

IMPLEMENTING MARKETING CONTROL WITH THE WEB-BASED PROFITABILITY ANALYSIS PACKAGE

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ABSTRACT

The Web-based Profitability Analysis Package enables competing participant teams to learn, identify and assess the underlying reasons for profitability or loss of each strategic business unit (SBU) within their brand portfolio during each decision period. This decision support package (a) extracts and presents the earnings per share of each competing firm as well as the main components of revenues and expenses for each SBU of each of the competing firms from the simulation results, and (b) identifies and flags the antecedents of each determinant of revenues and/or expenditures for each SBU. Competing participant teams use this package to exercise marketing control. The package enables users to monitor performance, identify deviations, understand the underlying reasons, take corrective action and thereby exercise marketing control.

INTRODUCTION

The Profitability Analysis Package is a decision support system that enables competing participant teams in the marketing simulation COMPETE (Faria, 1994, 2006) to learn, identify and assess the underlying reasons for profitability or loss of each strategic business unit (SBU) within their brand portfolio during each decision period. SBUs are specific product offerings in specific regions that have specific target markets with specific needs and purchase motivations, a specific set of strategies, facing a specific set of competitors with specific competing strategies.

This Excel-based Profitability Analysis Package automatically extracts relevant profitability performance data via external links from the Excel-version of the COMPETE simulation results. The Excel-version of the simulation results are generated by the instructor/administrator from the original dos-text based COMPETE simulation results. Later, the Excel-version of the simulation results are uploaded to the COMPETE Online Decision Entry System (CODES) repository for subsequent access by competing participant teams. Only relevant data on the determinants

of sales revenue and expenses are extracted from the simulation results. This decision support package saves substantial time needed to identify and enter the relevant data and reduces the potential for data entry error.

DECISION SUPPORT SYSTEMS

Several scholars have commented on the value of including decision support software/systems in computer simulations (Keys and Biggs, 1990; Teach, 1990; Gold and Pray, 1990; Wolfe and Gregg, 1989). In addition, the literature is replete with references to the use and impact of decision support systems with computer simulations (Affisco and Chanin, 1989, 1990; Burns and Bush, 1991; Cannon et al., 1993; Fritzsche et al., 1987; Grove et al., 1986; Halpin, 2006; Honaiser and Sauaia, 2006; Markulis and Strang, 1985; Mitri et al., 1998; Muhs and Callen, 1984; Nulsen et al., 1993, 1994; Palia, 1989, 1991, 2006; Peach, 1996; Schellenberger, 1983; Shane and Bailes, 1986; Sherrell et al., 1986; Wingender and Wurster, 1987; Woodruff, 1992).

Decision support systems (DSSs) are defined as ...a collection of data, systems, tools, and techniques with supporting software and hardware by which an organization gathers and interprets relevant information from business and environment and turns it into a basis for...action (Little, 1979; Burns and Bush, 1991). In addition, they are defined as computer-based information systems that support the process of structuring problems, evaluating alternatives, and selecting actions for more effective management (Forgionne, 1988). Further, they are described as the hardware and software that permit decision-makers to deal with a specific set of related problems by providing tools that amplify a manager's judgment (Sprague, 1980).

DSSs used with business simulations yield several benefits. These include greater depth of understanding of simulation activity with resulting increase in planning (Keys et al., 1986), in-depth understanding of quantitative techniques as students visualize the results of their applications, sensitivity to weaknesses in techniques used, and experience in capitalizing on their strengths (Fritzsche et al.,

1987). Other benefits include minimization of paperwork and errors, error-free graphical representation of output, a competitive tool with increasing value as simulation progresses, and potential for participants to create their own DSSs (Burns and Bush, 1991). In addition, DSSs enhance understanding of complex business relationships and provide additional value over time (Halpin, 2006). Further, DSSs provide realism, relevance, literacy, flexibility and opportunity for refinement (Sherrell et al., 1986).

Some authors contend that combining an active student generated database in the form of a simulation game with a DSS will result in improved decision making, lead to improved pro-active rather than re-active strategic planning, and result in improved simulation game performance and enhanced learning (Muhs and Callen, 1984). Others have reported no support for the premise that DSS usage improves small group decision making effectiveness (Affisco and Chanin, 1989), and that DSS usage to support manufacturing function decisions resulted in decreased manufacturing costs and increased "earnings/cost of goods sold" ratio in the second year of play (Affisco and Chanin, 1990).

Given the inconsistent findings with regard to the efficacy of DSSs reported in the literature, does DSS usage increase decision effectiveness and/or enhance learning? One scholar notes that while the DSS assists the decision maker, it does not make decisions, nor can it substitute for intelligent analysis and synthesis (Schellenberger, 1983). In addition, as with other computer-based or experiential learning techniques, the effectiveness of DSSs or the decisions made are less important than the insights they generate. The level of insight generated depends heavily on the clear explanation of the purpose, significance, assumptions, usage, and limitations of the DSS and underlying concepts applied, by the instructor. In addition, the level of insight generated depends heavily on the debriefing process used by the instructor to crystallize student learning (Cannon et al., 1993).

SIMULATION PERFORMANCE & PROFIT ANALYSIS

Several authors have investigated the relationship between game performance and use of DSSs (Keys & Wolfe, 1990) as well as other predictor variables such as (a) past academic performance (GPA) and academic ability of participants, and degree of planning and formal decision making by teams (Faria, 2000), (b) GPA and the use of DSSs (Keys and Wolfe, 1990), (c) age, gender, GPA and expected course grade (Badgett, Brenenstuhl & Marshall, 1978), (d) university GPA and academic major (Gosenpud & Washbush, 1991), (e) gender, GPA and course grade (Hornaday, 2001; Hornaday & Wheatley, 1986), (f) gender (Johnson, Johnson & Golden, 1997; Wood, 1987), (g) GPA, previous course grades, and course grade (Lynch and Michael, 1989), with conflicting results. These conflicting results led to the conclusion that no predictor variable con-

sistently predicts simulation performance (Gosenpud, 1987).

Other authors have discussed the use of simulation profit analysis in advertising (Motes and Woodside, 1979), accounting (Bonczkowski, Gentry & Caldwell, 1979; Bradley & Murtuza, 1988; Goosen, 1974, 1990; Leftwich, 1974; Lord, 1975), business ethics (Schumann, Scott and Anderson, 1994; business management (Millers, 1986), finance (Leftwich, 1974), and production operations and management (Mukherjee & Wheatley, 1999) courses.

The primary purpose of this paper is to present a new user-centered learning tool that provides participant teams the opportunity to assess the profitability of each SBU in their brand portfolio and thereby apply the Iceberg Principle in exercising Marketing Control.

MARKETING CONTROL

Marketing managers are charged with the responsibility of planning, organizing, implementing, and controlling marketing plans and programs that are designed to achieve a specific set of objectives (Bagozzi et al., 1998; Churchill and Peter, 1995; Kotler, 2003, 1988; Lehman and Winer, 1988; Lilien, 1993; Lilien and Rangaswamy, 2003; McCarthy and Perreault, 1984, 1987; Perreault and McCarthy, 1996). In performing their responsibilities, marketing managers are faced with scarce resources (discretionary marketing dollars) and unlimited wants to deploy these limited resources (sales force and advertising expenditures) in order to achieve their objectives. Consequently, they need to allocate the scarce resources at their disposal both effectively and efficiently. The efficient allocation of scarce marketing resources is facilitated through marketing control in order to keep performance in line with objectives.

Marketing control involves setting standards, monitoring performance, identifying deviations from standards, understanding the underlying reasons for the deviations, and taking corrective action when necessary (Bagozzi, et al., 1998; Churchill and Peter, 1995; Cravens, 2000; Cravens et al., 1987; Czinkota and Kotabe, 2001; Dalrymple and Parsons, 1995; Kotler and Keller, 2007; Lamb et al., 2004; Peter and Donnelly, 1994). First, marketing managers decide which aspects of marketing strategy (such as price, salesforce, advertising, quality) to monitor. Next, marketing managers set standards based on objectives in order to monitor and gauge performance. These standards may include sales targets, market share, profit contribution, as well as behavioral standards such as level of customer awareness. Then, marketing managers design feedback mechanisms where useful, relevant and timely information are used to evaluate the effectiveness of marketing activities. They use these feedback mechanisms to interpret the results of marketing programs, identify gaps between objectives and performance, understand the underlying reasons for the deviations in performance, and change strategy or tactics to eliminate or reduce the performance gaps.

Marketing managers identify which products' sales are highest and why, which products are profitable, what is selling where, and how much the marketing process costs. They need to know what's happening in detail in order to improve the bottom line. Traditional accounting reports such as income statements and balance sheets are too general to be of much help to marketing managers. For instance, a company may be profitable while 80 percent of its business comes from 20 percent of its customers or products. The other relatively less profitable 80 percent may remain undetected unless each product, region, or customer segment is analyzed in order to determine its profitability. This 80/20 relationship is fairly common and is often referred to as the 80/20 rule or principle (McCarthy and Perreault, 1984, 1987; Perreault and McCarthy 1996).

Marketing control consists of sales analysis, performance analysis and marketing cost analysis. Sales analysis involves a detailed breakdown of the company's sales records by geographic region, product, package size, customer size, type or class of trade, price or discount class, method of sale (mail, telephone, or direct sales), terms of payment (cash or charge), size of order, and or commission class. The purpose of sales analysis is to keep marketing managers in touch with their markets and to enable them to check their assumptions and hypotheses. Ignoring sales analysis can lead to poor forecasting and consequent poor decisions.

Performance analysis identifies exceptions or variations in planned performance. Marketing managers can compare one territory against another, against the same territory's performance in the previous year, or against expected performance. The purpose of performance analysis is to improve operations by (a) monitoring performance, (b) comparing actual performance with projected performance, (c) identifying deviations (Actual – Projected) in performance, (d) calculating performance indices (Actual / Projected x 100), (e) understanding the underlying reasons for sub-par performance, and (f) taking corrective action. The salesperson, territory or other factors exhibiting poor performance can be identified, analyzed and corrective action taken. Outstanding performance can be analyzed, reasons for success identified, and extrapolated to other salespersons, territories or other factors. In addition to sales, other data such as miles traveled, number of calls made, number of orders, or cost of various tasks can be analyzed.

Marketing cost analysis (Kerin and Peterson, 2004; McCarthy and Perreault, 1984, 1987; Perreault and McCarthy, 1996) enables the marketing manager to calculate the profitability of individual profit centers rather than total company profit. Marketing cost analysis involves the conversion of natural accounts based on how the money was actually spent into marketing functional accounts which indicate the function performed through the expenditure of funds (McCarthy and Perreault, 1984, 1987; Perreault and McCarthy, 1996; Pride and Ferrell, 1995). First, natural accounts (such as salaries, depreciation, taxes, advertising and other expenses) in the financial statements (such as income statement and regional income contribution state-

ments) are converted to functional accounts which show the purpose for which expenditures are made. Then, the functional accounts are reallocated to customers, market segments, regions or products for which the amounts were spent. This reallocation of functional accounts enables marketing managers to assess the profitability of customers, market segments, territories or products.

Marketing cost analysis deals with three broad categories of costs. Direct costs such as salesforce salaries are directly attributable to the performance of marketing functions such as selling (a) of a specific product, (b) in a specific region, or (c) to a specific customer. Traceable common costs such as space rental costs for production, storage and selling, can be allocated indirectly, using one or several criteria (such as cost per square foot used for storage) to the functions that they support. Non-traceable common costs such as interest, taxes, and top management salaries, cannot be assigned according to any logical criteria. Hence, they are assignable only on an arbitrary basis (McCarthy and Perreault, 1984, 1987; Perreault and McCarthy, 1996; Pride and Ferrell, 1995).

Marketing cost analysis employs either the full-cost approach or the direct-cost approach. The full-cost approach includes direct costs, traceable common costs, and nontraceable common costs. All costs are included to provide an accurate profit picture. Since nontraceable common costs are allocated using arbitrary criteria, different criteria used can yield different results that affect profitability, promotion potential, and bonuses received. A cost-conscious unit can be adversely affected and discouraged if numerous costs are assigned to it arbitrarily. In order to eliminate such problems, the direct-cost approach, which includes direct costs and traceable common costs but not nontraceable common costs, is used. Yet, critics say that the direct-cost approach is not accurate as it does not include nontraceable common costs (McCarthy and Perreault 1984, 1987; Perreault and McCarthy, 1996; Pride and Ferrell, 1995).

Marketing managers use sales analysis, performance analysis and marketing cost analysis in order to exercise marketing control. They assess the sales, profitability and marketing costs of each SBU in order to improve the bottom line. In this regard, they are aware of the significance of both the 80/20 Principle and the Iceberg Principle.

THE ICEBERG PRINCIPLE

The Iceberg Principle or the 90/10 Principle states that much good information is hidden in summary data (McCarthy and Perreault 1984, 1987; Palia 2007; Perreault and McCarthy, 1996; Pride and Ferrell, 1995). Icebergs reveal only about 10 percent of their mass above water level. The remaining 90 percent is concealed and non-uniformly distributed below water level, and can sink ships such as the Titanic that venture too near.

Much business and marketing data exhibit the same

characteristics. While the Income Statement may reflect substantial sales revenue and profits, and/or the Balance Sheet may indicate substantial amounts of cash, investments and retained income, these financial statements may conceal problems in specific SBUs. Based on a review of these financial statements, everything may appear to be calm and peaceful on the surface. Yet, closer analysis may reveal jagged edges in one or more SBUs that can sink the business. While summary data and averages simplify and facilitate understanding, managers need to ensure that data summaries don't conceal more than they reveal.

A seemingly healthy person may suffer from a hidden cancer in the cardiac, circulatory, digestive, lymphatic, nervous or other system that could seriously impair overall long-term health. Similarly, a seemingly healthy business with adequate sales, assets, profits, and cash flow, may suffer from hidden losses or other problems in one or more SBUs that could seriously impair overall long-term performance.

Effective health maintenance requires periodic screening tests in order to determine whether there are any indicators of malfunctioning systems. Effective marketing managers monitor their results, identify SBUs that exhibit sub-par performance, understand the underlying reasons for sub-par performance, and take corrective action.

The Profitability Analysis package Version 2.0 builds on the Proforma Analysis Package (Palia, 2007) and the SBU Analysis Package (Palia, 2009) used in marketing control. Both the Proforma Analysis and SBU Analysis packages focus primarily on intra-firm data on antecedents of sales revenue and expenses to understand the underlying reasons for deviant performance (low overall profit or SBU contribution to margin). The Profitability Analysis package extracts and presents both intra-firm and inter-firm data on each of the antecedents of sales revenue and expenses to help understand the underlying reasons for deviant performance.

THE MARKETING SIMULATION COMPETE

COMPETE (Faria, 2006) is a marketing simulation designed to provide students with marketing strategy development and decision-making experience. Competing student teams are placed in a complex, dynamic, and uncertain environment. The participants experience the excitement and uncertainty of competitive events and are motivated to be active seekers of knowledge. They learn the need for and usefulness of mastering an underlying set of decision-making principles.

Competing student teams plan, implement, and control a marketing program for three high-tech products in three regions Region 1 (R1), Region 2 (R2) and Region 3 (R3) within the United States. These three products are a Total Spectrum Television (TST), a Computerized DVD/Video Editor (CVE) and a Safe Shot Laser (SSL). The features

and benefits of each product and the characteristics of consumers in each region are described in the student manual. Based on a marketing opportunity analysis, a mission statement is generated, specific and measurable company goals are set, and marketing strategies are formulated to achieve these goals. Constant monitoring and analysis of their own and competitive performance helps the teams better understand their markets and improve their decisions.

Each decision period (quarter), the competing teams make a total of 74 marketing decisions with regard to marketing their three brands in the three regional markets. These decisions include nine pricing decisions, nine shipment decisions, three sales force size decisions, nine sales force time allocation decisions, one sales force salary decision, one sales force commission decision, twenty-seven advertising media decisions, nine advertising content decisions, three quality-improvement R&D decisions, and three cost-reduction R&D decisions. Successful planning, implementation, and control of their respective marketing programs require that each company constantly monitor trends in its own and competitive decision variables and resulting performance. The teams use the COMPETE Online Decision Entry System (CODES) (Palia & Mak, 2001; Palia et al., 2000) to enter their decisions, retrieve their results, and download and use a wide array of marketing dss packages.

THE PROFITABILITY ANALYSIS PACKAGE

The Web-based Profitability Analysis Package Version 2.0 is accessible online to competing participant teams in the marketing simulation COMPETE. It enables competing participant teams to learn, identify and assess the underlying reasons for profitability or loss of each strategic business unit (SBU) within their brand portfolio during each decision period. The competing teams can select the "Show Concerns" option to identify and flag the determinants of revenues and/or expenditures for each SBU which are of potential concern. Competing participant teams can use this package to monitor performance, identify deviations, understand the underlying reasons, take corrective action and thereby exercise marketing control.

The Profitability Analysis package (a) extracts relevant antecedents of the price and quantity components of sales revenue as well as relevant antecedents of the cost of goods sold and operating expense components of total expenses for all five competing teams from the COMPETE results for a specific period, (b) uses the competitor with the highest earnings per share as the benchmark when comparing each of the relevant antecedents, and (c) and provides the user with the option of flagging each of the antecedents of sales revenue and total expenses that contributed to low profit. The user may show or hide the flagged antecedents that contributed to low profit when compared with the firm with the leading earnings per share, and use other bench-

marks such as average values for each antecedent when analyzing the reasons for low profitability.

The Profitability Analysis Package (Workbook) Version 2.0 is a zipped folder "Profitability Analysis.zip" which consists of an Excel workbook "Profitability Analysis.xlsx" (with external links to the COMPETE results

(output) file Period.xls) and Period.xls Excel version of sample COMPETE output for a specified period. This Profitability Analysis.xlsx workbook consists of ten worksheets. The Profit worksheet focuses on Company profit of loss. The other nine worksheets TST Region 1, TST Region 2, TST Regions 3, CVE Region 1, CVE Region 2,

EXHIBIT 1 Company Profitability Analysis Worksheet

Performance Analysis							
Profitability							
TriniTech Company 2 Period 6							
	Company 1	Company 2	Company 3	Company 4	Company 5	NAEM Indy. Avg.	Our Company
Revenues	\$38,912,799	\$40,073,029	\$35,258,507	\$39,031,025	\$36,946,246		
Price							
TST	\$ 4,417	\$ 4,490	\$ 4,573	\$ 4,447	\$ 4,493		
CVE	\$ 444	\$ 443	\$ 437	\$ 440	\$ 444		
SSL	\$ 51	\$ 51	\$ 50	\$ 52	\$ 51		
Quantity							
Price							
TST	\$ 4,417	\$ 4,490	\$ 4,573	\$ 4,447	\$ 4,493		
CVE	\$ 444	\$ 443	\$ 437	\$ 440	\$ 444		
SSL	\$ 51	\$ 51	\$ 50	\$ 52	\$ 51		
Advertising \$s	\$ -	\$ -	\$ -	\$ -	\$ -		
Ad Awareness							
TST						104.3	105.7
CVE						102.7	101.3
SSL						104.7	105.3
Salesforce #	100	101	103	117	112		
SF Salary	\$ 4,000	\$ 4,000	\$ 4,100	\$ 4,185	\$ 4,000		
SF Commission	3.0%	2.8%	3.0%	2.8%	0.3%		
Quality							
TST	102	102	103	102	103		
CVE	101	101	101	101	102		
SSL	100	100	100	100	100		
Expenses							
COGS							
Cost of Prodn.							
TST						\$3,556.73	\$3,558.32
CVE						\$ 358.71	\$ 358.81
SSL						\$ 37.36	\$ 37.24
Ending Inventory							
TST							34
CVE							619
SSL							7,703
Overtime							
TST							0
CVE							106
SSL							3,179
Operating Exp.							
Advertising (\$mil)	\$ -	\$ -	\$ -	\$ -	\$ -		
Salesforce	100	101	103	117	112		
R&D (\$000s)						1,694	\$ 2,100
EPS	\$ (0.12)	\$ 0.56	\$ 0.21	\$ 0.56	\$ 1.00		

CVE Region 3, SSL Region 1, SSL Region 2, and SSL Region 3 focus on the specified SBU profit or loss.

The Profit worksheet consists of external links to the Excel version of the quarterly COMPETE output file "Period.xls". This Profit worksheet extracts and displays the company name, company number, and decision period (quarter) number from the Excel version of the COMPETE results file "Period.xls" (see exhibit 1).

In order to analyze the price component of total revenue, the Profit worksheet extracts, calculates and displays the average Price (for each of the three products TST, CVE, and SSL) for each of the competing firms (see exhibit 1). Further, in order to calculate and display the Total Revenue of each of the competing firms (at the top of the worksheet), this worksheet extracts and displays, (a) price and (b) quantity sold for each of the nine SBUs for each of the competing firms (see exhibit 2).

Next, in order to analyze the antecedents of the quanti-

ty sold component of total revenue, the Profit worksheet (see exhibit 1) extracts and displays (a) the average price for each of the three products, (b) total advertising \$s, (c) advertising awareness index for each product (available only for company investigated), (d) total salesforce size, (e) salesforce salary, (f) salesforce commission, and (g) quality index for each product, for each of the competing firms.

Total expenses consist of cost of goods sold item and operating expenses (see exhibit 1). In order to analyze the antecedents of cost of goods sold, the Profit worksheet extracts and displays (a) unit cost of production for each product, (b) ending inventory for each product, and (c) overtime production for each product only for the company analyzed. Further, in order to analyze the antecedents of operating expenses, this worksheet extracts and displays (a) total advertising \$s, and (b) total salesforce size, for each of the competing firms.

Information on (a) advertising awareness indices for

EXHIBIT 2 Company Profitability Analysis Worksheet

	Company 1	Company 2	Company 3	Company 4	Company 5	Indy. Avg.
Price						
TST - 1	\$ 4,500	\$ 4,530	\$ 4,600	\$ 4,500	\$ 4,500	\$ 4,526
TST - 2	\$ 4,200	\$ 4,370	\$ 4,390	\$ 4,350	\$ 4,280	\$ 4,318
TST - 3	\$ 4,550	\$ 4,570	\$ 4,730	\$ 4,490	\$ 4,700	\$ 4,608
CVE - 1	\$ 470	\$ 452	\$ 450	\$ 450	\$ 450	\$ 454
CVE - 2	\$ 429	\$ 435	\$ 428	\$ 430	\$ 432	\$ 431
CVE - 3	\$ 434	\$ 443	\$ 433	\$ 440	\$ 450	\$ 440
SSL - 1	\$ 55	\$ 52	\$ 52	\$ 53	\$ 54	\$ 53
SSL - 2	\$ 46	\$ 50	\$ 48	\$ 50	\$ 48	\$ 48
SSL - 3	\$ 51	\$ 51	\$ 50	\$ 52	\$ 50	\$ 51
Actual Sales						
TST - 1	815	700	824	662	700	\$ 740
TST - 2	972	721	888	743	516	\$ 768
TST - 3	575	600	826	608	600	\$ 642
CVE - 1	11,620	13,832	8,730	11,064	15,015	\$ 12,052
CVE - 2	16,561	15,706	11,056	17,195	14,041	\$ 14,912
CVE - 3	13,249	12,249	7,217	10,319	14,022	\$ 11,411
SSL - 1	62,869	85,797	79,040	83,023	53,349	\$ 72,816
SSL - 2	84,003	88,190	91,951	88,215	85,596	\$ 87,591
SSL - 3	57,031	71,134	67,073	83,963	52,919	\$ 66,424
Sales Revenue						
TST - 1	\$ 3,667,500	\$ 3,171,000	\$ 3,790,400	\$ 2,979,000	\$ 3,150,000	\$3,351,580
TST - 2	\$ 4,082,400	\$ 3,150,770	\$ 3,898,320	\$ 3,232,050	\$ 2,208,480	\$3,314,404
TST - 3	\$ 2,616,250	\$ 2,742,000	\$ 3,906,980	\$ 2,729,920	\$ 2,820,000	\$2,963,030
CVE - 1	\$ 5,461,400	\$ 6,252,064	\$ 3,928,500	\$ 4,978,800	\$ 6,756,750	\$5,475,503
CVE - 2	\$ 7,104,669	\$ 6,832,110	\$ 4,731,968	\$ 7,393,850	\$ 6,065,712	\$6,425,662
CVE - 3	\$ 5,750,066	\$ 5,426,307	\$ 3,124,961	\$ 4,540,360	\$ 6,309,900	\$5,030,319
SSL - 1	\$ 3,457,795	\$ 4,461,444	\$ 4,110,080	\$ 4,400,219	\$ 2,880,846	\$3,862,077
SSL - 2	\$ 3,864,138	\$ 4,409,500	\$ 4,413,648	\$ 4,410,750	\$ 4,108,608	\$4,241,329
SSL - 3	\$ 2,908,581	\$ 3,627,834	\$ 3,353,650	\$ 4,366,076	\$ 2,645,950	\$3,380,418
Total Revenues	\$38,912,799	\$40,073,029	\$35,258,507	\$39,031,025	\$36,946,246	

each product, (b) unit cost of production for each product, (c) ending inventory for each product, (d) overtime production for each product, and (e) total R&D spending are considered confidential to each competing firm, and available only for the company under analysis in the Excel version of the company's COMPETE results "Period.xls". These variables are extracted and displayed on the right side and compared with the NAEM (Industry) averages for (a) Advertising Awareness Index by product, and (b) Unit Cost of Production by product, as well as (c) total Industry R&D spending (see exhibit 1) provided in the Excel version of the simulation results "Period.xls". In addition, the Profit worksheet extracts the price and quantity sold for each of the nine SBUs by company and calculates (a) the sales revenue (price x quantity sold) for each SBU by company, (b) the total revenue for all nine SBUs by company, and (c) the average industry price and quantity sold by SBU (see exhibit 2).

Each of the remaining nine SBU-specific Profit worksheets, such as TST-Region 1 worksheet consists of external links to the quarterly COMPETE output file Period.xls. Each of these SBU-specific worksheets extracts and dis-

plays the specific SBU antecedents of the price and quantity components of SBU total revenue, and the specific SBU antecedents of the cost of goods sold and operating expense components of total expenses. The layout of the SBU-specific worksheet is similar to the Profit worksheet used to analyze the overall company performance. The industry averages for the SBU-specific (a) price, (b) total advertising, (c) broadcast advertising, (d) print advertising, (e) sales promotion, (f) regional salesforce size, (g) salesforce salary, (h) salesforce commission, and (i) product quality index are calculated and displayed on the right side (see exhibit 3).

As with the Profit worksheet, the confidential information on (a) SBU-specific advertising awareness index, (b) product-specific unit cost of production, (c) SBU-specific ending inventory, (d) SBU-specific overtime production, and (e) product-specific R&D investment are extracted from "Period.xls" and displayed for the company under analysis on the right side (see exhibit 3). These variables are compared to the NAEM (Industry) averages for (a) Advertising Awareness Index by SBU, (b) unit cost of production by product, as well as (c) product-specific total

EXHIBIT 3 TST – Region 1 Profitability Analysis Worksheet

Performance Analysis								
Profitability								
TriniTech								
Company 2								
Period 6								
TST - Region 1								
		Company 1	Company 2	Company 3	Company 4	Company 5	NAEM Indy. Avg.	Our Company
Revenues		\$3,667,500	\$ 3,171,000	\$3,790,400	\$2,979,000	\$3,150,000	\$3,351,580	
	Price							
	TST-1	\$ 4,500	\$ 4,530	\$ 4,600	\$ 4,500	\$ 4,500	\$ 4,526	
	Quantity							
	Price	\$ 4,500	\$ 4,530	\$ 4,600	\$ 4,500	\$ 4,500	\$ 4,526	
	Advertising \$s	\$ 320,000	\$ 270,000	\$ 160,000	\$ 240,000	\$ 330,000	\$ 264,000	
	Broadcast	\$ 160,000	\$ 110,000	\$ 90,000	\$ 120,000	\$ 130,000	\$ 122,000	
	Print	\$ 70,000	\$ 80,000	\$ 50,000	\$ 50,000	\$ 100,000	\$ 70,000	
	Sales Promo	\$ 90,000	\$ 80,000	\$ 20,000	\$ 70,000	\$ 100,000	\$ 72,000	
	Ad Awareness						103	105
	Reg. Salesforce #	37	37	39	42	45	40.0	
	Co. SF Salary	\$ 4,000	\$ 4,000	\$ 4,100	\$ 4,185	\$ 4,000	\$ 4,057	
	Co. SF Commission	3.0%	2.8%	3.0%	2.8%	0.3%	2.4%	
	Quality	102	102	103	102	103	102.4	
Expenses								
	COGS							
	Cost of Prodn.						\$ 3,556.73	\$3,558.32
	Ending Inventory							0
	Overtime							0
	Operating Exp.							
	Advertising	\$ 320,000	\$ 270,000	\$ 160,000	\$ 240,000	\$ 330,000	\$ 264,000	
	Reg. Salesforce #	37	37	39	42	45	40.0	
	Co. R&D (\$'000s)						1,694	\$ 2,100
								Co. Total

EXHIBIT 4

Data Extraction Table – Company Profit Worksheet (Revenue Determinants)

Data Extraction from COMPETE Results Workbook Period.xls To Profitability Analysis Worksheet (Revenue Determinants 1)						
COMPETE Profitability Analysis Worksheet		COMPETE Results Workbook Period.xls				
Account	Cell	Worksheet (Tab)	Page #	Account	Cell Ref.	
Company Name	A4	from ==> Title	Title Pg.			C15
Company Number	A5	from ==> Title	Title Pg.			C14
Period	A6	from ==> Title	Title Pg.			C16
TST Price - Company 1	C12	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(D32+G32+J32)/3
TST Price - Company 2	D12	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(D33+G33+J33)/3
TST Price - Company 3	E12	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(D34+G34+J34)/3
TST Price - Company 4	F12	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(D35+G35+J35)/3
TST Price - Company 5	G12	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(D36+G36+J36)/3
CVE Price - Company 1	C13	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(E32+H32+K32)/3
CVE Price - Company 2	D13	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(E33+H33+K32)/3
CVE Price - Company 3	E13	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(E34+H34+K34)/3
CVE Price - Company 4	F13	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(E35+H35+K35)/3
CVE Price - Company 5	G13	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(E36+H36+K36)/3
SSL Price - Company 1	C14	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(F32+I32+L32)/3
SSL Price - Company 2	D14	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(F33+I33+L33)/3
SSL Price - Company 3	E14	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(F34+I34+L34)/3
SSL Price - Company 4	F14	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(F35+I35+L35)/3
SSL Price - Company 5	G14	from ==> Forecast, Prices	9	Avg. Price = (Reg1+Reg2+Reg3)/3		(F36+I36+L36)/3
Advertisinig \$s - Company 1	C20	from ==> Ave Comp., Ad	11	Company 1 Advertising		E14
Advertisinig \$s - Company 2	D20	from ==> Ave Comp., Ad	11	Company 2 Advertising		E15
Advertisinig \$s - Company 3	E20	from ==> Ave Comp., Ad	11	Company 3 Advertising		E16
Advertisinig \$s - Company 4	F20	from ==> Ave Comp., Ad	11	Company 4 Advertising		E17
Advertisinig \$s - Company 5	G20	from ==> Ave Comp., Ad	11	Company 5 Advertising		E18
Ad Awareness - TST - NAEM Indy. Avg.	H22	from ==> NAEM Bulletin 1	16	Indy Ad Awareness Index-TST avg.		(D20+D21+D22)/3
Ad Awareness - TST - Company Avg.	I22	from ==> NAEM Bulletin 1	16	Co. Ad Awareness Index-TST avg.		(D12+D13+D14)/3
Ad Awareness - CVE - NAEM Indy. Avg.	H23	from ==> NAEM Bulletin 1	16	Indy Ad Awareness Index-CVE avg.		(E20+E21+E22)/3
Ad Awareness - CVE - Company Avg.	I23	from ==> NAEM Bulletin 1	16	Co. Ad Awareness Index-CVE avg.		(E12+E13+E14)/3
Ad Awareness - SSL - NAEM Indy. Avg.	H24	from ==> NAEM Bulletin 1	16	Indy Ad Awareness Index-SSL avg.		(F20+F21+F22)/3
Ad Awareness - SSL - Company Avg.	I24	from ==> NAEM Bulletin 1	16	Co. Ad Awareness Index-SSL avg.		(F12+F13+F14)/3
Salesforce # - Company 1	C25	from ==> Salesforce, Salaries	10	Company 1 Combined Salesforce		G19
Salesforce # - Company 2	D25	from ==> Salesforce, Salaries	10	Company 2 Combined Salesforce		G20
Salesforce # - Company 3	E25	from ==> Salesforce, Salaries	10	Company 3 Combined Salesforce		G21
Salesforce # - Company 4	F25	from ==> Salesforce, Salaries	10	Company 4 Combined Salesforce		G22
Salesforce # - Company 5	G25	from ==> Salesforce, Salaries	10	Company 5 Combined Salesforce		G23
Salesforce Salary - Company 1	C26	from ==> Salesforce, Salaries	10	Company 1 Salesforce Salary		F35
Salesforce Salary - Company 2	D26	from ==> Salesforce, Salaries	10	Company 2 Salesforce Salary		F36
Salesforce Salary - Company 3	E26	from ==> Salesforce, Salaries	10	Company 3 Salesforce Salary		F37
Salesforce Salary - Company 4	F26	from ==> Salesforce, Salaries	10	Company 4 Salesforce Salary		F38
Salesforce Salary - Company 5	G26	from ==> Salesforce, Salaries	10	Company 5 Salesforce Salary		F39
Salesforce Commission - Company 1	C27	from ==> Salesforce, Salaries	10	Company 1 Commission Rate		E35
Salesforce Commission - Company 2	D27	from ==> Salesforce, Salaries	10	Company 2 Commission Rate		E36
Salesforce Commission - Company 3	E27	from ==> Salesforce, Salaries	10	Company 3 Commission Rate		E37
Salesforce Commission - Company 4	F27	from ==> Salesforce, Salaries	10	Company 4 Commission Rate		E38
Salesforce Commission - Company 5	G27	from ==> Salesforce, Salaries	10	Company 5 Commission Rate		E39
Quality TST - Company 1	C29	from ==> Quality, Dollar Sales	14	Company 1 TST Quality Index		F9
Quality TST - Company 2	D29	from ==> Quality, Dollar Sales	14	Company 2 TST Quality Index		F10
Quality TST - Company 3	E29	from ==> Quality, Dollar Sales	14	Company 3 TST Quality Index		F11
Quality TST - Company 4	F29	from ==> Quality, Dollar Sales	14	Company 4 TST Quality Index		F12
Quality TST - Company 5	G29	from ==> Quality, Dollar Sales	14	Company 5 TST Quality Index		F13
Quality CVE - Company 1	C30	from ==> Quality, Dollar Sales	14	Company 1 CVE Quality Index		F14
Quality CVE - Company 2	D30	from ==> Quality, Dollar Sales	14	Company 2 CVE Quality Index		F15
Quality CVE - Company 3	E30	from ==> Quality, Dollar Sales	14	Company 3 CVE Quality Index		F16
Quality CVE - Company 4	F30	from ==> Quality, Dollar Sales	14	Company 4 CVE Quality Index		F17
Quality CVE - Company 5	G30	from ==> Quality, Dollar Sales	14	Company 5 CVE Quality Index		F18
Quality SSL - Company 1	C31	from ==> Quality, Dollar Sales	14	Company 1 SSL Quality Index		F19
Quality SSL - Company 2	D31	from ==> Quality, Dollar Sales	14	Company 2 SSL Quality Index		F20
Quality SSL - Company 3	E31	from ==> Quality, Dollar Sales	14	Company 3 SSL Quality Index		F21
Quality SSL - Company 4	F31	from ==> Quality, Dollar Sales	14	Company 4 SSL Quality Index		F22
Quality SSL - Company 5	G31	from ==> Quality, Dollar Sales	14	Company 5 SSL Quality Index		F23

R&D spending (see exhibit 3).

The relevant data are extracted from the COMPETE Results Excel workbook Period.xls to the Profitability Analysis workbook as indicated in the Data Extraction Tables for the Company Profit Worksheet (see exhibits 4 and 5), and each of the SBU-specific Worksheets (see exhibits 6 and 7). In each of the Data Extraction Tables, the Excel worksheet (tab), page number in the Excel-version of the COMPETE results printout, and cell references for each account are shown in the COMPETE Results Workbook table (on the right). The corresponding cell references for each account are shown in the Profit Analysis worksheet table (on the left) in the Data Extraction Tables.

For instance, in the Data Extraction Table for the Company Profit Analysis worksheet – Revenue determinants (see exhibit 4), the Advertising \$s - Company 1 in a specific period in cell C20 on the Company Profit worksheet in exhibit 1 is extracted from cell E14 in the “Advertising Expenditures By Company (In Millions)” table on the “Ave Comp., Ad” worksheet of the COMPETE results workbook Period.xls. Similarly, the Salesforce # – Company 1 in cell C25 on the Company Profit worksheet in exhibit 1 is extracted from cell G19 in the “Salesforce Size By Region By Company” table on the “Salesforce Salaries” worksheet of

the COMPETE results workbook.

In addition, in the Data Extraction Table for the Company Profit Analysis worksheet – Expense determinants (see exhibit 5), the TST Cost of Production for the company in a specific period in cell I22 on the Company Profit worksheet in exhibit 1 is extracted from cell I10 in the “Product Cost Report” table on the “Quality, Cost, OT, Shipments” worksheet of the COMPETE results workbook Period.xls. Similarly, the Company R&D (\$000s) – in cell I49 on the Company Profit worksheet in exhibit 1 is extracted from cell G35 on the “USA Income Statement” worksheet of the COMPETE results workbook.

Further, in the Data Extraction Table for the TST Region 1 Profit Analysis worksheet – Revenue determinants (see exhibit 6), the TST Region 1 Broadcast \$s for Company 1 in cell C16 on the TST Region 1 Profit worksheet in exhibit 3 is extracted from cell E10 in the “Advertising Expenditures By Medium By Product By Region By Company (in Millions)” table on the “Full Ad., Content” worksheet of the COMPETE results workbook Period.xls. Similarly, the TST Region 1 Print \$s for Company 2 in cell D17 on the Company Profit worksheet in exhibit 1 is extracted from cell F13 in the “Advertising Expenditures By Medium By Product By Region By Company (in Millions)” table on

EXHIBIT 5

Data Extraction Table – Company Profit Worksheet (Expense Determinants)

Cost of Production - TST Company	I22	from ==>	Quality, Cost, OT Ship	7
Cost of Production - CVE Company	I23	from ==>	Quality, Cost, OT Ship	7
Cost of Production - SSL Company	I24	from ==>	Quality, Cost, OT Ship	7
Ending Inventory - TST	I39	from ==>	Quality, Cost, OT Ship	7
Ending Inventory - CVE	I40	from ==>	Quality, Cost, OT Ship	7
Ending Inventory - SSL	I41	from ==>	Quality, Cost, OT Ship	7
Overtime Production - TST	I43	from ==>	Quality, Cost, OT Ship	7
Overtime Production - CVE	I44	from ==>	Quality, Cost, OT Ship	7
Overtime Production - SSL	I45	from ==>	Quality, Cost, OT Ship	7
Operating Expenses				
Advertising (\$mil) - Company 1	C47	from ==>	Forecast, Prices	9
Advertising (\$mil) - Company 2	D47	from ==>	Forecast, Prices	9
Advertising (\$mil) - Company 3	E47	from ==>	Forecast, Prices	9
Advertising (\$mil) - Company 4	F47	from ==>	Forecast, Prices	9
Advertising (\$mil) - Company 5	G47	from ==>	Forecast, Prices	9
Salesforce # - Company 1	C25	from ==>	Salesforce, Salaries	10
Salesforce # - Company 2	D25	from ==>	Salesforce, Salaries	10
Salesforce # - Company 3	E25	from ==>	Salesforce, Salaries	10
Salesforce # - Company 4	F25	from ==>	Salesforce, Salaries	10
Salesforce # - Company 5	G25	from ==>	Salesforce, Salaries	10
R&D (\$'000s) - Industry Total	H49	from ==>	NAEM Bulletin 2	17
R&D (\$'000s) - Company	I49	from ==>	USA Income Statement	2
Overall Measure of Profitability				
Earnings per Share - Company 1	C51	from ==>	EPS, Mkt%, SF Activity	8
Earnings per Share - Company 2	D51	from ==>	EPS, Mkt%, SF Activity	16
Earnings per Share - Company 3	E51	from ==>	EPS, Mkt%, SF Activity	16
Earnings per Share - Company 4	F51	from ==>	EPS, Mkt%, SF Activity	16

the “Full Ad., Content” worksheet of the COMPETE results workbook.

Lastly, in the Data Extraction Table for the TST Region 1 Profit Analysis worksheet – Expense determinants (see exhibit 7), the TST Region 1 Ending Inventory in cell I26 on the TST Region 1 Profit worksheet in exhibit 3 is extracted from cell I10 in the “Shipments and Inventory By Region By Product” table on the “Quality, Cost, OT, Ship” worksheet of the COMPETE results workbook Period.xls. Similarly, the TST Region 1 Overtime Production in cell I28 on the Company Profit worksheet in exhibit 1 is extracted from cell G18 in the “Overtime Production / Shipments” table on the “Quality, Cost, OT, Ship” worksheet of the COMPETE results workbook.

In summary, the Company Profit Analysis worksheet (see exhibit 1) (a) extracts and presents for all competing firms the Earnings per Share, sales revenue determinants (price, advertising \$s and awareness indices, salesforce size, salary, commission, and quality for all companies, (c) calculates, and presents the average Price and Advertising Awareness Index of each of the three products across all three regions for each of the competing firms, and (d) extracts the total Ending Inventory and Overtime Production for each of the three products across all three regions of the company being analyzed. In addition, the Company Profit Analysis Worksheet (a) extracts the price charged and quantity sold for each of the nine SBUs for all competing firms, and (b) calculates and presents the Sales Revenue by SBU by company as well as the total sales revenue for each company (see exhibit 2).

Each of the nine SBU-specific profitability worksheets (see exhibit 3) (a) extracts and presents for all competing firms the SBU-specific sales revenue determinants (price, advertising \$s and awareness indices, salesforce size, salary, commission, and quality for all companies, (c) calcu-

lates, and presents the average Price and Advertising Awareness Index of each of the three products for each of the competing firms, and (d) extracts the SBU-specific Ending Inventory and Overtime Production of the SBU being analyzed. The use of external links ensures relevant data are extracted from relevant sources (statements) in the simulation results and precludes data entry error.

The Profitability Analysis Package Version 2.0 enables the competing teams to (a) monitor and identify company and SBU-specific performance, and (b) uncover potential reasons for sub-par performance. The package enables the teams to compare determinants of each of the (a) revenue components (price and quantity sold) and (b) expense components (cost of goods sold and operating expenses) with selected benchmarks. Each of the determinants can be compared with either (a) the market leader (highest earnings per share), (b) the industry average, (c) a direct competitor, or (d) other designated benchmarks.

A tab labeled “Compete” at the top of each of the Profitability Analysis worksheets when selected, enables the user to either highlight or hide concerns (potential causes of poor profitability). This tab was developed using the Custom UI Editor (<http://openxmldeveloper.org/blog/b/openxmldeveloper/archive/2009/08/07/7293.aspx>). When the “Show Concerns” button is selected, each of the team’s variables is compared with the market leader based on a set of pre-specified rules (see exhibit 8) and highlighted (shown on a pink background with bold red lettering) when appropriate. The “Hide Concerns” button enables the user to remove the warning flags (highlighted cells) in order to use alternative benchmarks for analysis of sub-par performance.

The concerns (cells) are highlighted when the outcome of a comparison between two values is true. The comparisons are always done between two values in the same row.

EXHIBIT 7

Data Extraction Table – TST Region 1 Profit Worksheet (Expense Determinants)

Data Extraction from COMPETE Results Workbook Period.xls To Profitability Analysis Workbook (Expense Determinants 1)						
TST Region 1 Profitability Analysis Worksheet			COMPETE Results Workbook Period.xls			
Account	Cell		Worksheet (Tab)	Page #	Account	Cell Ref.
TST Region 1 Cost of Goods Sold						
TST Cost of Production NAEM Indy Avg	H26	from ==>	Quality, Cost, OT, Ship	7	NAEM Avg. TST Unit Cost of Production	J10
TST Cost of Production - Company	I26	from ==>	Quality, Cost, OT, Ship	7	Company TST Unit Cost of Production	I10
TST Region 1 Ending Inventory	I27	from ==>	Quality, Cost, OT, Ship	7	Company TST Region 1 Ending Inventory	F27
TST Region 1 Overtime Production	I28	from ==>	Quality, Cost, OT, Ship	7	Company TST Region 1 Overtime Prodn.	G18
TST Region 1 Operating Expense						
TST Region 1 Advertising - Company 1	C30	from ==>	Full Ad., Content	12	Co. 1 TST R1 (Broadcast + Print + SP)	(E10+F10+G10) x !000000
TST Region 1 Advertising - Company 2	D30	from ==>	Full Ad., Content	12	Co. 2 TST R1 (Broadcast + Print + SP)	(E13+F13+G13) x !000000
TST Region 1 Advertising - Company 3	E30	from ==>	Full Ad., Content	12	Co. 3 TST R1 (Broadcast + Print + SP)	(E16+F16+G16) x !000000
TST Region 1 Advertising - Company 4	F30	from ==>	Full Ad., Content	12	Co. 4 TST R1 (Broadcast + Print + SP)	(E19+F19+G19) x !000000
TST Region 1 Advertising - Company 5	G30	from ==>	Full Ad., Content	12	Co. 5 TST R1 (Broadcast + Print + SP)	(E22+F22+G22) x !000000
Region 1 Salesforce - Company 1	C31	from ==>	Salesforce, Salaries	10	Company 1 Regional Salesforce - Reg. 1	D19
Region 1 Salesforce - Company 2	D31	from ==>	Salesforce, Salaries	10	Company 2 Regional Salesforce - Reg. 1	D20
Region 1 Salesforce - Company 3	E31	from ==>	Salesforce, Salaries	10	Company 3 Regional Salesforce - Reg. 1	D21
Region 1 Salesforce - Company 4	F31	from ==>	Salesforce, Salaries	10	Company 4 Regional Salesforce - Reg. 1	D22
Region 1 Salesforce - Company 5	G31	from ==>	Salesforce, Salaries	10	Company 5 Regional Salesforce - Reg. 1	D23
TST R&D (\$'000s) - NAEM Industry Average	H32	from ==>	NAEM Bulletin 2	17	NAEM Total Indy R&D (\$'000s) - TST	D17
TST R&D (\$'000s) - Company	I32	from ==>	USA Income Statement	2	Company R&D (\$'000s) - TST	G35

Three types of comparisons are used. The company under scrutiny is compared against either (a) the strongest competitor with the highest earnings per share shown at the bottom of the Profit worksheet, (b) the NAEM industry average, or (c) a fixed value (e.g. overtime > 0).

A VBA (Visual Basic for Applications) module was developed to encapsulate the logic that implements these row-wise comparisons. Logic that ensures the correct test is applied to each row has been added to each of the ten worksheets (Profit worksheet and nine SBU-specific worksheets). There is also some logic for each worksheet (Profit and the 9 SBU's) that ensures the correct test is applied to each row.

PROFITABILITY ANALYSIS PACKAGE USE

The web-based Profitability Analysis Package Version 2.0 is accessible online to competing participant teams in the marketing simulation COMPETE. The Profitability Analysis Package Version 2.0 is a zipped folder Profitability Analysis.zip that consists of an Excel workbook file Profitability.xlsx with external links to the Excel version of sample COMPETE results (output) Period.xls for a specific period.

The updated Profitability Analysis workbook consists of a Company Profit Analysis worksheet and nine SBU-specific Profit Analysis worksheets. The Company Profit Analysis worksheet (see exhibit 1) is used to monitor and assess company profitability performance relative to competitors and to understand the primary reasons for profit or loss during a specific decision period (quarter). The user can compare each of the primary determinants of company sales revenues (such as price, advertising, salesforce size, salary, and commission, and quality relative to the leading firm with the highest earnings per share. In addition, the user can compare each of the primary determinants of company expenses (such as unit cost of production, ending inventory, overtime production relative to the industry average extracted from the industry trade association (NAEM) newsletter bulletin in the COMPETE results. Further, the user can compare each of the primary operating expenses (such as advertising expense, salesforce expense, R&D expense) relative to the leading firm with the highest earnings per share. The user can use the "Show Concerns" option to highlight (flag) those determinants of company sales revenues and expenses with sub-par performance relative to the leading firm. Alternatively, the user can use the "Hide Concerns" option to revert to the original display in order to compare each of the determinants of company sales revenue and expenses with sub-par performance relative to the industry average or a specific competitor.

Each of the nine SBU-specific Profit Analysis worksheets such as TST Region 1 Profit Analysis worksheet (see exhibit 2) can be used in a similar manner to monitor and assess the specific SBU profitability relative to com-

petitors and to understand the primary reasons for adequate or inadequate contribution to margin during a specific decision period (quarter). The user can compare each of the primary determinants of SBU-specific sales revenues (such as price, advertising, salesforce size, salary, and commission, and quality relative to the leading firm with the highest earnings per share. In addition, the user can compare each of the primary determinants of SBU-specific expenses (such as unit cost of production, ending inventory, overtime production relative to the industry average extracted from the industry trade association (NAEM) newsletter bulletin in the COMPETE results. Further, the user can compare each of the primary operating expenses (such as advertising expense by SBU, salesforce expense by region, R&D expense by product) relative to the leading firm with the highest earnings per share. The user can use the "Show Concerns" option to highlight (flag) those determinants of SBU-specific sales revenues and expenses with sub-par performance relative to the leading firm. Alternatively, the user can use the "Hide Concerns" option to revert to the original display in order to compare each of the determinants of SBU-specific sales revenue and expenses with sub-par performance relative to the industry average or a specific competitor.

PROFITABILITY ANALYSIS PACKAGE PROCESS

First, the user downloads and unzips the Profitability Analysis.zip folder for a specific period. Next, the user logs in to CODES and downloads, renames and saves the Excel version of results for a specific decision period (quarter) as Period.xls in the unzipped "C:\Profitability Analysis" directory. Then, the user opens and updates the Profitability.xlsx workbook.

Next, the user selects the Profit worksheet to commence analysis of the overall company performance. The market leader (company with highest earnings per share) can be identified at the bottom of the Profit worksheet. Then, the user selects the Compete tab at the top of the worksheet. This reveals two buttons "Show Concerns" and "Hide Concerns" at the top left of the worksheet. When the "Show Concerns" button is selected, the user can immediately identify the highlighted cells with potential causes of sub-par profitability relative to the market leader (see exhibit 8). These cells are identified and highlighted based on a set of pre-specified rules relative to the market leader with the highest earnings per share (see exhibit 9). When the "Hide Concerns" button is selected, the highlighted cells disappear, enabling the user to analyze sub-par company profit performance using other benchmarks such as a more direct competitor instead of the market leader.

For example, the executives of one of the competing participant teams TriniTech (Company 2) have used the Profitability Analysis package to analyze the operations of

their firm during period 6. The Company Profit Analysis worksheet (see exhibit 8) indicates (at the bottom) that their earnings per share of \$0.56 are lower than the leading \$1.00 earnings per share of the market leader Company 5. When they use the Compete tab to select “Show Concerns,” the highlighted cells in red on a pink background

indicate potential reasons for their company performance.

For instance, when they analyze the determinants of revenue (price and quantity sold) they find that their TST price of \$4,490 and CVE price of \$443 are lower than the corresponding prices of \$4,493 and \$444 respectively of the market leader company 2 (see exhibit 8). These lower

EXHIBIT 8 Company Profitability Analysis Worksheet with Warning Flags

Performance Analysis Profitability								
TriniTech Company 2 Period 6								
	Company 1	Company 2	Company 3	Company 4	Company 5	NAEM Indy. Avg.	Our Company	
Revenues	\$38,912,799	\$40,073,029	\$35,258,507	\$39,031,025	\$36,946,246			
Price								
TST	\$ 4,417	\$ 4,490	\$ 4,573	\$ 4,447	\$ 4,493			
CVE	\$ 444	\$ 443	\$ 437	\$ 440	\$ 444			
SSL	\$ 51	\$ 51	\$ 50	\$ 52	\$ 51			
Quantity								
Price								
TST	\$ 4,417	\$ 4,490	\$ 4,573	\$ 4,447	\$ 4,493			
CVE	\$ 444	\$ 443	\$ 437	\$ 440	\$ 444			
SSL	\$ 51	\$ 51	\$ 50	\$ 52	\$ 51			
Advertising \$s	\$ -	\$ -	\$ -	\$ -	\$ -			
Ad Awareness								
TST						104.3	105.7	
CVE						102.7	101.3	
SSL						104.7	105.3	
Salesforce #	100	101	103	117	112			
SF Salary	\$ 4,000	\$ 4,000	\$ 4,100	\$ 4,185	\$ 4,000			
SF Commission	3.0%	2.8%	3.0%	2.8%	0.3%			
Quality								
TST	102	102	103	102	103			
CVE	101	101	101	101	102			
SSL	100	100	100	100	100			
Expenses								
COGS								
Cost of Prodn.								
TST						\$3,556.73	\$3,558.32	
CVE						\$ 358.71	\$ 358.81	
SSL						\$ 37.36	\$ 37.24	
Ending Inventory								
TST							34	
CVE							619	
SSL							7,703	
Overtime								
TST							0	
CVE							106	
SSL							3,179	
Operating Exp.								
Advertising (\$mil)	\$ -	\$ -	\$ -	\$ -	\$ -			
Salesforce	100	101	103	117	112			
R&D (\$000s)						1,694	\$ 2,100	
EPS	\$ (0.12)	\$ 0.56	\$ 0.21	\$ 0.56	\$ 1.00			

prices could have yielded lower margins and lower profits, especially if demand for these products is price inelastic. Their advertising awareness index of 101.3 for the CVE is less than the industry average of 102.7. This indicates that there is room for improvement in media choice (broadcast v print v sales promotion) and copy choice (price, quality, features, benefits, warranty/service/repairs) when compared to the industry average. In addition, their salesforce size of 101 is lower than the 112 salesforce size of the market leader. Furthermore, their TST quality index of 102 and CVE quality index of 101 are both lower than the corresponding 103 and 102 quality indices of the market leader. In a brief period, they have uncovered the primary reasons for weak sales revenues relative to the leader.

On the expense side they find that their unit cost of production for the TST of \$3,558.32 and for the CVE of \$358.81 both exceed the NAEM Industry Average of \$3,556.73 and \$358.71 respectively, making them less competitive and reducing their margins. In addition, they find that they have relatively high ending inventories for the CVE of 619 units and for the SSL of 7703 units leading to spoilage, high inventory carrying costs, storage costs and possibly clearance sales at marked down prices. Finally, they have overtime production of 106 units for the CVE and 3,179 units for the SSL as a consequence of poor forecasting leading to stockouts, lost sales and most important-ly lost customers.

The pre-specified rules for the Company Profit Analysis worksheet are indicated on the right side (see exhibit 9). The benchmark price (BM) used when the Compete tab is used to select "Show Concerns" is the industry leader Company 5 with the highest earnings per share.

Sales revenues are the product of price charge and quantity sold. Assuming an inelastic demand (not necessarily true in all instances) for these luxury products, when prices are lower than the benchmark ($P < BM$), the cells are highlighted to indicate concerns. The antecedents of quantity sold (market share) are price, advertising budget, advertising awareness index, salesforce size, salary, commission, and quality. All these determinants have a direct relationship with quantity sold. Accordingly, the cells are highlighted if the values for each of the above variables for the company are less than the corresponding values for the market leader Company 5. The rules are specified on the right.

Total expenses consist of cost of goods sold items and operating expenses. The primary determinants of cost of goods sold are the unit cost of production for each of the three products, ending inventory & storage charge, and overtime production. The major operating expenses include advertising, salesforce expense, and R&D expense which can be used to improve quality and lower cost of production. All these determinants have a direct relationship either with costs of goods sold or with operating expenses. Accordingly, the cells are highlighted if the values for each of the above variables for the company are more

than the corresponding values for the market leader Company 5 or the NAEM industry average in the case of unit cost of production. Excessive inventory is flagged when TST inventory exceeds 100 units, CVE inventory exceeds 500 units, and SSL inventory exceeds 1000 units as indicated on the right. Any overtime is considered undesirable as indicated.

Later, the user can select one or more of the nine SBU-specific worksheets in order to analyze sub-par profitability (contribution to margin) performance of specific SBUs. The nine SBU-specific worksheets extract SBU-specific data on such variables as SBU price, SBU advertising with breakdowns of broadcast advertising, print advertising, and sales promotion, and regional instead of total salesforce size. In addition, each of the SBU worksheets calculates and displays industry averages for each line item where industry averages are not available from the Excel version of the COMPETE results Period.xls. Once again, the selection of the "Compete" tab followed by the "Show Concerns" button enables the user to immediately identify the highlighted cells with potential causes of sub-par profitability relative to the market leader (see exhibit 10). These cells are identified and highlighted based on a similar set of pre-specified rules relative to the market leader with the highest earnings per share (see exhibit 11). When the "Hide Concerns" button is selected, the user can analyze sub-par SBU profit (contribution to margin) performance using other benchmarks such as a more direct SBU-specific competitor instead of the overall market leader or the calculated and displayed SBU-specific industry averages.

For example, the executives of TriniTech (Company 2) have used the Profitability Analysis workbook to analyze the operations of their SBU TST – Region 1 during period 6. The TST – Region 1 Analysis worksheet (see exhibit 10) uses the same benchmark industry leader Company 5 with the leading \$1.00 earnings per share identified in the Company Profit worksheet. When they use the Compete tab to select "Show Concerns," the highlighted cells in red on a pink background indicate potential reasons for their TST – Region 1 performance.

For instance, when they analyze the determinants of revenue (price and quantity sold) they find that their TST - Region 1 price of \$4,530 is higher than the corresponding TST – Region 1 price of \$4,500 of the market leader company 2 (see exhibit 10). This higher price yielded higher margins and profits, especially if demand for these products is price inelastic and hence is not flagged as a determinant of sales revenue. Yet, when analyzing the determinants of quantity sold, this same higher price of \$4,530 could have resulted in lower unit sales (all other variables held constant) as the COMPETE simulation is based on the rational man model. Their total TST – Region 1 advertising budget of \$270,000, Broadcast advertising budget of 110,000, Print advertising budget of \$80,000, Sales Promotion budget of \$80,000 are all less than the corresponding budgets of \$330,000, \$130,000, \$100,000, and \$100,000 respectively

EXHIBIT 9
Company Profitability Analysis Worksheet Rules

Performance Analysis						
Profitability						
		Company 2	Company 5	NAEM Indy. Avg.	Our Company	Rules: Warn if
Revenues		\$ 40,073,029	\$ 36,946,246			
	Price					
	TST	\$ 4,490	\$ 4,493			P < BM
	CVE	\$ 443	\$ 444			P < BM
	SSL	\$ 51	\$ 51			P < BM
	Quantity					
	Price					
	TST	\$ 4,490	\$ 4,493			P > BM
	CVE	\$ 443	\$ 444			P > BM
	SSL	\$ 51	\$ 51			P > BM
	Advertising \$s	\$ -	\$ -			A\$ < BM
	Ad Awareness					
	TST			104.3	105.7	AA < NAEM
	CVE			102.7	101.3	AA < NAEM
	SSL			104.7	105.3	AA < NAEM
	Salesforce #	101	112			S# < BM
	SF Salary	\$ 4,000	\$ 4,000			Salary < BM
	SF Commission	2.8%	0.3%			Comm < BM
	Quality					
	TST	102	103			Quality < BM
	CVE	101	102			Quality < BM
	SSL	100	100			Quality < BM
Expenses						
	COGS					
	Cost of Prodn.					
	TST			\$ 3,556.73	\$ 3,558.32	CoP > NAEM
	CVE			\$ 358.71	\$ 358.81	CoP > NAEM
	SSL			\$ 37.36	\$ 37.24	CoP > NAEM
	Ending Inventory					
	TST				34	EI > 100
	CVE				619	EI > 500
	SSL				7,703	EI > 1000
	Overtime					
	TST				0	OT > 0
	CVE				106	OT > 0
	SSL				3,179	OT > 0
	Operating Exp.					
	Advertising (\$mil)	\$ -	\$ -			A\$ > BM
	Salesforce	101	112			S# > BM
	R&D (\$'000s)			#DIV/0!	\$ 2,100	R&D > INDY AVG
	EPS	\$ 0.56	\$ 1.00			BM = High EPS

of the market leader Company 5 (see exhibit 10). Their TST – Region 1 advertising awareness index of 105 is higher than the NAEM TST – Region 1 industry average of 103 and is accordingly not flagged. Their Region 1 salesforce size of 37 is lower than the 45 Region 1 salesforce size of the market leader. Their salesforce salary and commission of \$4,000 and 2.8% are the same as or better than the \$4,000 salary and 0.3% commission of the market leader company 5 and are not flagged. However, their TST quality index of 102 is lower than the corresponding 103 TST quality index of the market leader. Again, they have uncovered the primary reasons for weak TST – Region 1 sales revenues relative to the leader.

On the Expense side they find that their unit cost of production for the TST of \$3,558.32 exceeds the NAEM Industry Average of \$3,556.73, making them less competitive and reducing their TST – Region 1 contribution-to-margin. They have no TST – Region 1 ending inventory or stockout concerns, but their company R&D budget exceeds that of the NAEM industry average. While this may result in higher quality, it contributes to total operating expenses and lower profits.

The pre-specified rules for the TST – Region 1 Profit Analysis worksheet are indicated on the right side (see ex-

hibit 11). The benchmark price (BM) used when the Compete tab is used to select “Show Concerns” is once again the industry leader Company 5 with the highest earnings per share. As before all determinants of the quantity sold component of total revenues have a direct relationship with sales revenue except for price. This is due to the rational man model assumption used in the COMPETE simulation. In addition, all the determinants of Total Expenses have a direct relationship either with costs of goods sold or with operating expenses. Accordingly, the cells are highlighted if the values for each of the above variables for the company are more than the corresponding values for the market leader Company 5 or the NAEM industry average in the case of unit cost of production. Excessive inventory is flagged when TST inventory exceeds 100 units as indicated on the right. Any overtime is considered undesirable and highlighted.

Once the reasons for sub-par overall company and SBU-specific performance are recognized, appropriate corrective action can be taken to improve performance, thereby operationalizing the Iceberg Principle and exercising marketing control.

EXHIBIT 10 TST-Region 1 Profitability Analysis Worksheet with Warning Flags

Performance Analysis							
Profitability							
TriniTech							
Company 2							
Period 6							
TST - Region 1							
	Company 1	Company 2	Company 3	Company 4	Company 5	NAEM Indy. Avg.	Our Company
Revenues							
Price	\$3,667,500	\$ 3,171,000	\$3,790,400	\$2,979,000	\$3,150,000	\$3,351,580	
TST-1	\$ 4,500	\$ 4,530	\$ 4,600	\$ 4,500	\$ 4,500	\$ 4,526	
Quantity							
Price	\$ 4,500	\$ 4,530	\$ 4,600	\$ 4,500	\$ 4,500	\$ 4,526	
Advertising \$s	\$ 320,000	\$ 270,000	\$ 160,000	\$ 240,000	\$ 330,000	\$ 264,000	
Broadcast	\$ 160,000	\$ 110,000	\$ 90,000	\$ 120,000	\$ 130,000	\$ 122,000	
Print	\$ 70,000	\$ 80,000	\$ 50,000	\$ 50,000	\$ 100,000	\$ 70,000	
Sales Promo	\$ 90,000	\$ 80,000	\$ 20,000	\$ 70,000	\$ 100,000	\$ 72,000	
Ad Awareness						103	105
Reg. Salesforce #	37	37	39	42	45	40.0	
Co. SF Salary	\$ 4,000	\$ 4,000	\$ 4,100	\$ 4,185	\$ 4,000	\$ 4,057	
Co. SF Commission	3.0%	2.8%	3.0%	2.8%	0.3%	2.4%	
Quality	102	102	103	102	103	102.4	
Expenses							
COGS							
Cost of Prod.						\$ 3,556.73	\$3,558.32
Ending Inventory							0
Overtime							0
Operating Exp.							
Advertising	\$ 320,000	\$ 270,000	\$ 160,000	\$ 240,000	\$ 330,000	\$ 264,000	
Reg. Salesforce #	37	37	39	42	45	40.0	
Co. R&D (\$000s)						1,694	\$ 2,100
							Co. Total

STRENGTHS AND LIMITATIONS

Company and SBU-specific profitability analysis can help management identify (a) the degree of profitability of the company and each SBU within the brand portfolio, (b) which SBUs within the brand portfolio are not contributing to overall profit, (c) the primary reasons for lack of overall profitability, and (d) the primary reasons for lack of contribution to margin of poorly performing SBUs. After they identify relatively unprofitable SBUs, and understand the primary reasons for lack of profitability, marketing managers can use the insight derived to take appropriate corrective action.

Positive anecdotal student feedback was received from undergraduate students at the end of the Spring 2013 semester. Some undergraduate students reported that the decision support packages were very useful and helpful in understanding the determinants of profitability. They indicated that the automatic extraction feature saved a “LOT” of time instead of having to type in all the numbers. They hoped it would continue to be used in the future as it defi-

nitely made a difference.

The Online Profitability Analysis Package has some limitations. First, some of the variables extracted from the COMPETE results are broken down by product (Quality, Cost of Production, R&D expense), other variables are broken down by region (salesforce size), and a few other variables such as salesforce salary and commission are only available company-wide. These data limitations may not accurately reflect the emphasis that management decides to give each of the nine SBUs in their marketing program. In addition, if the firm does not order the necessary market research reports, the required information will be missing and not available for extraction from the Excel version of the COMPETE results Period.xls file. Further, the Profitability Analysis Package flags the determinants of sales revenue and expenses for both the company and each of the nine SBUs based on comparison with the leading competitor with the highest overall earnings per share. However, it is possible for the user to turn off the flags by selecting the “Hide Concerns” option, and compare each antecedent of sales revenue and expense with average company values or

EXHIBIT 11 TST-Region 1 Profitability Analysis Worksheet Rules

Performance Analysis						
Profitability						
TST - Region 1						
		Company 2	Company 5	NAEM Indy. Avg.	Our Company	Rule Warn if:
Revenues		\$3,171,000	\$3,150,000	\$3,351,580		
	Price (P)					
	TST-1	\$ 4,530	\$ 4,500	\$ 4,526		P < BM
	Quantity					
	Price (P)	\$ 4,530	\$ 4,500	\$ 4,526		P > BM
	Advertising \$s (A\$s)	\$ 270,000	\$ 330,000	\$ 264,000		A\$s < BM
	Broadcast (BC)	\$ 110,000	\$ 130,000	\$ 122,000		BC < BM
	Print (PRT)	\$ 80,000	\$ 100,000	\$ 70,000		PRT < BM
	Sales Promo (SP)	\$ 80,000	\$ 100,000	\$ 72,000		SP < BM
	Ad Awareness (AA)			103	105	AA < NAEM
	Reg. Salesforce # (S#)	37	45	40		S# < BM
	Co. SF Salary	\$ 4,000	\$ 4,000	\$ 4,057		Salary < BM
	Co. SF Commission	2.8%	0.3%	2.4%		Comm < BM
	Quality	102	103	102.4		Quality < BM
Expenses						
	COGS					
	Cost of Prod. (CoP)			\$ 3,556.73	\$3,558.32	CoP > NAEM
	Ending Inventory				0	EI > 100 (TST), 500 CVE, 1000 SSL
	Overtime				0	OT > 0
	Operating Exp.					
	Advertising (A\$s)	\$ 270,000	\$ 330,000	\$ 264,000		A\$s > BM
	Reg. Salesforce # (S#)	37	45	40		S# > BM
	Co. R&D (\$'000s)			\$ 1,694.00	\$ 2,100	R&D > INDY AVG
					Co. Total	

with a specific selected competitor. In future, it may be possible to provide the user with benchmark options. The user can then select relevant or alternative benchmarks to analyze their own profitability.

Despite these limitations, the Profitability Analysis Package is a simple yet powerful web-based user-centered learning tool that extracts relevant data from the simulation results, precludes data entry error, and saves considerable time involved in identifying and entering relevant data. Yet, in order to maximize learning about the Iceberg Principle and Marketing Control, and actualize the learning potential of the Profitability Analysis Package, the instructor needs to (a) explain the purpose, significance, assumptions, usage, and limitations of this dss package, (b) require inclusion of a sample analysis in a team report or presentation, and (c) test students on their understanding of the underlying concepts at the end of the semester.

CONCLUSION

The Web-based Profitability Analysis Package is a user-centered learning tool that helps to prepare students for marketing decision-making responsibilities in their future careers. The package enables users to apply the Iceberg Principle in Marketing Control and determine whether each SBU in their brand portfolio is contributing to the overall company profit or loss. Participants use the Profitability Analysis Package to determine if each SBU is profitable or not, and to compare the primary antecedents of sales revenue and expenses with those of the leading competitor with the highest earnings per share. This Web-based Profitability Analysis Package facilitates the integration of computers, the Internet and the World Wide Web into the marketing curriculum.

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