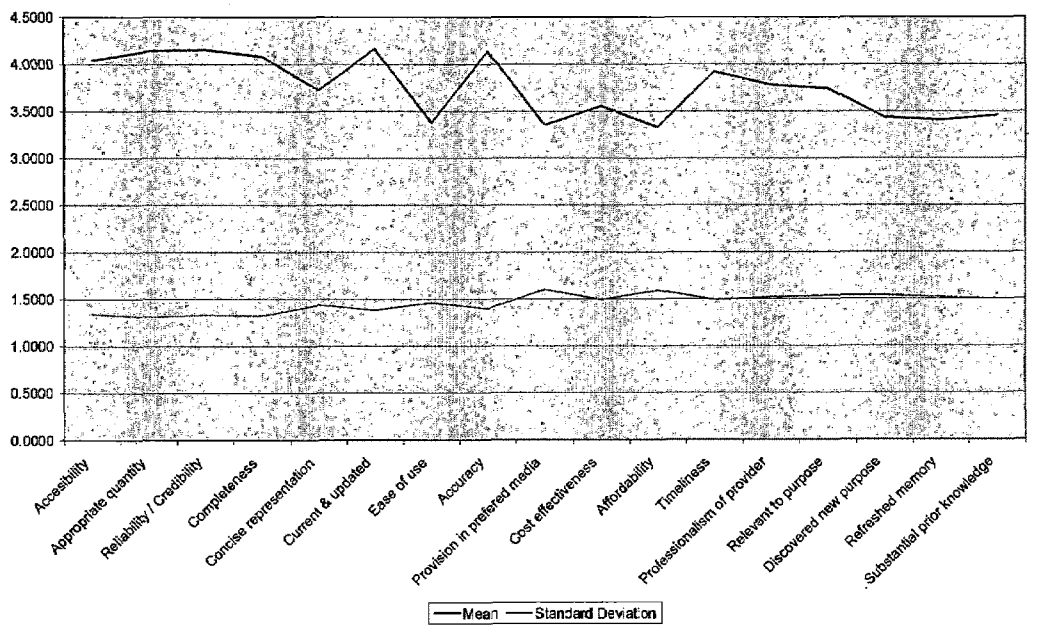
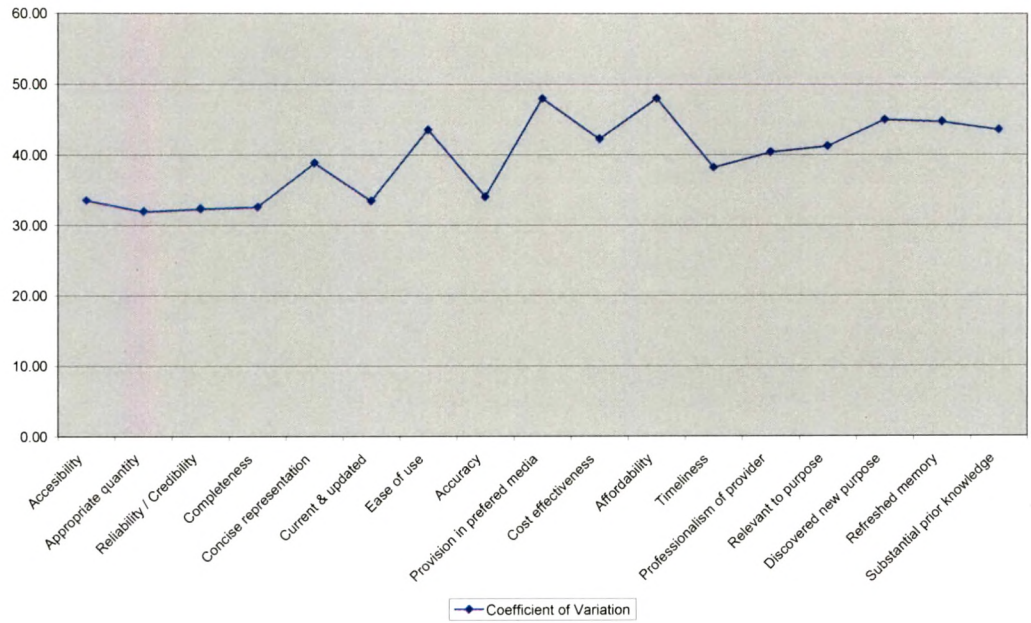


Table 4.18 and Figure 4.24 clearly indicate the coefficient of variation is quite high for provision in affordability (48.01), preferred media (47.99), discovered new purpose (44.98), refreshed memory (44.70) and the ones with lower variations in data were appropriate quantity (31.95), reliability & credibility (32.35), completeness (33.44), current & updated (33.44) and accessibility (33.51). Figure 4.24 is a plot of the values of coefficient of variation for all the attributes of information as perceived by the managers.

Figure 4.24: Information attributes – variation chart



4.9. HYPOTHESIS TESTING

The hypotheses developed in the study were tested using the z-test for difference in means and find the test statistic z as under:

$$z = \frac{\bar{X}_1 - \bar{X}2}{\sqrt{\frac{\sigma^2_{p1}}{n1} + \frac{\sigma^2_{p2}}{n2}}}$$

z = test statistic z

$\bar{X}_1$ = mean of services sector sample

$\bar{X}2$ = mean of manufacturing sector sample

σ_{p1} = standard deviation of services sector sample

σ_{p2} = standard deviation of manufacturing sector sample

n1 = 174 (service sector sample)

n2 = 129 (manufacturing sector sample)

The results were reviewed whether the z score was higher than 1.95 at 5% significance level.

4.9.1. Technology used

The first hypothesis - There is no difference in information technology usage among managers working in manufacturing and services sectors - was tested in this section by first segregating the total sample into two sub-samples: sub-sample of 174 respondents (n1) working in the services sector (111 companies) and the other sub-sample of 129 respondents (n2) working in the manufacturing sector (74 companies).

First the mean and standard deviation of the data was calculated for both the sub samples corresponding to PC, Laptop, LAN, Web and mobile options in the

information technology section. Then the z-test was adopted and the test statistic z was calculated using the formula given above.

Table 4.19 gives the z values of PC, Laptop, LAN, Web and Mobile aspects that were covered in the study as a part of the technology used at work.

The z test clearly indicates that there is a significant difference between both the sectors in the PC usage as the results indicate the mod value of z is 2.05 and is considered significant if mod value of z is more than 1.95 at 5% level of significance. This also indicates that in the manufacturing sector the PC usage is much more than in services sector. In the comparison of Laptop the mod value of z was 1.714 and at 10% significance level this may be a significant difference as any value greater than 1.65 is significant at that level. This may also imply that there may be more usage of laptop in the services sector as compared to the manufacturing sector. As far as the LAN, web and mobile are concerned the mod z values were 0.055, 0.525 and 1.13 respectively, indicating that there was no major difference between services and manufacturing sectors.

The reasons for significant difference in PC usage between the sectors may be due to the relatively more usage of Laptop in the services sector and this may have caused for respondents working in the services sector not using the PC since they have laptops. Moreover in Indian context we can also state that it is possible that PC is a

shared resource and one PC may be used by many where as Laptops are not used by many.

Table 4.19: Comparison between manufacturing and services sectors: Technology used at work

Values	PC	Laptop	LAN	Web	Mobile
$\bar{X}_1$	4.21264368	3.6321839	4.4195402	4.505747	4.28736
$\bar{X}_2$	4.52713178	3.2713178	4.4108527	4.434109	4.44961
σ_1	1.55279383	1.8063148	1.3777202	1.229442	1.37196
σ_2	1.11156927	1.8146622	1.3382148	1.130853	1.11075
$\frac{\sigma^2_{p1}}{n1}$	0.01385729	0.0187516	0.0109087	0.008687	0.01082
$\frac{\sigma^2_{p2}}{n2}$	0.00957819	0.0255271	0.0138823	0.009913	0.00956
z	-2.0543163	1.7149389	0.0551758	0.525275	-1.13653

So we can say that the first hypothesis is not entirely true as overall technology usage seems to be same from the study except in the case of PC and partially in the case of laptop.

4.9.2. Information type required

The second hypothesis - There is no difference in information required or used by managers in manufacturing and services sectors - was tested and is reported in this

section. The hypothesis test was conducted in four parts - government & environmental information, administrative information, market information and sector information.

Firstly, similar to the first hypothesis test, the total sample was segregated into two sub-samples: sub-sample of 174 respondents (n1) working in the services sector and the other sub-sample of 129 respondents (n2) working in the manufacturing sector.

On these sub-samples data calculations for deriving z value was carried out and they are follows:

4.9.2.1. Information type required: Government & Environment

In this section where we compare the usage of various topics under the head of government and environment information we see a clearly significant difference in the usage and need of government & environment information between services sector and manufacturing sector and this makes us reject the hypothesis in this context.

Table 4.20: Comparison between manufacturing and services sectors: Government and environment information needed

Values	Policies	Projects	Procedures	Regulatory	Postings	Tenders	Socio	Political	Demo
$\bar{X}_1$	3.53448276	3.1954023	3.2931034	3.063218	2.10345	2.17816	2.37356	2.4023	2.62644
$\bar{X}_2$	3.92248062	3.8217054	3.9689922	3.565891	2.55814	3.08527	2.74419	2.56589	2.97674
σ_1	1.59350761	1.6116561	1.6377973	1.673155	1.43075	1.54598	1.53705	1.40157	1.58519
σ_2	1.30271593	1.1487059	1.2558487	1.385443	1.36878	1.47389	1.33041	1.33373	1.46557
$\frac{\sigma^2_{p1}}{n1}$	0.01459349	0.0149278	0.015416	0.016089	0.01176	0.01374	0.01358	0.01129	0.01444
$\frac{\sigma^2_{p2}}{n2}$	0.01315557	0.0102289	0.012226	0.014879	0.01452	0.01684	0.01372	0.01379	0.01665
z	-2.3291	-3.9487	-4.0652	-2.8564	-2.8043	-5.1877	-2.2432	-1.033	-1.9867

As shown in the Table 4.20, the mod z value of 2.329 for policies implies that there is a significant difference (as the value is above 1.96 at 5% significance level) between both sectors in using policies information and we can say that the manufacturing sector needs the government – policies information more than the services sector.

In projects information, the difference is much more with mod z value at 3.9338 and again the usage of this type of information is higher in manufacturing sector. The procedures and documentation information is also used more in manufacturing sector and the usage and the need and usage is significantly different as indicated in the mod z value of 4.0653. Regulatory and monitoring agencies information is also significantly different in use when compared between manufacturing and services sectors (z value is -2.8564). Government postings also matters for manufacturing sector more than for services sector managers as indicated in the z value of -2.8044. Tenders and notices has the most significant difference with a z value of -5.1877 and this indicates the favor of using this information by manufacturing sector more than in the services sector. In this segment socio-cultural information had a z value of 2.2432 and demographic information had significant difference in usage between the two sectors with a z value of -1.9867.

The only insignificant difference in usage in this section was in political information with z value of -1.033 (mod values less than 1.95 are insignificant at 5% level of significance).

4.9.2.2. Information type required: Administrative

Table 4.21: Comparison between manufacturing and services sectors: Administrative information needed

Values	Health	Travel	Legal	Internal Memo	HR Information	Finance	Media
$\bar{X}_1$	2.9195	3.1667	3.2126	3.1782	3.4943	3.4368	2.8851
$\bar{X}_2$	3.1318	3.2248	3.4109	4.0620	3.5349	3.5659	3.0543
σ_1	1.6000	1.5133	1.4528	1.6155	1.5497	1.5633	1.5797
σ_2	1.4704	1.4320	1.4286	3.6928	1.4580	1.3570	1.3993
$\frac{\sigma^2_{p1}}{n1}$	0.0147	0.0132	0.0121	0.0150	0.0138	0.0140	0.0143
$\frac{\sigma^2_{p2}}{n2}$	0.0168	0.0159	0.0158	0.1057	0.0165	0.0143	0.0152
z	-1.1964	-0.3411	-1.1856	-2.5440	-0.2335	-0.7672	-0.9848

In the section the z value was found for different subdivisions under the administrative information heading and they included health care, travel, legal, internal office memos, human resource information, financial information and media information. Table 4.21 shows that among all these the only significant difference was found in use of internal office memos with a mod value of z at 2.5440. This implied that in the manufacturing sector managers rated internal office memos as more important than the services sector. In all the other parameters there was no significant difference in need or usage of information in this section, i.e.,

administrative information, between services and manufacturing sectors. HR information was the parameter where the z score was the lowest at 0.2335 indicating very similar usage in both manufacturing and services sectors.

4.9.2.3. Information type required: Market

In the section the comparison of managers' perceptions of need and use of information on market across manufacturing and services sectors was carried out. As explained earlier the z test was carried out and the values are mentioned in the Table 4.22 for each of these parameters under market information and they include competitor, product, customer, consultant, market trends, supplier / buyer, technology trends, patents, M&A, company news and executive posting. The difference between managers of manufacturing sector and managers in the services sector was insignificant only in M & A (0.3414), company news (1.3537) and customer (1.6238). In rest of the parameters there was a significant difference in the need and use of market information. Supplier / buyer (5.0640), product (4.3580), patents (3.4788), market trends (3.1808), competitor (2.8914), consultant (2.6290), executive posting (2.4606) and technology trends (2.2941) had significantly high z scores as given in brackets and were in the negative, implying on all these parameters the responses of use or need was high in manufacturing sector when compared to services sector.

Table 4.22: Comparison between manufacturing and services sectors: Market information needed

Values	Compe -titor	Product	Customer	Cons -ultant	Market Trends	Sup/ Buyer	Tech Trends	Patents	M&A	Co. News	Exec. Posting
$\bar{X}_1$	4.0057	3.9885	4.1782	3.4310	3.9598	3.4483	3.7816	2.9195	3.1322	3.7414	3.0057
$\bar{X}_2$	4.4419	4.5891	4.4186	3.8450	4.4186	4.2636	4.1628	3.5504	3.1938	3.9535	3.4341
σ_1	1.5563	1.5984	1.4614	1.5851	1.5371	1.6710	1.5979	1.6776	1.6691	1.5420	1.6640
σ_2	1.0673	0.7460	1.1159	1.1555	0.9658	1.1286	1.2917	1.4682	1.4635	1.1849	1.3627
$\frac{\sigma^2_{p1}}{n1}$	0.0139	0.0147	0.0123	0.0144	0.0136	0.0160	0.0147	0.0162	0.0160	0.0137	0.0159
$\frac{\sigma^2_{p2}}{n2}$	0.0088	0.0043	0.0097	0.0104	0.0072	0.0099	0.0129	0.0167	0.0166	0.0109	0.0144
z	-2.8914	-4.3580	-1.6238	-2.6290	-3.1808	-5.0640	-2.2941	-3.4788	-0.3412	-1.3537	-2.4606

Table 4.23: Comparison between manufacturing and services sectors: Sectors' information needed

Values	Tele -com	Oil	Chem -ical	Cement	Power	Const - ruction	Media	Auto	Consul -tancy	Banking	Agri -based	IT	Educa -tion	Engine -ering
$\bar{X}_1$	3.0575	2.2931	2.1264	2.0575	2.5057	2.3161	2.6609	2.3218	3.0632	3.5057	1.9828	3.5632	3.1034	2.7069
$\bar{X}_2$	2.8682	2.7287	2.3721	2.2791	3.0388	2.6357	2.4264	2.8450	2.9225	3.0853	2.2946	3.2946	3.2481	3.5814
σ_1	1.8301	1.7001	1.5861	1.5571	1.6958	1.6892	1.7254	1.7634	1.7770	1.7295	1.5929	1.7150	1.8122	1.7960
σ_2	1.7065	1.6286	1.5415	1.4196	1.5881	1.5759	1.5092	1.6415	1.5493	1.6443	1.5831	1.5732	1.5960	1.6042
$\frac{\sigma^2_{p1}}{n1}$	0.0192	0.0166	0.0145	0.0139	0.0165	0.0164	0.0171	0.0179	0.0181	0.0172	0.0146	0.0169	0.0189	0.0185
$\frac{\sigma^2_{p2}}{n2}$	0.0226	0.0206	0.0184	0.0156	0.0195	0.0193	0.0177	0.0209	0.0186	0.0210	0.0194	0.0192	0.0197	0.0199
z	0.9254	-2.2592	-1.3548	-1.2890	-2.8062	-1.6925	1.2580	-2.6571	0.7341	2.1528	-1.6908	1.4141	-0.7359	-4.4576

4.9.2.4. Information type required: Sector

In this section the differences in the use and need of sector information by managers working in manufacturing and services sectors was explored. Table 4.23 shows that significant variations between manufacturing and services was evident in engineering, power, automobile, oil & gas and banking by the z scores of 4.4576, 2.8062, 2.6571, 2.2592, 2.1528 respectively.

In fact the variation was very high for engineering and indicated that it was most used or needed by the manufacturing sector. Rest of the z scores for other parameters reflected no significant variation between respondents' of manufacturing and services sectors as the mod value of z was less than 1.95 at 5% significance level in these cases.

The z test on all the parameters in the type of information required in summary revealed it was a mix where in government & environment information there was significant difference between manufacturing and service sector, except for political information that was used by both sectors. Manufacturing sector had rated government & environment information more important.

In case of Administrative information it was the other was round where only in one parameter of internal memos there a significant difference and on all other parameters

in this section there was no significant difference between manufacturing and service sector managers' perceptions.

Market information need when analyzed for manufacturing and service sector comparison, revealed significant difference in most parameters except customer, M&A and company news.

In the case of sector information, out of 17 sectors only 5 sectors, i.e., oil, power, automobile, banking and engineering sector information were perceived to be needed differently by managers working in the manufacturing and services sector companies.

Hence we can say that the second hypothesis that managers working in manufacturing sectors require similar type of information as required by managers working in the services sectors is not true on the count that it was found that there is a difference in type of information required by both though in some cases similar information type is needed.

Table 4.24: Comparison between manufacturing and services sectors: Information sources

Values	News -paper	Magazine	Journals	Hand -book	Office Memos	Own Files	Govt Documents	Survey / reports	Annual Reports	Direct -ries	Radio /TV	Exhib -tions	Website
$\bar{X}_1$	4.1782	3.9598	3.5977	3.5862	3.5287	3.9425	2.8728	3.3391	3.2529	2.7701	2.7586	3.4425	3.4770
$\bar{X}_2$	4.3023	4.1008	3.5504	3.6434	3.7287	4.3178	2.9612	3.5504	3.4341	3.2636	2.9070	3.9070	3.3798
σ_1	1.2152	1.3445	1.4261	2.6536	1.6366	1.5384	1.6197	1.4956	1.5671	1.6462	1.5354	1.5856	2.1843
σ_2	1.0797	1.1377	1.2988	1.3682	1.2975	1.1455	1.4054	1.2928	1.3101	1.4226	1.3255	1.2339	2.1404
$\frac{\sigma^2_{p1}}{n1}$	0.0085	0.0104	0.0117	0.0405	0.0154	0.0136	0.0151	0.0129	0.0141	0.0156	0.0135	0.0144	0.0274
$\frac{\sigma^2_{p2}}{n2}$	0.0090	0.0100	0.0131	0.0145	0.0131	0.0102	0.0153	0.0130	0.0133	0.0157	0.0136	0.0118	0.0355
z	-0.9380	-0.9867	0.3007	-0.2440	-1.1855	-2.4341	-0.5072	-1.3152	-1.0945	-2.7909	-0.9001	-2.8666	0.3873

4.9.3. Information sources

In this section the z test was carried out to test the third hypothesis – The manufacturing sector and services sectors managers use similar information sources for their business information needs.

For this a comparison of the responses provided by managers working manufacturing sectors and managers working in the services sectors was carried out using the z test. The results presented in Table 4.24 show that mod z values for exhibitions/ conferences / seminars: 2.8666, directories: 2.7909 and own files: 2.4341 were significantly higher than the permitted 1.95 at 5% significance level.

In all these three cases it was evident that the manufacturing sector managers used or needed these sources more than those in the services sectors. In case of the other sources – newspapers, magazines, journals, handbooks, office memos, government documents, surveys / reports, annual reports, radio / TV and websites the use was similar in manufacturing and services sectors.

Hence the third hypothesis was not entirely true though majority of the information sources needed were similar with differences in only three sources.

4.9.4. Information media

Table 4.25: Comparison between manufacturing and services sectors: Information media used

Values	Printed	Electronic - Online	Electronic - Offline	Oral-Telephone	Oral-Face
$\bar{X}_1$	3.8218	4.2069	3.2184	4.1839	4.0632
$\bar{X}_2$	3.9147	4.3566	3.4419	4.2946	4.0853
σ_1	1.4966	1.4194	1.7465	1.3432	1.3436
σ_2	1.3865	1.0062	1.5047	1.1068	1.3171
σ^2_{p1} / $\overline{n1}$	0.0129	0.0116	0.0175	0.0104	0.0104
σ^2_{p2} / $\overline{n2}$	0.0149	0.0078	0.0176	0.0095	0.0134
Z	-0.5574	-1.0740	-1.1931	-0.7852	-0.1429

The fourth hypothesis that managers working in the manufacturing sector and managers working in the services sector use the same type of information media was tested using the z test and the results are presented in Table 4.25. The mod z value for all options was below the 1.95 mark at 5 % significance level and that implied that there is no difference in the information media used by managers working in the manufacturing sector and those working in the services sector.

The hypothesis that managers working in the manufacturing sector and managers working in the services sector use the same type of information media was proved to be true.

4.9.5. Information Search

Table 4.26: Comparison between manufacturing and services sectors: Information search

Values	Search by self	Search by others
$\bar{X}_1$	4.2989	3.5172
$\bar{X}_2$	4.4031	3.4884
σ_1	1.2550	1.5974
σ_2	1.1076	1.5161
$\frac{\sigma^2_{p1}}{n1}$	0.0091	0.0147
$\frac{\sigma^2_{p2}}{n2}$	0.0095	0.0178
Z	-0.7652	0.1602

To test the hypothesis that managers working in the manufacturing sector search for information similar to information search by managers working in the services sector z test was conduced. The results are shown in Table 4.26 which clearly shows that there is no significant difference between both sub-samples. This proves the fifth hypotheses that managers in both sectors search for information more by themselves rather than depend on others. The fact that managers search for information by themselves is clear from the high mean scores and low standard deviation scores for both the sub-samples.

4.9.6. Information providers

To test the hypothesis that managers working in manufacturing sector perceive importance of information providers differently from their counterparts working in services sector, z test was administered and the results are shown in the Table 4.27. Among the 14 providers there was significant difference for vendor (4.5766), supplier (4.0016), government departments (2.7527), friends (2.5107), chamber of commerce (2.4175) and colleagues (1.9691) and this was reflected in the mod z scores are shown in the Table 4.26. There was no significant difference in the perceptions of managers working in manufacturing and services sectors for other providers like libraries, information service providers, institutes, consultants, trade associations, TV/radio, boss and customers.

Hence it can be said that the hypothesis that managers working in manufacturing sector perceive importance of information providers differently from their counterparts working in services sector is not true with perceptions on six providers being significantly different.

Table 4.27: Comparison between manufacturing and services sectors: Information providers

Values	Cham -ber	Trade Assn	Govt Dept	Libraries	Institute	Service Provider	Friends	TV	Consu -ltants	Collea -gues	Boss	Customers	Supplier	Vendor
$\bar{X}_1$	2.1609	2.3563	2.3908	2.8333	2.7816	3.0575	2.8448	2.8621	3.0920	3.5460	3.6322	3.7299	3.1667	3.1264
$\bar{X}_2$	2.5736	2.6977	2.8760	2.9070	3.0000	3.2171	3.3023	3.1628	3.3411	3.8682	3.8760	4.0000	3.8682	3.9380
σ_1	1.5423	1.6621	1.6261	1.7003	1.7630	1.8015	1.6775	1.7181	1.7077	1.6148	1.6700	1.6241	1.7139	1.7291
σ_2	1.4130	1.5187	1.4307	1.5178	1.5052	1.5611	1.4822	1.5949	1.4550	1.2335	1.3636	1.3863	1.3369	1.3564
$\frac{\sigma^2_{p1}}{n1}$	0.0137	0.0159	0.0152	0.0166	0.0179	0.0187	0.0162	0.0170	0.0168	0.0150	0.0160	0.0152	0.0169	0.0172
$\frac{\sigma^2_{p2}}{n2}$	0.0155	0.0179	0.0159	0.0179	0.0176	0.0189	0.0170	0.0197	0.0164	0.0118	0.0144	0.0149	0.0139	0.0143
z	-2.4175	-1.8580	-2.7527	-0.3966	-1.1603	-0.8236	-2.5107	-1.5701	-1.3679	-1.9691	-1.3972	-1.5580	-4.0016	-4.5766

4.9.7. Purpose of information search

Table 4.28: Comparison between manufacturing and services sectors: Purpose of information search

Values	Decision making	Planning & Strategy	Implementation & Execution	Skill Development	Help others	Enhancement Knowledge
$\bar{X}_1$	3.7414	4.0402	3.9770	3.9540	3.5920	4.1839
$\bar{X}_2$	4.0930	4.4419	4.1860	4.0620	3.8372	4.3023
σ_1	1.5680	1.4480	1.4741	1.4578	1.5320	1.2770
σ_2	1.1281	0.8377	1.0515	1.2671	1.1442	1.0353
$\frac{\sigma^2_{p1}}{n1}$	0.0141	0.0120	0.0125	0.0122	0.0135	0.0094
$\frac{\sigma^2_{p2}}{n2}$	0.0099	0.0054	0.0086	0.0124	0.0101	0.0083
z	-2.2701	-3.0370	-1.4404	-0.6877	-1.5952	-0.8905

The hypothesis – Purposes of information search among managers working in services sector and managers working in manufacturing sector is similar, was tested through the z test. The results of the test are presented in Table 4.28. The mod z scores for planning & strategy and for decision making for routine jobs was 3.0370 and 2.2701 respectively and indicated that in rating these purposes both the groups behave differently. The manufacturing sector managers conducted information search more for planning and decision making when compared to service sector managers. In case of other purposes, implementation and execution, skill

development, help others (boss & colleagues) and enhancement of knowledge the groups had similar perceptions reflected in the responses.

Hence we can say that the hypothesis that purposes of information search among managers working services sector and managers working in manufacturing sector is similar - is largely true but not completely true.

4.9.8. Important attributes of information

The next hypothesis that perceptions on attributes of information that are important in fulfilling information needs by managers working in services sector and managers working in manufacturing sector are similar was tested by the z test. The results are presented in the Table 4.29.

The z scores for most of the attributes were less than 1.95 at 5% significance and so it can be said that the differences were insignificant. Only two attributes completeness with a mod z value of 2.1368 and accuracy with 2.2515 were significant. This implies that the manufacturing sector gave more importance to accuracy of information and completeness of information. In all the 17 attributes there was no difference in the responses. Hence we can say that the hypothesis - perceptions on important attributes of information that are important in fulfilling information needs by managers working in services sector and managers working in manufacturing sector are similar – is largely true.

Table 4.29: Comparison between manufacturing and services sectors: Important information attributes

Values	Acces -ibility	Appropr -iateness	Reliability credibility	Complet -eness	Concise	Current updated	Ease of Use	Accuracy	Media Preference	Cost	Afford -ability
$\bar{X}_1$	3.9770	4.0230	4.0805	3.9540	3.6379	4.1034	3.3046	3.9885	3.3161	3.4540	3.2759
$\bar{X}_2$	4.1395	4.3023	4.2558	4.2713	3.8450	4.2481	3.8450	4.3333	3.4109	3.6977	3.4109
σ_1	1.4464	1.4858	1.4443	1.4538	1.5915	1.5132	1.5108	1.6056	1.6720	1.6326	1.6670
σ_2	1.2231	1.0503	1.1943	1.1302	1.2212	1.2121	4.5833	1.0557	1.5290	1.3027	1.5084
$\frac{\sigma^2_{p1}}{n1}$	0.0120	0.0127	0.0120	0.0121	0.0146	0.0132	0.0131	0.0148	0.0161	0.0153	0.0160
$\frac{\sigma^2_{p2}}{n2}$	0.0116	0.0086	0.0111	0.0099	0.0116	0.0114	0.1628	0.0086	0.0181	0.0132	0.0176
z	-1.0575	-1.9167	-1.1551	-2.1368	-1.2810	-0.9230	-1.2882	-2.2515	-0.5125	-1.4439	-0.7363

Values	Timeliness	Professionalism of provider	Relevant	New Purpose	Refreshed Memory	Substantial Prior K
$\bar{X}_1$	3.8448	3.7184	3.7011	3.3391	3.3333	3.3621
$\bar{X}_2$	4.0310	3.8682	3.8062	3.5736	3.5116	3.5891
σ_1	1.5297	1.6150	1.6491	1.6709	1.6176	1.6203
σ_2	1.4574	1.3997	1.3924	1.3566	1.3870	1.3324
$\frac{\sigma^2_{p1}}{n1}$	0.0134	0.0150	0.0156	0.0160	0.0150	0.0151
$\frac{\sigma^2_{p2}}{n2}$	0.0165	0.0152	0.0150	0.0143	0.0149	0.0138
z	-1.0765	-0.8625	-0.6000	-1.3473	-1.0302	-1.3369