Interdisciplinary business decision making assignment

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ABSTRACT

This article presents an assignment for students to apply interdisciplinary business decision-making skills to a series of tasks in support of a small business. The assignment contributes to the preparation for a career where businesses of any size respond to opportunities not restrained by organizational silos. Interdisciplinary knowledge of business specializations is developed through coursework and experiential learning. Learning pedagogies that incorporate hands-on assignments and quantitative data analysis skills are considered a successful technique to both motivate and prepare learners. The interdisciplinary business competencies addressed in this assignment are consistent with AACSB Standard 4: Curriculum.

Keywords: business education, data analysis, decision making, interdisciplinary curriculum, technology in education

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INTRODUCTION

The typical business curriculum for institutions of higher education includes coursework in a specific business discipline along with a set of classes in the predominate business disciplines. These business disciplines include accounting, finance, information technology, marketing, and management (AACSB, 2020). Often, the set of business survey courses in these business disciplines is referred to as the business core. It is anticipated that at graduation students will be prepared for their careers because they participated in intensive training in a specific discipline (the major), along with developing a broad base of business knowledge through the business core (Djoundourian, 2017). Since corporate recruiters report the need for graduates who are problem-solvers with interdisciplinary competencies, it is important for students to have skills beyond a basic understanding of the business disciplines. Students should also be able to recognize the integration of the separate business disciplines in addressing problems and opportunities (McCord et al., 2015; Sroufe & Ramos, 2015).

Business core class rosters can include students from a wide variety of majors. This provides students with the opportunity to interact with students from different majors. Specific majors tend to show different skill sets and communication styles in its student body. The ability to communicate with individuals from various disciplines is necessary to solve business problems and implement business strategy (Hannon et al., 2018; Marshall et al., 2018). Research supports the value of cross-disciplinary abilities; business plans require integration of multiple disciplines (Hannon et al., 2018). The value of interdisciplinary curriculum is recognized by AACSB in order to be prepared for future careers and graduate school (AACSB, 2020).

Student learning is enhanced through the hands-on assignments that apply theoretical course content. Research reports that active, applied learning is important in the development of important critical thinking and analysis skills and preferred by students (Manzon, 2017). In addition, employers report the need for recruits who apply business skills and ingenuity to problem solving (Kaufman et al., 2019). Higher education institutions are encouraged to develop interdisciplinary experiences to mimic the work environment that awaits each student post-graduation (Kaufman et al., 2019). In particular, hands-on quantitative decision-making assignments which include data analysis are valuable in the development of students' abilities (Borthick et al., 2017).

This article presents an interdisciplinary, multi-stepped assignment for students majoring in any business discipline. The assignment has been successfully integrated into a lower, mid, or high-level class. The design of the assignment is in support of AACSB Standard 4: Curriculum in several areas, including the use of quantitative methods that rely on technology and the importance of applying business discipline theory to a relevant business situation (AACSB, 2020). The presentation of the assignment is in several sections. The learning objectives are discussed, and the appropriate audience is described along with information about trial runs of the assignment in various types of classes. Classroom-ready assignment directions are included, followed by teaching notes that include the suggested solution along with a description for assignment modifications so that the assignment is reusable.

THE ASSIGNMENT

Learning Objectives

With this assignment, students build information literacy and critical thinking as they apply business acumen and technology skills to a multi-step small business situation. Specifically, students gain experience with:

- general business knowledge in marketing and finance
- financial accounting
- information literacy skills including data manipulation, analysis, and presentation
- business quality writing
- research skills

Audience

The assignment includes a number of sections where students address challenges from the perspective of a small business consultant. The assignment may be completed as an individual or with a team. Adequate preparation for this assignment requires knowledge of basic spreadsheet construction concepts, development of a rudimentary income statement, expected value, sensitivity analysis, and introductory marketing and finance concepts. It is recommended that the assignment be used in a class which includes the minimum prerequisites of an Introduction to Business course and a Microsoft Office applications course.

Iterative versions of the assignment were tested multiple times in several classes. The first version of the assignment was delivered in a senior-level capstone course for IT majors. This course involves the analysis, synthesis, evaluation, and application of theories and skills associated with information technology and business. The assignment was one of several applied projects and cases. The vast majority of students in the class completed all classes in the business core during their freshman and sophomore years except for the finance and business policy classes. These two classes are typically completed in the junior and senior years, respectively. The assignment was introduced through class discussion and collaborative open labs. Students completed most of the assignment outside of class time. At the conclusion, students provided feedback through class discussion. The assignment was refined to incorporate student feedback and issues identified through the grading process. The assignment was used in a total of six sections between two different courses.

The first course where this assignment was used was as a team project in five sections of a sophomore-level enterprise technology course for all business majors. These students completed Introduction to Business and the Microsoft Office applications course. In addition, the students completed some portion of the business core classes. The assignment was introduced through class discussion and collaborative open labs to teams comprised of students majoring in a variety of disciplines. Teams completed most of the assignment outside of class time. At the conclusion, students provided feedback through class discussion. Based on this feedback, the assignment needed minimal changes.

The second and most recent use of this assignment was as a team project in one section of an experimental course, Integrated Business Seminar. This course strengthens business acumen through assignments and discussion that requires the application of skills from multiple business decisions to determine strategy for business of all sizes. In addition, students were challenged

with situations for the application of legal and ethical reasoning, communication, interpersonal skills, critical thinking skills, and quantitative skills. Applied exercise, like this assignment, and case analyses were the vehicle to present course content. Most students in this class completed the Introduction to Business course, the Microsoft Office applications course, and most of their business core classes.

The assignment was successful in multiple IT and business classes as either an individual or team project. In general, students responded well to the opportunity to review and apply concepts learned in their business classes. Through its design, it is possible to create uniqueness by changing the various numbers and components. This detail is described in the Teaching Notes section of this article.

Assignment Directions

Clean Food Grocers is a family-owned LLC specializing in retailing of minimally processed food and household goods. There are three locations within an affluent, growing metropolitan area. The centralized management team's goal is to plan for the future. The management team contracted with a small business consultant to complete several tasks in support of the decision-making process. There are six tasks: (1) develop an income statement based on forecasted budget information, (2) complete what-if analysis, (3) create chart-visual aids, (4) calculate expected value and complete sensitivity analysis, (5) investigate financial decision making, and (6) investigate marketing decision making.

Task 1: Forecasted Income Statement

Clean Foods requires an income statement for the current year and the next three years to support planning and decision making. Refer to Exhibit 1 (Appendix) to review information collected by the VP of Accounting. The information is based on past performance that has been adjusted for future events. Using the information in Exhibit 1 as a guide, create a Microsoft Office Excel worksheet named "Forecasted Income Stmt". This worksheet should include two defined areas. The top of the worksheet should include the four-year income statement based on budget forecasts. The bottom of the worksheet should include the budget information used to derive the income statement. Since the income statement is based on budget estimates, the statement itself should not include any hard-coded values. Each income statement cell should include a formula which references information in the bottom section. Since the income statement information is separate from the budget forecasts, Clean Foods may adjust projection and view the impact on the income statement. This method facilitates decision-making activities.

In creating the Sales and Cost of Goods Sold section of the income statement, include data by product category include of included just the total sales number. Note that the President's salary is a percentage of gross profit; a salary is paid only if the business is profitable. This logic should be built for formula used in the income statement using the IF function. Protect the cells in the information section from accidental update.

Task 2: What-if Analysis

The information used to build the forecasted income statement is based on estimated budget information. The management team requests information on the impact to net income for

various conditions. Exhibit 2 (Appendix) includes a sample of questions posed by the management team. The forecasted income statement is used to respond to the questions. The worksheet is reset to its original values before responding to each prompt.

Task 3: Charts and Visual Aids

Clean Foods management team requests a chart that compares the contribution to total sales of the various product lines (prepared meals, refrigerated, bulk goods, etc.) based on their sales volumes for $Year_0$. Select three (3) possible chart types and then create the charts. Place the charts on the Microsoft Office Excel workbook in a new worksheet, and name the worksheet "Sales Chart".

Task 4: Expected Return and Sensitivity Analysis

Clean Foods needs to purchase new equipment for the deli to expand operations to include catering. Determine the optimal strategy for the selection of the new equipment based on three alternatives and uncertainty regarding future events. Three grades of machinery are available: premium, standard, and economy. The estimated return from each machine depends on the overall demand for the deli items in the marketplace. Demand may be classified as high (H) or poor (P). The returns from each of the systems under these possible outcomes are summarized; refer to Exhibit 3 (Appendix).

Calculate the expected return for the alternatives assuming a 0.40 probability for the event that the demand is high. Create a Microsoft Office Excel worksheet, named "Deli Equip", within the same workbook as the forecasted income statement to perform sensitivity analysis examining the expected pay as the probability of demand changes. Over what range of demand is each alternative optimal? Place all responses on the "Deli Equip" worksheet.

Task 5: Financial Decision Making

Clean Foods is considering several financing alternatives to obtain capital for its proposed catering project. The small business consultant is requested to research and report on the following tasks for the management team in support of the decision-making process. The report should include a dictionary of all business terms that defines all business terminology included in the report.

1. Investigate appropriate financial information to consider when a small business makes a capital investment decision.
2. Describe the key information that a financial lending institution would likely consider in making a loan decision for a small business.

Task 6: Marketing Decision Making

Clean Foods is considering expanding into catering through its deli departments at each of its locations. The small business consultant is requested to research and report on the following tasks for the management team in support of the decision-making process. The report should include a dictionary of all business terms that defines all business terminology included in the report.

1. Develop a market-oriented mission statement for Clean Foods recognizing that they are expanding their clean-foods grocery store operations to include catering. The current mission statement is as follows:
The mission of Clean Foods is a commitment to supporting healthy choices for our customers and our environment.
2. With respect for buying groceries, discuss the buyer decision process.

TEACHING NOTES

Students address the challenges of this assignment from the perspective of a small business consultant. The assignment may be completed as an individual or with a team. Prepare the students through a discussion of the assignment directions. Discuss the importance of business quality writing in the preparation of the assignment. Then, review the business and technology concepts required to complete each assignment task.

Task 1: Forecasted Income Statement requires the development of a statement based on budget information. Class discussion should include a review the purpose and format of an income statement and the budget process. Discuss structured data concepts and the importance of the use of formulas and reference cells when developing spreadsheets. There are multiple places where the assignment may be easily modified for uniqueness, including sales estimates and growth rates, product sales by category percentages, cost of goods sold percentages, operating expenses, tax rates, and wage information.

Exhibit 4 (Appendix) includes the suggested solution for the top portion of the worksheet – the forecasted income statement.

Exhibit 5 (Appendix) includes the formula view of the top portion of the worksheet.

Exhibit 6 (Appendix) includes the suggested solution for the bottom portion of the worksheet – the budget information used to build the forecasted income statement.

Exhibit 7 (Appendix) includes the formula view of the bottom portion of the worksheet.

Task 2: What-if Analysis includes a what-if analysis that examines the impact to net income for various changes to budget information. This task reinforces the structured data concepts and the importance of the use of formulas and reference cells when developing spreadsheets. This task may be easily modified for uniqueness by either asking different analysis questions and/or modifying the percentages within the suggested questions. It may be interesting to have students prepared visualization to show the various levels of costs associated with each product line.

Exhibit 8 (Appendix) includes the suggested solution for the what-if analysis prompts.

Task 3: Charts and Visual Aids includes the creation of three alternative visual presentations of data included in the forecasted income statement. Discuss the benefits of data visualization to the presentation of information. This task may be easily modified for uniqueness by asking for illustrations of different budget variables.

Exhibit 9 (Appendix) includes the suggested solution for the Charts and Visual Aid task.

Task 4: Expected Return and Sensitivity Analysis calculates expected return and completes sensitivity analysis to aid in a capital decision. Discuss the challenges of decision making with uncertainty. Review expected return calculations and the process to complete sensitivity analysis. Explain the importance of sensitivity analysis in reaching a decision with uncertainty. This task may be modified for uniqueness by changing the problem from expected return to expected cost, modifying the level of demand, changing the number of alternative machines, or changing the value of the variables in the pay-off table.

Exhibit 10 (Appendix) illustrated the suggested solution based on the 0.40 probability that the demand is high and expected return analysis.

Exhibit 11 (Appendix) includes the formula view of the suggested solution.

Exhibit 12 (Appendix) illustrates the expected value for each grade of deli equipment based on the various probabilities of high and low demand.

Exhibit 13 (Appendix) includes the formula view of the expected value at various levels of demand. Exhibit 14 (Appendix) graphically illustrates the expected value for each grade of

deli equipment based on the various probability of high and low demand.

Task 5: Financial Decision Making requires the investigation of financial information to consider when a small business makes a capital investment decision. In addition, students research the key information businesses provide to financial lending institutions. This task challenges students to apply business writing skills to the explanation of researched capital investment decisions. Student responses may be run through a plagiarism tool to evaluate uniqueness. Responses will vary. Suggested content follows.

1. Appropriate financial information to consider when a small business makes a capital investment decision includes the following: cost of borrowing, changes in demand, confidence, capital productivity, availability of bank loan, inflation, expected cash flow, and changes in fixed and variable costs.
2. A financial lending institution would likely consider the following key information in making a loan decision for a small business: length of time that the business has been in operation, credit history, total business revenue, purpose of loan, available collateral, cash flows, business plan, working capital, and financial statements.

Task 6: Marketing Decision Making requires the development of a market-oriented mission statement for an organization that is expanding its operations. It also requires the research of the buyer's decision process. This task challenges students to apply business writing skills to the explanation of marketing decision making. Student responses may be run through a plagiarism tool to evaluate uniqueness. Responses will vary. Suggested content follows.

1. Market-oriented mission statement is developed based on assumptions about the organization's image, whom the organization serves, and its products.
2. With respect for buying groceries, the buyer decision process has changed in recent years. Once loyal to a specific brand, time spent on evaluating alternatives is very brief. The purchase decision continues into the future. Shoppers more concerned about saving money or getting a healthier product will spend more time to go through the buying decision process. As they cross-compare brands, they read labels and pay attention to prices.

This task may be modified for uniqueness through an alternative marketing decision making assignment that challenges students in the analysis of marketing mix. Students report on the various product category's contribution towards profit. Students research the report on promotional strategies to increase sales in profitable product categories.

CONCLUSION

Interdisciplinary business competencies are address in Association to Advance Collegiate Schools of Business (AACSB) Standard 4: Curriculum. AACSB is the premier international accreditation organization for higher education business schools. The article presents an interdisciplinary business decision making assignment, with suggestion solution, that reinforces the interconnectedness of the business disciplines. The assignment is an opportunity to apply and reinforce business concepts learned in introductory and survey courses. The assignment has been successfully administered in lower and upper-level courses. Modification suggestions are included so that the assignment is reusable.

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APPENDIX

Exhibit 1 – Budget Information.

Clean Foods Budget Information		
Product Category	**Sales: Percent of Total Sales**	**Cost: Percent of Product Category Sales**
Prepared meals	8.0	42
Refrigerated	18.0	50
Bulk goods	9.0	72
Frozen	20.5	68
Proteins	19.0	51
Fruits and Vegetables	12.5	60
Paper Products	9.0	64
Toiletries	2.0	50
Beverages	2.0	28
Marketing	6	
Administrative	9	
Depreciation	$18,000 annual fixed amount.	

Sales Growth Rate (from previous year)
=YEAR(TOTAY() = $3,950,000
=YEAR(TOTAY() + 1): 6.25 percent
=YEAR(TOTAY() + 2): 7.75 percent
=YEAR(TOTAY() + 3): 8.25 percent
Payroll Information
President - 11 percent of gross profit
Director: $58,000 annually
Supervisor: $42,000 annually
Team Associate: $14.50 hour
16 Team Associates, 40-hour work week, 50 weeks annually
Taxes
Federal: 21% of Income Before Taxes
State: 4.5% of Income Before Taxes
Local: 1.25% of Income Before Taxes

Exhibit 2 – What-if analysis sample questions.

1. Report the change in company's net income for $Year_1$, $Year_2$, and $Year_3$ if total sales increases 8 percent from $Year_0$ to $Year_1$, 9.5 percent from $Year_1$ to $Year_2$, and 10 percent from $Year_2$ to $Year_3$.
2. Report the change in company's net income for $Year_1$, $Year_2$, and $Year_3$ if total sales increases 4.5 percent from $Year_0$ to $Year_1$, 5 percent from $Year_1$ to $Year_2$, and 5.5 percent from $Year_2$ to $Year_3$.
3. Report the change in company's net income for $Year_1$ if Clean Foods decreases the President's salary to 8 percent of gross profit and increases the team associates hourly wage to $15.50.
4. Report the change in the company's net income for $Year_1$ if three additional team associates are hired.
5. Report the change in the company's net income for $Year_1$ if the following changes are made: President salary is increased by five percent, the director's salary is increased by $2,000, and the supervisor's salary is increased by $3,000.

Exhibit 3 – Expected return for alternative deli equipment choices.

Decision Alternatives	High Demand	Poor Demand
Premium-Grade Equipment	$18,500	-$1,800
Standard-Grade Equipment	$14,600	$2,800
Economy-Grade Equipment	$9,800	$6,400

Exhibit 4 – Suggested solution for the top portion of the worksheet: forecasted income statement.

	A	B	C	D	E
1	**Clean Foods**				
2	**Forecasted Income Statement**				
3	**Prepared On:**				
4	**=TODAY()**				
5		=YEAR(TODAY())	=YEAR(TODAY()) + 1	=YEAR(TODAY()) + 2	=YEAR(TODAY()) + 3
6	**Sales**				
7	Prepared meals	$316,000	$335,750	$361,771	$391,617
8	Refrigerated	$711,000	$755,438	$813,984	$881,138
9	Bulk goods	$355,500	$377,719	$406,992	$440,569
10	Frozen	$809,750	$860,359	$927,037	$1,003,518
11	Proteins	$750,500	$797,406	$859,205	$930,090
12	Fruits and Vegetables	$493,750	$524,609	$565,267	$611,901
13	Paper Products	$355,500	$377,719	$406,992	$440,569
14	Toiletries	$79,000	$83,938	$90,443	$97,904
15	Beverages	$79,000	$83,938	$90,443	$97,904
16	**Total Sales**	$3,950,000	$4,196,875	$4,522,133	$4,895,209
17	**Cost of Goods Sold**				
18	Prepared meals	$132,720	$141,015	$151,944	$164,479
19	Refrigerated	$355,500	$377,719	$406,992	$440,569
20	Bulk goods	$255,960	$271,958	$293,034	$317,210
21	Frozen	$550,630	$585,044	$630,385	$682,392
22	Proteins	$382,755	$406,677	$438,195	$474,346
23	Fruits and Vegetables	$296,250	$314,766	$339,160	$367,141
24	Paper Products	$227,520	$241,740	$260,475	$281,964
25	Toiletries	$39,500	$41,969	$45,221	$48,952
26	Beverages	$22,120	$23,503	$25,324	$27,413
27	**Total Cost of Goods Sold**	$2,262,955	$2,404,390	$2,590,730	$2,804,465
28	**Gross Profit**	$1,687,045	$1,792,485	$1,931,403	$2,090,744
29	**Operating Expenses**				
30	Marketing	$217,250	$230,828	$248,717	$269,236
31	Administrative	$345,625	$367,227	$395,687	$428,331
32	Depreciation	$18,000	$18,000	$18,000	$18,000
33	Wages	$582,560	$582,560	$582,560	$582,560
34	Common Costs	$185,575	$197,173	$212,454	$229,982
35	**Total Operating Expenses**	$1,349,010	$1,395,788	$1,457,418	$1,528,109
36	**Income Before Taxes**	$338,035	$396,697	$473,985	$562,635
37	**Taxes**				
38	Federal	$70,987	$83,306	$99,537	$118,153
39	State	$15,212	$17,851	$21,329	$25,319
40	Local	$4,225	$4,959	$5,925	$7,033
41	**Net Income**	$247,611	$290,581	$347,194	$412,130

Exhibit 5 – Suggested solution for the top portion of the worksheet: formula view of the forecasted income statement.

	A	B	C	D	E
1	**Clean Foods**				
2	**Forecasted Income Statement**				
3	**Prepared On:**				
4	**=TODAY()**				
5		=YEAR(TODAY())	=YEAR(TODAY()) + 1	=YEAR(TODAY()) + 2	=YEAR(TODAY()) + 3
6	**Sales**				
7	Prepared meals	=B47*C64	=B47*D64	=B47*E64	=B47*F64
8	Refrigerated	=B48*C64	=B48*D64	=B48*E64	=B48*F64
9	Bulk goods	=B49*C64	=B49*D64	=B49*E64	=B49*F64
10	Frozen	=B50*C64	=B50*D64	=B50*E64	=B50*F64
11	Proteins	=B51*C64	=B51*D64	=B51*E64	=B51*F64
12	Fruits and Vegetables	=B52*C64	=B52*D64	=B52*E64	=B52*F64
13	Paper Products	=B53*C64	=B53*D64	=B53*E64	=B53*F64
14	Toiletries	=B54*C64	=B54*D64	=B54*E64	=B54*F64
15	Beverages	=B55*C64	=B55*D64	=B55*E64	=B55*F64
16	**Total Sales**	=SUM(B7:B15)	=SUM(C7:C15)	=SUM(D7:D15)	=SUM(E7:E15)
17	**Cost of Goods Sold**				
18	Prepared meals	=C47*B7	=C47*C7	=C47*D7	=C47*E7
19	Refrigerated	=C48*B8	=C48*C8	=C48*D8	=C48*E8
20	Bulk goods	=C49*B9	=C49*C9	=C49*D9	=C49*E9
21	Frozen	=C50*B10	=C50*C10	=C50*D10	=C50*E10
22	Proteins	=C51*B11	=C51*C11	=C51*D11	=C51*E11
23	Fruits and Vegetables	=C52*B12	=C52*C12	=C52*D12	=C52*E12
24	Paper Products	=C53*B13	=C53*C13	=C53*D13	=C53*E13
25	Toiletries	=C54*B14	=C54*C14	=C54*D14	=C54*E14
26	Beverages	=C55*B15	=C55*C15	=C55*D15	=C55*E15
27	**Total Cost of Goods Sold**	=SUM(B18:B26)	=SUM(C18:C26)	=SUM(D18:D26)	=SUM(E18:E26)
28	**Gross Profit**	=B16-B27	=C16-C27	=D16-D27	=E16-E27
29	**Operating Expenses**				
30	Marketing	=B68*C64	=B68*D64	=B68*E64	=B68*F64
31	Administrative	=B69*C64	=B69*D64	=B69*E64	=B69*F64
32	Depreciation	=B70	=B70	=B70	=B70
33	Wages	=F78+B73+B74	=F78+B73+B74	=F78+B73+B74	=F78+B73+B74
34	Common Costs	=C72	=D72	=E72	=F72
35	**Total Operating Expenses**	=SUM(B30:B34)	=SUM(C30:C34)	=SUM(D30:D34)	=SUM(E30:E34)
36	**Income Before Taxes**	=B28-B35	=C28-C35	=D28-D35	=E28-E35
37	**Taxes**				
38	Federal	=B58*B36	=B58*C36	=B58*D36	=B58*E36
39	State	=B59*B36	=B59*C36	=B59*D36	=B59*E36
40	Local	=B60*B36	=B60*C36	=B60*D36	=B60*E36
41	**Net Income**	=B36-B38-B39-B40	=C36-C38-C39-C40	=D36-D38-D39-D40	=E36-E38-E39-E40

Exhibit 6 – Suggested solution for the bottom portion of the worksheet: budget information used to build the forecasted income statement.

	A	B	C	D	E	F
43	**Clean Foods**					
44	**Budget Information**					
45						
46	**Sales Category**	**Portion of Sales**	**Portion of COGS**			
47	Prepared meals	0.080	0.42			
48	Refrigerated	0.180	0.50			
49	Bulk goods	0.090	0.72			
50	Frozen	0.205	0.68			
51	Proteins	0.190	0.51			
52	Fruits and Vegetables	0.125	0.6			
53	Paper Products	0.090	0.64			
54	Toiletries	0.020	0.50			
55	Beverages	0.020	0.28			
56						
57	**Taxes**	**Percent**				
58	Federal	0.21				
59	State	0.045				
60	Local	0.01				
61						
62						
63	**Income Statement Item**		=YEAR(TODAY())	=YEAR(TODAY()) + 1	=YEAR(TODAY()) + 2	=YEAR(TODAY()) + 3
64	**Total Sales**		$3,950,000	$4,196,875	$4,522,133	$4,895,209
65	Growth Rate		0.0625	0.0775	0.0825	---
66						
67	**Operating Expenses**	**Portion/Amount**				
68	Marketing	0.06				
69	Administrative	0.09				
70	Depreciation	$18,000				
71	Salaries:					
72	President: % based on Gross Profit	0.11	$185,575	$197,173	$212,454	$229,982
73	Director	$58,000	---			
74	Supervisor	$42,000	---			
75						
76	Team Associate					
77	**Count**	**Hours Per Week**	**Weeks Worked**	**Paid Vacation Wks**	**Rate Per Hour**	**Total Wages/YR**
78	16	$40	50	2	$14.50	$482,560

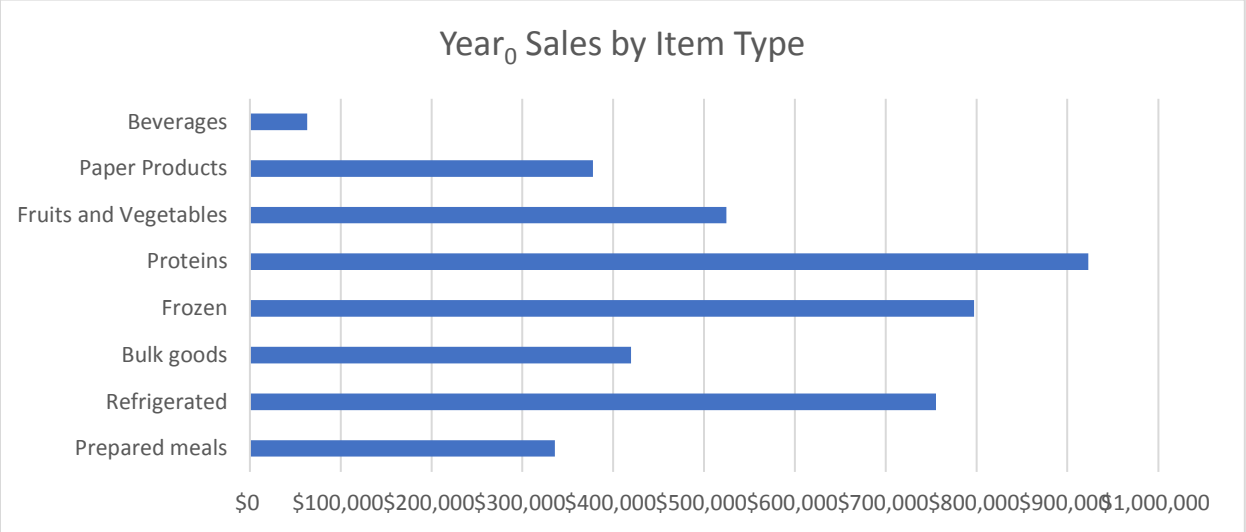
Exhibit 7 – Suggested solution for the bottom portion of the worksheet: formula view of budget information used to build the forecasted income statement.

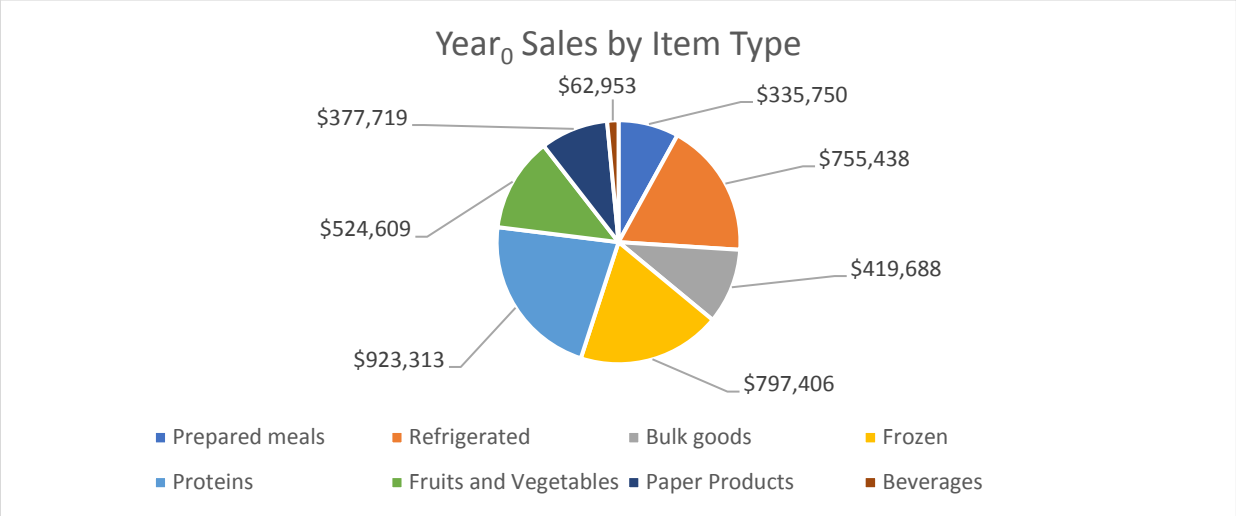
	A	B	C	D	E	F
43	**Clean Foods**					
44	**Budget Information**					
45						
46	**Sales Category**	**Portion of Sales**	**Portion of COGS**			
47	Prepared meals	0.08	0.42			
48	Refrigerated	0.18	0.5			
49	Bulk goods	0.09	0.72			
50	Frozen	0.205	0.68			
51	Proteins	0.19	0.51			
52	Fruits and Vegetables	0.125	0.6			
53	Paper Products	0.09	0.64			
54	Toiletries	0.02	0.5			
55	Beverages	0.02	0.28			
56						
57	**Taxes**	**Percent**				
58	Federal	0.21				
59	State	0.045				
60	Local	0.0125				
61						
62						
63	**Income Statement Item**		=YEAR(TODAY())	=YEAR(TODAY()) + 1	=YEAR(TODAY()) + 2	=YEAR(TODAY()) + 3
64	**Total Sales**		3950000	=(C64*C65) + C64	=(D64*D65) + D64	=(E64*E65) +E64
65	Growth Rate		0.0625	0.0775	0.0825	---
66						
67	**Operating Expenses**	**Portion/Amount**				
68	Marketing	0.055				
69	Administrative	0.0875				
70	Depreciation	18000				
71	Salaries:					
72	President: % based on Gross Profit	0.11	=IF(B28>0,B28*B72,0)	=IF(C28>0,C28*B72)	=IF(D28>0,D28*B72)	=IF(E28>0,E28*B72)
73	Director	58000	---			
74	Supervisor	42000	---			
75						
76	Team Associate					
77	**Count**	**Hours Per Week**	**Weeks Worked**	**Paid Vacation Wks**	**Rate Per Hour**	**Total Wages/YR**
78	16	40	50	2	14.5	=(C78+D78)*E78*B78*A78

Exhibit 8 – Suggested solution for what-if analysis sample questions.

Prompt	Impact	=YEAR(TODAY()) + 1	=YEAR(TODAY()) + 2	=YEAR(TODAY()) + 3
1	Net Income increases	$13,104	$24,855	$46,102
2	Net Income decreases	$13,104	$30,745	$61,174
3	Net Income decreases	$17,207		
4	Net Income decreases	$66,277		
5	Net Income decreases	$73,703		

Exhibit 9 – Suggested solution for chart-visual aids.





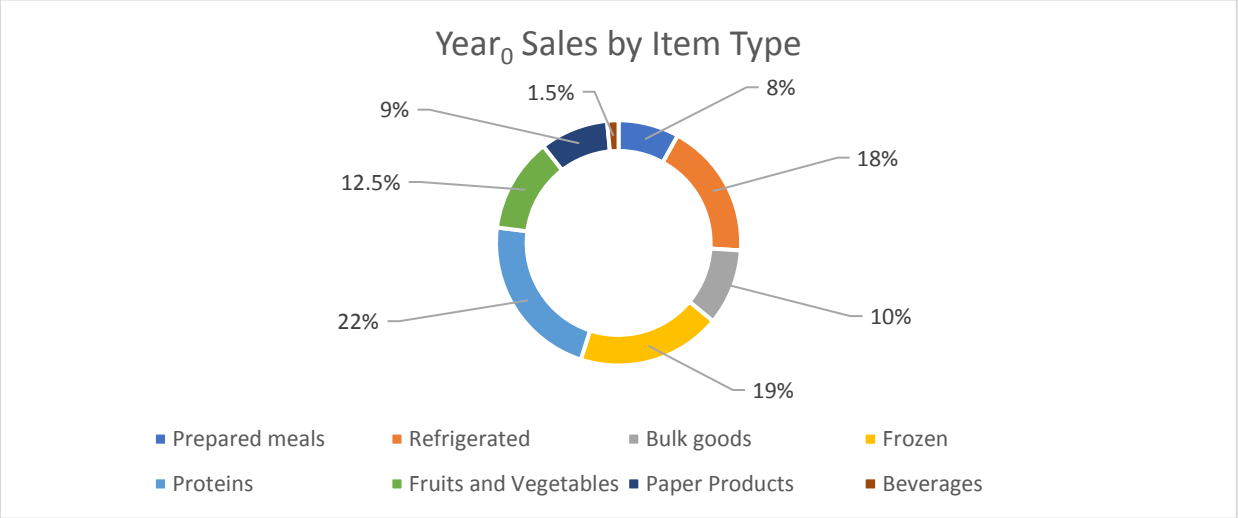


Exhibit 10 – Suggested solution – Expected Return.

	A	B	C	D	E	F
1	**Decision Alternatives**	**High Demand**	**Poor Demand**	**P(HD)**	**P(LD)**	**Expected value**
2	Premium-Grade Equipment	$18,500	-$1,800	0.4	0.6	$6,320
3	Standard-Grade Equipment	$14,600	$2,800	0.4	0.6	$7,520
4	Economy-Grade Equipment	$9,800	$6,400.00	0.4	0.6	$7,760

Based on the assumption of a 40% probability that demand will be high, the expected value analysis for the economy-grade equipment provides the highest expected return.

Exhibit 11 – Suggested solution – formula view of Expected Return.

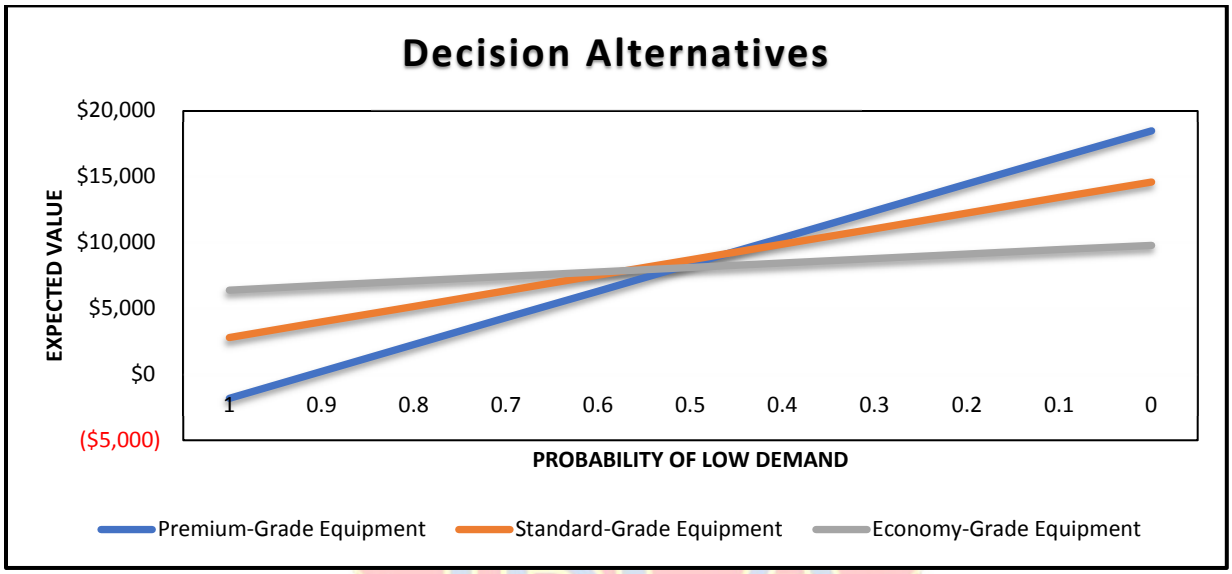
	A	B	C	D	E	F
1	**Decision Alternatives**	**High Demand**	**Poor Demand**	**P(HD)**	**P(LD)**	**Expected value**
2	Premium-Grade Equipment	18500	-1800	0.4	0.6	=(B2*D2)+(C2*E2)
3	Standard-Grade Equipment	14600	2800	0.4	0.6	=(B3*D3)+(C3*E3)
4	Economy-Grade Equipment	9800	6400	0.4	0.6	=(B4*D4)+(C4*E4)

Exhibit 12 – Suggested solution – expected return for various levels of demand.

	A	B	C	D	E	F
6	**Decision Alternatives**	**High Demand**	**Poor Demand**	**P(HD)**	**P(LD)**	**Expected value**
7	Premium-Grade Equipment	$18,500	-$1,800	0	1	($1,800)
8		$18,500	-$1,800	0.1	0.9	$230
9		$18,500	-$1,800	0.2	0.8	$2,260
10		$18,500	-$1,800	0.3	0.7	$4,290
11		$18,500	-$1,800	0.4	0.6	$6,320
12		$18,500	-$1,800	0.5	0.5	$8,350
13		$18,500	-$1,800	0.6	0.4	$10,380
14		$18,500	-$1,800	0.7	0.3	$12,410
15		$18,500	-$1,800	0.8	0.2	$14,440
16		$18,500	-$1,800	0.9	0.1	$16,470
17		$18,500	-$1,800	1	0	$18,500
18						
19	Standard-Grade Equipment	$14,600	$2,800	0	1	$2,800
20		$14,600	$2,800	0.1	0.9	$3,980
21		$14,600	$2,800	0.2	0.8	$5,160
22		$14,600	$2,800	0.3	0.7	$6,340
23		$14,600	$2,800	0.4	0.6	$7,520
24		$14,600	$2,800	0.5	0.5	$8,700
25		$14,600	$2,800	0.6	0.4	$9,880
26		$14,600	$2,800	0.7	0.3	$11,060
27		$14,600	$2,800	0.8	0.2	$12,240
28		$14,600	$2,800	0.9	0.1	$13,420
29		$14,600	$2,800	1	0	$14,600
30						
31	Economy-Grade Equipment	$9,800	$6,400	0	1	$6,400
32		$9,800	$6,400	0.1	0.9	$6,740
33		$9,800	$6,400	0.2	0.8	$7,080
34		$9,800	$6,400	0.3	0.7	$7,420
35		$9,800	$6,400	0.4	0.6	$7,760
36		$9,800	$6,400	0.5	0.5	$8,100
37		$9,800	$6,400	0.6	0.4	$8,440
38		$9,800	$6,400	0.7	0.3	$8,780
39		$9,800	$6,400	0.8	0.2	$9,120
40		$9,800	$6,400	0.9	0.1	$9,460
41		$9,800	$6,400	1	0	$9,800

Exhibit 13 – Suggested solution – Formula view of expected return for various levels of demand.

	A	B	C	D	E	F
6	**Decision Alternatives**	**High Demand**	**Poor Demand**	**P(HD)**	**P(LD)**	**Expected value**
7	Premium-Grade Equipment	18500	-1800	0	1	=(B7*D7)+(C7*E7)
8		18500	-1800	0.1	0.9	=(B8*D8)+(C8*E8)
9		18500	-1800	0.2	0.8	=(B9*D9)+(C9*E9)
10		18500	-1800	0.3	0.7	=(B10*D10)+(C10*E10)
11		18500	-1800	0.4	0.6	=(B11*D11)+(C11*E11)
12		18500	-1800	0.5	0.5	=(B12*D12)+(C12*E12)
13		18500	-1800	0.6	0.4	=(B13*D13)+(C13*E13)
14		18500	-1800	0.7	0.3	=(B14*D14)+(C14*E14)
15		18500	-1800	0.8	0.2	=(B15*D15)+(C15*E15)
16		18500	-1800	0.9	0.1	=(B16*D16)+(C16*E16)
17		18500	-1800	1	0	=(B17*D17)+(C17*E17)
18						
19	Standard-Grade Equipment	14600	2800	0	1	=(B19*D19)+(C19*E19)
20		14600	2800	0.1	0.9	=(B20*D20)+(C20*E20)
21		14600	2800	0.2	0.8	=(B21*D21)+(C21*E21)
22		14600	2800	0.3	0.7	=(B22*D22)+(C22*E22)
23		14600	2800	0.4	0.6	=(B23*D23)+(C23*E23)
24		14600	2800	0.5	0.5	=(B24*D24)+(C24*E24)
25		14600	2800	0.6	0.4	=(B25*D25)+(C25*E25)
26		14600	2800	0.7	0.3	=(B26*D26)+(C26*E26)
27		14600	2800	0.8	0.2	=(B27*D27)+(C27*E27)
28		14600	2800	0.9	0.1	=(B28*D28)+(C28*E28)
29		14600	2800	1	0	=(B29*D29)+(C29*E29)
30						
31	Economy-Grade Equipment	9800	6400	0	1	=(B31*D31)+(C31*E31)
32		9800	6400	0.1	0.9	=(B32*D32)+(C32*E32)
33		9800	6400	0.2	0.8	=(B33*D33)+(C33*E33)
34		9800	6400	0.3	0.7	=(B34*D34)+(C34*E34)
35		9800	6400	0.4	0.6	=(B35*D35)+(C35*E35)
36		9800	6400	0.5	0.5	=(B36*D36)+(C36*E36)
37		9800	6400	0.6	0.4	=(B37*D37)+(C37*E37)
38		9800	6400	0.7	0.3	=(B38*D38)+(C38*E38)
39		9800	6400	0.8	0.2	=(B39*D39)+(C39*E39)
40		9800	6400	0.9	0.1	=(B40*D40)+(C40*E40)
41		9800	6400	1	0	=(B41*D41)+(C41*E41)

Exhibit 14 – Suggested solution for sensitivity analysis.

As the graph illustrates, When the probability of low demand is greater than 50%, then the economy-grade equipment provides the highest expected value. When the probability of low demand is less than about 50%, then the premium-grade equipment provides the highest expected value. The standard-grade equipment, under any probability of low demand, never provides the highest expected value.