

e-Book



FIELD SERVICE MANAGEMENT 4.0

ABSTRACT:

Industry 4.0 is used interchangeably with the fourth industrial revolution and represents a new stage in the organization and control of the industrial value chain. Cyber-physical systems form the basis of Industry 4.0.

The Industrial Internet of things can be simply defined as a network of interconnected sensors and instruments to optimize industrial processes and management. With the help of these new possibilities, companies can now work on the principles of prescriptive and predictive analysis.

Predictive analysis can be used to forecast the demand of services by customers, and prescriptive analytics can be used to fix optimal maintenance schedules. This can ultimately aid in developing better and more efficient business models and minimize uncertainties in maintenance services.

Field service management mainly refers to the collection of functions used by industries to bridge the gap between operations-driven solutions and customers.

Studies on model workforce planning have been done for quite some time now when we take researches in the field of industrial operations. Although, the new opportunities provided by the Industrial Internet of things still need to be incorporated in managing and scheduling Jobs for field service technicians.

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For Field Users

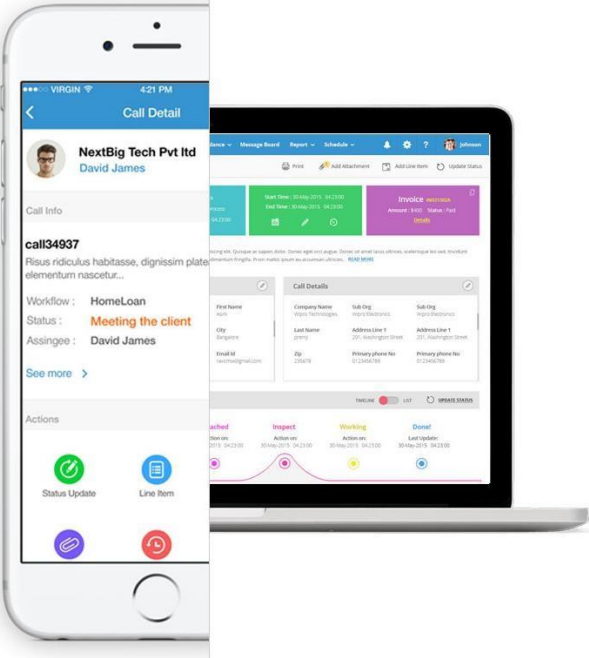
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INTRODUCTION:

Field service management has some of the following features: It involves a lot of scheduling in terms of service appointments and service resources. Along with that, it also includes asset management. Planned contracted activities, where customers have a fixed contract and maintenance or field services need to be provided at specific intervals in a fixed manner. These are relatively easy to schedule and manage. The other type of activity is Unplanned contracted activities. These occur mostly in the manufacturing and industrial sectors. Here, the customer has a contract but does not have a pre-scheduled activity. In this case, the technician needs to deal with ad-hoc problems and other customer issues as and when they arise. Another type is the planned non-contracted activities, where there is no warranty or contract included, but predefined activities are performed. The last type of field service management is unplanned no contracted activities where there is no contract or pre-scheduled activity. For now, we will be focusing on technician service management in the industrial or manufacturing industries.

These days, companies producing industrial machinery offer repair and maintenance services to their customers through skilled technicians. Managing a huge workforce of technicians becomes a huge task that needs to be fulfilled diligently.

With the widespread popularity of the Industrial Internet of Things or Industry 4.0, the established systems of management have been revolutionized. It creates a framework that connects different machines with the help of synchronizing software tools. This collaboration of the workforce with machines and devices helps to optimize the field service management for industries by predicting uncertainties and allowing for faster decision making.

With the Industrial Internet of Things (IoT), many opportunities that were inaccessible before have opened up. It has provided the opportunity to access various data provided by sensors in industrial and machine and has allowed for the development of innovative data-driven services through emerging new technologies.

Integrated FSM Solution

The modernization of [Field Service Management](#) systems should go hand-in-hand with Organizational digital transformation of a business to realize the following benefits.

- The optimized allocation of human resources, through the enhanced allocation of technicians to specific tasks based on the skills of each employee.
- Greater efficiency in the supply chain of the parts needed for any eventual repair work.
- The possibility of integrating industrial processes, in such a way that the data from the IoT devices facilitates preventive maintenance tasks.
- Improved reporting on the profitability of field services, based on real data about the time spent on tasks, details such as timeliness, or optimum route management.

If the FSM system also includes robust analytical support based on Business Intelligence technologies, its effectiveness can be extended beyond control panels and advanced reporting, and even cover expectations such as predictive maintenance, based on trends and accumulated experience.

CONCEPTS OF TECHNICIAN FIELD SERVICE MANAGEMENT

The following are the two main concepts upon which the field service technician management is built:

1. ASSET MANAGEMENT

Instead of self-provisioning service and repair services, companies are switching to the outsourcing of these services. External service providers are benefitted from the infrastructural capacities of the company. For [asset management](#) in industries, a shift can be seen from utilizing

short-term isolated service providers to long-term contracts of repair and maintenance. By shifting their focus to the outsourcing of these services, companies can easily focus on their core products and resources and focus on activities that are strategically essential. Moreover, it reduces the economic risk associated with unpredicted failure of machines and uncertain demand for repair and maintenance services.

There is a growing demand for field service/maintenance, and companies that were traditionally focusing just on the development of core products are now changing their working system by providing these supplementary services.

This is beneficial for generating extra revenue for the manufacturers as well. A combination of products and services will increase their value in the market as compared to its competitors. Some of the major advantages of this method are evident in terms of confronting competitors since sales margins keep fluctuating. Apart from increasing revenues, it also welcomes the customer's direct feedback. In fact, data sharing and collection will also be beneficial in formulating innovative business models.

Optimizing field service networks is extremely crucial for an organization. This is because managing a workforce that large is a complex activity. There is a high number of geographical discrepancies in the demand areas where services need to be rendered. An increasing variety of products and parts that need to be repaired also require proper management. Responding to clients with unexpected failures in a timely manner is also crucial. Technicians should be equipped with a comprehensive knowledge of the highly heterogeneous technologies and systems that need repair.

In an industrial setup, asset maintenance is defined by three interconnected building blocks: The first category is maintenance actions, which are basically those tasks or services carried out by a technician that is corrective or preventive in nature. Corrective action is when you repair a failed asset to bring it back to its original state, and Preventive action is when you reduce or minimize the likelihood of the failure of an asset. The second is Maintenance policies that are a set of mechanisms that trigger maintenance actions. Here are some of the popular maintenance policies:

- Run-to-failure maintenance or breakdown maintenance
- Usage or time-based maintenance
- Condition-based maintenance
- Opportunity based maintenance
- Design-out maintenance, that is, redesigning those parts that require a high level of maintenance

Next in the line are maintenance concepts, which emerge from a combination of the first two, that is, maintenance actions and maintenance policies. Some of the common maintenance concepts are listed below:

- Life-cycle costing
- Total productive maintenance
- Reliability centered maintenance

2. WORKFORCE MANAGEMENT

It is extremely crucial for companies to efficiently manage the workforce by combining operational planning and strategic decision-making. Operational planning essentially involves managing technicians to coordinate maintenance jobs.

It largely focuses on evaluating incoming jobs and scheduling maintenance jobs for workers along with allocating resources. Although, the main focus still remains technician scheduling. It is important to keep in mind the different factors that influence it. Uncertain or unscheduled calls for repair, geographical discrepancies of demand of services, skill sets of different technicians, etc., are some of the factors that affect the scheduling of tasks. Therefore, due to all these complexities, companies generally prefer relying upon manual operators rather than machines to manage the scheduling of technicians.

Operational planning should always be combined with strategic decision-making in this field. Apart from the fixing of time slots and allocation of resources to technicians, the management needs to acknowledge the different skill sets of the workers.

With increasing competition in this field, it is the need of the hour to focus on the quality of service provided as well. The complex relationships in the modern workforce also come into play here. The focus should be laid upon fostering a productive work environment, cross-training of employees and collaboration strategies to strategically manage the workforce.



PATH TO FIELD SERVICE MANAGEMENT

It is clear by now that optimal [field service technician management](#) requires decision support systems for:

1. Strategic decision making
2. Operational planning

With the services provided by the Industrial Internet of Things, it has become easier to collect data regarding machines that need maintenance, repair, installation or overhauling. The new data mining techniques have made previously inaccessible data available. Now, large amounts of data sources that contained unstructured data have been made available. This data can now be utilized for predictive analysis to determine which assets need maintenance. However, these have not been properly utilized in closely related fields. We still do not have much information on how it can be used in managing field service technicians.

It needs to be kept in mind that predictive and preventive analyses are closely related to operational planning and strategic decision making. Predictive analysis and preventive analysis can transform uncertain and unorganized service systems. Predictive analysis can help the management figure out which assets would need maintenance and where preventive

maintenance would be feasible. If the operator can predict the duration of a maintenance task beforehand, they can avoid rescheduling of services. Companies can also offer economically feasible full-service contracts by estimating service costs and the economic impact of unfulfilled service for customers.

Companies can also use the method of strategic decision-making to analyze what kind of technician services would be in demand in the future. This way, they either employ field service technicians beforehand or organize cross-training of employees to make them more skilled and prepared to deal with unfamiliar circumstances.

Instead of traditional scheduling and time management, companies keep in mind the demand and supply forecasting as well worker optimization and participation. Several aspects that can improve field service management in the coming times have been analyzed. The traditional service management and service networks can be effectively changed with new data mining techniques.

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