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SERVICE SYSTEM MODELING OF FIELD OFFICES WITHIN A GOVERNMENT AGENCY

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ABSTRACT

An extensive simulation modeling study effort has been undertaken by the Social Security Administration (SSA) in order to develop a tool which assists in making resource allocation decisions. This modeling study will examine and determine the effect of staffing size and staffing mixes on the level of service provided to clientele served through SSA field offices. These widely distributed field offices are initial point of contact facilities, often receiving large volumes of walk-in and telephone business on a daily basis. Modeling of individual field offices provides SSA with a tool to study various methods of operation.

The simulation modeling study effort undertaken to provide the required degree of insight into the field office system dynamics encompasses a widely dispersed range of individual characteristics particular to each office location throughout the United States. These characteristics coincide primarily with the differences in population demographics between office locations.

ProModel, and ServiceModel software, developed by ProModel Corporation, have been applied in the study effort. The logical constructs and graphical animation features inherent within the software environments have been elemental in creating robust system models, as well as in quickly securing valid model results.

1 BACKGROUND

The Social Security Administration operates 1300 field offices throughout the United States. These offices serve beneficiaries within their geographical service areas who require assistance in one of several areas. A typical customer may request help with applying for a social security number, filing for various benefits or adjustments. Others may have disbursement discrepancies, or other general inquiries handled on an individual personal interview basis.

Overall organization downsizing in staff levels over the past several years has forced SSA to maintain acceptable levels of service with fewer resources. SSA must insure that large backlogs do not build up on a regular basis, and levels of customer service do not suffer due to excessive waiting times.

Analyzing the situation involves an extensive study effort in that the field offices vary considerably in the quantities and types of workload from

location to location. Task type and quantity directly correspond with the demographics of the respective immediate areas.

For instance, a small office (up to 12 office personnel) located in a rural or suburban setting may service a local population exhibiting an evenly distributed mix of demographic characteristics such as typical median age and moderate economic standards. Whereas a medium size office (approximately 25 office personnel) located in another area may serve a population comprised largely of retired persons. A large office (50 or more office personnel) located in an urban area may serve a population group of predominantly economically disadvantaged citizens. Each of these groups represents a significantly different beneficiary clientele workload mix with differing service intervals. There are very real differences in field office operating environments which require different staffing levels and compositions to provide equivalent levels of service.

SSA beneficiary clientele generate work for the office personnel either by arriving in person at the office locations, or by placing telephone calls directly to the offices. In both cases, contact is made by appointment as well as on a random basis. Office personnel generally fall into one of several categories: Managers, Supervisors, Title II Claims Representatives, Title XVI Claims Representatives, Generalists, Service Representatives, Receptionists, and Clerical. Arriving clientele check in with a receptionist, who may conduct short interviews. Receptionists direct arriving clientele to the appropriate service or claims representative, or to a waiting area. The service time is comprised of speaking with a client and any follow up tasks including research or paperwork which may have to be performed immediately or at some future time (workload backlog).

2 OBJECTIVE

SSA is now in the process of determining a relationship of staffing levels and their compositions, with that of the levels of service provided to its clientele. System criteria of concern include waiting times, interviews completed for a selected time period, and backlogs created and processed. This relationship must weigh differences in operating environments from field office to field office. It must take into account workload volumes, frequencies, and distributions. It must also reflect any significant differences in operating practices, procedures, and priorities for individual offices.

Constructing simulation models of the system was identified as the basis by which the objective of the tasks could be accomplished.

3 SIMULATION MODELING APPROACH

The field office system can be appropriately characterized as a typical service organization arrangement. From a modeling standpoint it is comparable to bank teller operations with daily customer arrivals during normal business hours. However, upon closer inspection, SSA field office dynamics do exhibit

several unique characteristics.

Whereas bank tellers handle workloads which are often short (1 minute) in duration, with very few, or no alternate customer routings, transactions at an SSA office may take an hour or longer per customer. Processing of these transactions are divided amongst groups of specialized representatives based on the type of transaction. At an SSA office some visitors arrive once per lifetime. The level and complexity of information needed to process a transaction is much greater at an SSA field office. At a bank, customers tend to have equal priority, based on a FIFO rule. At SSA field offices, priorities are assigned based on workload type. Arrivals having scheduled appointments are also common.

Earlier SSA studies did not apply simulation modeling and therefore the approach had to be well tested and repeatedly proven prior to its acceptance. A prototype model of a sample field office was created with ProModel Software in order to determine whether the modeling approach would be sound. Animation constructs within the software allowed for the creation of a model complete with significant aspects of the office layout depicted as well as clientele traffic flow patterns.

For developing the initial model, management data on hand from studies previously conducted provided an indication of workload type and quantity as well as day to day procedural characteristics. Concurrently, model output was verified against actual data collected through time studies and workload samples while the model was being created.

The detail to which the model was constructed was carefully monitored in order to emulate the field office operation as closely as possible. In this manner, shortcomings in the early model could be addressed and approval garnered once appropriate modifications were made. No specific details of the operation with any significance were left out. In a systematic process the model was thoroughly subjected to review by several levels of management from field office supervisors up through executive members of the administration. In this fashion the model structure was tailored to meet the requirements of management personnel on an ongoing basis. Similarly, model verification and validation were completed to the satisfaction of all parties involved.

System operating characteristics were modeled in appropriate detail. For example, customer arrival patterns were analyzed on an hourly basis in order to establish arrival patterns corresponding to these periods which suggest identifiable cyclical patterns. Therefore the arrival rates of customers in the model reflect these probabilistic patterns. Three distinct patterns of daily arrival rates were selected upon reviewing the data, and were used to reflect the frequency of occurrence for busy, average, and slow weeks of the month.

Service types coinciding with arriving clientele and telephone calls were divided into twenty five categories for some office locations, and as many as thirty for others. Frequency of occurrence of these services

along with their corresponding service interval times were analyzed in order to define proper statistical distributions applicable to model them.

Initially, in the absence of data, service intervals were approximated as random variables for the model. Most often a triangular distribution was used as it was appropriately suited to limited data obtained through operational audits. Later, as the necessary data became available through more current time studies, Unifit II statistical analysis software was utilized for curve fitting to accurately facilitate the modeling of the input information.

4 RESULTS AND CONCLUSIONS

The simulation modeling effort has proven to be quite successful. Validation of model output with regard to customer waiting time has been recently shown to closely agree with that experienced by clientele during sample days when the system was modeled under current conditions. Workloads and respective backlogs also have been shown to be in line with that exhibited by the model of that system. Thus a major element of the study effort has been accepted in light of the exhaustive analysis which has been undertaken.

Several noteworthy observations can be made regarding this modeling effort. The process of identifying, and modeling the movement of people in a service environment can become quite complex. Oftentimes the varied routes which customers and service personnel follow in a system are of great significance in analyzing the overall resource requirements and therefore cannot be effectively generalized or ommitted. The visual aspects of a model apparent through animation of it are essential in this situation. Reviewing an animation of the system model is a key element in the validation and verification phase of the process. Enjoining personnel who are familiar with the system or who are a part of the system itself has proven to be invaluable in addressing the issue of model validity.

Currently the staffing level vs service relationships are being determined from the output of the modeling effort up to this point. Conclusive confidence levels are being identified through multiple replication analysis of the output statistics. This effort is also directly performed within the ProModel software environment.

Other operations within the SSA are now being similarly evaluated through simulation modeling - due largely to the success of this project thus far. ServiceModel, a recently developed software tool from ProModel Corporation is now being applied. Developed specifically for the modeling of service systems, it significantly streamlines the modeling process through its higher level constructs and enhanced animation.

AUTHOR BIOGRAPHY

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