

Chapter No. 5

Findings, Suggestions and Conclusion

- 5.1 Introduction
- 5.2 Findings
 - 5.2.1 Findings from analysis of data collected from strategic business unit head or owner of organization
 - 5.2.2 Findings from analysis of data collected from human resource management, engineering or production department head
- 5.3 Suggestions
- 5.4 Scope for Further Research
- 5.5 Conclusion

CHAPTER NO. 5

FINDINGS, SUGGESTIONS AND CONCLUSION

5.1 INTRODUCTION

After analysis of data the researcher has following important findings, suggestions about competency mapping of engineers in engineering organizations and conclusion.

5.2 FINDINGS

5.2.1 Findings from analysis of data collected from strategic business unit head or owner of organization-

1. Majority, i.e. 52.78 % and 25 % of the engineering organizations are small and medium scale organizations respectively. (Reference Table No. 4.2.1)
2. 94.74 % organizations of workforce strength, less than 50 and 77.78 % organizations of workforce strength, 50 to 200 are not using competency mapping system. 87.50 % organizations of workforce strength, more than 200 are using competency mapping. (Reference Table No. 4.2.2)
3. The organizations which use competency mapping in those. 60 % are at initial or primary stage in competency mapping implantation. 40 % of organizations are using competency mapping from more than 5 years. (Reference Table No. 4.2.3)
4. Majority i.e. 70 % of engineering units develop and use in- house competency mapping system. (Reference Table No. 4.2.4)
5. Only 40 % of the engineering units are implementing complete competency mapping i.e. from top to lower level of organization. 60 % of engineering units are using skill matrix at lower level. (Reference Table No. 4.2.5)
6. The organizations which have competency mapping, in that all organizations competencies are clearly defined. (Reference Table No. 4.2.6)
7. 70 % of engineering units involve training and development and all organizations involve performance appraisal in competency mapping as a human resource management procedures. 90 % of the organizations have not involved through human resource management procedures i.e. competency

based recruitment, competency based payment and bonus etc. in competency mapping. (Reference Table No. 4.2.7)

5.2.2 Findings from analysis of data collected from Human Resource Management, Engineering or Production department head-

1. The important key result areas for production engineers are quality and process efficiency as they rank 1st and 2nd respectively. It is also observed that, Spearman's rank co-relation coefficient (R) is $0.59 \approx 0.6$. Hence there is high degree positive co-relation between expected and observed weights of key result areas of production. (Reference table No. 4.3.1)
2. All the organizations using competency mapping, have used rating scales for mapping i.e. 100 %. (Reference table No. 4.3.2)
3. According to the classification of competencies, in generic competencies basic engineering education, communication and time management are considered as must as they rank from 1 to 3. Whereas analyzing and reasoning, physical ability, learning, listening, decision making and taking initiative are tolerable as they rank from 4 to 6. It is also observed that, Spearman's rank co-relation coefficient (R) is $0.76 \approx 0.8$. Hence there is high degree positive co-relation between expected and observed weights of generic competencies. (Reference table No. 4.3.3)
4. In the managerial competencies manpower management, leadership and administration are considered as must as they rank from 1 to 3 and planning, training and negotiation skill are tolerable as they rank from 4 to 6. It is also observed that, Spearman's rank co-relation coefficient (R) is 0.82. Hence there is high degree positive co-relation between expected and observed weights of managerial competencies. (Reference table No. 4.3.4)
5. In the technical competencies, machine and maintenance, production process, ISO or TS system, designing and business knowledge are considered as must as they rank from 1 to 5. Knowledge of product, basic computer knowledge, CAD, CAM, material, safety, quality, tooling, customer requirement handling, industrial engineering knowledge and CNC programming are considered as tolerable technical competencies as they rank from 6 to 10. It is also observed that, Spearman's rank co-relation coefficient (R) is 0.72. Hence there is high degree positive co-

relation between expected and observed weights of technical competencies. (Reference table No. 4.3.5)

6. In the human or behavioral competencies the most important competencies are positive attitude, hard working, patience and interpersonal relationship as they rank from 1 to 2 .Whereas leadership, team work, motivation, confidence and responsibility handling are considered as tolerable as they rank from 3 to 4. It is also observed that, Spearman's rank co-relation coefficient (R) is 0.43. Hence there is weak co-relation between expected and observed weights of human or behavioral competencies. (Reference table No. 4.3.6)
7. It is found that most important conceptual competencies required for the production engineers are innovation and creativity as are ranked 1st and 2nd respectively. (Reference table No. 4.3.7)
8.
 - A. According to sub-functional areas of production the important competency required for designing is drawing as it ranks 1st, CAD and CAM are considered as tolerable as they rank 2nd. (Reference table No. 4.3.8 A)
 - B. The important competency required for the production and material planning sub function is knowledge of production process as it ranks 1st, knowledge of material planning and administration are considered as tolerable as they rank 2nd. (Reference table No. 4.3.8 B)
 - C. The important competencies required for Quality Control, Lab and calibration are knowledge of TS or ISO system and MSA as they rank 1st and 2nd respectively. Analyzing and inspection skill are tolerable as are ranked 3rd and 4th respectively. (Reference table No. 4.3.8 C)
 - D. The most important competencies required for the tooling sub function are knowledge of machine operating, process and general CNC programming as they rank 1st and 2nd respectively. (Reference table No. 4.3.8 D)
 - E. For purchasing function communication and market knowledge are the most important competencies as they rank from 1 to 2. Whereas the costing, customer requirement analysis, knowledge of government

rules and taxation and negotiation skill are considered as tolerable as they rank from 3 to 4. (Reference table No. 4.3.8. E)

F. For the maintenance and storing function, most important competencies are knowledge of machine, safety and housekeeping as they rank 1st. CAPA is consider as next important as it ranks 2nd. (Reference table No. 4.3.8 F)

9. For the senior or top engineers, the most required competency is decision making as it ranks 1st. For the middle level production engineers, the most required competency is basic engineering knowledge as it ranks 1st and for the lower level management, supervision and work done through workers are the most important competencies as they rank 1st and 2nd respectively. (Reference table No. 4.3.9)

5.3 SUGGESTIONS

As per the study of the sample units, researcher suggests following important suggestions for improvement of competency mapping procedure in the engineering units.

1. The engineering units should use competency mapping, at least the units which have separate human resource department and have set their business goals.
2. Majority of the engineering organizations have considered competency mapping as a performance appraisal procedure, so the organizations should change their approach towards competency mapping, study and implement competency mapping as separate procedure for improvement of both organization and employees.
3. The organization should involve all organizational levels, organizations mission, job profile and human resource procedures i.e. competency based recruitment, training, performance appraisal, planning of the human resource etc. as an integrated competency mapping procedure.
4. Organizations should find out the basic competency domain required for better performance and for all job designations in an organization and revise that domains of competencies according to organizational strategies, goals and changing environment.

5. The organization should develop and continuously revise the competency model by conducting research at organizational level.
6. The organizations should organize competency mapping workshop for awareness and improvement of the competency mapping in employees and employers.
7. As per the research conducted on competency mapping of the engineers of engineering units in Satara, researcher suggests the competency model and means of competency model development for the production engineers.

(P.T.O.)

Table No. 5.3.1 A Competency model for engineers consisting of competencies according to its basic types and requirement level

Sr. No.	Competency Type	Must (The competencies which are essential or must or basic for job)	Tolerable (The competencies considered as supporting to the basic competencies)	Supplementary (Added competencies)
1.	Generic Competencies	Basic engineering education, Communication, Time management	Analysis and reasoning, Physical ability, Learning, Listening, Decision making, Taking initiative	Grasping, Enthusiasm, Observation, Discipline, Presentation skills
2.	Managerial Competencies	Manpower managing, Leadership, Administration	Planning, Training others, Negotiation skill	Report writing, delegation of authority, Taking preventing actions, Organizing, Controlling and supervision, Co- ordination skill, Follow-up and feed back
3.	Technical Competencies	Machine and maintenance, Knowledge of production process, ISO/TS system knowledge, Drawing or designing, Market or business knowledge	Knowledge of product, Basic computer operating knowledge, CAD ,CAM, Material resources knowledge, safety knowledge, knowledge of quality, Tooling, customer requirement handling, Industrial engineering, CNC programming	Knowledge of Waste elimination, Housekeeping, Inspection and testing, Knowledge of calibration process , SPC, MSA, PPAP, Time and motion study, FMEA, APQP, Plant layout and facility evaluation, CAPA, knowledge of new gauge and jig fixing
4.	Human Competencies	Positive attitude, Hardworking, Patience, Interpersonal relationship,	Leadership, Teamwork, Motivation, Confidence, Responsibility handling	Social awareness
5.	Conceptual Competencies	Innovation, Creativity		

Table No. 5.3.2 A competency domain for production engineers according to major sub- functional areas and requirement level

Sr. No.	Major sub- functional areas of production	Must (The competencies which are essential or must or basic for job)	Tolerable (The competencies considered as supporting to the basic competencies)	Supplementary (Added competencies)
1.	Designing	Drawing	CAD, CAM	Computer operating knowledge, Mathematics, Creativity
2.	Production and Material planning	Knowledge of production process	Material planning, Administration	Time management, Working condition and Technical Knowledge
3.	Quality control, Lab and Calibration	System knowledge ISO/TS, MSA	Analyzing skill, Inspection	Calibration process knowledge, Claims handling, SPC,PPAP
4.	Tooling	Machine operating and Machine process, General CNC programming knowledge		
5.	Purchasing	Communication and Market knowledge	Knowledge of costing, Customer requirement analysis, Government rules and taxation, Negotiation skill	Product and resource knowledge, Record keeping
6.	Maintenance and storing function	Knowledge of machine , Knowledge of Safety, Housekeeping	CAPA	FMEA

8. The organization should prepare the competency model with details of the competencies according to requirements of organizations and processes.

For example-

**Table No. 5.3.3 Competency model in detail –
Technical Competencies of Production Engineers
For Production Department**

Sr. No.	Competencies	Competencies in detail
1.	Job Knowledge	Knowledge about <ol style="list-style-type: none"> a) Process parameters and their effects on product quality. b) Machine parts, their maintenance and their applications. c) Response during emergencies and trouble shooting.
2.	Knowledge about safety	<ol style="list-style-type: none"> a) Safety measures to be taken at the time of the cleaning of the machine. b) Basic requirements of safety measures on the shop floor.(e.g. ear plugs, mask etc.) c) Fire fighting and accident handling
3.	Knowledge about product	<ol style="list-style-type: none"> a) Different products of manufacturing b) Applications of different products c) Technical parameters
4.	Simple mathematics and conversion of specifications	<ol style="list-style-type: none"> a) How to calculate quantity of raw material required for a particular order. b) How to calculate ratios, machine output etc. c) Standard units and relevant conversions.(e.g. Kgs, gms)

5.4 SCOPE FOR FURTHER RESEARCH

Researcher put forth statements for further research based on present study. The studies mention below on competency model development and implementation may help for progress of engineering units.

1. Development of competency model for all organizational employees with organizations' vision, objectives and goals.
2. Renew the existing human resource and organizational procedures to match employees' performance with organizational goals.
3. Designing of curriculums for imparting training in competency mapping by notable organizations.

5.5 CONCLUSION

As competency mapping is an effective tool of measuring the competencies of the employees, it is important to improve and retain talents in the organization. In today's competitive environment it is necessary for any organization to develop competency model of employees by considering organizations' objectives, strategies and job needs with its functional areas.

In the present research titled as 'A Study of Competency Mapping of Engineers With respect to Engineering Industry in Satara', researcher has studied competency mapping procedures of engineering units in industrial area of Satara. It is observed that 72.22 % of engineering units are not implementing competency mapping and are also unaware about competency mapping. The units which are implementing competency mapping in those, 60 % units are at initial stage in competency mapping implementation and same percentage of units are using skill matrix for the lower organizational level. All organizations considered performance appraisal and 70 % of organizations considered training and development programs in the competency mapping.

As competency mapping is an integrated procedure including organizations' goals, objectives and all human resource procedures, to overcome this situation, the researcher has suggested competency model for engineers. The model consists of the competency domain with its requirement level for better performance of engineer's job. Competencies are classified in the generic, managerial, functional or technical. human and conceptual competencies. The basic competencies required for the sub functional areas or key result areas of the production are also provided with its necessity.

If organizations would conduct workshops, make employees aware of this concept, conduct research and renew this competency models with organizational needs and goals, both employees and organizations will develop to overcome future challenges and competitive environment. This will leads to competent employees, learning organizations and knowledge based organizational culture.

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