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VENTURE LAUNCH: USE OF SIMULATION TO SUPPORT STRATEGIC OPERATIONAL DECISIONS

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ABSTRACT

This paper describes how discrete-event simulation enhanced a traditional process design effort for a new media company in pre-launch mode. Because the company's business model is new, and thus its critical operational processes are new, a need existed to not only design the new processes but also to determine at a high level the "goodness" of the proposed design. This high-level approach to simulation modeling can open new doors to simulation professionals accustomed to performing detailed simulation analyses. Benefits derived from use of the high-level simulation along with considerations for using high-level models in this rapidly changing environment are discussed.

1 INTRODUCTION

This paper discusses use of simulation in a non-traditional environment – a pre-launch media company with a shifting business model and undefined processes. This approach moves simulation into an area where precision is less important that speed and "directional correctness." The pre-launch environment contains many pressures, particularly to launch as quickly as possible, even if not all of the final decisions about processes, organization and technology have been made. As the commonly used axiom states, there are two kinds of startup companies, the quick and the dead.

Managers in the startup environment are often satisfied to be 70% "right" on decisions in order to keep pressing ahead toward launch and the initial revenue streams that accompany it. Most critical here is avoidance of potentially fatal mistakes, such as the creation of non-scalable architectures that will fail or create great expense as business volumes grow.

Bringing discrete-event simulation into this environment presents opportunities and risks for simulation professionals, particularly in how the project is defined and how expectations for results are managed. How can we create models that will support the startup executive's need for quick answers? How can we prepare to give advice based on high-level processes and speculative business volume and data assumptions? Can we help startup companies avoid fatal mistakes in early process design choices?

The subject of this study is a startup company with a plan to use existing technologies to create a direct data linkage among advertisers, retailers, and consumers. The company will be the first to create this linkage, thus giving them potential for marketplace leadership. The company has a patent for encoding TV signals to include messages which can be streamed from the TV into a consumer device. This has the potential to revolutionize consumer couponing, promotion design, TV advertising effectiveness and TV sales generation.

The company's business model is highly dependent on partnering with retailers, advertisers, broadcasting firms, and banks to execute successfully. The company's challenge is to move quickly into this space so that it will have "first-mover" advantages over other companies with technologies that may rely upon their patented encoding technique. Due to the number of business partner relationships and the dependence on partner performance for success, the company must ensure that its business model can be successful and that its operations are scalable.

The business model and technology require that advertising offer information be encoded onto video broadcast signals to make those offers available for capture by a hand-held wireless device. The encoding process is complex and includes activities across multiple independent organizations. Potential operating strategies for the encoding process exist, and the company requested assistance in estimating the operational impacts of various operating strategies for encoding. Building on Process Architecture work completed for the company, the design team created a Process Design for encoding and a process simulation model for video encoding.

2 PURPOSE AND APPROACH

As author Michael Schrage (2000) states, "truly effective models aim not to predict the future but to envision possible futures that can be managed successfully." The

purpose of the simulation was to indicate, at a high level, the potential size of a centralized video encoding facility. With this information, the company's executives could determine an operational strategy with a higher degree of confidence. Also, the modeling process would help executive decision-makers visualize proposed processes to indicate potential management issues for each solution.

2.1 Purpose

The overall purpose of the project was to design a video encoding solution that would allow the company to start operations and to expand geographic coverage from a small trial area in the American Southwest to a complete coverage of the United States television broadcasting market.

The design team addressed three questions with the Encoding High-Level Process Simulation model:

1. Where are the potential bottlenecks in the encoding process?
2. Which points in the process require significant numbers of human resources or capital equipment such as tape replication machines?
3. Where are potential issues with the company's ability to provide encoded commercials to affiliates and/or networks for broadcast on a timely basis?

Simulation would also allow the team to examine critical process scalability issues and to create and/or solidify buy-in to the encoding solution from the company's Board of Directors and key executives.

2.2 High-Level vs. Detailed Models

Detailed models lay out fine distinctions in processes, including task times and resource schedules. Detailed models are the traditional types of models created using simulation techniques, and can take from eight to 20 weeks on average to create, depending on scope and level of detail.

The high-level simulation model is designed to communicate information about a process in a much shorter period of time with less precision. A high-level model must by definition aggregate tasks into activities. In the startup environment, this is done for two reasons: 1) information regarding how processes will function is not yet defined; and 2) aggressive schedules require limits on the level of detail that can be simulated. This aggregation, or "black-boxing" of activities limits the ability of the model to produce precise or predictive results.

Many clients are interested in confirming the "goodness" of a design without spending the time and money required to build a detailed simulation model. Clients are willing in some cases to accept the lack of precision for results that are "directionally correct" and that are provided in less than on half the time required to construct a detailed model.

2.3 Approach and Execution

Critical questions about the operations were used to focus the design process on goals in line with the business strategy. Some of these questions included:

1. What are the key performance indicators for this capability?
2. What are the minimum levels of performance required at launch?
3. How will the capability operate to deliver the desired performance level?
4. What are the key operating characteristics?
5. Should all or part of this capability be outsourced?

To accomplish this goal, the process design team used a variation of a standard simulation project plan and timeline. Accommodating the need for speed, the team compressed the project schedule, particularly in the area of model build time. High-level models by their nature do not require as much time to construct as do detailed models.

Data collection and analysis tasks normally performed to determine distributions were limited due to the lack of actual performance data. Subject matter experts provided projections for task processing times.

Order volume projections from the company's marketing executives shifted significantly during the project, prompting a series of experiments covering a broad range of possible order volumes and mixes. Orders for encoding could arrive for new ad campaigns, generating a batch of arrivals, or as an update to an existing campaign, generating a single arrival. Experiments with the model addressed a variety of new and updated campaigns.

The design team defined requirements for the process to ensure that it met key operational performance levels, provided a good customer experience, and meshed well with the existing broadcast operations infrastructure. After the management team approved the processes requirements, the team created a static flowchart model of the current broadcast infrastructure to gain a common understanding of the business environment.

Building on these items and working with media industry experts, the team designed alternative encoding processes which would integrate with the existing broadcast infrastructure in different ways. The team agreed to simulate a solution where all encoding functions would be performed in-house by the company. This decision was made because some executives had favored this approach for encoding, but the approach required a significant capital investment and carried potential impacts to the time required to create and distribute encoded spots. Use of simulation could help project the magnitude of capital and human resource expenditures required to implement this solution.

3 OUTCOMES

The modeling effort succeeded in focusing the company's executives on a number of key operational issues and on potential future capital investments required to meet specified process performance goals.

3.1 Process Modeling Benefits

Due to the experience of the company's staff, the process modeling effort made to understand the current broadcast infrastructure environment provided significant benefit. Before this effort, the company had not been able to create a framework in which to understand how its operational strategy would integrate and perform.

3.2 Directional Outcomes

The team designed its experiments to provide a comparison of staff requirements based on rapidly changing business growth assumptions. Simulation showed the size of operations required to support video encoding during initial roll-out and through the first year of operations.

Results of the model indicated the number of encoding machines required and the number of technicians required to operate those machines. Because of the high-level nature of the model, the design team explained that the results were indicative of the magnitude of expansion required to satisfy business volumes and still meet key process performance goals. The team explicitly stated that the results were not precise, and could not be precise until actual performance data exists.

The design team created the model using spreadsheet driven input to allow quick experimentation with updated business volume assumptions. The spreadsheet input also allows quick change of activity processing times to allow for adjustments as more detailed knowledge of activities and tasks is gained.

3.3 Process Visualization

As Hammer and Champy state, seeing paper with workflow diagrams can allow managers and executives to understand more quickly how processes will work, how they will integrate, and how customers will interact with the business. The use of animation in a dynamic simulation model creates allows this understanding to occur more quickly.

This project created a compelling animation of the process to help communication among the executive staff and with potential partners, investors, and customers. Executives could see what the customer experience would look like, and understood how variations in order arrival patterns in an expanding business could endanger specified order cycle time goals. The model animation generated key executive buy-in to the selection of an operating strategy for encoding data onto advertising spots.

4 CONSIDERATIONS FOR HIGH-LEVEL MODELING

High-level simulation models present opportunities for simulation to play a greater role in environments of uncertainty. Professionals must ensure that the approach to simulating in rapidly changing environments is well-suited to meeting needs for quick, "directionally correct" answers. The approach must also mitigate risk through solid understanding of desired outcomes and project scope control.

4.1 Fluid Nature of Process Environment

There is no more rapidly changing business environment than is found in a pre-launch startup company. As business model changes take place, new alliances and new directions shape the key processes of the business. In this environment, creating a detailed model of how a process will be implemented is extremely difficult if not impossible. The operating mode at this point in the company's launch cycle is more likely to be one of iteration and experimentation rather than one of implementation.

This ongoing iteration toward stable processes is natural, and the company can benefit from experimenting with multiple static process models as well as from the use of dynamic simulation models. Companies in this stage or pre-launch activity will, however, have limited patience for experimentation, preferring to move ahead with "directionally correct" solutions. Business growth assumptions and process performance standards can change dramatically through this period, weakening the ability of a detailed simulation model to give precise results.

4.2 Expectations for Model Results

A high-level model, whether in a new venture or in the oldest of processes, cannot give a statistically predictive result. It is imperative that this expectation be set with the user of the model results before the project starts, and be reinforced throughout the project. This understanding is the most significant critical success factor for a high-level modeling project.

The primary benefits of high-level modeling are process visualization and an understanding of the directional implications of change. Process visualization cannot be underestimated in its impact for creating understanding. The design team can ensure they are all speaking the same language and see a dynamic representation of the static design maps and data. Company insiders can quickly grasp evolving design changes in other areas. The company can use the animation to explain the basic process to potential vendors, customers and investors.

Often clients desire to have the model left behind at the end of a project for future use. In the start-up world where decisions are made quickly, models are built quickly to give specific answers and then are discarded. Re-use of high-level models is limited. They are similar to software prototypes that give an impression of the final manifestation of what will be created. As with software prototypes, simulation process "prototypes" are best used as historical documents, not as the basis for the next generation of a more detailed model.

4.3 Maintain Focus at Right Level of Detail

Simulation professionals are accustomed to mapping and analyzing processes at a very low level of detail, performing rigorous data collection and analysis, and ensuring model results accurately reflect reality. Surrounded by the uncertainty of the start-up environment, flexibility is critical to allow for changes in business goals, key questions that must be answered by the model, and level of detail required to answer these key questions.

Scope is always a consideration in modeling, with many projects suffering when the breadth of an analysis expands to other processes or when additional questions are asked at a late date. With a high-level model, the largest risk is that the depth of detail increases so that the quick answers desired cannot be given. When the level of detail increases, it is incumbent on the project manager to control these increases. More detail can take an unacceptable period of time due to the fact that it is likely that no more detail exists for the new processes.

4.4 Future Opportunities

High-level modeling can open new opportunities for simulation professionals who are prepared to live with a rapidly changing environment where models are quickly built, used and discarded. The use of quickly developed and used process simulation prototype models allows professionals to have significant participation in process design choices.

Simulation professionals are well-prepared to move into the area of process design, and are valuable because of their ability to view processes in terms of the performance characteristics such as cycle time and throughput. This end-to-end process focus helps new companies concentrate efforts on key processes that affect the customer experience.

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