COMPETITIVE PRIORITIES AND THEIR RELATIVE IMPORTANCE IN INDIAN SELECTIVE MANUFACTURING INDUSTRIES

M.S. Narwal[1], Dilbag singh[2]

[1]*Associate Professor, DCRUST, Murthal, Haryana, India*
[2]*Assistant Professor, Max Group of Institutions, Ambala, Haryana, India*

Abstract—This paper presents the findings of an extensive survey of Indian manufacturing industries.   The survey encompassed three sectors: four Wheeler automobile industries, two wheeler automobile industries and general manufacturing industries. Various competitive priorities such as quality, cost, delivery and flexibility have been identified and assessed in Indian manufacturing environment. Their sub classifications are also made as observed from the literature review. Sector wise comparison of quality, cost, delivery and flexibility is provided. Correlation is also made between the various competitive priorities The results are obtained using SPSS software (version 20).It is observed that Indian manufacturing companies are highly emphasizing on quality and least on flexibility having mean score value 4.68 and 3.20 respectively. This study will help to provide a better understanding of manufacturing competence in a dynamic and fast changing business environment.

Key Words—Competitive Priorities, Mean Score Value,   Correlation. Manufacturing competence

I.   INTRODUCTION

The overall and overarching goal of any company is long time survival in market place and the ability to produce useful outputs. In manufacturing companies the outputs are usually products offered to customers resulting in profits divided by its owners. The small and medium-sized enterprises (SMEs) are famous for their agile and dedicated manufacturing capabilities. However, during the last decade, fragments markets, diversify products and the pressure of creating new functionality and product differentiation have made competition stronger than ever in electronics industries. In order to complement the weakness of insufficient infrastructural facilities and financial resources of SMEs, strategic alliances have become a highly fashionable business management implements to improve their competitive advantages. Any organization that wants to successfully compete in the marketplace must focus on customer requirements. These requirements can be numerous even for a narrow customer segment. An organization must translate customer requirements into objectives for operations known as competitive priorities. Examples of competitive priorities include low cost, consistent quality, and on-time delivery etc. Competitive priorities play an important role in technology adoption, process choice, capacity management, manufacturing planning and control systems, employee skill development and quality assurance (Hayes and Wheelwright, [2]. Today, Indian industries are facing a very different competitive scenario as compared to the past. They are facing competition from imports and from MNCs in the domestic markets. Several industries also have to compete as new entrants in global markets. Therefore, many strategies that may have worked in the past are not likely to succeed in the future. The new competition is in terms of reduced cost, improved quality, products with higher performance, a wider range of products, and better service all delivered simultaneously. Industries have also started

paying attention to quality, but it is not clear whether enough is being done about faster throughput and delivery, introduction of a wider range of products, and better service. It would not be incorrect to say that we are still struggling to get the "quality" right and those industries will perhaps focus on other issues at a later date. The Indian market place has been witnessing a quiet revolution where old products are being substituted by better ones. In fact, for the first time, products and services are being introduced to meet certain customer needs that were only partially met in the past. Customers now prefer a large variety of products. This phenomenon has inspired manufacturing industries to look for progressive computerized automation in various processes. Thus mass production is being replaced by low-volume, high-variety production. Manufacturing industries have recognized the importance of "flexibility" in the manufacturing system to meet the challenges posed by the pluralistic market. The concept of flexibility in manufacturing systems has attained significant importance in meeting the challenges for a variety of products of shorter lead-times, together with higher productivity and quality. Various authors have reported that flexibility is the underlying concept behind the transition from traditional methods of production to the more automated and integrated methods.

II. LITERATURE REVIEW

 The purpose of literature review is to provide background information on the issues to be considered in this paper and to emphasize the relevance of the present paper. In the present paper the literature review is more concerned in Indian context. Skinner [1], he described common competitive performance criteria for manufacturing strategy such as short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in volume changes and low cost. He claimed that these competitive priorities must be implemented to achieve the goal of business. Hayes and wheelwright [2], they defined competitive priorities as strategic preferences or the ways in which an organization chooses to compete in the marketplace. They accepted that competitive priorities in manufacturing can be expressed by at least four basic factors: cost, quality, delivery, and flexibility D'Souza and Williams [3], they defined the four dimensions of manufacturing flexibility; volume, variety, process and material handling flexibility. They noted that volume and variety are "mainly externally driven" towards meeting the needs of the market. Within existing manufacturing operations the most influential types are the ability to adjust manufacturing volume and the ability tochange between products. Oltra and Flor [4], they used SMEs in Spanish to examine the moderation effect of business strategy on the relationship between operations strategy and firms' performance. The study claimed that firms focused on cost and quality priorities to have better firm performance. Mahender Singh, P.C. Basak and Rajbir Singh [5], they have presented some findings of Indian manufacturing sectors viz. automobile (especially two-wheeler), tractor and general manufacturing industry. Various manufacturing strategy issues such as competitive priorities, improvement activities, and performance measures, have been identified and assessed in Indian context. Sector wise comparison of competitive priorities and performance measure is provided. Their results show that most of the Indian companies are still emphasizing on quality. However, automobile sector has set to compete globally with high innovation rate, faster new product development, and continuous improvement. Suzana N. Russell and Harvey H. Millar [6], they examined the competitive priorities emphasized by manufacturing firms in the Caribbean. They studied five manufacturing competitive priorities - quality, flexibility, cost, delivery and innovation. Survey data from 60 manufacturing firms in 4 Caribbean countries show that cost and quality are most strongly emphasized while innovation is the least emphasized. The findings from their study also provide support for the cumulative capabilities theory and show that Caribbean manufacturers are simultaneously emphasizing all five priorities and do not appear to be trading off one priority for another. In light of these findings, the implications for manufacturing managers and policymakers in

the Caribbean and other developing economies are discussed. Mahender Singh [7], he studied the various issues of manufacturing strategy issues such as competitive priorities in Automobile (two wheeler), Tractor and General manufacturing sector companies. It has been attempted to fill some of the gaps in the contemporary research in manufacturing strategy in selected Indian corporate sectors. He observed that Indian manufacturing companies are highly emphasizing on quality and the least on flexibility.

III.   COMPETITIVE PRIORITIES

Competitive priorities define the set of manufacturing objectives and represent the link to market requirements. Dimensions commonly used are; cost, quality, flexibility, and delivery. While some studies suggests innovativeness and service as additional priorities empirical research and strategy theories consistently stress the four basic dimensions. Most researchers consider the competitive priorities part of manufacturing strategy as the link between market requirements and manufacturing. Among the competitive priorities there are often trade-offs inherent and to focus the attention to certain dimensions is the essence in the factory focus literature drawing on Skinner's [1] work. However, limiting the scope brings another problem, which dimensions to focus on. Hill [8], presented the concept of order winners and qualifiers related to the importance of competitive priority dimensions. Qualifying criteria (dimensions) are those that a company must meet for the product to even be considered in the market place. Common criterions considered qualifiers are conformance quality and delivery reliability. Order winning criteria are those that differentiate the manufacturer from its competitors and "win" the order. Although the concept of order winners and qualifiers provides a categorisation and prioritisation of competitive dimensions. The four major components of competitive priorities are briefly described below.

3.1 Quality

Quality refers to all physical aspects of the process and product or service delivered. Quality is a competitive weapon in the marketplace. Quality is not confined to eliminating defects and conforming to specifications. Quality engenders competitive advantage by proving products that meet or exceed customer needs and expectations. Quality is defined using different perspectives as it is still a subjective goal that has indefinable characteristics. Factors considered under the domain quality are given below.

- Conformance Quality (CQ)
- Product Performance (PP)
- Product Durability (PD).
- Product Reliability (PR)

3.2 Cost

Cost refers to the sum of all costs to the company involved in developing, producing, delivering, servicing and disposing of the product. Porter [9] argues that competitive advantage can be achieved by adopting one or more of the following generic competitive strategies: such as Cost leadership strategy: Differentiation strategy: Focus strategy. Factors considered under the domain cost are given below.

- Low Cost (LC)
- Quality Costs (QC)

3.3 Delivery

Delivery is a competitive priority where the customers are interested in satisfying their needs and wants in the right quantity at the right time. In this context, Kumar and Kumar, [10] state that delivery of the required function means ensuring that the right product (meeting the requirements of quality, reliability and maintainability) is delivered in the right quantity, at the right time, in the right place, from the right source (a vendor who is reliable and will meet commitments in a timely fashion), with the right service and, finally, at the right price. Following factors considered under this domain.

- Fast Delivery (FD)
- On-time Delivery (OD)

3.4 Flexibility

Flexibility as the ability to respond effectively to changing circumstances. There are a number of ways to classify flexibility. The ability to customize a wide range of products to individual tastes, to introduce new products rapidly, to modify existing one, and to react to individual value needs is increasingly being seen as a strategic weapon. Ability to handle volume and product mix changes. Factors considered under the domain flexibility are given below.

- Design Adjustments (DA)
- Ability to Rapidly Change Product Mix   (CPM)
- Ability to Rapidly Change Production Volumes (CPV)

IV.   RESEARCH METHODOLOGY

Research methodology is based on empirical data collected through a questionnaire survey. The survey methodology is used for study. The main objective of survey is observing the status of competitive priorities of Indian manufacturing industries. The problem was selected on the gap identified in literature. The questionnaire was administered in 80 industries in the northern region of India. The databases of 80 manufacturing industries located in northern part of India have been extracted industries directories. This is having name of the company, their location and postal address. The companies in which number of employee are more than 100 are included in survey. In Indian scenario, major manufacturing industries are Automobile (Two Wheeler and Four Wheeler) and General Manufacturing Industries.

### 4.1 Development of Questionnaire

Based on literature, Mahender singh [7] and G.S. Dangayach [11] a questionnaire was designed. The questionnaire has been developed on a five point Likert scale. The competitive priorities such as quality, cost, delivery, and flexibility have been incorporated relevant to Indian context which was not incorporated by the earlier researchers The Earlier studies are on manufacturing strategy, competitive priorities and competitive priorities, but not focused particularly on competitive priorities. This motivated to develop a new questionnaire in Indian context. The question related to competitive priorities such as quality, cost, delivery, flexibility. Question is related to company profile, number of employee and degree of investment in different type of competitive priorities. The questionnaire contained two section 'A' and 'B'. Section 'A' contain 03 question pertaining to company details and section 'B' has 15 question related to competitive priorities.

Table 1 Total Number of Questions on Various Competitive Priorities

Sr. No.	Various Competitive Priorities	No. of Questions
1	Quality	04
2	Cost	02
3	Delivery	02
4	Flexibility	03

4.2 Profiles of Respondents

After the phone calls, email and remainder, out of 80 sending questionnaire, 25 filled responses have been received from the industries, which gives response rate 31.25%. Out of 25 respondents, 11(44%) were from quality control department manager, 7 (28%) were factory/plant manager, 7 (28%) were general manager
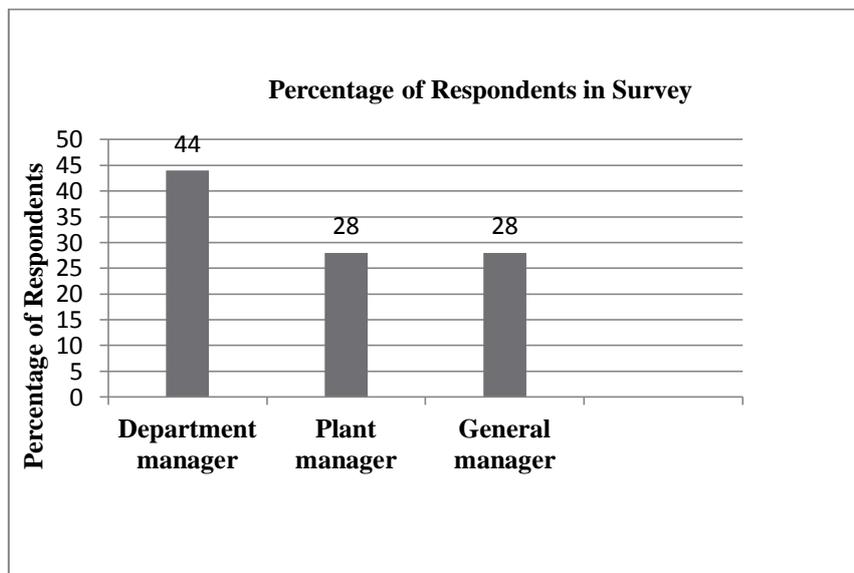
Fig. 1 Percentages of Various Respondents

V.   ANALYSIS AND OBSERVATIONS OF COLLECTED DATA

The responses of various manufacturing industries (such as two wheeler, four wheeler and general manufacturing industries) are collected through questionnaire survey. The data has been analysed by SPSS software. The quantitative tools are used for the analysis of collected data in the present work. Quantitative tools include descriptive statistic, reliability analysis, and correlation analysis.

5.1 Descriptive Statistics

Descriptive Statistics include minimum, maximum, mean and standard deviation. This is used for computing sector wise and overall statistic of various competitive priorities. Table-2 shows the mean and standard deviation of all four competitive priorities. The table shows the highest mean score value 4.68, it indicates that Indian manufacturing industries gives more importance to quality.

Flexibility has the lowest mean score value 3.20, which indicates that Indian manufacturing less importance to flexibility.

Table 2 Mean and Standard Deviation

Competitive Priorities	Mean	Standard Deviation
Quality	**4.68**	0.48
Cost	4.08	0.64
Delivery	4.12	0.78
Flexibility	3.20	0.87
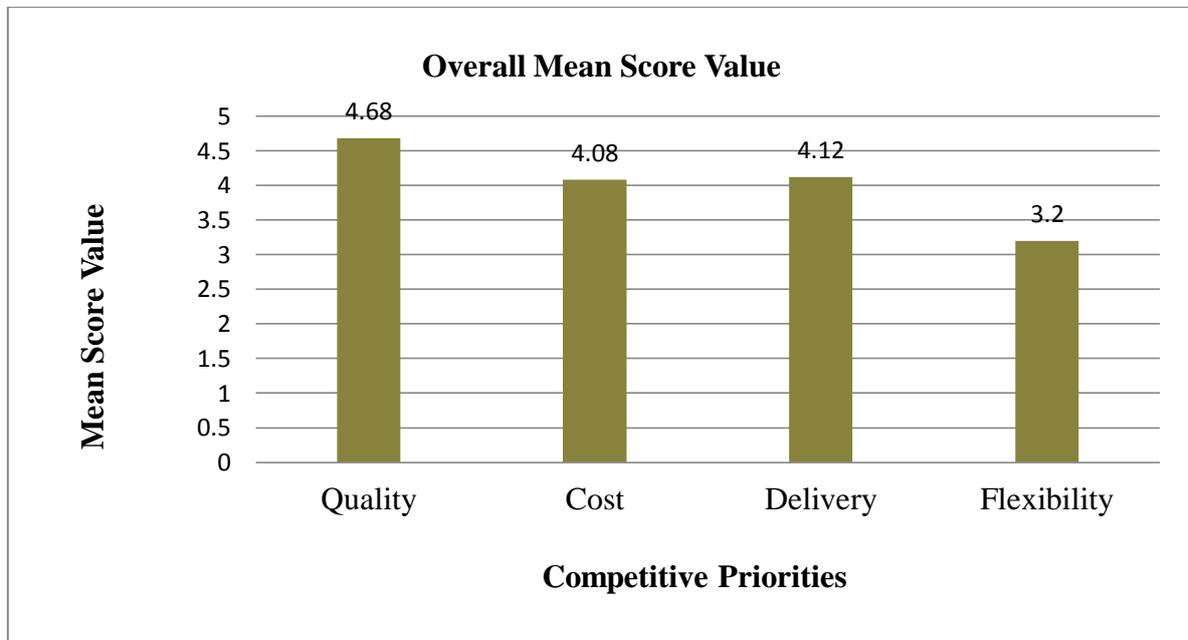
Fig.2 Mean Score Value of Competitive Priorities

Table 3 Sector Wise Competitive Priorities

Competitive Priorities	Four Wheeler		Two Wheeler		General		Overall	
	Mean(R)	SD	Mean(R)	SD	Mean(R)	SD	Mean(R)	SD
Quality(Q)								
CQ	4.77(2)	0.44	4.40(3)	0.55	**4.71(1)**	0.49	**4.72**	0.46
PP	**4.85(1)**	0.38	4.40(4)	0.55	4.14(4)	0.69	4.56	0.58
PD	4.38(5)	0.77	4.20(5)	0.45	4.00(5)	0.58	4.24	0.66
PR	4.54(3)	0.52	4.20(6)	0.45	3.86(7)	0.69	4.28	0.61

Sector statistics	4.64	0.53	4.30	0.50	4.18	0.61	4.45	0.58
Cost(C)								
LC	4.38(6)	0.65	4.60(2)	0.55	3.57(8)	0.53	4.20	0.71
QC	4.46(4)	0.52	4.20(7)	0.45	4.00(6)	0.58	4.28	0.54
Sector statistics	4.42	0.59	4.40	0.50	3.79	0.56	4.24	0.63
Delivery(D)								
FD	4.31(8)	0.85	4.20(8)	0.84	4.71(2)	0.76	4.40	0.82
OD	4.38(7)	0.77	**4.80(1)**	0.45	4.43(3)	1.13	4.48	0.82
Sector statistics	4.35	0.81	4.50	0.65	4.57	0.95	4.44	0.82
Flexibility(F))								
DA	3.46(11)	1.33	3.20(11)	1.30	3.00(11)	1.00	3.28	1.21
CPM	4.00(9)	1.23	3.40(10)	1.52	3.14(9)	0.69	3.64	1.19
CPV	4.00(10)	1.08	3.60(9)	1.14	3.14(10)	1.07	3.68	1.11
Sector statistics	3.82	1.21	3.40	1.32	3.09	0.92	3.53	1.17

From data analysis it is observed that Indian manufacturing industries are investing more on quality as compared to cost, delivery and flexibility. It indicates that Indian industries want to gain competitive advantage by giving more emphasis on cost and flexibility.

5.2 Reliability Analysis

The reliability analysis gives the information about the relationship between individual items on scale. This analysis is used to check the reliability of collected data. Cronbach's coefficient alpha is calculated for each scale as recommended for empirical research in operations management Reliability analysis is an integral part of ideal survey research. If the value of reliability factor (α) comes less than 0.50, it raises the doubt about the reliability of the collected data. The data which have the reliability is less than 0.50 are excluding from further analysis. the table 4 shows that the value of Cronbach's Coefficient Alpha is more than 0.50 which shows that our data is reliable.

Table 4 Cronbach's Coefficient Alpha

Sr.No.	Number of Questions	Alpha(α)
1	Quality (4 Questions)	0.67
2	Cost (2 Questions)	0.65
3	Delivery (2Questions)	0.62
4	Flexibility (3 Questions)	0.72

5.3 Correlation Analysis

The Pearson correlation coefficient is calculated for all the competitive priorities. It measures the linear association between the various variables. Values of the correlation coefficient range from -1 to 1. The sign of coefficient indicate the direction of the relationship. The Pearson correlation coefficient describes the extent to which an increase or decrease in one variable is accompanied by a corresponding increase or decrease in the other. Table 5 gives the correlation for four wheeler, two wheeler automobile industries, and general manufacturing industries. All competitive priorities are significantly correlates with each other. The correlation means that if we change the one parameter than what effect will be on other parameter.

Table 5 Correlation Factor for Overall Manufacturing Sectors

Competitive Priorities	CQ	PP	PD	PR	LC	QC	FD	OD	DA	CPM	CPV
CQ	1.00	.572**	.286	.325*	.045	-.225	.650*	.380	.484*	.465*	.176
PP		1.00	.222	.461**	.262	.395	.160	.356	.321	.362	.205
PD			1.00	.273	.513**	.354	.693**	.576**	.188	.177	.100
PR				1.00	.323*	.548**	.159	.064	.334	.393	.446*
LC					1.00	.418**	.519**	.346	.067	000	.233
QC						1.00	.217	.064	.149	.262	.297
FD							1.00	.439*	.085	.239	.090
OD								1.00	.515**	-.266	.100
DA									1.00	.767**	.290
CPM										1.00	.567**
CPV											1.00

Pearson's correlation coefficient calculated with SPSS for window (version 7.5)
**Correlation is significant at the 0.01level (2-tailed).

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

The most preferred Competitive Priorities for Indian manufacturing industries are given in table 6. Table 7 shows that least preferred priorities for overall manufacturing sectors.

Table-6 Most Preferred Sector Wise Competitive Priorities

Rank	4-Wheeler Automobile Industries	2-Wheeler Automobile Industries	General Manufacturing Industries	Overall Manufacturing Industries
1	Product performance	On time delivery	Conformance quality	Conformance quality
2	Conformance quality	Low cost	Fast delivery	Product performance
3	Product reliability	Conformance quality	On time delivery	On time delivery
4	Quality costs	Product performance	Product performance	Fast delivery
5	Product durability	Product durability	Product durability	Product reliability

Table-7 Least Preferred Sector Wise Competitive Priorities

Rank	4-Wheeler Automobile Industries	2-Wheeler Automobile Industries	General Manufacturing Industries	Overall Manufacturing Industries
1	Design adjustments	Design adjustments	Design adjustments	Design adjustments
2	Ability to rapidly change production volumes	Ability to rapidly change product mix	Ability to rapidly change production volumes	Ability to rapidly change product mix
3	Ability to rapidly change product mix	Ability to rapidly change production volumes	Ability to rapidly change product mix	Ability to rapidly change production volumes
4	Fast delivery	Fast delivery	Low cost	Low cost
5	On time delivery	Quality costs	Product reliability	Quality costs

VI. CONCLUSIONS

Based upon the study, we have concluded following things

1. Four wheeler automobile industries are investing more on product performance (PP) in quality, quality cost (QC) in cost, on time delivery (OD) in delivery and Ability to rapidly change product mix (CPM) in flexibility. Overall four wheeler industries are investing more on product performance (PP).

2. Two wheeler automobile industries are investing more on product performance (PP) in quality, low cost (LC) in cost, on time delivery (OD) in delivery and Ability to rapidly change production volume (CPV) in flexibility. Overall two wheeler industries are investing more on time delivery (OD).

3. General manufacturing industries are investing more on conformance quality (CQ) in quality, quality cost (QC) in cost, fast delivery (FD) in delivery and Abilityto rapidly change product mix

(CPM) in flexibility. Overall general manufacturing Industries are investing more on conformance quality (CQ).

4. From literature review, 11 competitive priorities can be broadly classified into four categories. Quality, cost, delivery and flexibility. From our study it is observed that Indian manufacturing industries are investing more on quality. It observed that Indian manufacturing industries wants to gain competitive advantage by giving emphasis on quality as compared to technology. Indian manufacturing industries investing less design adjustment.

REFERENCES

[1] SKINNER, W. (1974), The focused factory, Harvard Business Review May/Jun, 113-119

[2] HAYES, R.H. and WHEELWRIGHT, S.C., 1984. Restoring our Competitive Edge. Competing through Manufacturing, Wiley, New York.

[3] D'SOUZA, D.E. and WILLIAMS, F.P., (2000), Towards a taxonomy of manufacturing flexibility dimensions, Journal of Operations Management, 18(5), 577-593. .

[4] OLTRA, MARIA J. and M. LUISA FLOR (2010), The moderating effect of business strategy on the relationship between operations strategy and firms' results,, International Journal of Operations & Production Management, 30(6), 612-638.

[5] MAHENDER SINGH, P.C. BASAK and RAJBIR SINGH (2013), Manufacturing strategy issues in Selected Indian manufacturing industry, Management Science Letters, 3, 731-742.

[6] SUZANA N. RUSSELL and HARVEY H. MILLAR (2014), Competitive priorities of manufacturing firms in the Caribbean, IOSR Journal of Business and Management, 16(10), 72-82

[7] MAHENDER SINGH (2014), competitive priorities for manufacturing strategy planning in Indian industry, International Journal of Science, Engineering and Technology, 2(4), 59-69.

[8] HILL T.J., Text Manufacturing Strategy, Cases, Irwin, Homewood, IL, 1989.

[9] PORTER, M.E., (1985), Competitive Advantage –Creating and Sustaining Superior performance, Free Press, New York, NY.

[10] KUMAR, K. and KUMAR, U. (2004), A conceptual framework for the development of a service delivery strategy for industrial systems and products", Journal of Business & Industrial Marketing, 19(5), 310-319.

[11] DANGAYACH, G.S. and DESHMUKH, S.G., (2001). Manufacturing strategy: literature review and some issues, International Journal of Operations and Production Management, 21(7), 884–932.

BIOGRAPHIES

M.S. Narwal is working as an Associate Professor in the Department of Mechanical Engineering at D.C.R. University of Science & Technology Murthal, Sonepat (Haryana), India. He has received his B.Tech degree in Mechanical Engineering from Regional Engineering College Kurukshetra (Now NIT Kurukshetra) and Ph.D. degree from M.D.U Rohtak (India). He is life member of ISTE, Institution of Engineers and Indian Institution of Industrial Engineering. He has published more than 20 research papers in journals & conferences at national and international level. He has more than 19 years teaching experience in Mechanical Engineering.

Dilbag Singh is working as an Assistant Professor in the department of Mechanical Engineering at E.M.G.O.I. (Ambala).He has received his B.Tech degree in Mechanical Engineering from Kurukshetra University (India) and Master Degree from DCRUST, Murthal, Sonepat, (Haryana).