

Evaluating financial performance: Adding a product with ESG risks

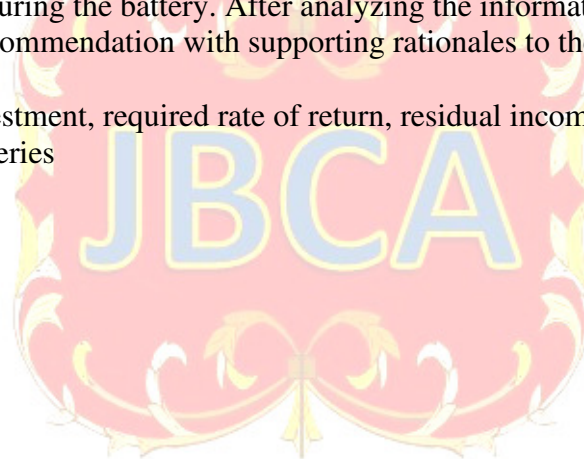
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ABSTRACT

In this case study students assume the role of an organization's Controller who must recommend to their Chief Financial Officer whether to add a new product to an existing manufacturing unit. Specifically, the Controller will analyze whether to add an electric vehicle lithium-ion battery to the organization's existing Lithium-Ion Battery Unit. As the Controller, students will calculate the anticipated return on investment and residual income. Students will also explore the effect adding the battery will likely have on the Lithium-Ion Battery Unit's manager. Students will then consider the environmental, social and governance ("ESG") risks associated with manufacturing the battery. After analyzing the information presented, students will submit their final recommendation with supporting rationales to the Chief Financial Officer.

Keywords: return on investment, required rate of return, residual income, ESG risks, electric vehicles, lithium-ion batteries



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INTRODUCTION

Analysts project that global sales of electric vehicles (“EVs”) will increase significantly over the next 15 years as countries seek to reduce greenhouse gas emissions (IEA, 2022a; Wu et al., 2020; Sakunai et al., 2020). An increase in the need for lithium-ion batteries will accompany the increase in EVs as the batteries will be needed to power new EVs and replace spent batteries in existing EVs (IEA, 2022b; Wu et al., 2020; Sakunai et al., 2020). The increased demand for lithium-ion batteries presents a production expansion opportunity for manufacturers. However, before investing in a new EV lithium-ion battery line, manufacturers must determine whether producing the batteries will sufficiently benefit their organization.

BACKGROUND

Manufacturers should consider multiple factors when determining whether a new product will benefit their organization. They should consider traditional financial performance factors, such as the return on investment (“ROI”), required rate of return (“ROR”) and residual income (“RI”) for a new product. In addition, manufacturers should consider more modern factors, such as the projected environmental and social effects of the production and consumption of the new product (Kramer & Pfitzer, 2022).

The ROI (return on investment) measure “is the most popular approach to ... [analyzing financial] performance ... [because] it blends all the ingredients of profitability – revenues, costs, and investment – into a single percentage” (Datar et al., 2021, p. 926). The goal for the organization “is to increase ROI because it indicates that more profit is being earned per dollar invested in operating assets” (Noreen et al., 2023, p. 537). The commonly accepted formula for ROI is Operating Income divided by Average Invested Assets. Figure 1A illustrates this formula and provides an example of applying the formula (see Appendix A).

Organizations also favor using the ROI measure because “it can be compared with the rate of return [ROR] on opportunities elsewhere, inside or outside the [organization]” (Datar et al., 2021, p. 926). ROR “is set internally by the organization, usually by upper management, and typically represents the return that an organization can expect to receive elsewhere for an investment of comparable risk” (Datar et al., 2021, p. 853). An organization’s ROR is influenced by factors such as investment risk, financing costs, and opportunity costs. This measure is frequently seen as a “floor,” the minimum acceptable performance level. The goal for the organization is to exceed its ROR both as an organization and among its individual subunits.

Organizations also use the RI (residual income) measure to analyze financial performance (Blocher et al., 2022). The RI measure compares operating income to a minimum level of profit based on an organization’s ROR. When an organization’s ROR is “multiplied by the investment [the result] is the imputed cost of the investment. The imputed cost of the investment is ... not recorded in financial accounting systems because it is an opportunity cost” (Datar et al., 2021, p. 927). If RI is positive, the investment is generating more than the minimum acceptable profit. If RI is negative, the investment is earning less than the minimum acceptable profit. The commonly accepted formula for RI is Operating Income minus the product of Average Invested Assets and Required Rate of Return. Figure 2A illustrates this formula and provides an example of applying the formula (see Appendix A).

The environmental, social and governance (“ESG”) risks associated with manufacturing a product include the environmental effect (e.g., emission of greenhouse gases) and societal impact

(e.g., dangerous working conditions) associated with raw materials, manufacturing techniques, and consumer use of the product (Kramer & Pfitzer, 2022). ESG risks also relate to a product's influence on the manufacturer's corporate governance (e.g., exposure to liability). Manufacturers should evaluate ESG risks when determining whether a new product will benefit their organization because ESG risks impact an organization's financial and operational performance (Kramer & Pfitzer, 2022).

When considering adding a new product, manufacturers should consider the traditional financial performance factors and the modern ESG risks for both the organization and the individual unit that will be affected by the new product. Analyzing the product's effect on the individual unit is particularly important when the unit operates as an investment center where the manager is responsible for the unit's investment in assets and their use in generating profitability. These managers make decisions regarding revenues (e.g., sales targets, pricing), costs (e.g., materials, labor, manufacturing overhead, selling and administrative) and investments in capital assets (e.g., manufacturing processes, equipment, facilities). As such, upper management often analyzes the financial performance of an investment center when determining its manager's performance evaluation and compensation package (Noreen et al., 2023; Blocher et al., 2022; Datar et al., 2021).

THE CASE

Esteban Electronics Corp. has six manufacturing units, including a Lithium-Ion Battery Unit that manufactures batteries for laptop computers. Figure 3A illustrates Esteban Electronics' corporate structure (see Appendix A). Recently, Hangul Corp, the holder of a patent for an EV lithium-ion battery, approached Esteban Electronics' CEO and Board of Directors with an offer to sell the organization an exclusive license to manufacture Hangul's EV lithium-ion battery. The CEO and the Board consider Hangul's offer a significant opportunity for product expansion.

Esteban Electronics' Chief Operating Officer ("COO") and Chief Financial Officer ("CFO") estimate that manufacturing the EV lithium-ion battery will require average invested assets (i.e., operating assets) of \$50 million, and the CFO estimates that the EV battery will generate \$8 million in operating income. Esteban Electronics has \$75 million available for new investments and the Board requires that all investments earn at least a 14% return. Currently, Esteban Electronics has \$129.3 million in Operating Income and \$753.2 million in Average Invested Assets. The Lithium-Ion Battery Unit has \$40.6 million in Operating Income and \$181.5 million in Average Invested Assets.

The Board is considering whether to maintain its current operations or add the production of the EV lithium-ion battery to the existing Lithium-Ion Battery Unit. As Controller, you have been asked by the CFO for your recommendation. Based on the information provided in The Case, answer Case Questions 1 – 5.

THE TEACHING NOTE

In this case study students assume the role of an organization's Controller who must recommend to their CFO whether to add a new product to an existing manufacturing unit. Specifically, the Controller will analyze whether to add an EV lithium-ion battery to the organization's existing Lithium-Ion Battery Unit which produces a significantly smaller laptop battery. During their analysis, students will calculate the anticipated financial performance of the

new battery and its impact on the Lithium-Ion Battery Unit's manager. Students will then go beyond the calculations to consider the significant ESG risks associated with the battery. The combination of analyzing the financial performance, the effect on the unit manager and the ESG risks of EV batteries makes this case study appropriate for students in undergraduate and graduate managerial accounting and risk management courses.

Journal of Business Cases and Applications' fictitious case statement – "This is a fictitious case. All information contained herein was fabricated by the authors. Any similarity contained herein to actual persons, businesses, events, etc. is purely coincidental and is the responsibility of the authors. Please contact the case authors directly with any concerns."

CASE QUESTIONS

Part 1

1. What is the current financial performance of Esteban Electronics, and what is the current financial performance of the Lithium-Ion Battery Unit?
2. What is the projected ROI for the EV lithium-ion battery?
3. If the Board of Directors' evaluation of the financial performance of a new product is based on the product's ROI and its effect on Esteban Electronics' ROI, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?
4. What is the projected RI for the EV lithium-ion battery?
5. If the Board of Directors' evaluation of the financial performance of a new product is based on the product's RI and its effect on Esteban Electronics' RI, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?

Part 2

Gisela Schneider is the manager of the Lithium-Ion Battery Unit. This unit, as well as two other units of Esteban Electronics, operates as an investment center. The Chief Executive Officer ("CEO") considers the financial performance of the Lithium-Ion Battery Unit when determining Gisela Schneider's performance evaluation and compensation package (Noreen et al., 2023; Blocher et al., 2022; Datar et al., 2021).

After analyzing the anticipated financial performance of the EV lithium-ion battery, you ask for Gisela's input as to whether Esteban Electronics should manufacture the EV lithium-ion battery. Based on the information provided in The Case and the additional information provided above, answer Case Questions 6 – 7.

6. If the Board of Directors' evaluation of the Lithium-Ion Battery Unit's financial performance is based on the unit's ROI, will Gisela Schneider support adding the EV lithium-ion battery to the unit? Why?

7. If the Board of Directors' evaluation of the Lithium-Ion Battery Unit's financial performance is based on the unit's RI, will Gisela Schneider support adding the EV lithium-ion battery to the unit? Why?

Part 3

As Esteban Electronics' Risk Manager, Jason Williams analyzes the organization's corporate social responsibility ("CSR") activities and ESG risks. While researching the new battery, Jason discovered a study which found a positive relationship between CSR activities and an organization's financial performance, especially for organizations associated with the automotive industry (Lin, et al., 2020). Given that the public views EVs as environmentally friendly and necessary to reduce global greenhouse gas emissions, Jason recognizes the strong CSR value associated with manufacturing parts for EVs (Norris, et al., 2017). However, Jason also found studies that classify cobalt, copper and graphite, some of the essential raw materials used in manufacturing lithium-ion batteries, as having extreme or high ESG risks (Sakunai et al., 2020; Norris, et al., 2017). For example, the studies report that cobalt is a high ESG risk because of its scarcity and the water-intensive mining techniques required to extract it (Sakunai et al., 2020). The studies also report that the Democratic Republic of the Congo, the leading producer of cobalt, has a history of labor and human rights violations, including child labor (Norris, et al., 2017).

Based on his research, Jason expresses concern over the high ESG risks associated with producing the EV lithium-ion batteries. Jason anticipates that manufacturing the EV lithium-ion battery will decrease the organization's CSR reputation and ultimately lower the organization's financial performance. However, Jason acknowledges that some emerging EV battery technologies, such as lithium iron phosphate and sodium-ion batteries, have lower environmental impacts and can be manufactured on established lithium-ion battery lines (American Chemical Society, 2022; IEA, 2022b; Wu et al., 2020).

After analyzing the anticipated financial performance of the EV lithium-ion battery, you ask for Jason Williams' input as to whether Esteban Electronics should manufacture the EV lithium-ion battery. Based on the information provided in The Case and the additional information provided above, answer Case Questions 8 – 10.

8. Given that the manufacturing of EV lithium-ion batteries has a high ESG risk, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?
9. If the Board of Directors modifies its policy and requires that investments with high ESG risks earn at least a 17% ROR to offset the potential risks, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?
10. Based on your analyses for Case Questions 1 – 9, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Discuss your decision.

DISCUSSION GUIDE**Part 1**

1. What is the current financial performance of Esteban Electronics, and what is the current financial performance of the Lithium-Ion Battery Unit?

Currently, Esteban Electronics has a 17.2% ROI and a \$23.9 million RI as illustrated in Figure 1B and 2B, respectively (see Appendix B). The Lithium-Ion Battery Unit has a 22.4% ROI and a \$15.2 million RI as illustrated in Figure 3B and 4B, respectively (see Appendix B). Both Esteban Electronics and the Lithium-Ion Battery Unit have ROIs higher than the organization's 14% ROR. Esteban Electronics' 17.2% ROI is more than 22% higher than the 14% ROR $[(17.2 - 14) / 14 = .229 = 22.9\%]$, and the Lithium-Ion Battery Unit's 22.4% ROI is 60% higher than the 14% ROR $[(22.4 - 14) / 14 = .60 = 60\%]$.

In addition to its high ROI, the Lithium-Ion Battery Unit demonstrates that it is a major contributor to Esteban Electronics' success by accounting for more than 31% of the organization's total operating income $[40.6 / 129.3 = .314 = 31\%]$, even though it comprises approximately 24% of the organization's invested assets $[181.5 / 753.2 = .241 = 24.1\%]$.

2. What is the projected ROI for the EV lithium-ion battery?

The projected ROI for the EV lithium-ion battery is 16% as illustrated in Figure 5B (see Appendix B).

3. If the Board of Directors' evaluation of the financial performance of a new product is based on the product's ROI and its effect on Esteban Electronics' ROI, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?

The Controller will recommend manufacturing the EV Lithium-Ion Battery. The new battery's projected 16% ROI (Figure 5B) is more than 14% higher than Esteban Electronics' 14% ROR $[(16 - 14) / 14 = .14 = 14\%]$. Adding the new battery to the organization's current manufacturing operations will result in a new ROI of 17.1% as illustrated in Figure 6B (see Appendix B). The new ROI is nearly identical to Esteban Electronics' current ROI of 17.2% (Figure 1B). Therefore, the addition of the new battery will result in a stable ROI and maintain the organization's level of operating performance which is 22% above the 14% ROR $[(17.1 - 14) / 14 = .221 = 22\%]$.

Note: ROI is a short-term performance measure, looking at results for a single year. Many investment opportunities provide long-term benefits that may not be readily discernible in a single year. Despite this limitation, ROI is a comprehensive financial measure useful for management decision making (Blocher et al., 2022).

4. What is the projected RI for the EV lithium-ion battery?

The projected RI for the new EV lithium-ion battery is \$1.0 million as illustrated in Figure 7B (see Appendix B).

5. If the Board of Directors' evaluation of the financial performance of a new product is based on the product's RI and its effect on Esteban Electronics' RI, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?

The Controller will recommend manufacturing the EV Lithium-Ion Battery. The new battery's projected \$1.0 million RI (Figure 7B) will increase the organization's RI from \$23.9 million (Figure 1B) to \$24.9 million as illustrated in Figure 8B (see Appendix B). Adding the EV battery will result in a 4.2% $[(24.9 - 23.9) / 23.9 = .042 = 4.2\%]$ increase in the organization's RI.

Note: RI is a short-term performance measure, looking at results for a single year. Many investment opportunities provide long-term benefits that may not be readily discernible in a single year. Despite this limitation, RI is a comprehensive financial measure useful for management decision making (Blocher et al., 2022).

Part 2

6. If the Board of Directors' evaluation of the Lithium-Ion Battery Unit's financial performance is based on the unit's ROI, will Gisela Schneider support adding the EV lithium-ion battery to the unit? Why?

Gisela Schneider will not support adding the EV lithium-ion battery to the unit. Adding the new battery to the Lithium-Ion Battery Unit's current manufacturing operations will increase the unit's estimated operating income to \$48.6 million and its estimated average invested assets to \$231.5 million. These increases will result in a new ROI of 21% as illustrated in Figure 9B (see Appendix B). Adding the EV battery will result in a 6.3% reduction in the unit's current ROI of 22.4% (Figure 3B) $[(21 - 22.4) / 22.4 = (.063) = (6.3\%)]$. This lowering of the unit's ROI will negatively impact Gisela's evaluation and her compensation package.

Note, this analysis demonstrates how the use of ROI as a manufacturing unit's performance evaluation measure may conflict with the goals of the organization. The new battery's projected 16% ROI (Figure 5B) is greater than Esteban Electronics' 14% ROR. Adding the new battery would be "good" for the organization, because the battery is estimated to generate more than the organizations' minimum ROR. However, the new battery's projected 16% ROI (Figure 5B) is lower than the Lithium-Ion Battery Unit's current 22.4% ROI (Figure 3B). Adding the new battery would be "bad" for the unit, because the battery is expected to decrease the unit's ROI. If the unit's performance measure is ROI, the manager will be motivated to only support those projects that are expected to increase the unit's ROI. Given that the new battery is expected to lower the unit's ROI, rejecting the project would be in the best interest of Gisela Schneider. However, rejecting the project would be contrary to the best interest of Esteban Electronics, creating a problem of goal congruence. As such, using ROI to evaluate an individual unit's performance "might not motivate decisions that increase the value of the business as a whole" (Blocher et al., 2022, p. 836).

7. If the Board of Directors' evaluation of the Lithium-Ion Battery Unit's financial performance is based on the unit's RI, will Gisela Schneider support adding the EV lithium-ion battery to the unit? Why?

Gisela Schneider will support adding the EV lithium-ion battery to the unit. Adding the new battery to the Lithium-Ion Battery Unit's current manufacturing operations will increase the unit's estimated operating income to \$48.6 million and its estimated average invested assets to \$231.5 million. These increases will result in a new estimated RI of \$16.2 million as illustrated in Figure 10B (see Appendix B). The new RI represents a 6.6% increase in the unit's current RI of \$15.2 million (Figure 4B) [$(16.2 - 15.2) / 15.2 = .066 = 6.6\%$]. This estimated increase in the unit's RI will positively impact Gisela's evaluation and her compensation package.

Note, when RI is used to determine whether a new project is acceptable to an organization, any positive result, regardless of its size, will increase the organization's and the individual unit's RIs. The unit's increased RI will motivate the manager to support the project. As such, using RI avoids the problem of goal congruence that might arise from using ROI. Another advantage of RI is the ability to adjust the ROR for investments of varying risk. An organization's board of directors could require a higher rate of return for risky ventures where factors such as specialized long-term assets (equipment, etc.) will be more costly. However, because RI is an absolute measure, its use to evaluate the performance of manufacturing units with significant size differences is limited. By their nature, large manufacturing units will have large RIs even if their performance is poor (Noreen et al., 2023; Blocher et al., 2022; Datar et al., 2021).

Part 3

8. Given that the manufacturing of EV lithium-ion batteries has a high ESG risk, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?

At a minimum, the Controller should caution Esteban Electronics' Board of Directors regarding the high ESG risks associated with manufacturing EV lithium-ion batteries. Given that the EV manufacturing "sector promotes sustainability and an eco-friendly image, the potential for being linked to extremely damaging ESG incidents should be a major concern" (Norris, et al., 2017, "Securing future supply opens Pandora's box of risk" section).

Over the past 15 years, many countries have imposed environmental and social sustainability reporting requirements to address their concerns over climate change and human rights violations (Datar et al., 2021). Also, in an attempt to reduce greenhouse gasses, many countries have required the automotive industry to begin shifting production from internal combustion engine vehicles to emission-free EVs (IEA, 2022b). However, the production of EVs, particularly the manufacture of EV lithium-ion batteries, has a negative environmental impact, with many countries classifying the raw materials for manufacturing lithium-ion batteries as having extreme or high ESG risks (Sakunai et al., 2020; Norris, et al., 2017). As the market for EVs and lithium-ion batteries continues to increase, so will the use of these raw materials, exposing

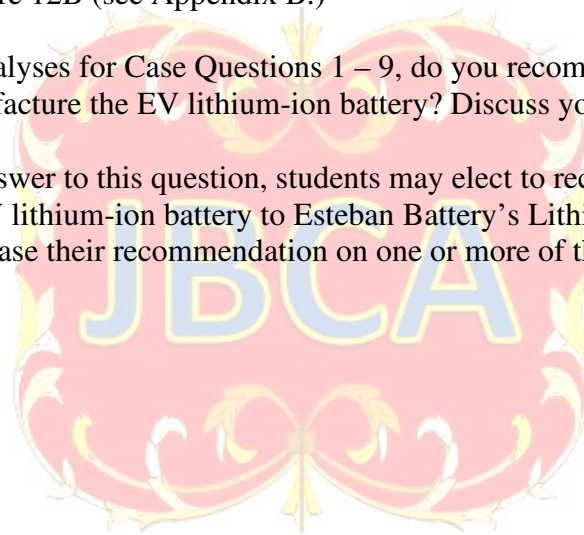
manufacturers to reputation and brand damage, as well as the potential for increased government regulation of the use of these raw materials (Norris, et al., 2017).

9. If the Board of Directors modifies its policy and requires that investments with high ESG risks earn at least a 17% ROR to offset the potential risks, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Why?

The Controller will not recommend manufacturing the EV lithium-ion battery. The new battery has high ESG risks and will be subject to the increased ROR requirement (see Case Questions – Part 3). Although the new battery's projected 16% ROI is acceptable when the Board requires a 14% ROR (Figure 5B), if the Board increases the ROR to 17%, then the new battery's projected 16% ROI is too low, as illustrated in Figure 11B (see Appendix B). Accordingly, the new battery's projected RI will also decrease from a positive \$1.0 million when the Board requires a 14% ROR (Figure 6B) to a negative \$0.5 million when the Board increases the ROR to 17% as illustrated in Figure 12B (see Appendix B.)

10. Based on your analyses for Case Questions 1 – 9, do you recommend that Esteban Electronics manufacture the EV lithium-ion battery? Discuss your decision.

For the answer to this question, students may elect to recommend either adding or not adding the EV lithium-ion battery to Esteban Battery's Lithium-Ion Battery Unit. Students should base their recommendation on one or more of their answers to Case Questions 1 – 9.



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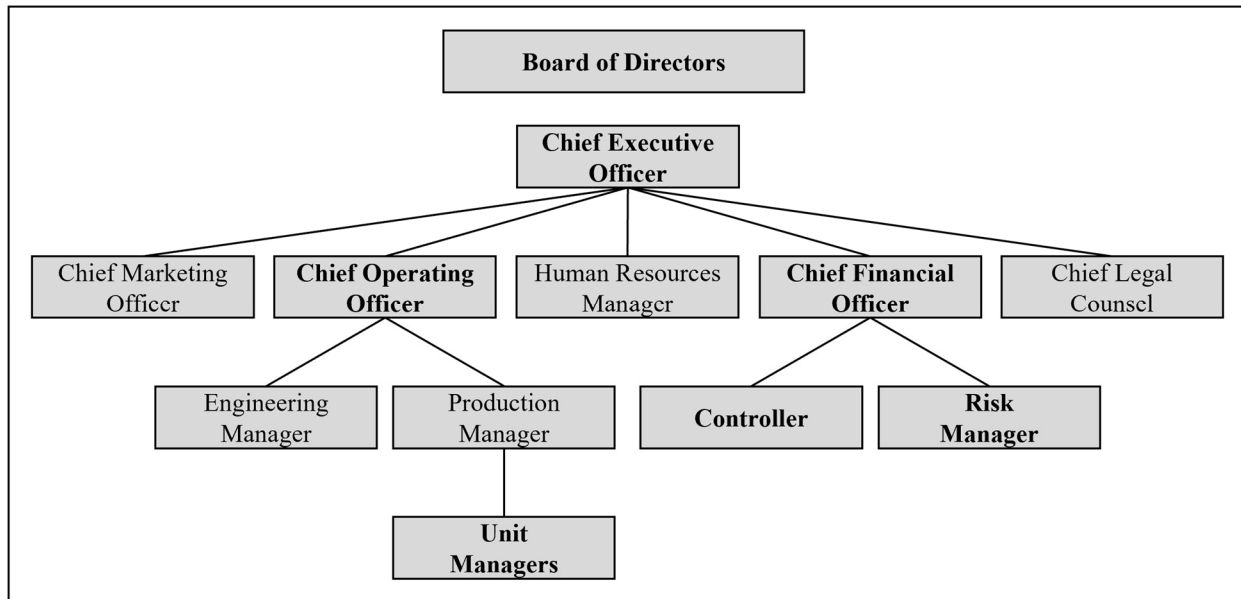
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APPENDIX A**Figure 1A***ROI Formula and Example*

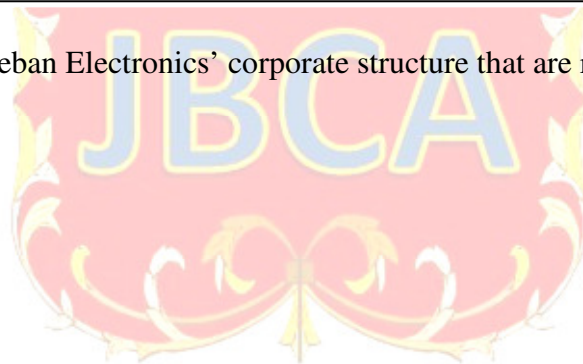
| | | | | |
|----------------------|---|--|---|-------------------------------------|
| ROI | = | Operating Income | / | Average Invested Assets |
| Alpha Company | | Operating Income = \$6,000 | | Average Invested Assets = \$100,000 |
| | | Average Invested Assets = \$100,000 | | Required Rate of Return = 8% |
| | | ROI = \$6,000 / \$100,000 | | |
| | | ROI = .06 = 6% (investment is generating less than the 8% ROR) | | |

Figure 2A*RI Formula and Example*

| | | | | | | | | |
|----------------------|---|--|---|---|-------------------------------------|---|--------------------------------|---|
| RI | = | Operating Income | – | (| Average Invested Assets | × | Required Rate of Return |) |
| Alpha Company | | Operating Income = \$6,000 | | | Average Invested Assets = \$100,000 | | Required Rate of Return = 8% | |
| | | Operating Income = \$6,000 | | | Average Invested Assets = \$100,000 | | Required Rate of Return = 8% | |
| | | RI = \$6,000 – (\$100,000 x .08) | | | | | | |
| | | RI = \$6,000 – \$8,000 | | | | | | |
| | | RI = (\$2,000) (negative number indicates investment is generating less than the 8% ROR) | | | | | | |

Figure 3A*Esteban Electronics' Corporate Structure*

Note: The portions of Esteban Electronics' corporate structure that are relevant to this case are identified in bold.



APPENDIX B**Figure 1B***Esteban Electronics' Current ROI*

| | | | | |
|---|---|---|---|--------------------------------|
| ROI | = | Operating Income | / | Average Invested Assets |
| Esteban Electronics: | | | | |
| | | Operating Income = \$129.3 million | | |
| | | Average Invested Assets = \$753.2 million | | |
| | | Required Rate of Return = 14% | | |
| ROI = \$129.3 / \$753.2 | | | | |
| ROI = .172 = 17.2% (investment is generating more than the 14% ROR) | | | | |

Figure 2B*Esteban Electronics' Current RI*

| | | | | | | | | |
|--|---|---|---|---|--------------------------------|---|--------------------------------|---|
| RI | = | Operating Income | – | (| Average Invested Assets | × | Required Rate of Return |) |
| Esteban Electronics: | | | | | | | | |
| | | Operating Income = \$129.3 million | | | | | | |
| | | Average Invested Assets = \$753.2 million | | | | | | |
| | | Required Rate of Return = 14% | | | | | | |
| RI = \$129.3 – (\$753.2 × .14) | | | | | | | | |
| RI = \$129.3 – \$105.4 | | | | | | | | |
| RI = \$23.9 million (positive number indicates investment is generating more than the 14% ROR) | | | | | | | | |

Figure 3B*Lithium-Ion Battery Unit's Current ROI*

| | | | | |
|---|---|-------------------------|---|--------------------------------|
| ROI | = | Operating Income | / | Average Invested Assets |
| Lithium-Ion Battery Unit: | | | | |
| Operating Income = \$40.6 million | | | | |
| Average Invested Assets = \$181.5 million | | | | |
| Required Rate of Return = 14% | | | | |
| ROI = \$40.6 / \$181.5 | | | | |
| ROI = .224 = 22.4% (investment is generating more than the 14% ROR) | | | | |

Figure 4B*Lithium-Ion Battery Unit's Current RI*

| | | | | | | | | |
|--|---|-------------------------|---|---|--------------------------------|---|--------------------------------|---|
| RI | = | Operating Income | − | (| Average Invested Assets | × | Required Rate of Return |) |
| Lithium-Ion Battery Unit: | | | | | | | | |
| Operating Income = \$40.6 million | | | | | | | | |
| Average Invested Assets = \$181.5 million | | | | | | | | |
| Required Rate of Return = 14% | | | | | | | | |
| RI = \$40.6 − (\$181.5 × .14) | | | | | | | | |
| RI = \$40.6 − \$25.4 | | | | | | | | |
| RI = \$15.2 million (positive number indicates investment is generating more than the 14% ROR) | | | | | | | | |

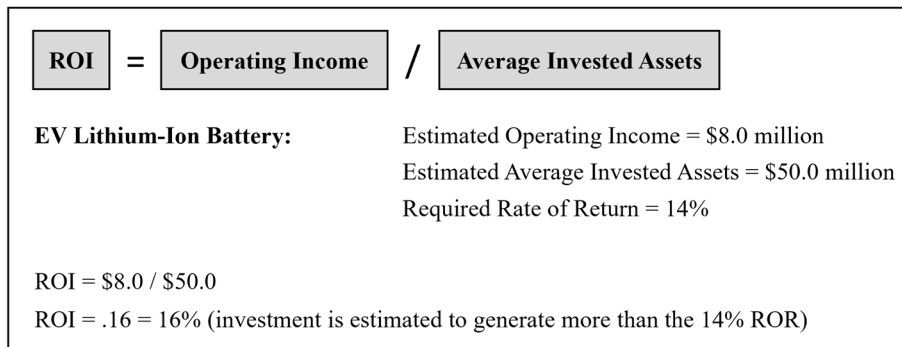
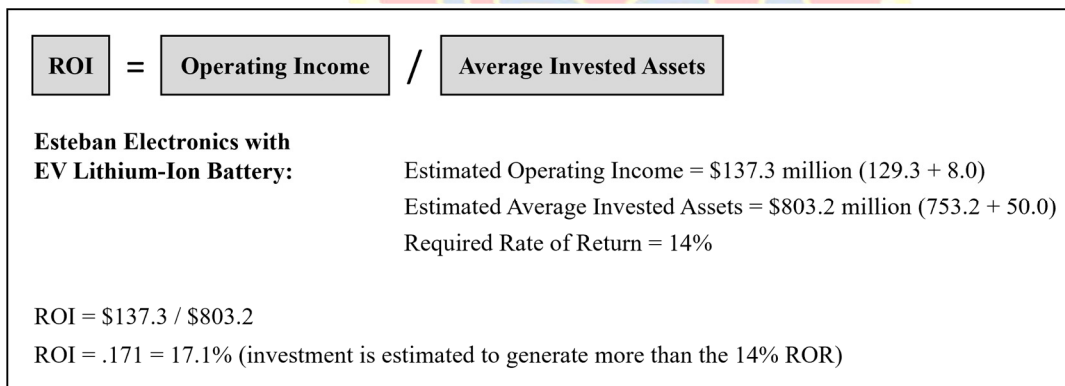
Figure 5B*EV Lithium-Ion Battery's Projected ROI***Figure 6B***Esteban Electronics with EV Lithium-Ion Battery's Estimated ROI*

Figure 7B*EV Lithium-Ion Battery's Projected RI*

$$\text{RI} = \text{Operating Income} - \left(\text{Average Invested Assets} \times \text{Required Rate of Return} \right)$$

EV Lithium-Ion Battery: Estimated Operating Income = \$8.0 million
 Estimated Average Invested Assets = \$50.0 million
 Required Rate of Return = 14%

RI = \$8.0 – (\$50.0 x .14)
 RI = \$8.0 – \$7.0
 RI = \$1.0 million (positive number indicates investment is estimated to generate more than the 14% ROR)

Figure 8B*Esteban Electronics with EV Lithium-Ion Battery's Projected RI*

$$\text{RI} = \text{Operating Income} - \left(\text{Average Invested Assets} \times \text{Required Rate of Return} \right)$$

**Esteban Electronics with
 EV Lithium-Ion Battery:** Estimated Operating Income = \$137.3 million (129.3 + 8.0)
 Estimated Average Invested Assets = \$803.2 million (753.2 + 50.0)
 Required Rate of Return = 14%

RI = \$137.3 – (\$803.2 x .14)
 RI = \$137.3 – \$112.4
 RI = \$24.9 million (positive number indicates investment is estimated to generate more than the 14% ROR)

Figure 9B*Lithium-Ion Battery Unit with EV Lithium-Ion Battery's Projected ROI*

| | | | | |
|--|---|--|---|--------------------------------|
| ROI | = | Operating Income | / | Average Invested Assets |
| Lithium-Ion Battery Unit with EV Lithium-Ion Battery: | | | | |
| | | Estimated Operating Income = \$48.6 million (40.6 + 8.0) | | |
| | | Estimated Average Invested Assets = \$231.5 million (181.5 + 50.0) | | |
| | | Required Rate of Return = 14% | | |
| ROI = \$48.6 / \$231.5 | | | | |
| ROI = .210 = 21.0% (investment is estimated to generate more than the 14% ROR) | | | | |

Figure 10B*Lithium-Ion Battery Unit with EV Lithium-Ion Battery's Projected RI*

| | | | | | | | | |
|---|---|--|---|---|--------------------------------|---|--------------------------------|---|
| RI | = | Operating Income | – | (| Average Invested Assets | × | Required Rate of Return |) |
| Lithium-Ion Battery Unit with EV Lithium-Ion Battery: | | | | | | | | |
| | | Estimated Operating Income = \$48.6 million (40.6 + 8.0) | | | | | | |
| | | Estimated Average Invested Assets = \$231.5 million (181.5 + 50.0) | | | | | | |
| | | Required Rate of Return = 14% | | | | | | |
| RI = \$48.6 – (\$231.5 × .14) | | | | | | | | |
| RI = \$48.6 – \$32.4 | | | | | | | | |
| RI = \$16.2 million (positive number indicates investment is estimated to generate more than the 14% ROR) | | | | | | | | |

Figure 11B*EV Lithium-Ion Battery's Projected ROI with 17% ROR*

| | | | | |
|---|---|-------------------------|---|--------------------------------|
| ROI | = | Operating Income | / | Average Invested Assets |
| EV Lithium-Ion Battery: | | | | |
| Estimated Operating Income = \$8.0 million | | | | |
| Estimated Average Invested Assets = \$50.0 million | | | | |
| Required Rate of Return = 17% | | | | |
| ROI = \$8.0 / \$50.0 | | | | |
| ROI = .16 = 16% (investment is estimated to generate less than the 17% ROR) | | | | |

Figure 12B*EV Lithium-Ion Battery's Projected RI with 17% ROR*

| | | | | | | | | |
|--|---|-------------------------|---|---|--------------------------------|---|--------------------------------|---|
| RI | = | Operating Income | - | (| Average Invested Assets | x | Required Rate of Return |) |
| EV Lithium-Ion Battery: | | | | | | | | |
| Estimated Operating Income = \$8.0 million | | | | | | | | |
| Estimated Average Invested Assets = \$50.0 million | | | | | | | | |
| Required Rate of Return = 17% | | | | | | | | |
| RI = \$8.0 - (\$50.0 x .17) | | | | | | | | |
| RI = \$8.0 - \$8.5 | | | | | | | | |
| RI = (\$0.5 million) (negative number indicates investment is estimated to generate less than the 17% ROR) | | | | | | | | |