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# Sales Personnel Scheduling in Financial Services Marketing: A Review of Applications, Methods and Model

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**Abstract:** ***Sales personnel scheduling is the process of constructing work time tables for its employees so that an organization can get new clients, retain old customers, find and promote products and oversee regular purchases. The sales personnel scheduling can provide enormous benefits, but require carefully implemented decision supporting systems if an organization is to meet customer requirements in a effective manner while satisfying requirements such as flexible work place agreements, shift equity, sales personnel preferences and part - time work. In addition, each financial service sector has its own set of issues and must be viewed in its own right. This paper presents a review of sales personnel problems in specific application areas and the operation research models and algorithms that have been reported in the literature for their solution.***

**Keywords:** Sales Personnel, Scheduling, Operation research models

## 1. Introduction

Sales personnel scheduling is the process of constructing work time tables for its staff so that an organization can get new clients, retain old customers, find and promote products and oversee regular purchases. The first part of this process involves determining the number of sales personnel, with particular skills, needed to meet the service requirements. Individual sales personnel members are allocated to shifts so as to meet the required levels at different times, and duties are then assigned to individuals for each shift.

All financial service regulations associated with the relevant workplace agreements must be observed during the process. In many organizations, the people involved in developing sales personnels need decision support tools to help provide the right employees at the right time and at the right cost while achieving a high level of employee job satisfaction. The components of such a decision support system will typically include appropriate operation research models and algorithms. The sales personnel tools are the main focus of this review. In general, the unique characteristics of financial service sectors mean that specific mathematical models and algorithms for sales personnel scheduling in area of application.

**Problem classification and models:**
In this section, we propose a general framework of classifying the sales personnel scheduling problems. In general sales personnel schedule problems are classified into five sub problems temporal sales personnel requirements, total sales personnel requirements, recreation and leave, work schedules and shift schedules.

The classification presented here is intended to produce a number of modules associated with the process of constructing a sales personnel schedule.

**Sales personnel process:**
Our classification presents the sales personnel process as a number of modules starting with the determination of sales personnel requirements and ending with the specification of the work to be performed, over some time period, by each individual in the work force.

**Module - 1: Sales personnel requirement modeling:**
The first module is to determine how many sales personnel are needed at different times over some planning period. Sales personnel are needed to perform duties that arise from incidents that occur during the planning period. Sales personnel requirement modeling is the process of translating some predicted pattern of incidents into associated duties and then using the duty requirements to ascertain a requirement for sales personnel.

**Module - 2: Days off scheduling:**
This module involves a determination of how rest days to be interspersed between work days for lines of work.

**Module - 3: Shift scheduling:**
Shift scheduling deals with the problem of selecting, from a potentially large pool of candidates, what shifts are to be worked, together with an assignment of the number of employees to each shift, in order to meet customer requirements.

**Module - 4: Line of work construction:**
This module involves the creation lines of work, which are sometimes referred to as work schedules for each sales personnel. The process of constructing a line of work depends on the basic shifts, typically shifts, duties that are used.

**Module - 5: Task assignment**
It may be necessary to assign one (or) more tasks to be carried out during each shift. These tasks may require

particular sales personnel skills (or) levels of seniority and must therefore be associated with particular lines of work.

**Module - 6: Sales personnel**
This module involves the assignment of individual sales personnel to the lines of work. Sales personnel assignment is often done during construction of the work lines.
The procedures outlined in modules 1 - 6 above provide a general framework of the sales personnel scheduling problem and their five sub problems.

**Application areas:**
The sales personnel scheduling methods have been applied to financial services such as banks, life insurances, non life insurances etc.

In this section we provide a brief description of the key problems related to sales personnel scheduling in application areas (financial services).

Sales personnel scheduling is important for financial services. The main difficulty is the variability of customers requirement over the day. It is possible to cope with this variability through the judicious use of part time sales personnel and overtime.

Another quite different problem arises in the scheduling of sales personnel. Here the main complexity arises through the non - homogeneous nature of customer requirements with a variety of sales personnel jobs that have a mix of skill requirements and different locations.

Various problems for both the workloads and the detailed scheduling requirements for sales personnel.

The main objective of the sales personnel scheduling methods is to maximize the amount of work done and to minimise the problems of scheduling requirements.

**Solution methods:**
In this connection, we review sales personnel scheduling solution methods of modules mentioned in the problem classification and models.

**1) Sales personnel requirement:**
There are usually two main components in sales personnel requirement. We need a method for translating incident data to a requirement for sales personnel and a method for forecasting incidents unless the incidents are derived from a known time table.

In some cases the sales personnel requirement may be generated from incidents in a reasonably straight forward, though possibly complicated manner. For example in financial service sectors the requirement for sales personnel is very straight forward because sales personnel scheduling is determined by known time tables.

The incident could be translated to a requirement for sales personnel via a look up table containing the immediate and follow up sales personnel requirements for the incident type, together with some measure of the duration of the different jobs. Using such a scheme, the numbers of appropriately qualified sales personnel needed in different time periods can be built up from a predicted time (or) place distribution of different incident types.

Queuing theory and simulation modeling are the two approaches most commonly used to translate incident data to requirement for sales personnel.

Having decided on a suitable method for converting incident data into sales. Personnel requirement, we are still faced with the problem of forecasting the likely distribution of sales personnel. Over the forthcoming planning horizon.

A number of approaches including simple averaging, exponential smoothing, and regression may be used for incident forecasting.

**2) Assignment:**
Assignment can occur as a sub problem at various modules of the sales personnel process. The most frequently used assignments are;

**Task assignment:**
Task assignments are often required when working shifts have been determined but tasks have not been allocated to individuals. Tasks are grouped and assigned to shifts (or) employees based on their starting times and durations. The assignment methods depend on whether task times are fixed (or) movable, breaks exist in shifts, overtime is allowed (or) specific skills (or) qualifications are required to perform tasks. Task assignment can also be carried out when constructing lines of work.

**Shift assignment:**
Shift assignments arises when constructing lines of work. Sequential assignment methods have been frequently employed to generate sales personnel shifts scheduling. Assigning the highest priority employees and assignment duties or) pairing to employees on a day by day basis.

**Sales personnel assignment:**
Sales personnel assignment involves the allocation of lines of work to individual sales personnel. This assignment can be done either after generating all lines of work (or) during construction of the lines of work. If the assignment takes place as the line of work is constructed, then it is common to individual sales personal preferences, availability and qualifications as part of the process.

**3) Linear programming (or) constraint programming for lines of work construction:**
Linear programming provides a powerful tool for finding feasible solutions to sales personnel problems. This technique is particularly useful when the problem is highly constrained and/or when any feasible solution will suffice when it is not optimal. However this technique is less likely to produce good solutions for problems where the main challenge is to find an optimal (or) near optimal solution out of a vast number of feasible solution.

In most applications, feasible sales personnel scheduling are significantly constrained by rules governing which work patterns are allowed for an individual. Such rules might

impose restrictions on the number of sequential night shifts to be worked, (or) specify some minimum time off between successive shifts, (or) refer to more complex preference constraints such as a requirement that no more than two 12 hours shifts be worked per fort night.

Often there is a distinction between hard and soft constraints. The former must be satisfied while the latter may be violated, though it is generally undesirable to do so. Modelling soft constraints usually involves the inclusion of penalty terms in the objective function.

These constraints, which must be applied independently to each line of work usually vary significantly between different financial sectors and these differences give rise to the great variety of sales personnel scheduling problems and models.

## 2. Conclusion

As a result of changing work Environments and conditions, it is likely that sales personnel algorithms will need to be more general in the future. Given the resulting flexibility of work place agreements, shift equity, sales personnel preferences and part time work that will be required of the algorithms, it is likely that we will see a more integrated approach to sales personnel scheduling solution developments.

For example, it will be necessary to consider integrated solution frame works that include linear programming simulation, queuing theory and assignment approaches to solve a multitude of sub problems within the context of solving the complex sales personnel scheduling problems in the future.

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