

The Just-In-Time Production System from the Perspective of Manpower (The case study of Iran)

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Abstract. The present study tries to work on this matter which is the case that, although technical equipments are fully supplied, why does some just-in-time production systems face failure? The main question of the study is what elements constitute manpower required indicators of the just-in-time production system? For this reason, a model was provided for determining manpower status according to the just-in-time production system conditions. The results show a meaningful difference between the current company conditions with the desired just-in-time production systems human conditions. Study results reveal that human factors are of vital importance in organization and, before investing on technical section of production, organization's manpower and human infrastructures have to be prepared.

Keywords: the just-in-time production systems, manpower, pathology, optimum implementation.

1. Introduction

Among the various modern production management systems, the just-in-time production system has attracted many managers' attentions. The just-in-time production system is a general management philosophy, before being a production control method. This philosophy is based on a system of beliefs and views which is mixed with a series of values and procedures. In most developed researches, main attention has been focused on engineering side of the just-in-time production system, different parameters considered to correctly implement this production system. Other modern systems effects have even been tried to be surveyed simultaneously with this production system. However, human factor has received less attention in developing this production system. Rahmani (2005) worked on the pathology of the just-in-time production system implementation in Iranian industries. Study results show that, towards implementing the just-in-time production system in Iran, considering software factors such as senior management and human are more significant than technical factors. Olfat (1999) surveyed all the system prerequisites and the first task of a series needed to implement this production system. Results of his work show that training staffs and letting them know, and economic and office structure reformation necessity to be stable are the most important matters. Noori (1996) designed a model for determining industrial units' compatibility with the just-in-time production system and its application in the Iranian automobile industry. He recognized 72 factors as the required criteria for making a manufacturing place with the just-in-time production system compatible. Although he paid a superficial attention to the human factor, production technical factors form the focus of his work. Kazzazi (1993) found that the best way to quantitatively recognize access degree in the just-in-time

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production system is to help maximize accessible advantages of implementing the just-in-time production system, according to synchronizing internal (human resources and production systems) and external factors (customers and procurement). Surveys in the field of this system show that observing some factors is the key to succeed in implementing such a production system:

1. using multifunction workers
2. standard operation
3. forming work teams
4. improving cooperation and participatory morale for doing things as a group
5. taking staffs serious and respecting them
6. using group problem solving methods
7. open communications
8. job rotation
9. training while working
10. Continuous improvement

2. Conceptual model of the research

This model forms the main structure of the present research. To determine the effect of the appointed factors and checking their accordance with the required conditions of the just-in-time production system, a poll was managed among the Kabl Khodro staffs.

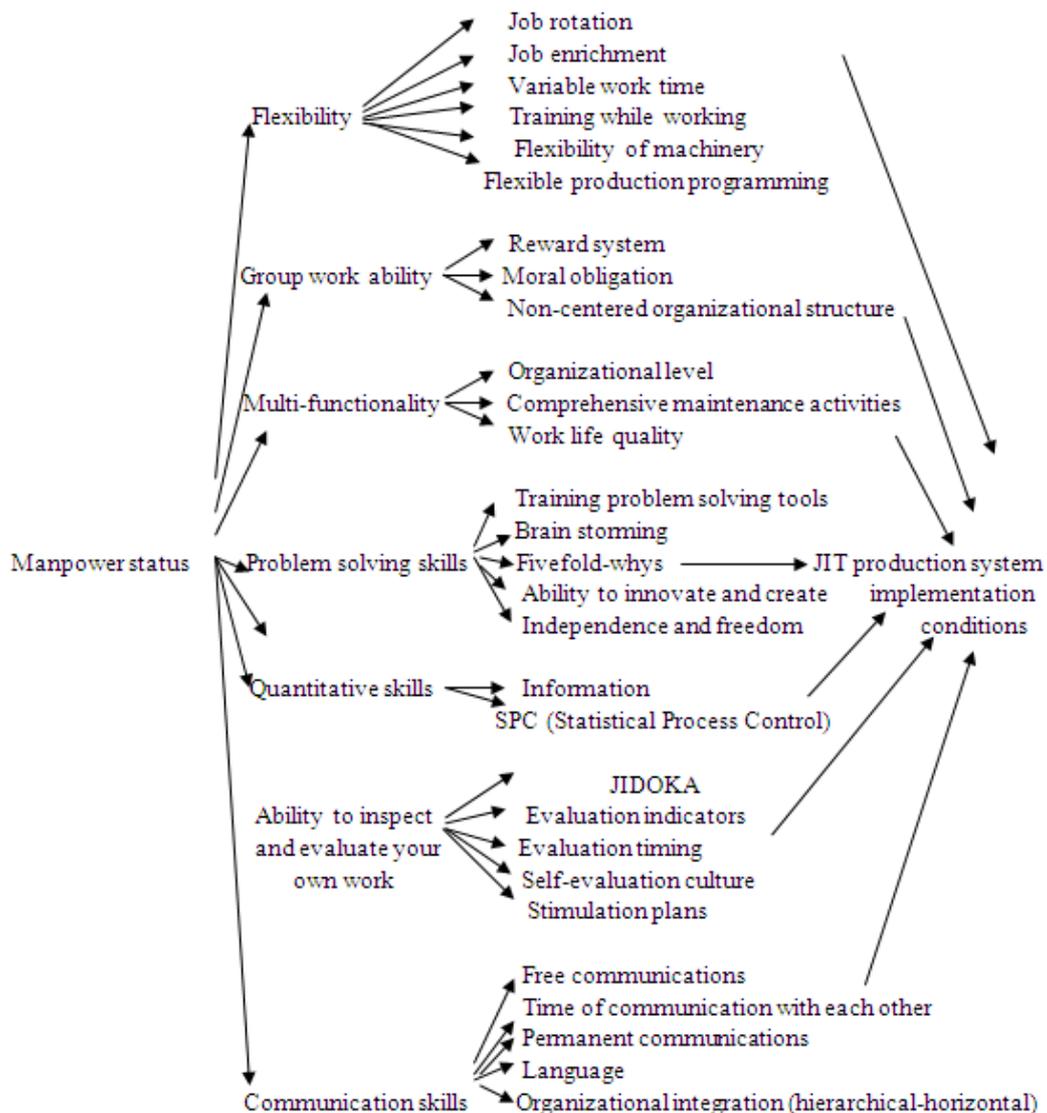


Fig. 1: conceptual model of the research

3. Research hypotheses

1. There is a meaningful relationship between flexibility and manpower in the just-in-time production system.
2. There is a meaningful relationship between group work ability and manpower in the just-in-time production system.
3. There is a meaningful relationship between multi-functionality and manpower in the just-in-time production system.
4. There is a meaningful relationship between problem solving skills and manpower in the just-in-time production system.
5. There is a meaningful relationship between quantitative skills and manpower in the just-in-time production system.
6. There is a meaningful relationship between ability to inspect and evaluate your own work and manpower in the just-in-time production system.
7. There is a meaningful relationship between communication skills and manpower in the just-in-time production system.

4. Research methodology

The present research was developed based on using a questionnaire with 37 questions. Its validity was confirmed by using Cronbach's Alpha that showed 91% reliability coefficient, conveying the internal correlation of the questionnaire's questions. Also, contents' structure of the designed questionnaire was taken under the scrutiny of related experts and specialists, justifiability of which confirmed after giving ideas and doing considered amendments. In order to analyze data by using descriptive and inferential statistical methods such as the related correlation coefficients and analysis of variance tables, the hypotheses were proceeded to be confirmed or rejected. The population considered was the set of managers and experts of Kabl Khodro Sabzevar Company who were overall 120 persons and had a relative acquaintance with the just-in-time production system. It should be noted that these persons had attended some classes to get the required trainings about this production system.

Regarding the small size of our population, decision made to census it. Thus, this population included 2 experts with MS, 54 experts with BS, 62 technicians and 2 ones with diploma. Accordingly, 120 questionnaires were distributed among the company's staffs to census with the lowest possible error (lower than 0.01). Due to in coordination of some and vacation of some others, 112 questionnaires rejected. By using step by step regression analysis, the effects of research hypotheses in manpower status were analyzed.

5. Results and discussions

Table.1 shown Level of significance, Factors affects on manpower and standard beta coefficient of hypotheses. As shown, total hypotheses affects manpower is accepted (level of significance lower than 0.01) and standard beta coefficient shows changes related to the staffs Factors measured by these questions, have been covered.

Table.1: level of significance and standard beta coefficient of hypotheses

Factors	Standard Beta Coefficient	Test t	Level of significance
Flexibility	0.700	10.288	0.000
Team work ability	0.715	10.723	0.000
Multi-functionality	0.685	9.870	0.000
Problem solving skills	0.858	17.495	0.000
Quantitative skills	0.657	9.132	0.000
Ability to inspect and evaluate your own work	0.743	11.646	0.000
Communication skills	0.843	16.409	0.000

In table.2, the change rates related to the company's manpower status per each factor's share are shown. As you can see, communication skills factor with 0.21 and quantitative skills with 0.08 have had the most and the least share and effect, respectively.

Table.2: comparison among the effect of each main factor in achieving the general objective

Factors	Standard Coefficient Beta	Test t	Level of significance
Flexibility	0.13	554.376	0.002
Team work ability	0.10	360.044	0.006
Multi-functionality	0.14	644.312	0.001
Problem solving skills	0.19	666.743	0.000
Quantitative skills	0.08	323.428	0.008
Ability to inspect and evaluate your own work	0.15	588.514	0.002
Communication skills	0.21	864.482	0.000
Total	100	----- --	-----

The results taken out of considering mean deviation by the correlative T test show a difference between the Kable Khodro Sabzavar Company's manpower status and the desired human conditions of the just-in-time production system. Regarding the mean comparison table.3 and the statistical tests taken, difference can be perceived in all the manpower factors in comparison with the required conditions for the just-in-time production system, and there is a need for more precise considerations and more work to prepare and reach to an environment required for implementing the just-in-time production system in all the factors.

Table.3: Comparison among the research sub-hypotheses averages

Factors	System Required Mean	Current Conditions Mean	Mean Deviation
Total manpower	$37 \times 4 = 148$	105.71	42.29
Flexibility	$6 \times 4 = 24$	18.25	5.75
Team work ability	$3 \times 4 = 12$	8.08	3.92
Multi-functionality	$6 \times 4 = 24$	19.16	4.84
Problem solving skills	$6 \times 4 = 24$	15.6	8.4
Quantitative skills	$2 \times 4 = 8$	5.08	2.93
Ability to inspect and evaluate your own work	$6 \times 4 = 24$	16.25	7.75
Communication skills	$8 \times 4 = 32$	23.29	8.71

6. Conclusion

Results show a meaningful difference between the current company conditions with the desired human conditions of the just-in-time production system. Thus, it is necessary to make arrangements in order to improve manpower status of the company to optimally implement this production system. In general, human factors are of vital importance; such that before huge investment in technical part of production, company's manpower related bed and infrastructure must be prepared.

Due to the results of the research and to achieve appropriate human beds of the just-in-time production system, below directions can be applied:

1. To make staffs flexible, the job rotation method can be used. By this method, not only staffs' morale boosts up, but also they learn a series of various and different duties as a result of not doing repetitive tasks.
2. Continuous and up to date skill trainings results in the staffs equipped with advanced knowledge, giving various skill solutions, flexibility of the staffs and highly ensured job security.

3. Organization members' attendance in outside group activities improves communications, coordination, and their trust in each other and, in the end, results in more correlation among most of the members of a group, creating competition among different groups.

4. Applying participatory management by engaging staffs and giving them authority to carry out organizational duties lets work groups and team making activities form, in addition to gaining better technical knowledge and more specialties.

5. Giving rewards and granting high respects as a result of learning various skills, causes staffs to make every effort to be multi-functional.

6. Involving staffs in production planning and in planning for their raw materials causes them to feel high self esteem and lets them tell their ideas, free from being afraid of others' criticism, resulting in a boost in their problem solving skills.

7. Staffs spontaneous groups formation in order to solve different problems can improve their communication skills.

7. References

- [1] Battman, Ghlich (2008).The First Step to Gain Superiority in Quality and Productivity. *www.betsa.ir*.
- [2] Brown, Jimmie & James, Shivnan & John, Harhen (2000).Production Management Systems, (With an Integrated Attitude). (M. Ghazanfari,S. Saghiri, translators). Tehran: Elm o Sanat University Press.
- [3] Rahmani, Mohammad (2006).IdentifyingThe Effective Factors on Implementing the Just-In-Time Production System in Iran. The Second Logistics and Supply Chain Seminar.
- [4] Saadat, Esfandiar (2005).Human Resources Management. Tehran: SAMT Publications.
- [5] Soltani, Manoochehr (1997).An Introduction to Production System. Mashad: Imam Reza University Prss.
- [6] Mottaghi, Haiedeh & Amir, Hussein Zadeh (2005). Production And Operation Management. Tehran: Avaaye Patrice Publications.
- [7] Mohammadi (2008). Pure Production. *http://www.daneshju.ir*.
- [8] Alawode, A.J, & Ojo, A.O(2008). Just-In-Time Manufacturing: A Panacea for Productivity and Idle Inventory in Nigerian Industries. *Journal of Engineering and Applied Sciences*, 10, 742-747.
- [9] Pont, G., & Furlan, A., & Vinelli, A. (2008).Interrelationships among Lean Bundles and their Effects on Operational Performance. *Oper Manag Res*, 1, 150-158.
- [10] Gupta, M., & Holladay, H., & Mahoney, M.J. (2000).The Human Factor in Jit Implementation a Case Study of Ambrake Corporation. *Production and Inventory Management Journal*, 4, 29-33.