

Human Resource Empowerment in Lean Manufacturing

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Abstract – The Human Resource is the most important asset of any organization, but few organizations have the potential ability to use this vital resource. The use of this vital resource plays an important role in succeeding of lean manufacturing. What important is to how implement this vital resource in the process of lean. We intend to discuss about important factors in the employee empowerment process. First, we will explain some of the most important factors in the human resources empowerment and then we will review these factors with TOPSIS method. Finally, according to the results, we will prioritize the factors in order to improve the ability of this vital resource.

Keywords – Human Resource, Human Resource Empowerment, Lean Manufacturing, Training, Toppsis.

I. INTRODUCTION

One of the critical tasks before implementing lean process is employee empowerment; because new management techniques such as lean manufacturing, waste reduction and delay can be achieved only through employee empowerment (Baird and Wang, 2010, 575).

In 1996, Jones and Womack pointed that if organizations do not use the ideas of Manpower, Manpower will be useless as a source of waste (Womack and Jones, 1996: 15). Empowerment is a vague concept. For the first time, this concept attracted the attention of many scholars in the 1990s. For successful implementation of empowerment process, we need to change organizational culture.

The principle of empowerment as a process is the program that recreative organizations and to respond quickly to customers and to create a sustainable competitive advantage. In this new approach, by the empowerment of human resource, managers can creative condition for staff to increase their talents (Boudrias et al, 2009, 626). In this paper, it is investigated some of the factors affects on the empowerment of the human resource in payaclutch company.

II. LITERATURE

Human resource Empowerment

The last two decades have seen an increase in management concepts whose aim is to better develop and deploy human resources in order to improve the effectiveness and competitiveness of organizations. One of the most popular of these concepts is employee empowerment (Logan and Ganster, 2007). Employee empowerment is a multidimensional construct (Petter et al., 2002) that has been studied from two different

perspectives: individual and organizational (Honold, 1997; Niehoff et al., 2001).

Consequently, it is difficult to find an exact definition of it (Honold, 1997). In spite of these limitations, however, research generally suggests that the greater the empowerment, the greater the job involvement, the higher the internal work motivation and the higher the job satisfaction (Honold, 1997). Moreover, employee empowerment may lead to better firm performance (Bratnicki et al., 2007). Psoinos et al. (2000) found that “empowerment Empowerment resulted from a desire to improve business performance and not as some form of charitable gesture”.

The concept of employee empowerment is based on the assumption that employees are an unexploited source of creativity, knowledge and initiative (Bratnicki et al., 2007).

There are many general and specific meanings for Empowerment such as: motivation and commitment to work or the transmission and sharing of resources and information (Robbins et al, 2002: 400). In fact, empowerment is a continuous and permanent process in a dynamic environment.

Empowering of employees is a Collection of systems and methods to use Individual merits for Improving and increasing productivity, Development, growth and prosperity of Organization (Carter, 2001: 14).

Harris Blanchard (1999) described Empowerment as: creating condition to enable employees to create added-value in organizations and Playing the desired role and responsibility in the organization.

Blanchard notes three important keys for empowerment: share information, the autonomy area, Team building instead of the hierarchy.

There are Different definitions of empowerment that some of them are mentioned below:

Wagner & Hauling (1995): Empowerment means delegating authority to employees for making important decisions.

Born and Mvlmn (1996): Empowering employees means developing and enriching jobs.

Empowerment is the process of empowering individuals. This process will help employees to improve their confidence. (Nigel, 1995:79).

Empowerment is to provide greater freedom, independence, work, taking responsibility for decision-making and self-control (Mullins, 1999: 17).

Empowerment is adjusting power between management and employees to improve performance (Roman et al, 2012: 6).

According to the definitions are provided, we think we can say:

"Empowerment is the development of power to lower levels of the organization."

The role of Human Resource Empowerment in successful lean manufacturing

Gary Packer (2003), winner of the Nobel Prize in Economics, said:

"As factories, machinery and other physical capital are considered as part of the Wealth of Nations, human capitals are also as part of this wealth.

All the principles that are presented in lean manufacturing such as total quality management (TQM), kaizen, production time, ISO, Six Sigma and ... Following to empower human resource.

Approach of comprehensive quality management system is based on achieving quality. All organizational members should contribute to achieve long-term goals through customer satisfaction.

Six sigma is combination of quality management and engineer systems that to cover methods include problem solve, customer appreciate, reduce volatility, creating excellent products and services, prospects, reduce cost and improve customer satisfaction.

In 1995, Forrester's article titled "Application of Lean Production in Human Resource Strategy" stressed on creation of opportunities for further improvement in the system of lean manufacturing (Forrester, 1995: 21).

In 2008, Alony and Jones stressed that the adoption of lean production requires large changes in thinking and subjective. It is difficult to Change attitude of human resource. Accepting large structural changes are required to adopt lean manufacturing systems, So, the managers must be provide conditions of manpower training for development of this vital resource. Managers need to change their attitude to HR and Just do not look at them as a machine but, they should try to prepare suitable conditions for using of their talents, abilities and ideas.

Effective factors on empowerment

Various factors affect on the human resource empowerment. Karen Lawson (2006) suggests four factors to empowerment:

1. Involving of employees in the decision-making process;
2. Involving of employees in the planning process;
3. To thank the staff;
4. Provide ongoing training and supporting staff.

Duffy et al (1994) expressed barriers to empowering employees in their research:

1. Lack of management commitment to empowerment
2. Not tendency to change

3. Poor communication between employees and managers
4. Failure to understand the concept of empowerment in the short term.

Wilkinson et al (1997) addressed this issue that how total quality management (TQM) can cause the empowerment.

Fragoso (1999) believes that change of the organizational culture, the acceptance of change by staff, personnel accountability, information sharing, establishing independence, providing feedback, and training, establish their groups navigator and the prospects for success are necessary in empowering staff.

Yim (2008) pointed two factors, sources of information for performance (the head of customer orientation) and the reward (the argument against behaviorism) as factors of successful empowerment of employees. He believed that information about the performance of clients can increase percent of successful empowerment.

In general, the managers can empower others successfully, if they have these five characteristics:

1. Selfeffectiveness: Sense of personal competence
2. Confidence: a feeling of safety and security
3. Self optional: a sense of personal choice
4. Significant: feel valuable work
5. Personal result accept: feeling of influence on others

III. MATERIAL AND METHODS

In this paper, it is investigated some of the factors affecting on empowerment of the human resource in payaclutch company. Our goal is to identify the factors that have the greatest impact on empowering employees. In this paper, we use a questionnaire that was used in Iranzadeh and Babaiheravi paper (Iranzadeh and BabaiHeravi, 2010: 60). In this research, 248 people Of Staff in various categories are selected and by Cochran formula, to obtain the sample. In this study, employees are asked to identify the factors that affect on their Empowerment. At the last, the 15 factors were determined. Cochran's sample size formula, we get:

$$N = \frac{N(Z \frac{\alpha}{2})^2 \times p.q}{e^2(N-1) + (Z \frac{\alpha}{2})^2 \times p.q}$$

N = 75

Here we examine 15 factors. First, data were extracted and their frequencies are shown in Table 1.

Table 1: Factors affects on the empowerment

Factors	No	Frequency	Percent Of Cumulative Frequency	Cumulative Frequency
Education	1	60	10	60
Team Work	2	55	20	115
Application Sharing	3	52	29	167
Career Enrichment	4	53	38	220
Communication	5	43	45	263
Experience	6	35	52	298
Culture	7	30	57	328

Managers attitudes	8	25	61	353
Job satisfaction	9	34	67	387
Creation	10	38	73	425
Organizational structure	11	35	80	460
Innovation	12	29	85	489
Stress	13	15	87	504
Monitoring	14	46	95	550
Integrity	15	28	100	578

Of the 15 factors, 6 factors were selected based on the frequency include education, team work, job enrichment, application sharing system, monitoring and communications.

To prioritize these factors are the following:

First step: quantifying decision matrix

For transferring qualitative index to quantitative index, we use different methods but, the best method is interval scale or bipolar scale that we use "space bipolar scale."

Table 2: Space Bipolar scale

Negative	1	3	5	7	9	Positive
-	Very low	Low	Medium	High	Very high	+

Numerical table for prioritizing effected factors is shown in table 3.

Table 3: Decision Matrix

Effected factors	Competence feeling	Choice right feeling	Usefulness feeling	meaningfulness feeling	A sense of trust
Education	6/7	7	6	7/9	8
Team work	5/5	4/49	8	7	5
Career enrichment	6	5	7	5/1	5/5
Application sharing system	4	5	7/5	5/7	5
Monitoring	4/4	5	6/5	5/6	8/5
Communication	6	7/3	6	5/7	7/4

For cimpartation of the results, we have to use unprecedent scale. In this paper, it is used of this norm according to formula.

$$n_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}^2} \quad (3)$$

Second Step: As we consider five criteria for prioritization factors, the degree of importance of these factors is not uniform; Therefore, we need to determine the weight of indexes, then the Shannon entropy techniques is used that these calculations are shown in Tables 5 to 9.

First, we Unprecedent scale the matrix by saaty norm (Table 5).

$$p_{ij} = \frac{r_{ij}}{\sum_{i=1}^m r_{ij}} \quad (3)$$

$$E_{ij} = -k \sum_{i=1}^m [p_{ij} \ln p_{ij}] \quad (4)$$

$$D_j = 1 - E_j \quad (5)$$

$$w_i = \frac{d_j}{\sum_{j=1}^m d_j} \quad (6)$$

Table 4: Scale matrix by norm

Effected Factors	Competence Feeling	Choice Right Feeling	Usefulness Feeling	Meaningfulness Feeling	A Sense of Trust
Education	0/5	0/5	0/36	0/52	0/49
Team work	0/41	0/32	0/47	0/46	0/30
Career enrichment	0/44	0/36	0/42	0/33	0/33
Application sharing system	0/30	0/36	0/44	0/37	0/30
Monitoring	0/33	0/36	0/39	0/37	0/52
Communication	0/44	0/52	0/36	0/37	0/45

Table 5: Linear unprecedented scale

Effectuated factors	Competence feeling	Choice right feeling	Usefulness feeling	meaningfulness feeling	A sense of trust
Education	0/21	0/21	0/15	0/23	0/20
Team work	0/17	0/13	0/19	0/19	0/13
Career enrichment	0/18	0/15	0/17	0/14	0/14
Application sharing system	0/12	0/15	0/18	0/15	0/13
Monitoring	0/14	0/15	0/16	0/15	0/22
Communication	0/18	0/21	0/15	0/15	0/19

Table 6: Results

Effectuated Factors	Competence Feeling	Choice Right Feeling	Usefulness Feeling	Meaningfulness Feeling	A Sense of Trust
Education	0/33	0/33	0/28	0/34	0/32
Team work	0/30	0/26	0/32	0/32	0/26
Career enrichment	0/31	0/28	0/30	0/27	0/27
Application sharing system	0/25	0/28	0/31	0/28	0/26
Monitoring	0/27	0/28	0/29	0/28	0/33
Communication	0/31	0/33	0/28	0/28	0/32

Table 7, we calculate the amount of uncertainty index.

Table 7: Uncertainty index

Effectuated factors	Competence feeling	Choice right feeling	Usefulness feeling	meaningfulness feeling	A sense of trust
Sum	1/77	1/76	1/78	1/77	1/76
E_j	0/988	0/98	0/99	0/988	0/98

Confidence index is calculated by the formula 5 and importance of each index is calculated by formula 6. The results are shown in table 8.

Table 8: Weighting of criteria

Effectuated factors	Competence feeling	Choice right feeling	Usefulness feeling	meaningfulness feeling	A sense of trust
$D_j = 1 - E_j$	0/012	0/02	0/01	0/012	0/02
W	0/16	0/27	0/13	0/16	0/27

After weighting the criteria, matrix of unprecedented scale is calculated that is given in Table 9.

Table 9: Unprecedented scale

Effectuated Factors	Competence Feeling	Choice Right Feeling	Usefulness Feeling	Meaningfulness Feeling	A Sense of Trust
Education	0/08	0/135	0/0468	0/0832	0/1323
Team work	0/066	0/0864	0/0611	0/0736	0/081
Career enrichment	0/0704	0/0972	0/0546	0/0528	0/0891
Application sharing System	0/048	0/0972	0/0572	0/0592	0/081
Monitoring	0/0528	0/0972	0/0507	0/0592	0/1404
Communication	0/0704	0/1404	0/0468	0/0592	0/1215

Third Step: Determine the positive and negative ideal solution

$$\tilde{v}_j^* = \max\{v_{ij3}\}, i = 1, 2, \dots, m, j = 1, 2, \dots, n \quad A^+ = (\tilde{v}_1^*, \tilde{v}_2^*, \dots, \tilde{v}_n^*) \quad (7)$$

$$\tilde{v}_j^- = \min\{v_{ij1}\}, i = 1, 2, \dots, m, j = 1, 2, \dots, n \quad A^- = (\tilde{v}_1^-, \tilde{v}_2^-, \dots, \tilde{v}_n^-) \quad (8)$$

In the next step, fuzzy ideal and negative ideal solution is calculated by equations 7 and 8; the results are given in Table 10.

Table 10: Determine the positive and negative ideal solution

Effect factors	Competence feeling	Choice right feeling	Usefulness feeling	meaningfulness feeling	A sense of trust
A^+	0/08	0/1404	0/0611	0/0832	0/1404
A^-	0/048	0/0864	0/0468	0/0528	0/081

Fourth Step: In this step, distance of each option from the positive and negative ideal solution is calculated by equations 9 and 10.

$$d_i^+ = \sum_{j=1}^n d_v(\tilde{v}_{ij}, \tilde{v}_j^*), i = 1, 2, \dots, m \quad (9)$$

$$d_i^- = \sum_{j=1}^n d_v(\tilde{v}_{ij}, \tilde{v}_j^-), i = 1, 2, \dots, m \quad (10)$$

Fifth Step: Calculate the closeness coefficient (CL) for each of the criteria

Closeness coefficient represents the fuzzy ideal solution and fuzzy negative ideal simultaneously. Closeness coefficients of each alternative are calculated as follows:

$$CL = \frac{d_i^-}{d_i^- + d_i^*}, i = 1, 2, \dots, m \quad (11)$$

Table 11: Determine the distance between positive and negative ideal to determine the relative closeness

Effect factors	d_i^+	d_i^-	CL_i^*
Education	0/017	0/083	0/83
Team work	0/082	0/031	0/27
Career enrichment	0/07	0/027	0/28
Application sharing system	0/084	0/025	0/23
Monitoring	0/06	0/063	0/51
Communication	0/035	0/071	0/67

Sixth Step: Ranking the options

Ranking alternatives is the basis on proximity factor and the option is selected with the highest proximity factor. As we can see, education and communication are with the highest ranking and most influential factors on employee empowerment in company. In such circumstances, the managers should provide condition for training the employee.

Managers need to change their attitude to HR and Just do not look at them as a machine but, they should try to prepare suitable conditions for use of their talents, abilities and ideas.

framework in various level for employee for developing and fulfilling process of empowerment.

Furthermore, for playing new roles and doing of tasks should be expanded training programs for employees.

Furthermore, it should be considered structural alignment, implementation of organizational systems including planning, reward, promotion, training, recruitment, appointment, and for the protection of employee empowerment.

Evaluating and improving the process of empowerment through improved assessment and understanding of the organization's members is inevitable in the process of empowerment.

RESULTS AND DISCUSSION

In lean manufacturing, human resource is considered as a valuable element and, for implementing process of lean manufacturing, we need human resources with various skills. As noted in this paper, various factors are affected on the human resource empowerment that importance of these factors is different in various companies, But it is important that we can develop process of empowerment in organization. Empowerment is a process, not an event and its successful implementation requires commitment, patience from both the management and the members of the group. In this paper, a six-step process of empowerment is identified and according to research findings, we conclude that for successful implementation of process of empowerment, first, we must define the concept of empowerment and shall be communicated to members. It should be considered an organizational

REFERENCES

- [1] Alony, I. and Jones, M. 'Lean supply chains, JIT and Cellular manufacturing; The Human Side, Journal of Issues in Informing Science and Information Technology, Vol. 5, 2008, pp.165-175.
- [2] Baird Kevin, Wang Haying, Employee empowerment: extent of adoption and influential factors", Personnel Review, Vol. 39 Iss: 5, 2010, pp. 574 – 599
- [3] Blanchard, K. and Carlos, J. 'enabling management staff' (Translator: M. Irannezhad), publishing executives, 1999.
- [4] Born, I. and Molleman, E. " Empowerment and rewards: a case study Empowerment in organizations ", An International Journal of Management, Vol 4, No 3, 1996, pp.30-33.
- [5] Boudrias Jean-Sébastien, Gaudreau Patrick, Savoie André, J.S. Morin Alexandre, Employee empowerment: From managerial practices to employees' behavioral empowerment", Leadership & Organization Development Journal, Vol. 30 Iss: , 2009, pp. 625 – 638
- [6] Bratnicki, M., Kulikowska-Mrozek, M., Marzec, I. and Zbierowski, P, "Empowerment and entrepreneurship, conceptual issues and empirical tests", Journal of Economics & Management, Vol. 3, 2007, pp. 35-54.

- [7] Carter, M. " Strategic planning (in nonprofit or for profit organizations)", <http://www.Strategicplanning.com>, 2001.
- [8] Duffy, J.A; Barragan, B. and Riley, B." A Study of Employee Empowerment in Small Business", Proceeding of the Southwestern Small Business Institute Association Proceedings, 1994.
- [9] Forrester, R. Implication of lean manufacturing for human resource strategy ", *Work Study*, Vol. 44, Issue: 3, 1995, pp. 20-24.
- [10] Fragoso, H. " An Overview of Employee Empowerment: Doe's and Don't", Indiana University Undergraduate Research Conference, 1999.
- [11] Honold, L, "A review of the literature on employee empowerment", *Empowerment in Organizations*, Vol. 5 No. 4, 1997, pp. 202-12.
- [12] Iranzadeh, S. & Babaiheravi S. "Identify and prioritize the factors enabling effective method TOPSIS", *Journal of Decision macking*, No. 13, 2010, Pp. 59-84.
- [13] Lawson, K." 4 Keys to Employee Empowerment", Lawson Consulting Group, Inc, 2006.
- [14] Logan, M.S. and Gangster, D.C, "The effects of empowerment on attitudes and performance, the role of social support and empowerment beliefs", *Journal of Management Studies*, Vol. 44 No. 8, 2007, pp. 1523-50.
- [15] Mullins, L. *Management and organizational behavior*. London: prentice-hall, 1999.
- [16] Nigel, N. "The Black well Encyclopedia Dictionary of organizational behavior", Blackwell Business, USA, v. 26, N.1, 1995, pp.72-93.
- [17] Niehoff, B.P., Moorman, R.H., Blakely, G. and Fuller, J. "The influence of empowerment and job enrichment on employee loyalty in a downsizing environment", *Group & Organization Management*, Vol. 26 No. 1, 2001, pp. 93-113.
- [18] Petter, J., Byrnes, P., Choi, D., Fergan, F. and Miller, R, "Dimensions and patterns in employee empowerment, assessing what matters to street – level bureaucrats", *Journal of Public Administration Research and Theory*, Vol. 12 No. 4, 2002, pp. 377-401.
- [19] Psoinos, A., Kern, T. and Smithson, S. "An exploratory study of information systems in support of employee empowerment", *Journal of Information Technology*, Vol. 15 No. 3, 2000, pp. 211-30.
- [20] Robbins, T.L.; Crino M.D. and L.D.Fredendall, "An integrative model of the empowerment process", *Human Resource management*, v. 12 N.1, 2002, pp.419-44.
- [21] Roman, K.; Anna, M and Anna, M. *Innovativeness, empowerment and IT capability: evidence from SMEs*", faculty of organization and management. Silesian University of Technology, Zabrze, Poland, 2012.
- [22] Wagner, J. and Hollenbeck, JR." *Management of Organizational behavior*", New Jersey, 1995.
- [23] Wilkinson, A.; Godfrey, G; Marchington, M. and Bouquets, B.B. *Total Quality Management and Employee Involvement in Practice*", Manchester School of Management. Forthcoming Organization Studies, 1997.
- [24] Womack, J. P. and Jones, D. T. " *Lean thinking: Banish waste and create wealth in your corporation*", New York: Simon & Schuster, 1996.
- [25] Yim, H.K. *Psychological Empowerment of Salespeople: The Construct, Its Inducement, and Consequences on Customer Relationships*", A Thesis Submitted to the Faculty of Drexel University, 2008.