Teaching Case

Network Analysis and Design for Tickets Sales, Inc.

Michael Gendron
A.T. Jarmoszko
Central Connecticut State University,
New Britain, CT USA
gendronm@ccsu.edu   jarmoszkoa@ccsu.edu

ABSTRACT

This case is for the senior-level data communications class within a business school setting. It requires abbreviated strategic and business analysis, which serves the instructional purpose of making explicit the linkages between the business-needs of an organization and the technology required to implement a useful solution. Ticket Sales, Inc (TSI) is a startup business that has received seed funding. They are using the seed funding to perform a number of feasibility studies that will enable them to seek first-round venture capital. They have already performed a marketing feasibility study and are now undertaking a technology feasibility study, including a 5-year total cost of ownership plan. They will use outside consultants to perform these studies.

Keywords: Technology; Networking; Feasibility-study; Venture-capital

1. CASE SUMMARY

Ticket Sales, Inc. (TSI) is a startup enterprise that has obtained seed-funding venture capital to perform various feasibility studies and to assemble a management team. Its goal is to create an automated ticket sales network in the greater New York City area by purchasing blocks of tickets at popular NYC venues at substantial discounts, then reselling those tickets to consumers at face value. The venue will benefit by guaranteed sales for a block of seats, and the customer will benefit through easy access to quality seats at face value, without the service charges imposed by many online ticket sellers.

TSI has already determined that it will use Genenco's GenServe[1] and kiosks products. GenServe supports the back office applications and web services for ticket sales, as well as direct retail access to ticket sales through their kiosk products. TSI has already performed a market feasibility study, sections of which are incorporated into this document. This case asks that students act as consulting companies and prepare a technology/networking feasibility study, including the following:
➢ business analysis (competitive forces, SWOT, Value Chain, Supply Chain) for TSI – this allows students to make informed technology and business recommendations;
➢ recommendations for building a technology/network infrastructure to support the business model and enhance the request for feasibility study.

2. INTRODUCTION

Ticket Sales, Inc. (TSI)[1] is a startup organization that has obtained seed-funding venture capital to perform various feasibility studies. Assuming the feasibility study requested in this document demonstrates TSI's ability to attain competitive advantage through technology, TSI will seek first-round venture capital to begin operations. TSI intends to operate in the New York City area. Its mission is to:

> "... employ technological solutions to provide easy access to tickets for movies, Broadway shows, and other ticketed events in large metropolitan areas."

TSI has already performed a market feasibility study, sections of which are incorporated into this document. Students, acting as a consulting company, are asked to conduct a Technology Feasibility Study. The goals of this Study are:

1) to craft a technology strategy that would place TSI in a competitively advantageous position within the retail ticket sales industry;
2) to develop a technology design and implementation plan to support the mission of TSI; and
3) to put together a five-year total cost of ownership budget for the network infrastructure and desktop technology implementation (as described elsewhere in this document).

---

[1] Fictitious company and application

259

The consulting company is asked to participate in TSI's feasibility study, pending successful conclusion of negotiations on terms and remuneration.

3. MINIMUM REQUIREMENTS

At a minimum, the **Technology Feasibility Study** submitted by your consulting company should provide a report that details the following:

- description of TSI, its strength and weaknesses, and an overview of how TSI's competitors exploit technology to enhance competitive advantage;
- implementation of an infrastructure to support the applications listed in this document;
- analysis of TSI's technology/infrastructure needs based on information obtained from TSI as well as your consulting company's own competitive analysis;
- design for a robust internal network within TSI's new corporate offices as well as plans to provide support functionality for:
  o information sharing through distributed applications
  o access to the Genenco GenServe application (see details below)
  o a comprehensive suite of desktop productivity software (e.g., word processing, spreadsheet, presentation software);
- design of Internet connectivity to support
  o offsite access for main office management,
  o internal e-business hosting based on the Genenco GenServe application suite,
  o secure retail ticketing transactions by TSI's chain of kiosk outlets around New York City.

4. E-BUSINESS INNOVATION REQUIREMENT

The entertainment industry, and ticket sales in particular, is a large part of the New York City economy. TSI has a unique and innovative idea to offer tickets to its customers at kiosks and online. Considering the number of tickets sold in this region TSI will capture market share through convenient and accessible ticket sales. There are many competitors (e.g., Ticket Master, TKTS, Ticketron) -- the technology solution that your consulting company proposes must allow TSI to provide better, faster, and more efficient services to ticket customers.

5. TSI BUSINESS MODEL

TSI will purchase blocks of seats from each venue at a discount and resell them at the face value of the ticket without any service charge. Significant discounts are negotiable through bulk purchasing arrangements because TSI take the risk for predicting sale levels for individual events. By committing to purchase blocks of seats, TSI guarantees its venue-partners revenue for those seats, thus increasing their incentive to sell at substantial discounts. TSI's flexible and real-time distribution network will allow us to realize a profit on the margin for each ticket.

6. BUSINESS OPERATIONAL OBJECTIVES

Below is a summary of TSI's major business goals within especially important categories. The proposed technology solutions must support these goals and provide a 5-year total cost of ownership plan.

6.1 Ticket Sales and Operations
- Provide connectivity for kiosks located in New York City
- Provide Internet connectivity to support on-line (web) sale of tickets.
- Provide network hardware to support data storage for ticket information sales and purchases.
- Provide main office desktop and remote connectivity for all authorized employees to the GenServe application

6.2 Infrastructure
- Provide workstations and printers for all staff (see below for specifications)
- Provide cost-effective, secure, and reliable Internet connectivity and wiring within TSI's new building
- Provide Servers to support the organizations needs for intranet and internet email, internal databases, printing, etc.
- Provide a secure LAN for TSI with appropriate Firewall software/hardware
- Provide VPN access into the TSI network from the Internet for kiosks and employee home computers
- Provide installation and ongoing connectivity to the Internet for the main office and for all kiosks. Note: the connectivity to the main office must have **95%** uptime reliability.
- Provide a backup solution for all servers and desktop PCs.
- Provide UPS support for all networking hardware and servers at the TSI main office.

6.3 Service Maintenance
- Provide onsite hardware service to maintain network and desktops
- Provide software maintenance for desktops, servers, etc.

7. GENENCO KIOSKS, APPLICATIONS AND BACK-OFFICE SOFTWARE

TSI's will provide tickets exclusively through the network of kiosks and via its website. They will purchase the web server application, client/server application and kiosks from Genenco, Inc. Based on the marketing analysis and the outcome of the technology feasibility study, TSI will place the kiosks in various public locations throughout New York City -- excerpts of the market analysis are included below. The projected volume of sales for web transactions and each kiosk type are discussed. The web transactions and kiosks will transmit credit card information over the Internet; therefore, end-to-end security is a major concern in the WAN design. The web and client/server (i.e., kiosk/main office) application is being custom designed and built for TSI and will be called GenServe.

The Genenco kiosk client/server and the web application will perform credit card validation/verification (as part of its software functionality) and will communicate with TSI's

bank and merchant account via the Internet. TSI will use software-based credit card processing for kiosk-generated sales, and online shopping cart credit card processing for sales through TSI's website. TSI will accept Visa, MasterCard, American Express, Discover, Diner's Club, and debit cards. The average credit card sale will be between $200 and $1,000, and our anticipated monthly volume is $250,000-$499,999.

The kiosks will communicate directly to the TSI home office via a VPN. Hardware/software must be included in the proposed network design to support VPN connectivity and end-to-end security. Even though Genenco will install and service the kiosks, your proposal must include all necessary connectivity components. This includes the form of connectivity (e.g., DSL) for each kiosk, or group of kiosks, any required interface cards (e.g., modems, network cards), and any communications hardware necessary at the kiosk location (e.g. switches/routers). The kiosks are preloaded with MS-Windows XP, a VPN client and the GenServe client application. The GenServe client application runs as a dedicated application in the kiosk environment. Main office servers will update kiosk internal databases during normal sales transactions -- those updates occur as background processing and are included in the transaction sizes given below. The updates include changes in venue, show, and seat availability.

Consumers purchasing tickets over the web will connect to the GenServe web application through the Internet via their own ISP. GenServe will employ encryption to protect credit card and personal information. Your proposal must include all connections, hardware, and software necessary for this to occur.

Since this is retail e-commerce environment, kiosk and website response time and reliability are important factors in network design. TSI conducts all of its business electronically and is financially very sensitive to interruptions in its own network and in Internet connectivity. Thus, redundancy is very important.

8. GENSERVE HARDWARE REQUIREMENTS

The GenServe application requires the following hardware:
1. Kiosks – they are provided by Genenco through a separate contract
2. Four servers, each rack mounted, and with the following specifications to support the server:
   - Each must support multiple high-end Pentium 4 processors for possible expansion. The initial configuration must include at least one processor.
   - 512 L2 Cache;
   - 4 GB Memory – expandable to 32GB;
   - Raid 5 HD Controller;
   - 5 Hard Drive bays for 5 X 1" hot-plug SCSI drives for a total initial storage of 90GB; External storage solutions will be considered
   - Fiber Optic network connections;
   - Redundant Power Supplies and Fans;

The servers must have the following installed:
- Server 1 MS-IIS;
- Server 2 MS-Commerce Server;
- Server 3 MS-SQL Server;
- Server 4 MS-Exchange Server

These servers are required to run the back-office operations of the GenServe application. The infrastructure design must include additional servers to support the business goals of TSI. The servers included in this section are dedicated to the GenServe applications.

9. OTHER TSI REQUIREMENTS

9.1 Security
All employees will have Internet access to track theater events at venues within NYC. Therefore, management needs to be able to track Internet usage by employee. Additionally, filtering of Internet sites --which management considers inappropriate -- is essential. Management also recognizes the need for strong protection from outside intrusion by hackers and viruses. A multi-level approach to security is expected.

9.2 Printing
Appropriate and specific types of printing will be required for different operations. Floors 2, 3, 4 and 5 (see below) will each have a Xerox Document Centre Digital Copier (leased directly form Xerox). All staff will use these as shared printers. All executives, managers and secretaries are to have local (not shared) laser printers capable of 10ppm. The marketing department requires a shared high-speed color laser printer capable of 11x17 printing.

9.3 Desktop PC Information
This list represents the minimum desktop configuration for ALL employees. Your consulting company can propose more than this minimum configuration, based on needs analysis.

- Software
  - Current Version of MS-Windows Desktop Operating System and MS-Office Professional Suite
  - Genenco GenServe Desktop Application – Installed by Genenco
  - Virus and Spyware Protection
- Hardware:
  - Pentium 4 2.8GHZ Processor Min;
  - 80 GB HD (7200rpm);
  - 1GB RAM;
  - 17 inch Flat Panel Monitor

10. STAFFING AND BUILDING SPECS

TSI plans to build a 5-story building with each floor being 7,500 square feet, for a total square footage of 37,500 sq ft. TSI is currently designing the building and therefore can only give approximate specifications. All cabling can be installed before the floor and ceilings are completed. Construction will take approximately 6 months, during which time installation can take place. Each floor will have a

261

large closet suitable for wiring and equipment, and a dedicated electric circuit. Table 1 provides details on staff location and building configuration.

Table 1 - Breakdown of Floors

Floor	Staff Members (Staff Count)	Office
1	Senior management from each major department, including CEO, CFO, and CIO (9)	Private Office
	Secretary for each senior manager (9)	Cubicle
	Building Receptionist (also does secretarial work) (1)	Lobby
2*	IT Staff (9)	Cubicle
	IT Manager (1)	Private Office
	IT Secretary (1)	Cubicle
3	Marketing Staff (19)	Cubicle
	Marketing Manager (1)	Private Office
	Marketing Secretary (1)	Cubicle
	Accounting Staff (19)	Cubicle
	Accounting Manager (1)	Private Office
	Accounting Secretary (1)	Cubicle
	Marketing/Accounting IT Support Staff (2)	Cubicle
4	Phone Center and Operations Staff (20)	Cubicle
	Phone Center/Operations Manager (1)	Private Office
	Assistant Operations Manager (1)	Cubicle
	Phone Center Secretary	Cubicle
	Phone Center IT Support Staff (2)	Cubicle
5	Phone Center and Operations Staff (20)	Cubicle
	Assistant Operations Manager (1)	Cubicle
	Assistant Operations Manager (1)	Cubicle
	Phone Center IT Support Staff (2)	Cubicle

* Floor 2 houses all core network and phone hardware

11. KIOSK MARKETING ANALYSIS AND FEASIBILITY STUDY

TSI previously commissioned a marketing feasibility study to determine the feasibility of its business model, the placement of kiosks and the expected ticket sales volume over the web and at kiosks. Selected details are discussed below.

11.1 Kiosk Utilization
The marketing study grouped kiosks into 3 categories by expected utilization: high, medium and low. Table 2 indicates the average number of tickets expected per transaction during peak utilization.

Table 2 - Number of Transactions by Kiosk Utilization Type during Peak

Utilization Type	Average Transaction During Primary Hours	Average Number of Tickets per Transaction
High	900	5.7
Medium	450	4.5
Low	227	2.3

Table 3 gives the number (#) of kiosks by area and utilization type (UT), the planned number of kiosks, the primary hours of operations and expected utilization grouping.

11.2 Web Utilization
The marketing study, conducted earlier, concluded that at this time it was not possible to estimate web sales due to a lack of data.

12. USE OF VENTURE CAPITAL

As stated above, TSI is using seed funding venture capital to pay for the necessary feasibility studies. The marketing analysis and feasibility study is done and some of its components are included above. Once the technology feasibility study is completed, TSI will seek first round venture capital to begin operation, and to support itself during its first 5-years of startup. The technology feasibility study must include all costs, including initial implementation, as well as five years of operational and support costs (total cost of ownership).

13. PROPOSAL FORMAT

The document submitted by your consulting company should have the following structure:

- Executive Summary
- Background, including the following analyses - Competitive Forces, SWOT, Supply Chain, Value Chain, discussion of business models. All of the above should portray your consulting company's understating of TSI and its placement in the ticket sales industry.
- Business/Network Needs Analysis - The technology needs of TSI must be explicated. Complete presentation of material is emphasized.
- Network Design and Technology Infrastructure - All hardware/software including operating systems, telecommunications equipment, desktop systems, servers, equipment racks, wiring, Internet connectivity for the home office. Internet Connectivity for each kiosk, network equipment and cables for each kiosk, etc.
- Costs - A five year total cost of ownership plan for this installation
  - ✓ Capital Costs
  - ✓ Operating Costs (including staff)
- Summary - Recommendations regarding the feasibility of this technology implementation.

Table 3 - Planned Kiosk Locations

Area	UT	#	Primary Hours	Configuration
Bronx	Med	6	4:00pm-11:00pm	3 locations with 2 Kiosks each
Bronx	High	4	6:00am-7:00am	All in separate locations
Brooklyn	High	5	8:00am-6:00pm	All in separate locations
Brooklyn	Med	5	6:00am-9:00am 4:00pm-8:00PM	All in separate locations
Brooklyn	Low	5	24 hours	All in separate locations
Manhattan	High	15	6:00am-8:00pm	5 locations with 3 Kiosks each
Manhattan	High	4	6:00am-8:00pm	2 locations with 2 Kiosks each
Manhattan	High	11	6:00am-8:00pm	All in separate locations
Manhattan	Med	6	5:00am-9:00am 4:00pm-8:00PM	2 locations with 3 Kiosks each
Manhattan	Med	4	5:00am-9:00am 4:00pm-8:00PM	2 locations with 2 Kiosks each
Manhattan	Med	5	5:00am-9:00am 4:00pm-8:00PM	All in separate locations
Queens	Med	10	2:00pm-10:00pm	All in separate locations
Queens	Low	5	24 hours	All in separate locations
Staten Island	Low	10	24 hours	5 location with 2 kiosks
Staten Island	Low	2	24 hours	All in separate locations

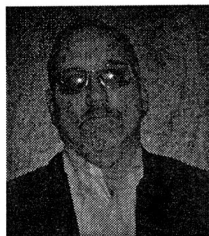## AUTHOR BIOGRAPHIES
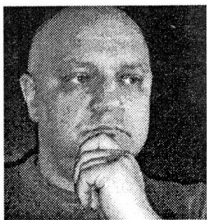
Michael Gendron is an associate professor in the Department of Management Information Systems, School of Business, Central Connecticut State University (CCSU). He also holds an appointment in the interdisciplinary MS program in Computer Information Technology at CCSU. His research and teaching interests include networking and data communications, data and information quality, Internet DNS governance and healthcare informatics. Prior to joining CCSU faculty, Dr. Gendron has been an instructor at The University at Albany, Chief Information Officer for a health maintenance organization, technology coordinator for a state health bureau, as well as being a networking and telecommunications consultant. He has over 27 years of industry and academic experience.

Andrzej Tomasz Jarmoszko is an associate professor in the Department of Management Information Systems, School of Business, Central Connecticut State University. His primary teaching areas are systems analysis and design, and data communications and networking. Prior to joining CCSU faculty, Dr. Jarmoszko was manager for strategic planning at a major mobile communications company in Central Europe. His research interests include information systems curriculum, mobile information systems, aligning knowledge management with the strategy process, and strategic management in the communications industry.