Endogenous limits and bottlenecks: Improving Anticipation and Response in VHA Homeless Programs Operations *

A strategic thinking exercise based on a simplified model of people express case

Abstract

This paper describes a serious game developed with the objective of highlighting the importance of latent limiting mechanisms that a production or service organization might run into even when it has diligently upgraded its explicit capacity portfolios. The game is based on a stylized model of People Express airline growth and collapse behavior. The gaming process, including briefing and debriefing considerations, the experience of actual game play and learning outcomes are described in detail. The gaming exercise was developed for the participants of the VA Homeless Programs Data and Sustainment Conference 2014, but can be used flexibly in a classroom or training activities for management and planning.

Key words: serious games, system dynamics, learning, service organizations, homelessness.

Introduction

While limits created by explicit capacity constraints are easy to discern, they can generate complex behavior patterns including overshoot and oscillations (Sterman 2000). Examples of such constraints include land or other physical resources, production or service capacity in terms of machines or other infrastructure, and physical space or buildings (Forrester 1961, 1969, 1971). When there is adequate manifest capacity, service limitations and bottlenecks can still arise from constraints created by latent capacity portfolios. Loss of market share, when there is adequate production capacity, and un-served customers when there is adequate service capacity are manifestations of latent capacity constraints.

This paper describes a Strategic Thinking Exercise implemented for the participants of the VA Homeless Programs Data and Sustainment Conference 2014. At this conference, the VA Homeless Programs National Office brought together national and network level operations leads for various programs and services in a conference to discuss data and sustainment issues related to the initiative to end Veteran homelessness. Senior executives and managers from the VA Homeless Programs sought to use this conference as an opportunity to anticipate, identify and tackle key operational challenges facing the initiative. The strategic thinking exercise was motivated by the desire to promote strategic thinking across the VA Homeless Programs. It was decided to use an alternate problem context, so player distraction to micro-detail is avoided. The case of People Express Airline, which grew at a phenomenal rate but then lost customers rapidly at a time when it had plenty of plane seats, was selected as a case for designing the exercise – a role playing game. It was also decided to use a computationally simple and stylized framework focused on manifest and latent capacity portfolios that could be easily explained to the audience for driving the game-play.

The paper also describes the game testing process, the game briefing, the gameplay experience, the game debrief and the feedback from the audience. The purpose of the exercise was to develop an awareness of the latent factors that may lead to operational bottlenecks and sustain homelessness even when careful attention is paid to the development of bed capacity. The gaming event achieved its objectives of creating the recognition of circular connections between role-play in different parts of the organization and also relating the explicit and latent capacity portfolios to the players work domain.

Manifest and latent capacity portfolios in organizations

Capacity in manufacturing and service organizations can be divided into two broad portfolios: manifest and latent. The manifest capacity resides in an explicit stock, like buildings, machines, plane seats, hospital beds, service centers, and personnel operating them. Its volume can be easily discerned and monitored and its growth can be tied to revenues, operating budgets or projections of demand. The latent capacity, on the other hand, exists in an intangible form. It can take the shape of coordination, effective utilization of infrastructure and resources, solving unforeseen problems, productivity management, conflict resolution, training, etc., whose volume

can neither be measured nor pro-actively planned. Its inadequacy is detected when a bottleneck appears and overcome in a reactive process that may involve considerable delays. Figure 1 demonstrates how the two capacity portfolios might impact performance in an organization.
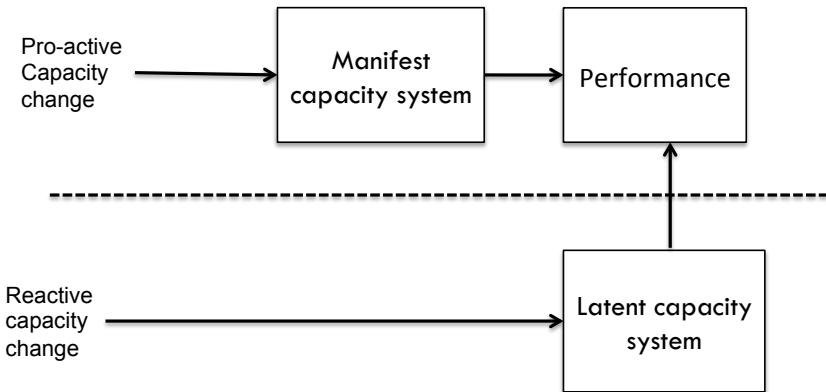
Figure 1   Manifest and latent capacity systems in organizations

Performance is affected by both manifest and latent capacity portfolios. While the former can be changed through pro-active planning, the latter is changed only through reactions to performance problems that might take a while to discern and correct. The latent capacity volume would therefore never be optimal, which can lead to unforeseen bottlenecks. Some examples of such bottlenecks are outlined in Saeed (2009). A related gaming environment is posted at:

http://forio.com/simulate/netsim/hiddencapacity/overview/

VA effort to end homelessness among Veterans

The United States (U.S.) Department of Veterans Affairs (VA) has made ending Veteran homelessness by the conclusion of 2015 a top priority, undertaking an unprecedented campaign to dramatically increase successful outcomes for Veterans and their families who are homeless or at risk of becoming homeless. This initiative aspires to a systematic end to homelessness, which means there are no Veterans sleeping on the streets and every Veteran has access to permanent housing. Should Veterans become or be at-risk of becoming homeless, VA will have the capacity

to quickly connect them to the help they need to achieve housing stability. The ultimate goal is that all Veterans have permanent, sustainable housing with access to high-quality healthcare and other supportive services. To meet this challenge, VA launched a comprehensive, evidence-based, and outcome-driven strategy consistent with the first ever Federal strategic plan to prevent and end homelessness. Developed in May 2010, the plan was named: Opening Doors: Federal Strategic Plan to Prevent and End Homelessness. VA together with its Federal, state, and local partners, has made steady progress toward preventing and eliminating homelessness among Veterans. The 2014 Point-in-Time Count, prepared by the U.S. Department of Housing and Urban Development (HUD), estimates there were 49,933 homeless Veterans on a single night in January 2014 in the United States. There has been a 33 percent reduction in Veteran homelessness since the initiative began in 2010 (HUD 2014).

Service, a form of latent capacity is critical to alleviating homelessness, yet it remains an undervalue asset (Mullen and Leginski (2010). Latent capacity factors significantly in the six strategic pillars in the initiative to end Veteran homelessness: Outreach/Education, Treatment, Prevention, Housing/Supportive Services, Income/Employment/Benefits, and Community Partnerships. The success of the initiative hinges on two key factors. The first factor is the dedicated efforts of VA and community clinical staff to connect homeless and at-risk Veterans to the right programs and services in a timely manner. The second factor is the effectiveness of the programs and services in enabling Veterans to achieve permanent housing placements.

Why use people express case?

The target participants for the exercise were national and network level operations leads for various VA programs and services. Initial discussions among the authors led to the recognition that bottlenecks appeared in the operations even while programs were being developed and resourced with careful consideration of the needs of Veterans. We decided to leverage simulation models to further understand this problem. Further, we sought to engage the audience in a strategic thinking exercise by leveraging a Serious Gaming Environment built around this model.

At first, we considered developing a model incorporating the homeless aging chain and a pressure driven service infrastructure so it is related to the knowledge/experience domain of the participants. Several issues were identified with the prototype:

1. Although the model developed had reasonable detail, it fell short of the detail in the mental models of the targeted audience. It was feared that the credibility of the model would suffer due to its stylized structure.

2. The model was still too complex to be easily explained to the audience. Behavior generated by this model could not be easily explained by the players and would presumably be received with some skepticism.

3. The larger model generated outcomes that subsumed the intended learning outcomes, but included many other features that could distract our players from the intended problem focus on latent factors in the system.

With these considerations, a parsimonious system dynamics model based on the Harvard Business School's People Express Airline case (Eisenmann and Barley 2012) was selected to serve as the game engine. An elaborate gaming environment based on People Express case created by John Sterman (Sterman 1988) and named People Express Management Flight Simulator is available at http://www.strategydynamics.com/microworlds/people-express/. This simulator was considered for use with our game audience but not selected as it contained diverse detail that would recreate issues 2 and 3 listed above in relation to using a domain specific structure and inhibit our audience from discerning the importance of latent service portfolios that create bottlenecks.

Synopses of the people express case

People Express was a small airline that wanted to grow its market and become a major player in the competitive domestic market. They reasoned that by dropping their prices significantly below those of their larger competitors, they could build a new market for themselves amongst those who never or rarely fly. They also expected their lower prices to attract a fraction of their competitors' customers.

But how could People Express lower their prices and still make money? Management's idea was that people would be willing to accept fewer services in exchange for the lower airfare. In particular, their no-frills airline did not offer first or business class and eliminated both free in-flight meals and free baggage check-in. By removing these frills and correspondingly reducing

their staffing for each flight, they sought to reduce their average service quality to 80% that of the industry average.

Although People Express cut these services, they strove to keep the quality of service of what remained as high as, if not higher than, the industry average. To do this, they insisted on training their own employees from the ground up. They were extremely selective about whom they hired and, in particular, avoided people who had prior airline experience. This led to extremely long training delays (six months to a year) in increasing their service capacity.

The management of People Express also felt that the only other thing limiting their growth was the size of their fleet. After all, if you do not have capacity for new customers, or do not provide the flights they need, they will look elsewhere. They felt a two-pronged attack of lowering prices and increasing the size of their fleet (and therefore number of passenger seats and routes serviced) would cause their business to grow dramatically. They also relied on customer word-of-mouth to increase the size of their customer base, as they expected many satisfied customers.

In the beginning, management's strategy appeared to succeed and the airline was hailed as a new model for the industry. An increased fleet size and a lower price did indeed cause their business to grow rapidly through the word-of-mouth effect. Unfortunately, after some time, and not due directly to competitive pressures, their business collapsed and the airline went out of business.

One phenomenon that management didn't take into account is that word-of-mouth is a two-way street. It can increase sales while there is a good "buzz" out there, but dissatisfied customers very quickly spread bad news, negating the word-of-mouth effect, and even driving potential customers away. In addition, dissatisfied customers are prone to look elsewhere for what they need, so the company also loses existing customers.

But why did the customers become dissatisfied if the prices were low and the service quality was acceptable? Because the company did not adequately manage their service quality and it fell dramatically. The reason for this was twofold:

First, the rapidly growing customer base stressed the service capacity of the organization far enough that average service quality fell. The fact that there was a long delay to increase service capacity made matters much worse as management could not respond effectively to these drops

in average service quality. Management was slow to accept these service quality discrepancies, as well as to order new capacity, introducing further delays into the ability to increase service capacity. In addition, since management could not directly measure service quality (it is, after all, an intangible attribute), it was ignored in the day-to-day business decisions. Instead, they monitored average service quality (an overall perception), adding yet another delay. Second, management did not take into account the long delays inherent in the market's perception of their reputation. In this specific case, it took four years for the effects of bad service quality to ripple into the market, dramatically reversing the word-of-mouth effect. Any attempts to improve service quality met with similar delays.

Although the customer population demographics of people express were different from that of the homeless program, the service provision had similar explicit and implicit components. Thus shelter capacity in homeless program was analogous to the plane seats in people express case and the service capacity appeared to represent an aggregate of outreach, counseling and problem-solving tasks performed by the homeless program to service its clients also similar to the multiplicity of tasks faced by an airline in managing its customers. The shelter construction program, which was a part of the services model, was based on budget allocation that could be tied to the estimates of the homeless population, but provision of other services could not be planned proactively. It had to be driven by perceptions of inadequacy that require long delays to be recognized. A stylized model of people express highlighting growth mechanisms and endogenously generated limitations, originally developed by the first author for instructional purposes, was used as the game engine. This model is described in the next section.

## A stylized model of people express operations used in the game

Although the model of the game was simple and its whole structure could fit a page, it was divided into four sectors to focus player attention on local decisions that appeared to be exercised appropriately. These sectors tracked changes in fleet, customers, reputation and service capacity. These sectors are described below:

1. Fleet acquisition

Airplane seats represent explicit capacity in airline business. As most airlines have lease in and lease out options, plane seats can be easily adjusted depending on the traffic carried. Figure 1-a describes the fleet adjustment process. Indicated plane seats arise from a policy of maintaining parity between revenue arising out of passengers carried and size of fleet. Actual plane seats adjust towards indicated target over an adjustment time depending on management vigilance.

2. Passengers flown

Passenger traffic (Figure 1-b) depends on plane seats, passengers carried per seat, fare attraction and airline reputation. Passengers carried per seat will depend on how effectively plane sets are used. It is determined by route intensity and maintenance that minimize idle and down times. Fare attraction is determined by the price relative to what is charged in the market. A discount airline will often have discounting target that calls for delicately balancing revenue needs with the traffic targets.
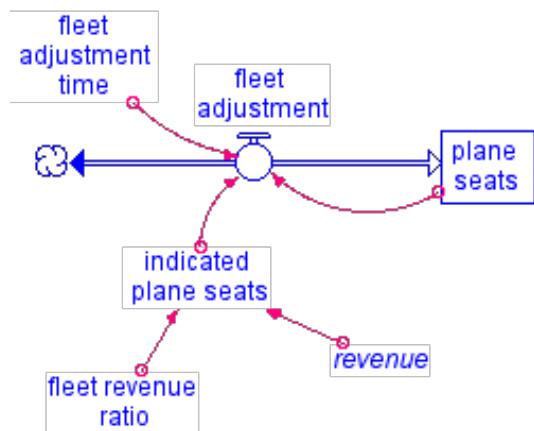
**Figure 1-a: Plane seat adjustment**
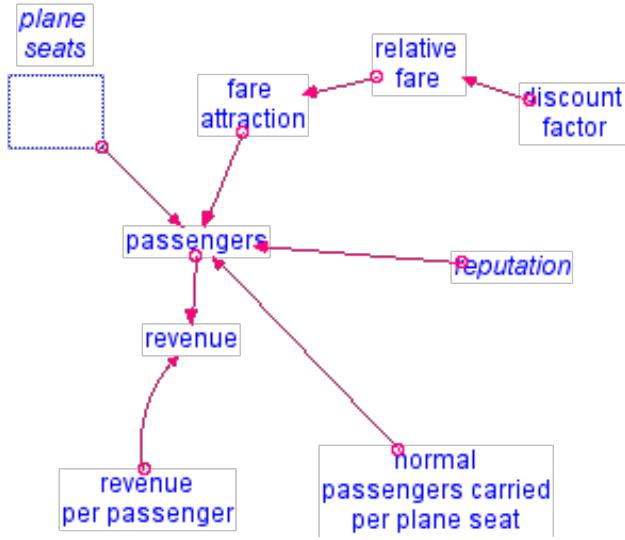
Figure 1-b: passenger traffic

3. Reputation

The reputation of the airline depends on customer word of mouth as shown in Figure 1-c. Customer word of mouth arises from their experience of flying and this experience results from the intrinsic quality delivered by the airline – each process requiring a perception delay. The intrinsic service quality is determined by the adequacy of the service capacity relative to the passengers carried. This service capacity is not as explicit as the plane seats. It can reside in many functions including seat booking, flight operations, passenger handling, schedule adherence, baggage handling, and unforeseen problem solving capability. Its exact magnitude is hard to know and its expansion cannot be planned as explicitly as plane seats.
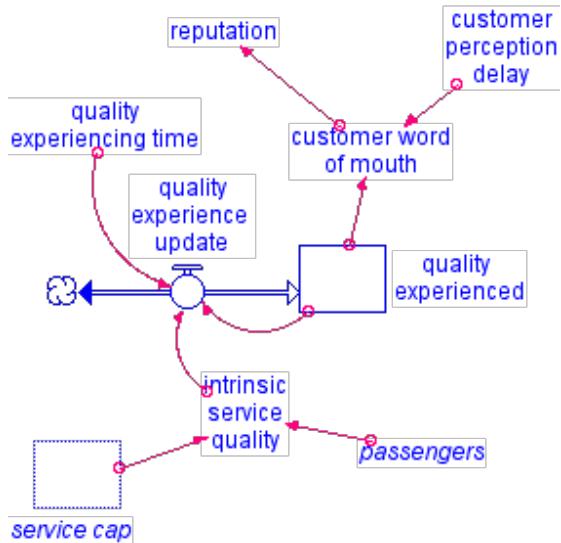
Figure 1-c: Reputation

4. Service capacity management

Finally, the service capacity management process is outlined in Figure 2. Service capacity does get upgraded or downgraded depending on the assessment of the management that is often driven by customer complains rather than a tangible measure of capacity need. Thus, while experienced service quality relative to the industry standard returns capacity discrepancy, the company takes some time to translate it into capacity orders, especially when it is targeting to deliver lower than market service level and attracting customers mostly through discounting fares. Also, since service portfolios require trained personnel, bringing such people into the organization is a time consuming process. Both hiring them and training them require time. Even when actual passenger traffic calls for service capacity reduction, lay off of surplus capacity may be as time consuming since it would not be considered prudent to let go trained people.
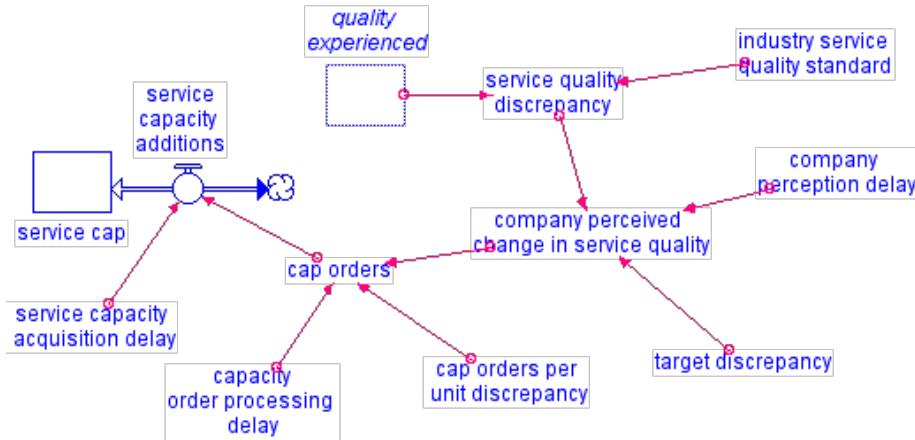
Figure 2-: Service capacity management

The model was structured in this way to establish that the decision process within each sector was indeed quite appropriate. The causal links created between the sectors outlined in Figure 3 however told another story.
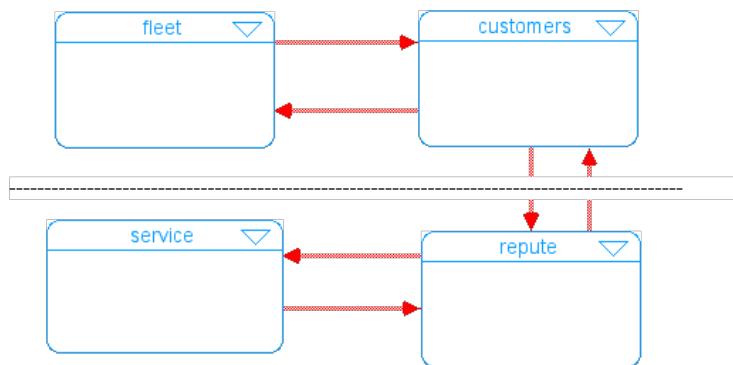

Figure 3: Causal links between sectors

It showed that while the fleet capacity could grow depending on the reinforcing feedback between plane seats and customers carried, growth of service capacity involved several balancing loops and information delays. These links were not revealed to the game audience. The discovery of these links called for systems thinking and was seen as an important learning objective of the game.

Gaming interface

Thrill arising from competing is important for engaging people into a game representing a stylized scenario. Hence, a winning criterion was created for the game. Figure 4 shows the structure added to the model to track player performance.
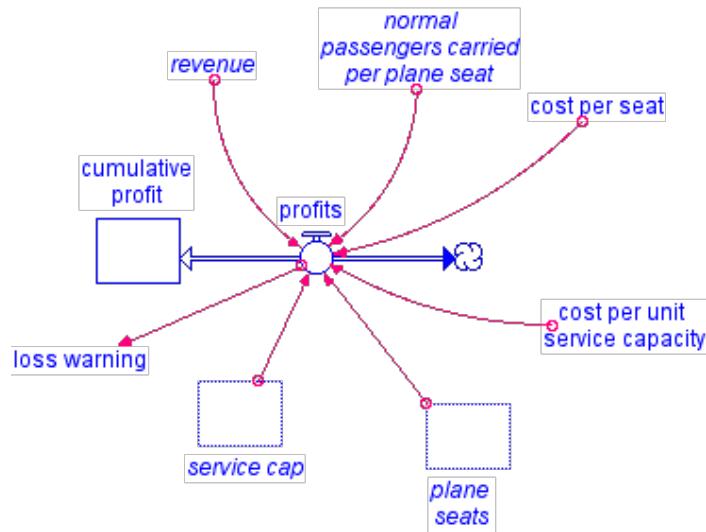


Figure 4: Structure for tracking performance.

The model was initialized in equilibrium with costs and revenues exactly balancing each another, which returned zero profit. Initial value of cumulative profit was also set at 0. The players had to decide on a growth strategy if they were to get at all on the winning bandwagon. The team with the highest cumulative profit at the conclusion of the game would win the game.

We also felt that the virtual reality of the game should afford an opportunity that goes beyond what can be achieved in actuality. Since the game was relatively simple to play and could be completed rather quickly, we decided to allow unlimited reruns that are not possible in the real world. We programmed the game to reset for a fresh run if the instantaneous rate of profit went negative. This virtual reality gave an opportunity to the players to understand the dynamics of the system through multiple trials. Each fresh start provided an opportunity for discourse that will lead to understanding failure and refining strategy for the new run. A loss-warning message with the following text popped up when a reset occurred:

People's Express is operating at a loss and the management team has lost the confidence of the company's creditors. The company has been dissolved. You will start over.

Figure 5 shows the gaming interface that consisted of sliders allowing players to input policy parameters after each performance period, counters that kept track of instantaneous and cumulative profits and the output as well as input charts. Scales both on sliders and the output charts were specified after making several runs with different parameter sets. Scales on the input charts replicated the range provided on the sliders. These scales allowed the participants to adequately test the sensitivity of their policy parameters as well as provide a good view of a wide range of outputs those parameters created.

Game Interface Quick Start: Overview
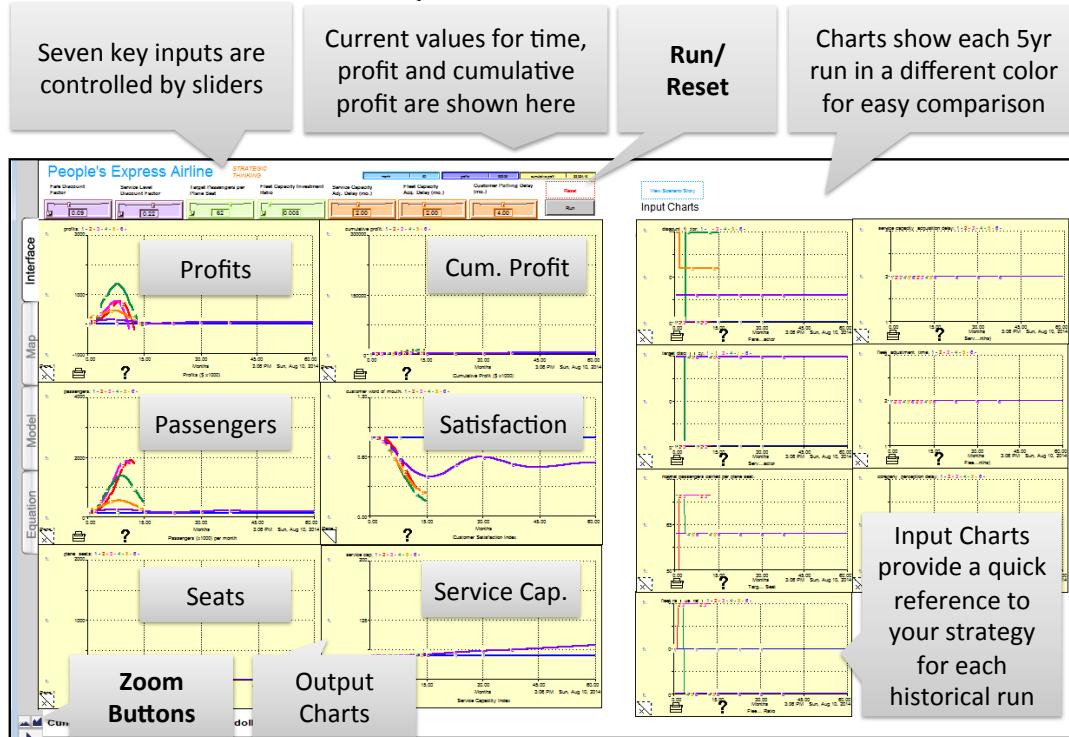
Figure 5: The game interface.

Figure 6 shows an enlarged view of the input sliders. Color codes on them corresponded to the ease with which the policies tied to them could be manipulated. Thus, purple sliders represented

policies targets on pricing and service level, both of which could be changed easily in the short run. Green sliders represented longer-term decisions that required route acquisition and maintenance investments for changing the frequency of use of an airplane, and investment into acquiring plane seats. Orange sliders were hardest to change since they arose from operational considerations often not in control of the company management. This color-coding of the decision inputs was explained to the game audience so they can make sensible decisions.

Game Interface Quick Start: Inputs
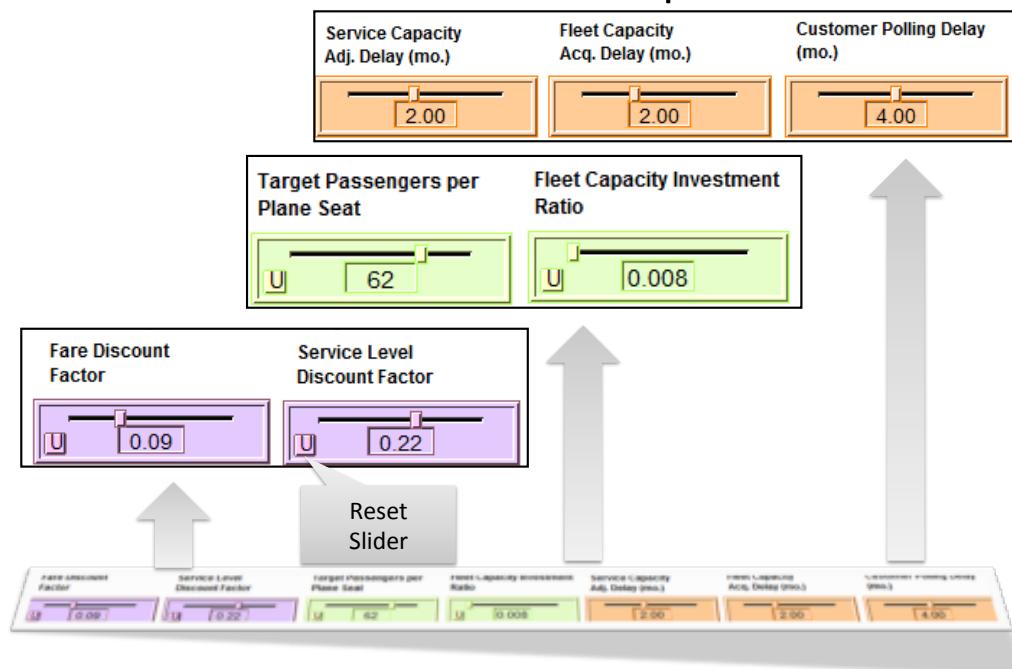
Figure 6: Input sliders

Game Testing

The game was tested with selected coworkers at the VA-Center for Applied Systems Engineering (VA-CASE) in Indianapolis, IN, prior to the gaming event scheduled at the Data and Sustainment Conference 2014. This test was designed only to return procedural bugs. Game testing was primarily limited to the functionality and mechanics of the game. Testers were

organized into two groups in a dry run of the exercise with one of the authors serving as a game master. Testers were instructed to employ a wide range of parameter sets and report any problems or errors experienced. The primary updates based on testing activity were to refine definitions of the policy parameters, ascertain ranges on sliders and output graphs, and introduce the reset protocol that restarted the game. This testing activity helped authors to understand and better organize the timeline, game protocol and floor plans for the exercise. It also served as a training activity for the exercise's technical facilitators.

Game play with the target group

The exercise was conducted as the afternoon activity on the first day of the VA Homeless Programs Data and Sustainment Conference 2014. It followed a plenary discussion of the operational problems faced by the participating managers and how they should be resolved. The participants were divided into five groups set up as separate airlines. They were physically placed at separate locations with a laptop running the game and a technical facilitator selected from the tester group. The facilitators were instructed to provide technical assistance only and to explicitly avoid aiding the participants in developing strategies.

One day prior to the game-play a pre-reading was distributed. It provided game timetable, an overview of the people express case, and definitions of game output variables and game input policy parameters. Prior to the game play, the participants were walked through the decision process in each of the four sectors of the model but were not provided the linkages between the sectors shown in Figure 3. They were given the winning criteria and explained the automatic reset conditions. They could also reset the game manually if they were dissatisfied with the results, but they had to finish the game within the time allocated to them. Thus, an opportunity was available to them for developing a winning strategy by gaming the game after they were able to understand the timing of their decisions through trial and error. Trying to win the game in this way at least called for understanding to some degree the reasons for failure, which we thought would be a good take away from the game.

Game play

After the groups were asked to commence the game, the authors visited to listen in on their conversations and answer any questions. Almost all groups started playing the game soon after a preliminary discussion about the mechanics. The first run generated the overshoot and collapse behavior experienced by People Express for all groups, which provided the fuel for initiating a discussion on strategy. Some groups asked the authors for outlining a winning strategy, but were told this was their assignment. The failure to sustain the company forced the groups to carefully look at the output and relate it to the pattern of decisions they were making.

Most groups recognized that the problem arose from inadequate service capacity, but their solutions to this problem varied. Since a successful game play was required to be created within a fixed time frame, many tried to game the system by overinvesting in service capacity and under investing in plane seats over the initial phase and then intensifying investment in the fleet towards the end. When questioned whether this was sustainable, most knew that it was not, but it would give them a fighting chance to win the game.

Many groups were heard talking about the need to understand the linkages between sectors for creating a sustainable behavior, but none tried to identify those linkages. It seems they were able to point to the general framework of the problem but did not have the process to go to the specifics. Towards the end of the allotted time period, a team that was especially frustrated with the repeated collapse of their airline started exploring strategies to win the game simply by aligning their peak operational performance with the end of the game. Two other teams that overheard this strategy started following it and excelled at creating ever greater peaks, all the while remarking that their strategy would not result in a sustainable operation.

Debriefing

The debriefing began with the determination of the winning group and the award of prizes in the form of trophies to its members. The winning group was then asked to outline its winning strategy and why they selected it. As observed during the game play, the winning group as well as others decided to focus on scoring high on the performance measures within the time frame of the game play rather than attempting to sustain the company in the long run after a few failed

attempts. Since pursuing this option called for understanding the nature of the two capacity portfolios and managing investments in them, it was seen as a positive learning outcome. The gaming strategies were however based on the knowledge that the game would end after a finite play period and strived to manage the timing of the investment portfolios rather than devising a state-based strategy. In a real situation, a state-based strategy would be the only sustainable option. More discussion on the merits and demerits of the time and state based strategies was needed, but could not be pursued in this first run of the game in view of the time constraints.

An important outcome was that the game players wanted to pursue the links between the various decision sectors of the game, which was consistent with the intended objectives of the game. They in fact helped to draw these links on a flip chart available in the room that allowed the group to discover the map of Figure 3 and give a meaning to their suspicion that knowing these links is important to devising a successful winning strategy.

There was time enough to point out that while both plane seats and service capacity portfolios affected ridership, the investment decisions in them were made on very different bases. The plane-seats were a visible and tangible portfolio and investment in it could be linked to the revenues, which created a clear basis for determining the size of the fleet. The service capacity on the other hand resided in many elements, including passenger handling, scheduling, baggage handling, counter and on-board services, training, corporate culture, problem solving capacity, etc. Its need could be assessed only when there was a perception of its shortage motivated by customer complaints and management observation. Thus, the fleet expansion decisions were driven by a positive feedback whose gain could be controlled, the capacity expansion decisions were driven by a negative feedback that arose out of a perception of discrepancy that took a while to come to fore. The first portfolio could be pro-actively managed, the second could not be.

The state-dependent resolution of this problem requires re-examining the information links and decision rules and therefore modifying the model, which can be attempted either by a trained modeler or through extended discourse which could not be pursued in the available time. The time dependent resolution of the problem required monitoring the aggressiveness of expansion of

each capacity portfolio over time carefully by continuously changing slider settings provided in the control panel. This option was pursued by most groups - with success.

Last but not least, the debriefing discussion led to recognizing a correspondence between the portfolio management problem in People Express and the VA homeless program where homelessness prevails in spite of increasing shelter provision. Some could also see that the imbalance between tangible and intangible service portfolios also prevailed in other VA operations. The take away from the game was clearly the need to manage these portfolios and the references to the game were quite prolific in the subsequent day deliberations of the meeting participants on their operational problems.

Our debriefing followed the spirit of structural debriefing outlined in Pavlov and Saeed (2015), although due to time limitations no attempt was made to group-model the game-play, which we highly recommend in a more drawn out exercise.

Conclusion

This strategic thinking exercise enabled VA senior executives and managers to confront many of the same challenges they encounter in the course of their demanding roles in the initiative to end Veteran homelessness. However, they were able to escape the confines of their existing individual mental models during the course of this strategic thinking exercise because the scenario was set in a different sector. The exercise enabled the audience to develop new shared mental models regarding latent capacity portfolios. Shared Mental Models are the building blocks of Organizational Learning, which increases the organization's capacity to take effective action (Kim, 1998). These mental models are now enabling executives and managers across the VA Homeless Programs to make better resource allocation and operations management decisions by considering service capacity alongside bed capacity. Since these mental models are shared, there has been broad support for decisions to limit the rate of bed capacity growth until service capacity issues are adequately addressed. The understanding that service capacity is mostly hidden and hard to measure has also informed Operations Management efforts. This has been

especially important for those VA Programs that have seen rapid expansion in shelter capacity over the past few years.

The People Express scenario and the structure of the game were highly relevant to the participants because they were able to relate key elements to their own organizational roles. VA Homeless Programs have experienced recent growth in physical capacity. In the weeks leading up to the conference, VA was undergoing a leadership change and the overall VA strategy was evolving. Customer service was becoming a key focus area for the new VA leadership. Lastly, similar to the structure of the game, participants faced an emphasis on achieving the strategic target of ending Veteran homelessness in a fixed time frame.

While these results exceeded the expectations for the exercise, participants also walked away with additional key insights that are highly relevant to VA Homeless Programs Operations. Participants underscored the need to relate to long-term targets in terms of short-term outcomes during the course of efforts to end Veteran homelessness. Another lasting insight was the importance of anticipating system level outcomes in efforts to sustain progress made in Veteran homelessness. Lastly, participants embraced systems thinking and resonated with the need to fully explore and understand the underlying drivers, delays and feedback loops leading to system level outcomes. Many months after the exercise, senior managers continue to draw references to the people express scenario and insights gleaned from the exercise.

Such applications of serious gaming to promote strategic thinking require the support of executives who recognize the pitfalls of using conferences as social events that discuss little more than pending tactical issues. Leveraging serious gaming to promote strategic thinking not only promotes connections across the organization but can also serve as a forum to tackle thorny strategic challenges. Such exercises are another tool for organizations like VA that are striving towards agile operations and continuous learning (VA, 2014). However, greater adoption of such tools will require attention to both their cost and realized value. This effort realized significant costs savings by using a well understood generic structure. A greater awareness of off-the-shelf models and in-depth understanding of the applicability of generic structures across domains can lower the cost of developing such exercises.

The three-day conference devoted a whole afternoon to the strategic thinking exercise. While this was a substantial investment on part of executives and managers, time constraints limited the value that could be tapped. For example, upon conclusion of the de-briefing session, participants wanted to play another round and apply newly gleaned insights into the nature of complex systems. This second round would have helped in consolidating systems thinking and reinforcing new mental models that were taking shape. In addition, scheduling and funding constraints limited attendance at this conference, as they do at most conferences. Participants believed that the strategic thinking exercise was relevant to many of their peers and could have benefited five times as many participants. Many participants requested a copy of the game and intended to further explore the exercise when they returned to their offices.

While such independent use of the game could realize additional value, it also presents new challenges and limitations. Independent use of the game does not have the benefit of a game facilitator to guide the participants in the process of converting their experiences into insights. Secondly, independent usage is void of group dynamics and cannot fully leverage game mechanics. Lastly, use of the game outside the confines of a structured exercise presents the risk of unintended applications that stretch the model beyond its intended usage. Despite the successes of this strategic thinking exercise and the willingness of the organizers to devote additional time in future events, significant potential remains both to scaling both the depth of engagement and breadth of participation in the strategic thinking exercise. The advent and maturation of social gaming technologies presents significant opportunities for achieving this scale.

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