Operational planning Role in Organizations Based on Strategy (Case Study: Saipa Co.)

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Abstract: Mission-driven organizations plan and implement the projects in order to achieve strategic objectives. Thus the effectiveness of project implementation in different levels should be reviewed. This research intends to evaluate the effectiveness of implementing operational planning system which is one of the strategic projects in Saipa Co. by evaluating two strategic goals of achieving production plan and cost reduction. In this context regarding the aim of achieving production plan, the impacts of this system on the total volume and production models and also in cost reduction target, the costs due to stopping route, late delivery penalties and cost of product warehousing will be investigated and the accuracy of assumptions by using organization documentary / real data - descriptive inferential analysis and statistics will be tested. The findings suggest the significant effect of implementing the system on production plan increase and cost reduction achievement, so in mission- based organizations which are acting based on customer needs and flexible mass production system, the implementation of this system will have significant impact on achieving strategic objectives.
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1. Introduction

Today in productive or non productive organization the strategic vision of major goals failure to the lowest layers of the firm has been into the consideration of the senior managers. So after developing strategic goals and outlooks of organizations, the management and how to achieve goals and measure their performances has been a daily challenge of organization managers. Thus, different systems and methods are applied in case of converting the objectives and programs from strategic to operational and tactical levels, or in other words coordinating the operational plans with the strategic plans (Amiri, 1387, page1). Mission-based organizations define several concrete goals in their strategic plan and for achieving any of these strategic objectives they suggest solutions.

Operational planning system is categorized in a system which operational organizations for achieving their strategic goals are mostly in need of it.

In Saipa Co. regarding the complex and logistics manufacturing processes and also the product diversity in recent years, the necessity for product diversity with cost reduction in case of responsibility to customer needs more than ever has been considered and with preparation for hardware and software in late 87 this system has been implemented.

In this study, we try to study the impact of the system performance in achieving production plan as well as cost reduction which both are the strategic objectives of Saipa Co.

Though , operational planning with different methods and functions according to the various nature of activities in many manufacturing and service companies including Saipa, Iran Khodro, Fars medical university, Tehran municipality, port of Amsterdam… has been implemented , but any research on the effectiveness of implementing operational planning on the organization's strategic goals has not been done so far.

Product operational plan consists of determining how to produce the type, number of production, beginning of production and production sequences in the context defined as a weekly program in such a manner that deviation from the minimum weekly program is minimized.

The purpose of this study is to measure the effectiveness of performed operational planning models on some strategic goals of Saipa including production and cost reduction

2. Literature study

Strategy:

Organizations for their survival and more affectivity should be sensitive to environmental changes and they should have an appropriate reaction. There are many factors which constantly necessitate the changes in organizations.

Therefore, the organizations should recognize the environment and feel the changes occurred and should run the essential practices in organization

efficiency according to the developments (Aysw saka, 2003). Those organizations will be successful that in doing business with new technology have all the abilities and win more market share, better prices and newer design in run fast (D Noblius, 2004). Ellie Sjef has expressed that the strategy is the clarification of objectives and activities within an organization. David Hunger and Thomas L Villain have described the strategy as a comprehensive plan of organization which through it achieves its mission and goals (Atefi, 1387, p. 2).

If a good strategy is not related to operational processes and proper handling, it can not be implemented and vice versa , although operational developing may lead to cost reduction, quality improving and time process reduction , but a company will not be able to achieve permanent success just with operational improvements and lack of perspective and strategy (Atefi, 1387, p. 2).

Tony Hayward, new senior BP (British Petroleum) announced in October 2007: the problem is not related to their strategy, but to its implementation. The survey conducted by BSCOL in 1996, shows that most organizations are in lack of formal system for their strategies implementation (Atefi, 1386, p. 1). For many years, the planning strategy and organization's major goals have been considered as a key to the success of firms.

The emphasis on strategy and perspective led to the forming of a wrong notion that "All which is necessary for success is a correct strategy" but only 10 percent of formulated strategies acted well successfully in practice. In fact we can say more important issue in the strategic management process, is the implementation and performance of strategy and organizational goals and 70 percent of senior managers failure in the U.S. was not because of their weakness in formulating the strategy but due to their failure in performing their strategies (Bakhtiari, 1383).

Mission- based Organization:

The results from a group consisting of 275 managers show that the ability of implementing the strategy is far more important than its quality, two key principles in implementing the organization's strategies and missions are strategy formulation and implementation.

These managers have stated that the most important factor in evaluating the company and the management is strategy implementation. When asking about how these organizations have achieved the successful results, managers frequently mention two words: alignment and focus (Bakhtiari, 1383). Although, both strategic and executive management tools have had tremendous growth, but there is no progress in tools which link these 2 skills together (Atefi, 1386).

Strategic Goals:

Strategic goals are described within the company; the goals determine what to do for successful implementation of strategies (Pahlevanyan, 1387). Strategic objectives are a connector between strategy as a major priorities and quantities as a tool for measuring the success rate. Objectives, organization perspective, mission, values and strategic priorities which are often general and vague are translated as direct expression and activity based of the implement strategies obligations (2003, Niven). Relations between strategic goals and strategic projects were drawn in Fig. 2.

Planning:

Although a comprehensive definition of planning can be provided but in brief can be stated that the planning is the determination of effective activities to achieve the targets.

In fact, the objectives of plans, is the moving between the ideal situation and available one (Haghpanah, 1386).

Acouf describes the nature of plan as a decision making system and believes that when planning is needed which our desired future conditions is involved in a series of dependent decisions such as decision system (V. Shiner, 2007).

Planning levels:

Planning is strategic or tactical/operational one. Strategic plan contains decisions about the organization long-term objectives and strategies. Tactical planning converts strategic objectives and plans into specific goals and programs which are associated with particular area of the organization. Operational planning shall specify the procedures and processes required in particular low levels of the organization (Shabani, 1388).

Operational planning consists of determination the product type, number of production, beginning of production and the sequence of production defined in a weekly program context which the deviation of a weekly program will be minimized (Sarlak, 1388).

Implementation of practical planning has some needs that noted in Fig. 1.

Saipa strategic goals:

Saipa Automotive Group as one of the country's biggest automotive industries has defined its strategic plan based on balanced scorecard and has clarified strategic objectives according to the movement toward the mission. Saipa main strategic goals are production plan accomplishment and cost reduction.

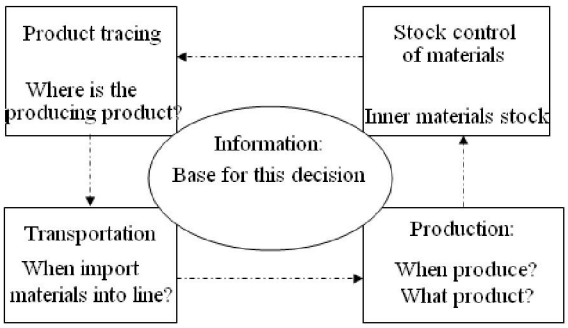

Fig 1: Operational Planning Requirements (Sarlak, 1388, logistics production lines)

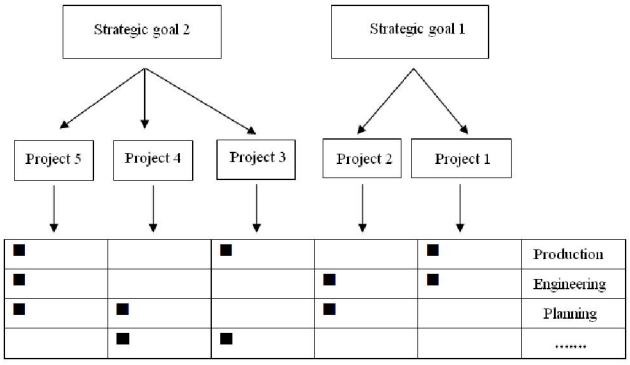

Fig 2: General research model (Saipa Co. strategic planning site)

Product operational planning in Saipa:

Regarding the strategic objectives achievement Saipa Company has designed and implemented the various projects that one of these projects is designing and implementation of operational planning system, which is defined in achieving production and cost reduction program. This project has been implemented in Saipa new site since late 87.

Since one of Saipa strategic plans is flexible production and rooted in customer need therefore we require the access of presentation and implementation of appropriate operational planning models which can coordinate different elements of relevant production which the customer's need may be fulfilled and as timely product delivery, the customer satisfaction is also achieved. But the important is the influential effect of this program in accessing the strategic goals and organization growth based on defined indicators in Saipa strategy map through BSC. In order to strengthen, support or remove and reform this system it is essential to evaluate its impact on company's strategic objectives.

Research hypotheses:
First hypothesis:

Implementation of Operational planning system has a significant impact on production plan which is one of Saipa strategic goals.

Second hypothesis:

Implementation of Operational planning system has a significant impact on reducing costs which is one of Saipa strategic goals.

3. Research method

Since in current study we intend to review the effect of operational planning system on Saipa strategic goals, our study will be operational type because the practical application of research achievements is considered. In this study a systematic and regular collection of data based on variables from library studies, documentation, instructions and available information in Saipa Co. are collected. So, our research is based on analytical data, descriptive and using library methods.

According to research topic as "evaluating the impact of operational planning system in Saipa strategic objectives" the statistical community of this study is located in Saipa Co.

Since 2 strategic goals of this research, operational planning and cost reduction are considered, therefore product plan rate and production are reviewed in Saipa new site.

The production volume of Saipa new site with products of Saipa Pride and Saipa 132 in 11 models is nearly 365,000 vehicles which during 3000 weekly program during 87-88 (before and after implementation of the system) have been investigated.

Considering population large size, according to the central limit theorem the community has been normal and also all members of the statistical population (total production of Saipa new site) were analyzed.

This study discusses the evaluation of operational planning on Saipa strategic objectives. In other words, we want to know whether if the implementation of operational planning system has significant impact on Saipa strategic objectives or not?

So two strategic goals, planning and cost reduction are considered and to examine these two goals, information about the following topics is reviewed.

Fulfillment the production plan includes the following models:

Normal Pride - Hydraulic Pride -Pride with ABS Brake - Hydraulic Pride with ABS Brake - Hybrid Pride - Hydraulic Hybrid Pride - Normal Saipa 132 Hybrid Saipa 132 - Hydraulic Saipa 132 -

Saipa 132 ABS -Hydraulic Saipa 132 with ABS Brake.

Delays in production lines

Penalties resulting from late delivery of vehicles due to lower production than initial program (Negative deviation).

Warehousing costs due to higher production than initial program (positive deviation).

Initially, in this study by using descriptive statistics and its indicators, and using the frequency tables, numbers, central index, mean, median, standard deviation, minimum and maximum of obtained data will be analyzed. Then by using analyzed with inferential statistics, the hypotheses are tested. T tests and Chi square according to the subject and data in testing the hypothesis are used. This analysis is occurred by zero and one test by using index number, mean, standard deviation, error criterion, calculated t, the degree of freedom, significance level, Levine test (homogeneity of variances).

4. Results

Descriptive statistics:

The table 1 shows the statistical indicators of program variable rate, production and percentage deviation from the plan, distinctively before and after the implementation of operational planning systems. Deviation is defined as the absolute value of production and program difference divided by program multiplied by 100. The cases which the program was zero in the calculation of deviations are Excluded, therefore the number of cases where deviations have been reported are about 2789 cases and less than the total number of data reported. Average percentage deviation in total is 59.4 SD 400.2. Prior to implementing operational planning system mean deviation is 85.9 SD 551.7. Also after the implementation of operational planning system the average percentage deviation is 30.7 and SD 45.3. Table 2 shows produced types based on quantity and percentage.

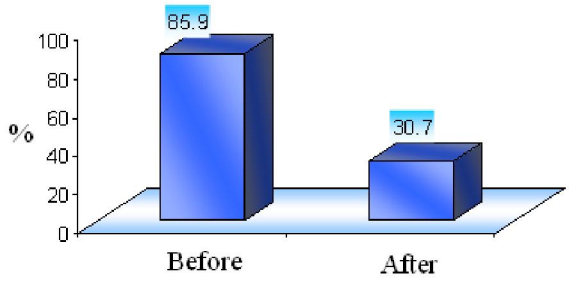

Fig 3: Deviation from plan (%)

Table 1: Descriptive statistics indicators before and after the implementation of operational planning system distinctively

Variable	Indicator / Practical plan	Number	Mean	Middle	Deviation	Minimum	Maximum
Plan	Before	1742	105.0	47.0	173.2	0	1336
	After	1848	103.4	47.0	180.5	0	1347
	Sum	3590	104.2	47.0	177.0	0	1347
Production	Before	1742	101.7	40.0	167.5	0	1366
	After	1848	101.3	37.5	174.6	0	1366
	Sum	3590	101.5	38.0	171.2	0	1366
Deviation (%)	Before	1452	85.9	24.0	551.7	0	14600.0
	After	1337	30.7	12.9	45.3	0	604.0
	Sum	2789	59.4	18.7	400.2	0	14600.0

Table 2: Percentage distribution of different models

Model	Model code	Abbreviated name	Quantity	%
Normal Saipa 132	0000	S132-SIM,IM	92543	25.4
Hybrid Saipa 132	0001	S132 – SIM,NoMixer Hybrid	18574	5.1
Saipa 132 ABS	0010	S132i – SIM, ABS	8659	2.4
Hydraulic Saipa 132	0100	S132 H – SIM, IM	7354	2.0
Hydraulic Saipa 132 with ABS Brake	0110	S132i H – SIM, ABS	245	0.1
Normal pride	1000	GTXi – SIM, IM, MP3	93756	25.7
Hybrid pride	1001	GTXi – SIM, IM,NoMixer,MP3 Hybrid	104874	28.8
Pride with ABS brake	1010	GTXi – SIM, IM, ABS,MP3	13877	3.8
Hydraulic pride	1100	GTXi H – SIM, IM, MP3	18046	5.0
Hybrid & Hydraulic pride	1101	GTXi H- SIM,NoMixer,MP3 Hybrid	5651	1.6
Hydraulic pride with ABS brake	1110	GTXi H- SIM, IM, ABS,MP3	796	0.2
Sum			364375	100.0

In table 2, number indicates the cases that a certain number of machine was scheduled for production and the average percentages indicates average deviation from the plan (For example, during certain years 431 times was scheduled for producing normal Saipa 132 that in this 431 times the average deviation from the plan is equal to 65.4 percent).

As the figure 4 shows the deviation from the plan in all models prior to the implementation of operational planning system was more than the deviations after the implementation of the operational planning system.

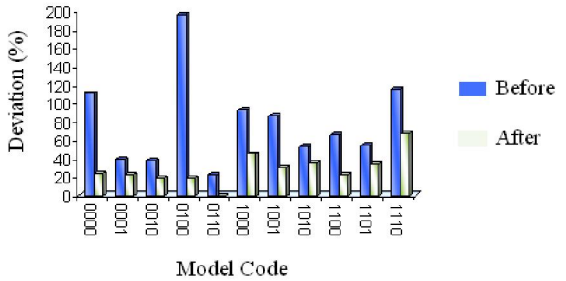

Fig 4: Deviation (%) from plan in different models

The significant difference before and after implementation system will be determined in the inferential statistics.

Table 3 and figure 5 show the distribution of stopping time in different years. These figures show that in year 88 (after implementation of operational planning system) the whole product stopping time has been decreased significantly compared to previous years. Table 4 shows the statistical indicators of stopping times based on various causes and in different years.

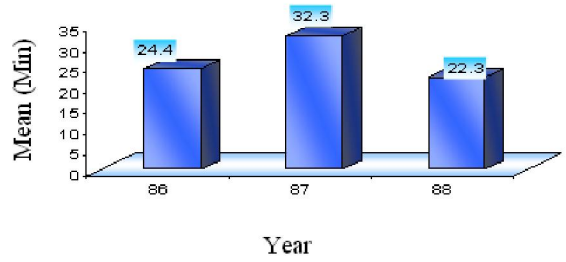

Fig 5: Mean stopping time

Table 3: Statistical indicators of product stopping time (per minute in different years)

Indicator	Year	Case	Quantity	Mean	Deviation	Sum
86		640	24.4	29.2		15591
87		506	32.3	46.1		16358
88		580	22.3	36.2		12922
Sum		1726	26.0	37.3		44871

Table 4: Statistical indicators of product stopping time (minute) in different years due to the cause of stop distinctively

Year	Problem / Indicator	Dis-Receiving body form color line (1)	Distortion of Instruments (2)	Problem in production process (3)	Delay in sending pieces into line edge (4)	Absence of pieces in firm (5)	Dis-qualification (6)	Others (0)
86	Mean	23.20	12.48	10.13	11.24	40.97	19.05	22.69
	Quantity	282	92	15	25	132	20	74
	Deviation	25.53	11.12	6.978	11.34	40.57	18.24	29.89
	Sum	6542	1148	152	281	5408	381	1679
87	Mean	21.94	12.06	13.48	9.65	54.29	30.20	36.74
	Quantity	143	51	21	54	180	10	47
	Deviation	24.24	15.00	8.32	10.12	63.85	34.80	39.26
	Sum	3137	615	283	521	9773	302	1727
88	Mean	24.41	8.41	12.60	9.28	50.20	21.89	17.73
	Quantity	156	82	15	94	100	9	120
	Deviation	39.14	7.49	4.35	7.72	56.90	26.40	24.07
	Sum	3808	690	189	872	5020	197	2128
Sum	Mean	23.21	10.90	12.24	9.68	49.03	22.56	22.96
	Quantity	581	225	51	173	412	39	241
	Deviation	29.49	11.15	6.97	9.06	55.80	24.94	30.09
	Sum	13487	2453	624	1674	20201	880	5534

The longest time for the delay resulted from two factors of part absence in company (code 5) and staying in car paint hall (code 1).

Statistical inference:

Hypothesis 1: implementation of the operational planning system on product accomplishment as one of Saipa strategic objectives has a significant impact.

As showed in table 5, as likely as 99 percent, there is significant difference between the mean deviation from the plan before and after implementing operational planning system.

Comparing the means in two groups (before and after) shows that the average deviation from the plan before implementing operational planning system is higher than average deviation from the program after implementing operational planning system.

Implementation of operational planning system has a significant impact on production accomplishment in different models.

As can be seen in table 6, T tests and Levine test were taken for 11 manufactured models distinctively, which rejected or accepted test result of the research are described in the following table briefly.

Table 5: SD t-test for comparing the deviation of program before and after application of operational planning system

Indicator / Group	Quantity	Mean	Deviation	Criterion Error	Mean diffraction	Calculated t	Freedom level	Meaning level	Levin's test (Variances coherence) F	Meaning level
Before	1452	85.92	551.7	14.47	55.24	3.801	1472	0.000	24.62	0.000
After	1337	30.68	45.3	1.23						

Table 6: T tests results for considering the effect of practical planning on achieving product planning goals; based on different models

Model	Zero Hypothesis	Research Hypothesis
Normal Saipa 132	Accept	Reject
Hybrid Saipa 132	Accept	Reject
Saipa 132 with ABS brake	Accept	Reject
Hydraulic Saipa 132	Accept	Reject
Hydraulic Saipa 132 with ABS brake	Accept	Reject
Normal pride	Accept	Reject
Hybrid pride	Reject	Accept
Pride with ABS brake	Reject	Accept
Hydraulic pride	Reject	Accept
Hydraulic and Hybrid pride	Accept	Reject
Hydraulic pride with ABS brake	Accept	Reject

Table 7: Chi-square test for comparing product stopping times in years 86- 88

Indicator / Year	Watched stopping time (Min)	Wanted stopping time (Min)	Difference	Calculated Chi-2	Freedom level	Meaning level
86	15591	14957.0	634.0			
87	16358	14957.0	1401.0			
88	12922	14957.0	-2035.0	435	2	0.000
Sum	44871	44871				

Hypothesis 2: implementation of operational planning system has a significant impact on reducing costs as one of Saipa strategic objectives. As can be seen in table 7, Comparison of stopping times in different years shows that the total stoppage time during the year of 1388 after the implementation of operational planning system are significantly less than observed stopping times in years of 1387 and 1386.

So it can be concluded that the implementation of operational planning system reduces the stop time and consequently will reduce the costs as well. Implementation of operational planning system has a significant impact on stopping time resulted from various causes.

Table 8 shows the distribution of stopping times among various causes between 86- 88. So we can conclude that there is significant difference between stopping time due to different causes in different years.

The comparison of stopping times about two major causes of part absence in the company and staying in paint room for different years made in previous table shows that after implementation of operational planning system the stoppage time resulted from both causes and a percentage share of these two causes have been decreased in year 88.

Implementation of operational planning has a significant impact on reducing negative diversion from the program.

As can be seen in table 9, according to calculated Chi square (11.597) which is larger than critical Chi square of Table (6.63) at 0:01 infallible, and 1 degree of freedom (or in other words the level is significantly smaller than 0.01, 0.01 <0.001p =), zero is rejected and hypothesis will be confirmed.

So we can conclude that there are significant difference in rate of negative deviation from the program between years of 87 and 88.

Comparing the negative deviation from the program in years of 87 and 88 shows that, the rate of negative deviation observed during year of 1388 which is after the implementation of operational planning system is significantly less than the rate of negative deviation observed in year of1387.

So it can be concluded that the implementation of operational planning system reduces the negative deviation from the program and in other words reduce penalties due to the late delivery of vehicles. Implementation of operational planning has significant impact on reducing positive deviation from the program.

As can be seen in table 10, according to calculated Chi square (134.9) which is larger than critical Chi square of Table (6.63) at 0:01 infallible, and 1 degree of freedom (or in other words the level

is significantly smaller than 0.01, 0.01 <0.000p =), zero is rejected and hypothesis will be confirmed.

Therefore, we can conclude that there is significant difference in the rate of positive deviation from the program between years 87 and 88. Comparing the positive deviation from the program in years 87 and 88 shows that the rate of positive deviations observed during the year 1388 after the implementation of the operational planning system is significantly less than the rate of positive deviation observed in 1387. So we can conclude that implementation of operational planning system has reduced the positive deviation from the plan and in other words it has reduced the carrying costs.

Table 8: Table of Stopping time according to causes and years distinctively

Year / Problem		86	87	88
Dis-Receiving body form color line	Time (Min)	6542	3137	3808
	%	42.0	19.2	29.5
Distortion of Instruments	Time (Min)	1148	615	690
	%	7.4	3.8	5.3
Problem in production process	Time (Min)	152	283	189
	%	1.0	1.7	1.5
Delay in sending pieces into line edge	Time (Min)	281	521	872
	%	1.8	3.2	6.8
Absence of pieces in firm	Time (Min)	5408	9773	5020
	%	34.7	59.7	38.9
Dis-qualification	Time (Min)	381	302	197
	%	2.4	1.8	1.5
Others	Time (Min)	1679	1727	2128
	%	10.8	10.6	16.5
Sum	Time (Min)	15591	16358	12904
	%	100.0	100.0	100.0

Table 9: Chi-square test for comparing the negative deviation from the program in years 87 and 88

Indicator / Year	Absolute watched deviation	Absolute wanted deviation	Difference	Calculated Chi-2	Freedom level	Meaning level
87	22336	21979.0	357.0			
88	21622	21979.0	-357.0	11.597	1	1.000
Sum	43958					

Table 10: Chi-square test for comparing the positive deviation from the program in years 87 and 88

Indicator / Year	Watched deviation	Wanted Deviation	Difference	Calculated Chi-2	Freedom level	Meaning level
87	28206	26860.0	1346.0			
88	25514	26860.0	-1346.0	134.9	1	0.000
Sum	53720					

5. Conclusion

Operational planning and implement of production plan:

Analyzing the descriptive statistics about the variables of plan, product, and percentage of deviation before and after the implementation of operational planning system reveals the operational planning system has significant impact on reducing the percentage deviation or increasing the implementation of production plan that has been the first hypothesis of the study so that the percentage deviation from the program has decreased from 86% to 30%. In other words we can say Saipa Co. before running the operational planning system has the capability of doing its compromises just less than 1/3 of car delivery according to customer desired model at usual time while after implementing the operational planning system over the 2/3 commitments has been done. The inferential statistics confirm this hypothesis as well. Therefore, the implementation of this system is strongly recommended to organizations which have various productions and a desire for production plan.

Operational planning and production plan in different models distinctively:

Regarding the impact of production system on different models produced in Saipa Co., despite the descriptive statistics which shows the system has achieved the success performance in production of 11 models, but inferential statistics on some models do not confirm this impact and with the review done, the reasons are as follows:

In respect of different models of Saipa 132 and considering that the bumper had the same color of the car body, so the production of each body is only possible due to the bumper availability and considering the lack of supply and delivery by the manufacturer (single source supply) in accordance with the program, and the lack of information about produced an d delivered cargo by the manufacturer, so the system operational planning had no significant effect on these car bodies. Therefore it is recommended for implementation of this system effectively; the companies should exit from the single source supply and have relationship with multiple suppliers to have the possibility of replacing parts in terms of crisis conditions. Also, the awareness of supplier about the products helps better implementation of operational planning system. When there is a contrast between the production and the plan due to the various causes of other models such as hybrid, and Saipa 132.... Regular PRIDE is replaced subsequently with the other models to avoid program line stopping, the availability of parts and ease of production makes the regular pride the best

alternative that this causes deviation from the normal production of Pride from the program list.

Hydraulic hybrid Pride and hydraulic ABS Pride regarding that these two models are the latest products of the company, production rate has been very low and has allocated lowest frequencies so the little positive change had no significant impact which had been occurred after implementing the system. During last two years the lack of supply by some of manufacturers and regarding these 2 models as the latest one has made some deviations from the plan. In other models, including hybrid Pride, Hydraulic Pride and ABS Pride, descriptive and inferential statistics reveals significant and meaningful impact on the implementation of operational planning system in achieving the production plan.

Therefore, implementation of operational planning systems is suggested for organizations that have a volume of mass production and product variety.

Operational planning and reducing costs: In order to evaluate the impact of operational planning system on reducing costs, 3 variations of route stopping, the late delivery vehicle costs due to low-production from the initial plan and product storage costs resulting from more production has been reviewed. Descriptive statistics compared to previous years shows that (after the implementation of operational planning system) during the year 88 the whole stopping time considerably has been decreased, so it has resulted in costs reduction.

Also the effect of this system on stopping route through different causes was determined that the most delays created among seven available factors was related to the two existing factors of parts absence and staying too long in paint hall which it shows that after implementation of operational planning system the stopping time resulting from these two causes and a percentage share of these 2 factors have been decreased. Therefore, organizations with continuous production line and the significance role of stopping route for them can use this system in order to reduce the stopping route and consequently costs reduction and increase in revenue.

Also the inferential analysis of lower production than normal plan variation (delayed penalty) and increase in production (warehousing costs of produced car out of the program) shows the implementation of this system has reduced both types of deviation in manufacturing and consequently has resulted in organization cost reduction. Therefore, organizations which are planning based on customer request the implementation of this system will reduce their costs. The lack of essential statistics and information based on concentrated and identical format spent much more time on collecting and harmonizing the information and statistics and in this study it was the most important limitation that we faced with. Also, another obstacle for this study was the lack of similar research for modeling.

Evaluating the impact of operational planning implemented on other strategic objectives such as customer's time of delivery and also the possibility of all the operational processes to be mechanized and generalizing the operational planning system within organization internally and to the suppliers externally can be a good resumption for this current study.

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