

JUST IN TIME IN BANKING

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1. Introduction

Just in Time (JIT) was first pioneered by Toyota in the 1950s and perfected by the firm over the next two decades. The JIT system diffused to other Japanese producers during the 1970's and to U.S. producer during the 1980's (Lieberman, Lau and Williams, 1990).

This philosophy of management is not the product solely of Japanese culture, or indeed postwar American invention. It is a combination of both. Fortunately, the techniques of greatest importance to western or non-Japanese organizations tend to be those introduced from the US. The philosophy behind the concept which has largely been influenced by the Japanese.

Unlike many other management concepts, JIT is part of a fundamentally different approach to management, which when fully developed will have to create a totally new industrial culture.

The goal of JIT is not new. The basic desire for continued reduction in material resource requirements has probably always been in the minds of conscientious business managers. What is new, relatively at least, is the means by which the goal is now being accomplished.

The achievement of JIT may sometimes be a spin-off or by product of a Company-wide Quality Improvement (CQI) programme, or it may be one of a number of specific goals such a programme.

It is worth noting that whilst JIT may or may not be one of the outcomes of CQI-style management, JIT cannot reasonably be achieved without it.

There is a common misconception that JIT concerns with such topics as CIM (Computer Integrated Manufacture), MRP II (Material Requirements Planning) and so on. Important though these concepts are to industrial efficiency, they are not in fact integral to the achievement of JIT.

The JIT system arose initially in the TOYOTA automotive plants in Japan in the early 1960s and is currently being used in a variety of industries, including automotive, aerospace, machinetools, computer and telecommunication manufacturing.

JIT can be viewed from three perspectives, all of which must be considered in order to achieve JIT. This is illustrated in figure 1.

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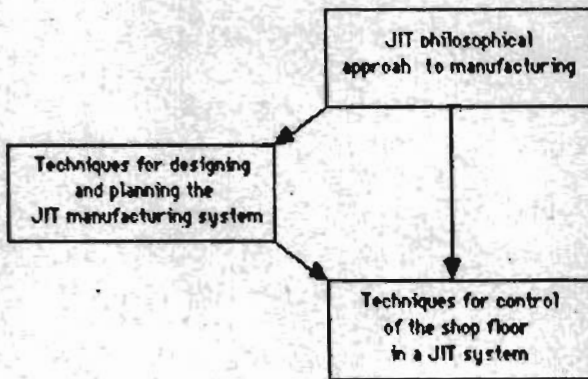


Figure 1. JIT approach
(Browne, Harhen, Shivnan, 1990)

These three perspectives can be summarized as follows:

a) The shop floor control system for JIT is the most visible manifestation of the JIT approach because of its use of Kanban cards. The Kanban technique controls the initiation of production and the flow of material with the aim of getting exactly the right quantity of items (components, sub-assemblies, or purchased parts) at exactly the right place at precisely the right time.

b) The techniques involve the design of the manufacturing system in its broadest sense, addressing issues of marketing, sales, product design, process engineering, quality engineering, plant layout and production management, in order to facilitate JIT production using the Kanban system.

c) The third and most fundamental level is the JIT philosophy of manufacturing on which JIT execution and the design planning of the JIT manufacturing system are premised. (Browne, Harhen, Shivnan, 1990).

JIT is a philosophy covering all aspect of a manufacturing operation with the aim of producing only as required, with perfect quality and no waste. It uses a collection of techniques and relies heavily on thoughtful and disciplined shop floor practice.

The main concepts underlying JIT are:

- a) System re--design and simplification
- b) Continual improvement
- c) Visibility

- d) People involvement
- e) Total quality management
- f) Standardisation of operations
- g) Waste removal

The objectives of JIT:

The objectives are that finished goods are manufactured Just in time to be delivered; Sub-assemblies are manufactured Just-in-time to be assembled into finished goods; parts are fabricated Just-in-time to go into sub-assemblies; materials are purchased Just-in-time to be transformed into finished products.

The assumptions made in JIT are that demand is stable; thus, it is more likely to be used for repetitive manufacture. Other assumptions are that the manufacturing system will be re-designed to create a JIT manufacturing environment; there is a focus plant, appropriate control system, involvement of all the necessary people, availability of cooperative material suppliers; and long term business planning to decide the market, make and defined product families. (Jones and Roberts, 1990).

Prerequisites for JIT

JIT does not come free-certain changes to the factory and the way it is managed must occur before the benefits are realized. Among these changes are changes in plant layout, supplier selection, materials handling methods, scheduling methods, quality control, production equipment, and worker training. Prerequisites for JIT:

- (1) There should be both stable and level production schedules. This means that the same products are produced in the same quantities in the same sequence every day of the month.
- (2) JIT systems should have smaller and more-focused factories. Small specialized factories are easier to manage, and JIT depends on the simplicity of these focused factories.
- (3) JIT requires the reduction of lot sizes. This feature universal to all JIT applications smaller lot sizes reduce inventory levels throughout factory and are achieved primarily through reducing set up times. Set up time is the time it takes to adjust the machine settings so that a new part can be produced at a work center. (Gaither, 1990).

To be more specific, JIT seeks to achieve the following goals:

- Zero defects
- Zero set-up times
- Zero inventories
- Zero handling

- Zero breakdowns
- Zero leadtime
- Lot size of one

The JIT approach involves a continued commitment to the pursuit of excellence in all phases of manufacturing systems design and operation.

(Jimmy Browne p. 148)

JIT aims to minimise costs and maximise competitiveness and profit.

Elements of JIT

Three basic elements of JIT are:

- Waste elimination
- Total Quality Control
- Personnel policies

It is necessary to emphasize upon the following properties among JIT elements.

* An intelligent match of the market demand with product design in an era of greatly reduced product life cycles and with the consideration of manufacturing problems at the product design stage.

* The definition of product families based on a number of important manufacturing goals and the design of manufacturing systems to facilitate flow based production of these families where possible.

* The establishment of relationships with suppliers to achieve just in time deliveries of raw materials and purchased components (Browne, 1990).

* Visibility, the ability to see what is happening is an important characteristic of JIT.

* Kanban, is a device used in the scheduling of activities in JIT systems.

* "Demand call", the entire system is led or pulled by demand. The need to serve/supply a customer triggers activities through to operating system. Thus, where a customer places an order for a manufacturing operation, that order requirement flows back through the system triggering each stage of the over of process.

* Efficient flow, the rapid movement of items between in processes, is an essential prerequisite. Rationalization of flow is therefore a requirement (Wild, 1989).

The following are some of the important elements that frequently are found where JIT production methods are used:

- a) A set, uniform production rate.
- b) A pull method of coordinating work centers.
- c) Purchasing and producing in small lots.

- d) Quick, inexpensive setups.
- e) Multiskilled workers and flexible facilities.
- f) High quality levels
- g) Effective preventive maintenance
- h) Continual work to improve (Dilworth, 1989).

The philosophy and techniques of JIT

Many elements of JIT have been applied in a various countries with great effectiveness as companies strive to attain, maintain, or regain world-class competitiveness. These efforts are sometimes called zero inventory problems, stockless production, and other names that reflect specific companies' programs.

JIT uses the following techniques to achieve its objectives which we have mentioned before.

- a) People involvement includes teamwork, discipline, supplier involvement, quality which regards it as a everybody's job and tries to get it at the source.
- b) Total quality control (TQC) which accepts that everybody is responsible his/her own quality.
- c) JIT production (i.e., production of goods shortly before they are needed, to keep inventories low). (Dilworth, 1989)

Benefits of JIT

The proponents of JIT systems emphasize these benefits of installing such a systems.

- a) Inventory and work-in-progress levels are drastically reduced.
- b) The time it takes for products to get true the factory is greatly reduced, thus enabling factories to be more responsive to changing demands and furthermore space requirement are reduced.
- c) Product quality is improved and the cost of scrap is reduced.

One reason that scrap cost is reduced is that with smaller production lots defective parts are discovered earlier.

- d) With smaller production lots less space is taken up with inventory and materials-handling equipment. Work stations are closer together, and workers can see each other, communicate more easily, work out problems more efficiently, learn each other's jobs, and switch jobs as needed. All of these promotes teamwork among workers and flexibility in work assignments.
- e) Because the focus in manufacturing is on solving production problems, manufacturing

operations are streamlined and problem free.

Reduced production costs, increased worker productivity, and improved product quality are the bottom line of these benefits (Gaither, 1990).

f) Improved customer services.

g) Smoother work flow. (Wild, 1989).

2. Bank Marketing

Banks were traditionally in the "business of banking", namely borrowing from one market and lending to another (Lewis, 1990)

The Turkish bank system is dominated by approximately Big Six - Ziraat, Emlak, Yap Kredi, T. Halk Bank, Akbank, Pamukbank.

The ability of banks to diversify stems from the late 1970s and early 1980s when the Central Bank of Turkey dissolved the interest rate cartel and actively encouraged competition between institutions. This diversification was essentially limited to banking, currency lending, leasing, credit finance, trade finance and credit cards. (Wright, 1990)

Rather than seeking to modify demand for a service that continues to be offered at the same time in the same place, it may be worthwhile to respond to market needs by modifying the time and place of delivery.

Four basic options are available. The first option represents a strategy of no change: Regardless of the level of demand, the service continues to be offered in the same location at the same time. By contrast, the second strategy involves varying the times when the service is available to reflect changes in customer preference by day or week, by season and so forth. For example during the summer in hot climates, banks may close for two hours at midday while people take a siesta but remain open later in the evening when other commercial establishments are still active.

The third strategy involves offering the service to customers at a new location. One approach is to establish mobile units that will take the service to customers, rather than requiring them to visit fixed-site-service locations, as an inducement to use.

Fourth strategy involves simultaneous variations in both scheduling availability and location. (Lidstone, 1985).

Through 1970's and 1980's, the nature of banking has altered and progressed as a result of a combination of changes in the market place, relating to the legislative, economic and business, technological and social environments, which affect both personal and corporate customers (Lewis, 1985).

Managing bank services effectively has become inevitable. Therefore this study is

aimed at finding out the relationship between bank services and JIT philosophy, if it is possible.

3. Example

Although JIT is generally applied to production, inventory control and quality control, it is considered that it is applied to service sector. For this purpose we took banking sector as an application area and conducted face to face questionnaires with the managers of central branches of eleven banks settled in Erzurum, Turkey. The city is medium sized (pop.260000), located at the eastern Turkey with main economic activities of agriculture and commerce. The economic hinterland of the city includes a large portion of the eastern portion of the country. The main activities of the banks in the city covers offering small and medium sized commercial, agricultural and industrial credits, consumer credits besides the other banking services.

The General Characteristics of the Respondents:

The banks surveyed were selected in such a way as to give information about their operations and other considerations which could be increased the efficiency of bank system and employees. The first distinction was the statu of the banks. As it is shown in the table 1 60% of the banks are the privately owned banks and 40% are publicly owned.

	Number	Percent
Private	6	.60
Public	4	.40
Total	10	1.00

The Aims of the Study

In this study, it was attempted to apply JIT philosophy to banking services. It was also thought that JIT techniques are potentially useful both goods and service production. Because of the intangible characteristics of services, applying JIT to the services seems to be very difficult. But when considering importance of waiting times of customers and clerks, the cost of running a bank system, and quality of services lead us to the study the applicability of JIT to the banking services. The view of the the study is from an economic rather than technical point. It is believed that JIT techniques may be useful in banking and may reduce cost of running, a bank system and

increase the efficiency in providing services.

The Selection of the Sample :

All banks located in Erzurum were considered as a population for this study then they were classified into two groups, namely private and public banks.

Ten banks were visited and thirty-one managers answered our questionnaires. Questionnaires were handed to the managers. These questions were carried out face-to-face. Therefore, the rate of replies is 100%.

The responses to the questionnaire were coded and processed using storm package programme by using an IBM PS/2 computer. The program employed in the evaluation of the results, STORM is a comprehensive tool for managing, analyzing and displaying information developed for the processing of data in the Operations Research.

Results :

Banks were asked which problems they faced in their operations. Results are evaluated below:

Table 2: Problem areas

Class	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	3	.0968	3	.0968
2	14	.4516	17	.5484
3	2	.0645	19	.6129
4	7	.2258	26	.8387
5	5	.1613	31	1.0000

Table 2 reveals that 0.9% of the respondents did not consider any problem and 45% of the respondents complained that there is a problem of more clients to be waiting to have services. On the other hand 0.6% of these respondents stated that services given take too long time. 22% of the respondents said that related services are far from each other, and that 16% of the respondents explained that some operations were left to the next day and some of them were completed with some error.

Table 3: Multifunction employees

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			29	.9355	29	.935
2	2			2	.0645	31	1.000

As it is shown in table 3, 93% of respondents claim that their employees are able to work in different services.

Table 4: In and out courses leading to gain multifunctionality

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			26	.839	26	.839
2	2			5	.161	31	1.000

Most of the respondents (84%) stated that they organize in and out company courses to increase their employees' effectiveness. A smaller portion of the respondents (16%) do not follow any courses.

Table 5: Problems which arise from layout.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	0			6	.1935	6	.194
2	1			1	.0323	7	.226
3	2			2	.0645	9	.290
4	3			6	.1935	15	.484
5	4			16	.5161	31	1.000

Table 5 shows that 52% of respondents do not have any problem connected with their facilities layout. %19 of respondents do not give any answer to this question. 0,6% of respondents stated that clients have to move between services as they are located for from each other 19% of respondents complained that it is too difficult to coordinate services and others said that controlling personnel is very difficult.

Table 6: Services which required more attention.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			6	.1935	6	.194
2	2			1	.0323	7	.226
3	3			1	.0323	8	.258
4	4			23	.7419	31	1.000

74 % of respondents noted that all services require same attention. On the other hand 19% of respondents claim that credit service requires more attention than others such as exchange and remittance.

Table 7: Wage/salary for different services.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			2	.0645	2	.0645
2	2			29	.9355	31	1.0000

Most of the respondents (94%) said that there is not wage/salary differences between different services in the bank.

Table 8: Prestige differences between different services.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			5	.161	5	.161
2	2			25	.839	31	1.000

According to the analysis of questionnaire, 84% of respondents stated that there is no prestige differences between different services. The answers given indicate that some services have prestige differences in some banks (16%).

Table 9: Methods used to increase personnel effectiveness.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			7	.226	7	.226
2	3			9	.290	16	.516
3	4			15	.484	31	1.000

A major portion of the respondents (48%) believe that discipline is essential to make personnel to work efficiently. This is especially true for private banks. In contrast, public banks managers agree that social activities make personnel to work efficiently.

Error detection and adjustment respondents are asked that how error detection and adjustment time affect normal activities of the banks. Answers given indicate that it does not have any effect on banks normal activities (42%), 35 % of respondents agree that it increases both cost and time spent in the banks, 13% of respondents said that the effect of error detection and adjustment depends largely on the nature of error done.

Table 10: Error detection and adjustment

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			3	.0968	3	.0968
2	3			11	.3548	14	.4516
3	4			13	.4194	27	.8710
4	5			4	.1290	31	1.0000

Table 11: Specialization in banks.

Class	Lower Limit	Upper Limit	Midpoint	Frequency	Relative Frequency	Cumulative Frequency	Cum. Rel. Frequency
1	1			11	.355	11	.355
2	2			20	.645	31	1.000

65% of the respondents did not agree that special services should be given in a bank. others said that it should be useful to provide special services in particular branches.

Managers who do not agree with the idea of specialized banks claim that bank services

should be given as a complete package, since some clients may request more than one service at the same time.

Managers agree that to increase goodwill and effectiveness of employees depend on following standards to be applied at work: these are, hospitality, discipline, team working, guidance for clients, seriousness and trustworthiness at work, and to serve clients just in time.

Above findings were obtained from questionnaires which included open-ended questions.

Another open-ended question is about winning clients. Respondents were asked which different services they were offering in order not to lose clients. It is known that banks try to offer different services to win clients such as establishing parallel channels at the same services, improving social relationships with clients, giving exact and true information to them and providing credit cards, automatic teller machines, etc.

Respondents were asked what they have done to improve the service quality. Their replies were concentrated on following points:

- (1) In- and out company courses
- (2) Effective control of employees
- (3) To follow recent developments in banking.
- (4) To introduce mechanization

All of respondents said that they have their equipment repaired and maintained periodically but did not give any exact figure how much they spent for them.

Vast majority of respondents expected that there would be an increase in the number of their clients of about 80%-100% for the next year.

4. Conclusions

It has been hypothesized that JIT application is useful in Banking in terms of reducing queues, and lost clients (waste) and improving quality and increasing efficiency of both employees and running a bank system.

Results obtained from questionnaire reveals that problems arise from clients waiting in a queue, layout of banks and lack of quality standards in banking with which JIT techniques may well deal with.

Respondents stated that improving efficiency of employees and quality of services depends largely on applying discipline rules. But JIT suggests that it would be better to apply team working and total quality approach in order to obtain efficiency. In addition multifunction employees may well reduce queue lengths if they are properly employed. This is true to a degree that queues occur in particular days of a month, in other words, queues are not continuous.

Therefore, multifunction employees may be employed in different services if queues occur.

As it was mentioned in the previous chapter, JIT concentrates on such subjects as waste (any type of stock), TQC and personnel policies. It could be said that JIT technique may especially be useful in personnel policies in banking which this study dealt with.

In order to reduce queue length, red light with "busy" or "available" signs, like a Kanban Card, may be used by servers to indicate that server is "busy" or "available" according to the situation.

According to the responses, banks do not seem to have particular standards to be applied in banking rather they use trivial applications that may be not regarded as a standard. Therefore, they should develop their standards or follow world standards in banking.

Providing service requires good communication between the employees as well as producing goods and good facility layout. In order to apply JIT techniques in banking, facilities should have been laid down properly to reduce clients moving between services and to prepare suitable conditions for good communication between the services as well as employees.

In conclusion, this study suggests that JIT philosophy may well be applied in banking as the main idea behind the JIT is to make ready everything to provide services and produce goods effectively whenever they are needed.

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