ABSTRACT

This is a thesis paper that shares the experience of starting and managing a virtual business. Throughout the simulation, there are important managerial aspects to pay attention to in great detail. Those include optimizing operational capacity, brand marketing, employee compensation, and product pricing, just to name a few. All of the data used in this study are real data from the Marketplace Business Simulation and will be used to explain the experience of the company of subject, in this case a bike shop. The simulation is in the setting of a competitive environment in which one of the main objectives is to drive financial performance for the bike business. Students enrolled in BUAD 453 took part in the Marketplace Business Simulations game. There were approximately ten different teams of about four to five students each. Each team had to submit their business quarter decision prior to the start of the next business quarter.

To help analyze the data to explain in detail the progression and setback of the company, visualization tools such as Excel and the simulation itself were used for plotting and graphing. These visualizations help bring the data to life and assist in describing the real-time decision making of the members that made up the team for the company of subject. Plots include line charts and clustered columns.

When looking at the results and characteristics of this data, it becomes clear that pricing is not the only factor in which products and brands drive revenue. Although pricing is a major driver in the strategy in driving profit throughout the industry, it is not the end all be all in terms of marketing efficiency and bring customers into the stores. Factors like advertising and brand recognition also play a significant role in driving demand for a business.

Strategic Moves and Market Response: A Simulation-Based Study of Financial Performance

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Introduction

I have studied at the University of Tennessee since the spring semester of my sophomore year. I am double majoring in Business Analytics and Finance in the Haslam College of Business. Throughout my academic career at Haslam, I have encountered coursework that detail the functions of different sectors of a business. Taking this course and completing this simulation has broadened my understanding of the economics of a competitive business environment and the factors that contribute to driving demand.

During the simulation, my team and I had used all of our prior studies and business knowledge to optimize our company's performance. We made real-time business decisions based on the performances and expectations of different sectors of the company. All of the data applied to this thesis were true projections or data results that were generated from each quarter of the Marketplace Business Simulations game. I have also created visualizations to assist in the detailing analysis of our simulation results.

Background

For a school to truly prepare its students for real-world business environment, it should provide exposure to each department or sector of a company. The Haslam College of Business at the University of Tennessee does this especially through this course. Every student pursing a degree in business must complete the capstone Business Administration 453 Strategic Management. In this course, students participate in the Marketplace Business Simulation to gain hands-on experience and apply knowledge accumulated throughout Haslam coursework.

The simulation was created to give students a real-life experience in managing a business without having real-life consequences. This ensures individuals get exposure to tactics and strategies without potentially harming a real business. Essentially, it offers the opportunity to 'make mistakes and learn from them' without having these mistakes develop any real-life consequences, other than potentially a course grade. Every quarter when decisions are submitted and results are released, the company progresses. This progression can be slight or significant, depending on how effectively strategic tactics are implemented through the team's decisions. The goal for each team's company is to maximize total market share and total performance.

Different versions of the Marketplace Business Simulation reflect different markets and business categories. I worked with four others in my team in which we discussed and debated different decisions for the business. For the simulation used in BUAD 453, the company's production was 3D-printed bikes that could be customized with different seats, handles, brakes, tires, and more.

One of the first tasks each team was to complete was launching one or two brand designs that would be released at the start of the next quarter. Different bike customizations were made by different brands depending on what their intended target bike type was. There were three different niches for businesses to focus on: recreational, mountain, or speed bike. Information was provided about customizations with what attachments are preferred with different bike types. Based on this information, each team had to design a bike they believed would be optimal for customers' desires for each type of bike.

Each team had the choice of opening their stores in any of the following four locations: New York City, Amsterdam, Rio de Janeiro, and Bangalore. Our team started off opening our first location in Amsterdam. We also had the option of opening on online store. Before the first decision submission, data and initial information was provided regarding consumer preferences and the demand forecasted for each region depending on product type. For example, our priority product type was recreational bikes, so we chose to open our first store in Amsterdam where the forecasted demand for recreational bikes was the highest.

The simulation ends after the sixth round of decisions are submitted. Quarter one is when the first decisions are made and when first stores are opened. Sales and revenue don't occur until the second quarter. Every proceeding quarter presents a new set of decisions to make including new bike designs, opening additional stores, and investing in new Research and Development.

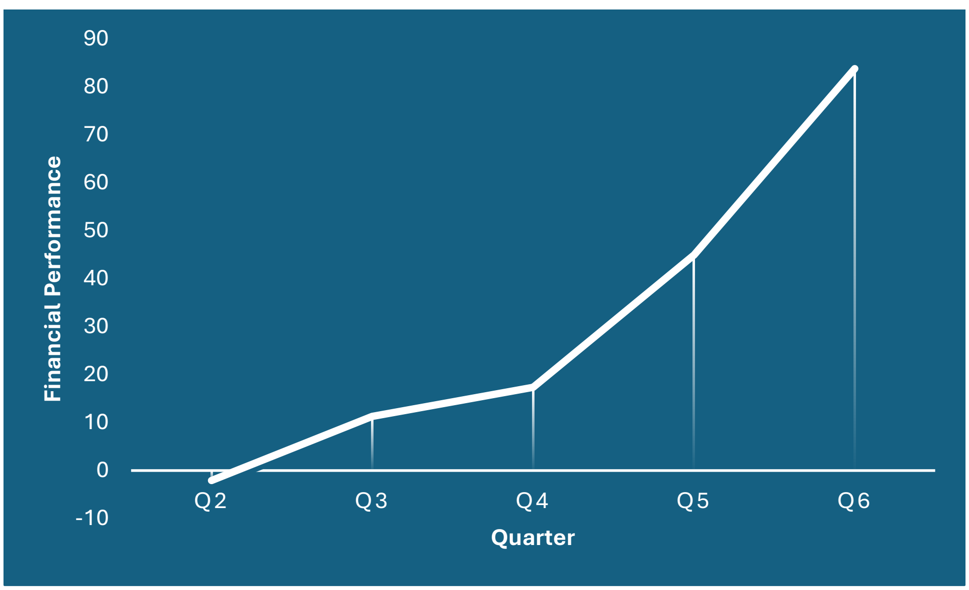
At the beginning of each quarter, results show what the virtual consumers think about the brand's value. Several different metrics are scored on a balanced scorecard. These metrics include financial performance, marketing effectiveness, investment in future, and manufacturing productivity. The goal for each business is to maximize what is know as the Total Performance metric on the balanced scorecard, which is just the sum of all the scores on the scorecard.

Financial Marketplace Information

In the marketplace simulation, all companies are responsible for managing their own business finances including budgeting, forecasting, and investing. Each team is given a initial amount of startup capital which they then much decide how to allocate, whether that's by increasing operational capacity or generating demand through marketing. Instead of following a fixed financial strategy for the duration of the game, there is a dynamic in which the team needs to decide to maintain or adjust its financial strategy based on business performance.

Financial performance differed throughout the duration of the game, and it was the team's responsibility to monitor cash flows, income statement, and balance sheet to gauge the business' financial health. As the simulation continues, the range of financial capabilities and decisions expanded, including options such as borrowing loans and licensing R&D. Figure 1 shows the financial progressional of our business.

Figure 1: Financial Progression



The equation for the metric of Financial Performance in the balanced scorecard is as follows:

Financial Performance = (Net Profit from Current Operations + Gross Profit) / 2 / Total Shares Issued

Notice also that the first record financial performance in Q2 was negative. This was due to the net profit from operating activities. In the early stages of the company, most of the operating cash flow was spent on the opening of new stores and web sales center expenses. Furthermore, production costs were high which is typical for startup businesses that have not yet achieve fully optimal production efficiency.

Methodology

As previously mentioned, the main purpose of the Marketplace Business Simulation is to give users the experience of briefly managing a company in a competitive market. This simulation mimics real-world scenarios by affecting results based on reactions from competitors are external forces on the business. The main goal is to maximize the Total Performance metric, which is a cumulation of all the other scoring metrics in the game. This analysis will use real financial data from my team's simulation to show that progression and setbacks of the cost leadership strategy-style company, *Smokey's Bike Shop*.

Team Structure and Decisions

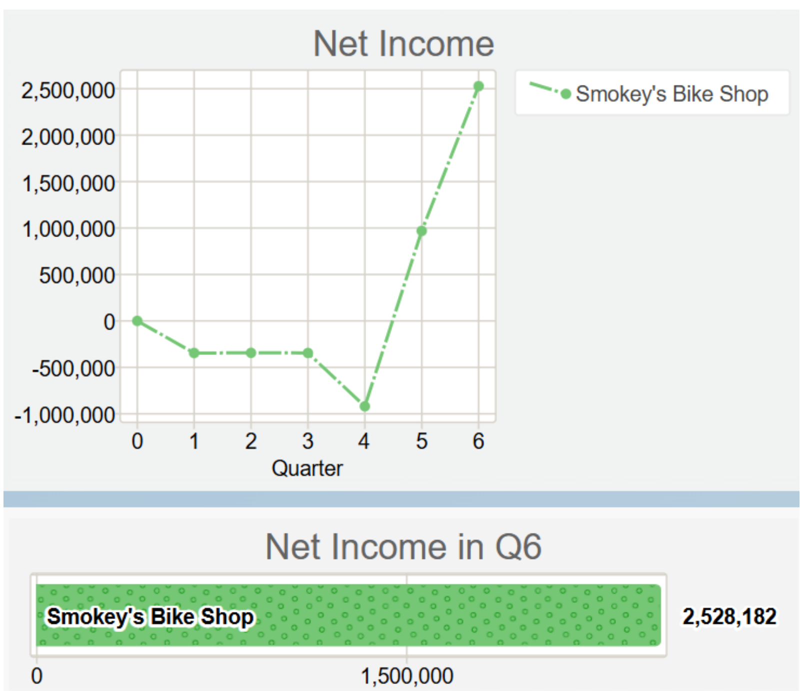
Our team had a structured meeting arrangement with everyone involved and communicating effectively. All team members were equally prioritized, and each individual's opinion was taken into account. Every week when results from the prior quarter's decisions were released, all of the outcomes were first observed and examined, highlighting achievement and shortcomings. Then each decision that had to be made based on our results would be considered one by one, going down the list of adjustments and modifications.

Every team meeting began with a review of the performance report in which Total Performance and Financial Performance metrics were released relative to the competition. Starting with decisions in Marketing Research, scores like Brand Judgement and Ad Judgment were released. These are important metrics for attracting demand for the company. Pricing was adjusted every quarter as well, depending on profit margins and the previous quarter's demand. For Human Resources, sales force and worker compensation were monitored each quarter, to ensure that compensation and employee performance were aligned with industry standards. Another important and complex discussion was how is operating capacity handling the demand generated by marketing. Does fixed capacity need to be upgraded? What investments should we make in our business going forward? These were among the most common questions brought up during team discussions.

Results

Financial success can be measured in several different ways, however most investors and businesses owners primarily interested in the company's net profitability. This measurement not only shows that the company can generate revenue, but also how well it can manage its costs and expenses after income. It clearly shows whether the company is stable and provides insights into the business' long-term viability. During the simulation, we were able to track this metric every quarter and gain a practical understanding of the effectiveness of the company. Achieving high net income is a process, especially for a startup company. Figure 2 shows the progression of our net income value over the six quarters.

Figure 2: Progression of Net Income



Breaking this down by quarter will help clarify the progression of net income and the increase in valuation of the business over time.

Q1, Q2, Q3, Q4 Introduction: During this stage, the first stores were opened and first products were designed. It is common to see low or negative profit during this time for a business. Costs were high due to production and marketing expenses. Making an entry into a competitive market can be a challenging and unstable period in which companies attempt to break ground and build awareness in the industry. In this case, the introductory stage lasted longer than expected. Typically, companies should start seeing progress into the growth stage at around Q3 or Q4. *Smokey's Bike Shop*, however, initially struggled to generate enough demand through advertising to see those results earlier.

Q5, Q6 Growth: This is the turning point where positive profits began to appear. A rapid increase in sales and profit was observed along with strong demand and growing brand recognition. During this stage, it was important for the company to scale its operations and launch new product designs to remain competitive. The company was then able to maintain a strong cost leadership position through aggressive pricing and reduced production cost. Figure 3 shows the companies cash flow statement for the 6 quarters consecutively.

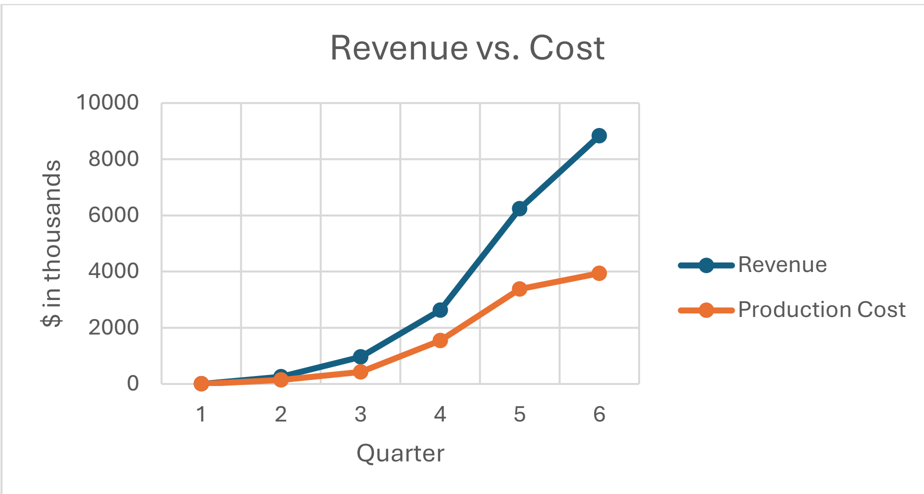
Figure 3

Cash Flow

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 5	Quarter 6
Beginning Cash Balance	**0**	**914,000**	**600,059**	**304,602**	**754,757**	**1,644,071**
RECEIPTS AND DISBURSEMENTS FROM OPERATING ACTIVITIES						
Revenues	0	253,053	967,314	2,631,435	6,238,203	8,835,100
- Rebates	0	12,950	6,850	0	0	0
- Production	0	139,447	429,616	1,544,167	3,382,070	3,940,589
- Research and Development	60,000	60,000	150,000	1,038,718	594,840	667,633
- Advertising	0	65,034	153,446	221,219	323,593	358,188
- Internet Marketing Expenses	0	2,000	5,000	15,640	34,533	55,947
- Sales Force Expense	0	45,754	121,113	266,080	397,090	415,810
- Store and Web Sales Center Expenses	286,000	194,000	321,000	267,000	196,000	196,000
- Web Sales Productivity Expenses	0	18,000	27,000	47,000	75,000	90,000
- Marketing Research	0	20,000	20,000	20,000	20,000	20,000
- Shipping	0	4,324	13,611	34,723	70,878	87,433
- Excess Capacity Cost	0	25,485	35,135	0	0	0
- Income Taxes	0	0	0	0	0	1,028,115
+ Interest Income	0	0	0	0	0	0
- Interest Charges	0	0	0	46,733	54,965	36,203
+ Licensing Income	0	0	0	0	0	759,000
- Licensing Fees	0	0	0	0	0	0
+ Other Income	0	0	0	0	0	0
- Other Expenses	0	0	0	0	0	0
= Net Operating Cash Flow	**-346,000**	**-333,941**	**-315,457**	**-869,846**	**1,089,234**	**2,698,182**

The growth from Q5 to Q6 can be best seen by highlighting the percentage increase in gross profit. This is calculated by simply subtracting the cost of production from the total revenue for each quarter. Figure 4 demonstrates a clear example of how the gap between revenue and production costs widened over time.

Figure 4



From this it can be seen that during the introduction phase of the company, the gap between sales and costs is minimal. From Q4 onward, the gap begins to widen, showing that high net income and gross income through cost reduction is directly correlated. Revenue increases significantly from Q5 to Q6, showing about a 45% increase in sales. In contrast, production costs increased only slightly, with about a 16% increase in cost. The more products a company produces, the more efficiently it can manufacture at lower costs.

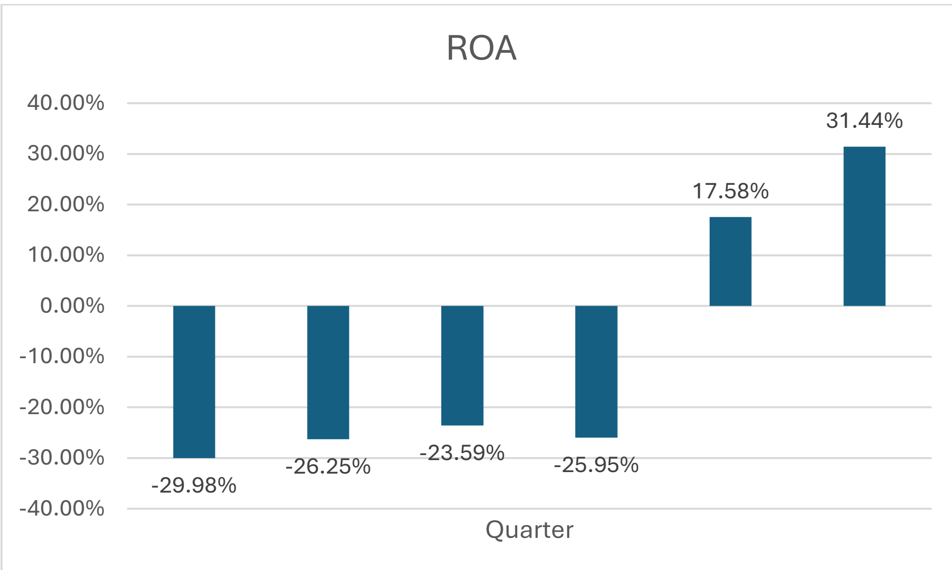
ROA

Another one of the most important metrics for measuring a business' financial success is tracking its ROA (return on assets) over time. This calculates how efficiently a company used its investments to generate profit. Tracking ROA is essential for evaluating if capital is reinvested into the right areas of the company. ROA is calculated as shown below:

$$ROA = \frac{Net\ Profit}{Total\ Assets}\ x\ 100$$

Throughout the simulation total assets included cash, stores, 3D printers, web sales center, R&D, and more. To calculate the percentage return on what we spent on our assets, divide the net profit for each quarter by the total assets of that same quarter, then multiply 100. Since net profit was negative during the first few quarters of the startup it is expected that ROA would also be negative for quarters 1-4, as shown in Figure 5.

Figure 5



Understanding the jump in net income after quarter 4 also explains the increase in ROA in Q5 and Q6. The almost doubled increase in ROA from Q5 to Q6 demonstrates the company's ability to grow net income rapidly as it acquires more and more assets. In quarter 6, an ROA of 31% indicates that the company generated $0.31 in profit for every dollar of assets held.

While negative metric values are shown in early stages, this is typical for a startup company in a competitive environment. However, decisions around reinvestments and pricing ultimately led to a significant increase in profits that are clearly projected to continue. This highlights the importance of not only generating revenue, but generating value through the resources a company has invested in.

Conclusion

The Marketplace Business Simulation was a valuable and risk-free learning environment where competition and strategy played an important role. During the simulation, I was able to apply all the knowledge I had acquired throughout the courses of the University of Tennessee. Everything from marketing to supply chain, from management and human resources to financial analysis, every aspect and department of business was considered and discussed. This project also required team collaboration and effective involvement and strong communication.

My team, *Smokey's Bike Shop*, encountered real-world challenges when trying to conduct business as a startup company in a competitive environment. Although we have lost money during the first few quarters of the simulation, we were able to preserve with our strategy and rely on our cost leadership tactics to turn the company into an efficient, operational, and profitable business. The financial analysis illustrates the importance of tracking financial metrics such as net profit and ROA. Every business owner or executive must always be fully aware of their company's financial performance.

This simulation has strengthened my knowledge of the many dynamics involved in running a business. It taught me how important every detail of a business decision matters and how it can impact financial outcomes. At the end of the day, everything comes down to money. Why do people generally open businesses? To make money. Why do businesses cut costs? To make money. Why do companies invest in marketing? To generate demand that leads to revenue and ultimately make enough profits. I love the art of building a business that I hope to incorporate into my professional life in the future. This experience will remain a cornerstone of my business education moving forward.