SecureIQ’s Launch Analysis

Team 20
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Executive Summary

Our Vision

This report analyzes the implementation of WatchDog’s potentially new product, SecureIQ. The market for security systems is increasing and WatchDog hopes to be on the front end of this movement. Due to the saturation of the lock market, we have explored a new field of the security system market. SecureIQ will be on the forefront of a fairly new high-end technology that is becoming more desired. According to our team’s findings, we estimate that SecureIQ will be profitable and secure a competitive advantage in this new market for WatchDog.

Key Findings

Based on our forecasted profits over the next 10 years and considering possible side effects and opportunity costs, SecureIQ will generate a net present value of $952,634 with an initial rate of return of 12.62%, which is greater than the project cost of capital of 10.53%. We believe that our project has a higher sensitivity than market average. That being said, if the market continues to perform well, we will have a return above the average.

To make sure this project is successful, we need to control our variable costs. Any significant increase in variable costs will result in the project having a negative net present value. In order to make sure we stay positive, our operations team recommends implementing a machine paced workforce system. This will ensure that our quality systems are properly followed, which will result in little variance in the
development of our product. If the quality is not consistent, this will lead to more costs through defects. Keeping this in mind, we decided to continue our relationship with our current supplier, Mona Manufacturing, for circuit boards in SecureIQ. We expect demand to grow at a healthy pace over the next ten years.

In order to maintain this demand, our marketing team has come up with an effective integrated marketing communication system to build relationships with our new target market. In order for this product to be successful, we feel it necessary to expand our current target customer base. This new market consists of white collar, tech savvy individuals. These people are typically invested in the safety of their personal real estate. In order to reach this market, our marketing strategy for SecureIQ will be different than our traditional approach.

Our product doesn’t end at the sale. We value the idea of building relationships over simple transactional sales. To support our new marketing strategies, we will need to hire customer service representatives. With a high-end product, comes high-end expectations from our customers. These individuals will need to be the front line to servicing our customers with SecureIQ, whether it be an emergency or general tech help. It is important to not only hire the best customer service reps possible, but also implement an effective performance management system. High performance will be rewarded with both extrinsic and intrinsic rewards. Our customer service team is imperative to the high quality that SecureIQ’s target market is expecting.
Potential Risks Involved

With any new product launch comes some potential risks. We have viewed some cultural issues within WatchDog that may arise due to the implementation of SecureIQ. We believe WatchDog’s current sales reps have a different focus than what SecureIQ demands. This product requires more than just a sale; customers expect a full commitment to their safety and protection of their property. Our new customer relationship management system needs our service reps to efficiently manage the data it provides. If this is not done properly, it can lead to substantial losses. Much like a domino effect, if sales aren’t as projected, our project will not reach its projected value. Not selling enough systems will drive up the fixed costs per unit, thus resulting in less overall profits.

It is imperative to make sure the quality of our product is up to the high expectations of our target market. If we do not invest heavily in prevention quality methods, we will face an increase in defects that will lead to negative publicity, thus depleting our brand equity. In the simplest of terms, anything that destroys our brand will eventually result in the failure of the project.

Moving Forward

In order to maintain the positive NPV amount, we suggest crashing the project from 35 weeks to 26 weeks. This will allow to minimize costs and maintain the first mover advantage. It is imperative that we start placing job descriptions and reach potential employees through LinkedIn and employee referrals. Furthermore, it is important for us to set marketing costs and then start placing advertisements suggested in the report. In order to ensure high
quality, we must implement training programs for both customer service reps and quality management personnel. We believe that these activities are crucial to a successful product launch for SecureIQ.

**WatchDog’s Future**

In the successful implementation of the product, WatchDog will penetrate a market that is rapidly growing. We see SecureIQ as a turning point for WatchDog and believe it is the start of its success in gaining market share in the security system industry.

With the introduction of a high-end product, WatchDog is increasing its brand equity and moving towards a more exclusive position in the industry. An increase in brand equity will attract better industry talent. This will produce a strong culture aligned with the organizational goals and a workforce that is willing to give their best work, which will result in low turnover and more efficient operations. These people will be more dedicated to the client and willing to go out of their way to protect them as well as their property.

It will be *impossible* to achieve the expected level of growth by merely competing for market share with existing products. With SecureIQ, WatchDog has an opportunity to rise out of stale sales growth. This will help align our shareholder’s thoughts with that of managements’. SecureIQ will create more profitable jobs at WatchDog adding value to the company as a whole.

We believe that, with comprehensive analysis and preparation, WatchDog has an opportunity to be at the forefront of the high-end security system industry. The launch of the product adds to WatchDog’s brand equity and market share. We
currently have the first-mover advantage with SecureIQ, thus making it difficult for competitors to catch on. With that, we suggest an immediate launch as there are other security companies constantly looking to advance their technology.
Management Analysis

Team 20
Staffing Secure IQ

Job Description for Customer Service Representative

A Customer Service Representative at WatchDog is a client focused professional representing the voice of our company by combating a variety of different situations presented by clients. The job also entails a technological aspect to it. The Customer Service Rep needs to have a technical core, should be able to create and develop (troubleshoot/update) WatchDog software. We are looking for an energetic self-starter who is comfortable working in a team environment or independently serving customers. Our representatives should have proficient speaking skills allowing them to clearly communicate with our customers. They are required to have the capacity to learn about the company’s product, and be able to solve small product issues over the phone with the customers. Customer Service Reps need the ability to actively listen to customers in an effective manner. They must be very respectful of different situations they may encounter with clients.

Position Competencies

**Problem Solving:** Working through difficult situations that they will encounter on an everyday basis. Critically thinking about how to solve the various tasks that our clients will ask of them.

**Strategic Thinking:** As the support for a security system, they will have to be quick on their feet. Thinking quickly and critically, while at the same time keeping the customer calm.
Communication: With most of their day spent on the phone, speaking to customers is a key part of their job. Communicating with clarity and purpose is contingent to the clients experience with WatchDog.

Decision Making: On the job, they will be faced with situations where they have to make critical choices. Every situation will be different with a different end goal for each client.

Professionalism: Clients depend on their comfort and support in times of need. They will have to handle different situations with open arms and respect.

Analysis: When faced with different situations, they will be asked to follow different protocols to achieve success. Here they will have to take on different points of view in order to see the situation clearly.

Client and Customer Focus: As a customer based service, we are here to make sure the client is taken care of. Anything from clarifying how to reset the system to calling 911 in case of emergency.

Adaptability: On this job, they need to be able to conform to different situations. Be familiar with the entirety of the system and be prepared to answer any questions the client may have.
Critical KSAO’s for Position

<table>
<thead>
<tr>
<th>Customer and Personal Service</th>
<th>Understand the different areas that customers will ask questions about.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Technology</td>
<td>Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>Vital decision making that helps solve customer needs</td>
</tr>
<tr>
<td>Oral Comprehension</td>
<td>Listening and understanding ideas presented to them.</td>
</tr>
<tr>
<td>Establishing and Maintaining Interpersonal Relationships</td>
<td>They represent an outreach for the client, and clients should feel comfortable speaking with them.</td>
</tr>
</tbody>
</table>

Technological Skills

Program testing software: Defect tracking software; Fault testing software; Hewlett Packard LoadRunner; Unit testing software

Web platform development software: Apache Tomcat; JavaScript; LAMP Stack; Ruby on Rails

Job Characteristics Model

The Job Characteristics Model measures the employee’s job satisfaction based on five key elements: Skill Variety, Task Identity, Task Significance, Autonomy, and Feedback. These five key elements determine how an employee will feel about the intrinsic value of their job.

Skill Variety has both positive and negative impacts on intrinsic motivation. Some positives are dealing with a different situation every day and coming forth with
ideas specific to those situations. However, doing the same job over and over every day can be repetitive and might have negative impacts on their intrinsic motivation. In order to mitigate the negative impacts, we could switch jobs between high priority call and low priority calls. Also, there can be job rotation among different departments dealing with different products.

Task Identity involves high intrinsic motivation because they are seeing the process the whole way through. They are taking the call, talking to the customer, and alerting officials of the situation at hand. Also, the job has high Task Significance, meaning that their job will help save customer lives and property. This aspect of the job provides fulfillment beyond monetary value.

While this job has many upsides to intrinsic motivation, Autonomy is the one exception. There is little room for freedom, independence, or discretion for carrying out procedures. Almost every situation they will find themselves in has a specific protocol to follow.

Feedback can have both positive and negative effects on intrinsic motivation. The supervisor of customer service representatives can listen in on incoming calls and can provide positive or negative feedback to the customer service representative. This would allow for the representative to change their approach for the next incoming call. For some situations, this might improve their performance, but for others it could be seen as a critique of their performance, which would be detrimental.

As the first line of response, WatchDog’s customer service representatives are responsible to calmly deal with any situation our clients may encounter.
Labor Forecasting

With the assumption of 300 customers served per full-time employee (FTE) and the demand from our Financial Analysts, the number of exact FTEs needed per year is listed in the Figure Z2.1.

Full-Time Customer Service Representative

There are many benefits to having full-time customer service reps. First off, they will be able to build better relationships with the customers. Having full-time employees allows for our employees and clients to develop long-term relationships. Also, they would not require a lot of training regarding how to troubleshoot and maintain the app that Milo created for SecureIQ. Full-time customer service reps might also help in building a strong organizational culture, which might reduce the need of formalization in WatchDog while still maintaining a good corporate culture, which leads to better labor forecasting.

While there are positives of hiring full-time employees, there are also some cons we need to consider. Hiring full-time employees will mean that WatchDog would have to invest in paying these full-time employees health benefits. To keep the intrinsic motivation high for employees, WatchDog would constantly have to worry about incorporating more and more skill variety in their jobs. Another side effect of a strong culture that needs to be considered is when a subculture is developed that does not align with organizational goals.

Although there are benefits to hire part-time employees, compared to hiring loyal full-time employees, the benefits are outweighed by the negatives. Some of the positives are being able to provide flexible hours for employees, providing better job
sharing opportunities, and a cheaper wage expense. However, more part-time employees typically lead to higher turnover rates. This means that WatchDog will have to constantly train employees, the costs of which offset additional benefits paid to the full-time employees. Also, there will be unstable and inconsistent service, which will not help WatchDog secure the high-end brand equity image that it desires. A constant turnover will make it difficult for them to build long-term client relationships that WatchDog needs to successfully implement SecureIQ. Finally, hiring part-time would hinder developing a strong organizational culture that WatchDog may desire to use in order to reduce formalization.

**Recruitment and Selection**

**Recruiting New Employees**

When Pat is recruiting new Customer Service Representatives, he should consider employee referrals and LinkedIn. We believe sourcing from these methods would be the most effective way to recruit top talent for Milo’s team. Employee referrals are one of the most effective ways to recruit talented employees. It is essential to find people that understand the values and goals of WatchDog. Using our already talented employees at our company to refer new potential employees is not only cost-effective, but they vouch for who they are referring and know that they can already perform the job. Employee referrals lead to them staying longer and employees referred could be a better fit, compared to fresh recruits out of college. Employee referrals can be highly effective in acquiring top talent employees. Due to
current employees putting their own reputation on the line, they would only want to refer someone that would exceed expectations.

We also believe that LinkedIn is another great alternative in recruiting customer service representatives. LinkedIn is the largest networking site in the world and WatchDog can use this to their advantage. Pat will be able to post current job openings and attract active job seekers seeking the desired position. LinkedIn is also a great way for current employees to recruit by notifying their LinkedIn network about the job openings. Individuals that use LinkedIn are using this site in a professional manner. Many users are trying to promote their brand and why they would be the best potential candidate for any job they may be interested in. Also, using LinkedIn as a means of recruiting candidates allows for diversification in the talent pool. WatchDog already has a salesforce that is comprised of only men. We would look to diversify our workforce when recruiting customer service representatives and LinkedIn would allow us to do that.

Selection Process

Representatives will involve a three-stage interview process. Each stage evaluates potential candidates to see if they hold the skills and knowledge necessary to perform the Customer Service Representative position to the level that we expect. Each round of interviewing will deplete our selection pool in order to weigh out the best possible candidates for our position. Before the first round, we would evaluate potential employees from a pool of applications. Considering we need to hire 37.5 FTEs for our initial selection process, it would be safe to consider around 100-150
potential candidates to make the first round to account for candidates who will reject the interview offer, drop during the process, or will not be selected to move on. The cognitive ability test would be done online and sent out to each of the interviewees’ emails. With a .51 validity and .85 reliability, it is safe to say that the test provides sufficient knowledge of whether or not the candidate is able to obtain a high volume of knowledge. The cognitive ability test will measure the ability of candidates to learn the high volume of information they will need to obtain to be successful in the job. In terms of KSAO’s, we will be evaluating their critical thinking.

Then, they will be invited to interview with us in a structured interview format to evaluate their fit in the company. Structured interviews are typically as valid as the questions asked (Validity of .51 and Reliability of .78). Therefore, careful consideration must be put into the relevance of the questions asked to our KSAO’s. Here, we will measure their customer and personal service knowledge, oral comprehension, and speech clarity ability. From this point, we will select the best possible candidates and reduce the pool by about 50%.

The next test, Technology Skills Test, could be performed online to measure the candidate's’ abilities in technology. This test will measure the candidate’s knowledge of computers and technology. Typically, this test performs at a .42 validity rating and .81 reliability rating, proving that the test accurate with providing consistent results. From this pool, we will weed out those who receive the bottom 25% of scores. The next candidates would return to have two final round tests. The Customer Service Orientation test would measure the ability of candidates to maintain personal relations, their customer service skills, and customer and personal
service orientation. With a validity of .46 and a reliability of .78, the test will provide us with the best candidates with a customer service mentality. The App Development Simulation would measure the ability of candidates to program software, work with apps, and system software development skills.

The total cost for a candidate who makes it through the entire interview process would be around $525. The costs are outlined in Figure Z3.1. We believe that the analysis of every potential candidate would lead us to find the proper employees who would provide the best quality relationships and services for our customers. With these relationships built, the profitability of each employee hired could be infinite. However, since each full-time employee can manage up to 300 customers, it is safe to say that each well-qualified employee will be able to perform well beyond their initial cost.

**Performance Management**

**Nine-Box Matrix Method**

The Nine-Box Matrix Method is a performance management tool that was famously implemented by Whirlpool to motivate and evaluate their employees to do their best work. An example of our idea for a Nine-Box Matrix is pictured in Figure Z4.1. The horizontal axis for the Nine-Box Matrix represents “Contribution, Impact & Value to Business” and the vertical axis represents “Chance of Promotion.”

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Analyzing Performance through Excel

We developed an Excel model (Figure Z4.2) to track how many products a customer service rep contributed to. By selecting a name, we can retrieve the data about different WatchDog products they contributed to and also see what region in the United States they contributed to the most. All the product data will be shown in charts so that it is easy to track different numbers for different months, and the size of the bubbles on the map will indicate how much the customer service rep contributed to that area. This will enable us to track our customer service reps’ performance and make decisions based on that data.

BARS Chart

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Always clear and consistent in providing information to the clients.</td>
<td>Solves clients’ issues most of the time.</td>
<td>Does what they are told, but still has many customer unsatisfactory reports.</td>
<td>Cannot effectively build client relationships.</td>
<td>Does not provide clear information to the clients.</td>
</tr>
<tr>
<td></td>
<td>Deals with problems effectively and promptly.</td>
<td>Solid work but has had few unsatisfactory reports from customers.</td>
<td>Not ready for promotion.</td>
<td>Many negative reports from customers.</td>
<td>Is not compliant with supervisors.</td>
</tr>
</tbody>
</table>

Effect Performance Management Has On Firm

Performance management provides intrinsic and extrinsic motivation for our employees to give WatchDog their best quality work. When our employees feel a
desire to perform at their best ability and feel proud of their work, we know that we will be receiving the highest quality performance, which results in high quality products and customer service. There are three components of evaluating how well a performance management tool aids the organization: Strategic, Administrative, and Developmental.

Strategically, the performance management system helps us determine how well the employees are solving clients’ problems. It also gauges performance in order to maintain consistent high brand equity. This aids WatchDog because it allows us to check if the employee’s goals align with the goals of the organization.

Administratively, the performance management system clearly defines when the employee should be promoted, what characteristics lead to the promotion, and what WatchDog needs to do prior to, and following, the promotion. This provides clear intrinsic motivation for an employee to follow those guidelines in order to benefit the business and their own career paths.

Developmentally, these performance management tools help shape WatchDog into a better overall company. By evaluating your employees, you can help define culture, enhance performance, and drive healthy turnover. This also provides feedback for employees to specifically follow and improve their performance to our standards. Therefore, we are not only developing our company, but our employees as well.
Employee Satisfaction

Core Values Central to Culture

We believe that integrity and ethics should be core values for SecureIQ’s service department. In a job where they are the touch point for a security system, they have access to very sensitive information about WatchDog’s clients. When they have information about where a person lives, their lifestyle habits, and most importantly how their security system works, these values become very important.

Strong ethics play a key role in the description of a desired customer service employee for SecureIQ. If a person has strong ethical behavior, they will not be tempted to misuse any of the information they are presented with on the job. Our nightmare situation is an employee who uses their knowledge of a client and their home to commit a crime.

Integrity is also a very important value that we believe SecureIQ’s customer service team should exemplify. Our team needs to be very honest and upright, both with our clients and with co-workers. We are looking for people who have good character and are overall good people.

We will work to ensure that these values remain central in our department through a couple of different tactics. A very intensive hiring process will be the first step to ensuring the core values. Upon hire, we suggest that management be very strict about matters of personal information of the clients. Handling any employee problems with a zero-tolerance method will help set a strong tone to other employees.
Important Policies to Consider

The two management practices that we suggest Milo should use to promote employee satisfaction and engagement would be **Participative Management** and **Employee Recognition Programs**.

Participative Management is a joint decision making system in which subordinates share a significant degree of decision making power with their immediate supervisors. Since Participative Management has been considered a panacea for poor morale and low productivity, we decided it was the best management practice for the customer service reps.

In order to effectively apply this management practice, Milo would have to include the customer service reps on his team while making decisions. He should ask their opinions about the decisions he makes. This would make the customer service reps on his team feel like their opinion mattered and they are a valuable asset to the company, hence increasing their morale.

If Milo faced a situation where the customer service reps were not quite achieving the organizational goals, he should refrain from using coercive techniques to make them better achieve their goals. Instead, he should stress the organizational consequences of their actions. This way we can make sure that the employees understand that they need to improve their performance for the organization and not for Milo.

However, to make this management practice effective, Milo would have to keep in mind that he would have to build trust and confidence among the customer service reps that would be on his team. If he wants something to be changed in the
SecureIQ app, he should explain to them the reason he thinks this is necessary and also listen to their opinions about it.

**Employee Recognition Program**

Another management practice we suggest would be Employee Recognition Programs to provide intrinsic motivation to our customer service reps. Although extrinsic rewards build employee motivation too, it is very important to note that intrinsic motivation can have better long-term effects. However, the Employee Recognition Program we suggest does not just have to be strictly intrinsic, we will include some extrinsic reward aspects to it.

For this, Milo would need to keep in mind to appreciate his team’s contributions. He can also compliment one service rep in front of others so that it motivates others to do their best too. Management should also consider putting a program in place where there will be an employee of the month award. It could also have some extrinsic rewards to it. We will leave it to the top management to decide what should be the amount for this reward. There can also be smaller recognition programs such as an award for employees who were on time to work for an entire month. These programs would not only boost the morale for the customer service reps, but also motivate them to achieve the organizational goals.
Management Appendix

**Figure Z2.1 – FTE Forecast**

<table>
<thead>
<tr>
<th>Years</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>7500</td>
<td>9000</td>
<td>10800</td>
<td>11880</td>
<td>13068</td>
<td>13722</td>
<td>14409</td>
<td>15130</td>
<td>15887</td>
<td>16682</td>
</tr>
<tr>
<td>FTE's Needed</td>
<td>37.5</td>
<td>45</td>
<td>54</td>
<td>59.4</td>
<td>65.34</td>
<td>68.61</td>
<td>72.045</td>
<td>75.65</td>
<td>79.435</td>
<td>83.41</td>
</tr>
<tr>
<td>Yearly Hiring Number</td>
<td>37.5</td>
<td>7.5</td>
<td>9</td>
<td>5.4</td>
<td>5.94</td>
<td>3.27</td>
<td>3.435</td>
<td>3.605</td>
<td>3.785</td>
<td>3.975</td>
</tr>
</tbody>
</table>

**Figure Z3.1 – Selection Process Budget**

<table>
<thead>
<tr>
<th>Person</th>
<th>Structured Interview Cost/Score</th>
<th>Cognitive Ability Test Cost/Score</th>
<th>Technology Skills Test Cost/Score</th>
<th>Customer Service Orientation Cost/Score</th>
<th>App Development Simulation Cost/Score</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate 1</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate 2</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate 3</td>
<td>$125 /</td>
<td>$90 /</td>
<td>$70 /</td>
<td></td>
<td>$150 /</td>
<td></td>
</tr>
<tr>
<td>Candidate 4</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td>$90 /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate 5</td>
<td>$125 /</td>
<td>$90 /</td>
<td>$70 /</td>
<td>$90 /</td>
<td></td>
<td>$150 /</td>
</tr>
<tr>
<td>Candidate 6</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate 7</td>
<td>$125 /</td>
<td>$90 /</td>
<td>$70 /</td>
<td>$90 /</td>
<td></td>
<td>$150 /</td>
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<tr>
<td>Candidate 8</td>
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<td>$90 /</td>
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<td>Candidate 9</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Candidate 10</td>
<td>$125 /</td>
<td>$90 /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cost Per Person (Max $500)</td>
<td>$125.00</td>
<td>$215.00</td>
<td>$285.00</td>
<td>$375.00</td>
<td></td>
<td>$525.00</td>
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</tbody>
</table>

25
**Figure Z4.1 – Sample Nine-Box Matrix**

Contribution, Impact & Value to Business

<table>
<thead>
<tr>
<th>Considerations:</th>
<th>Considerations:</th>
<th>Considerations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- New to company or new to role.</td>
<td>- High Chance for two promotions in less than three years.</td>
<td>- High Chance for two promotions in less than three years.</td>
</tr>
<tr>
<td><strong>Actions:</strong></td>
<td><strong>Actions:</strong></td>
<td><strong>Actions:</strong></td>
</tr>
<tr>
<td>- Keep track of performance.</td>
<td>- Is sufficient at doing daily tasks requirements.</td>
<td>- Five consistently high performance ratings by your supervisor.</td>
</tr>
<tr>
<td>- Assess work performance in less than two months.</td>
<td>- Not working at full potential.</td>
<td><strong>Actions:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Actions:</strong></td>
<td>- Consult them through any problematic situation they face at work.</td>
</tr>
<tr>
<td></td>
<td>- Figuring out what to do to increase performance.</td>
<td>- Plan for succession.</td>
</tr>
<tr>
<td></td>
<td>- Ensure better supervision. Plan for succession.</td>
<td>- Be sure better supervision is provided.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N/A</th>
<th>Considerations:</th>
<th>Considerations:</th>
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<tbody>
<tr>
<td><strong>Considerations:</strong></td>
<td><strong>Considerations:</strong></td>
<td><strong>Considerations:</strong></td>
</tr>
<tr>
<td>- High Chance of one promotion in less than two years.</td>
<td>- Chances of one promotion in less than two years.</td>
<td>- Almost no chance of promotion.</td>
</tr>
<tr>
<td>- Performs daily task requirements.</td>
<td>- Three consistent high performance ratings by supervisor.</td>
<td>- Dysfunctional turnover.</td>
</tr>
<tr>
<td>- Does not achieve full potential.</td>
<td><strong>Actions:</strong></td>
<td>- Consistently achieves raised performance achievements.</td>
</tr>
<tr>
<td><strong>Actions:</strong></td>
<td>- Consult them through any problematic situation they face at work.</td>
<td><strong>Actions:</strong></td>
</tr>
<tr>
<td>- Figuring out what to do to increase performance.</td>
<td>- Plan for succession.</td>
<td>- Find issue in performance.</td>
</tr>
<tr>
<td>- Target box position moves in less than 5 months.</td>
<td>- Better supervision should be in place.</td>
<td>- Place programs to better increase their performance.</td>
</tr>
</tbody>
</table>

**Considerations:**
- Some performance concerns in current role.
- Little or no performance improvement shown.

**Actions:**
- Decide job exit or transition.
- Functional turnover.
Figure Z4.2 – Excel Model for Performance Management
Marketing Analysis

Team 20
Evaluating WatchDog and Positioning the New Product

Relative Market Share of WatchDog

The Relative Market Share (RMS) of a company is the market share of that company compared to the company that has the biggest market share in the industry. The RMS of WatchDog in security system market compared to ABT, the company with the highest market share in the security system market is estimated to be 22.22%.

Whereas the RMS of WatchDog in the Locks + Alarm business is again compared to ABT, the company with the highest market share in the Locks + Alarm business is expected to be 9.62%.

WatchDog in the Competitive Arena

The lock market has been pretty consistent, not growing rapidly because of the advent of the security alert systems. However, it is expected to grow 5% in the foreseeable future. This growth, however, will not be very beneficial for WatchDog because the lock market is saturated. With the increasing growth rate, it might be even harder for WatchDog to gain market share from its competitors.

Due to the similarity of products in the lock market, it is very hard to compete against the firms that have already established themselves with the customer and have attained a higher consumer perceived value. Therefore, it is likely to see the same firms dominate the market. Because of this, it is very hard for WatchDog to differentiate itself and increase its market share.
The security alert market provides more opportunities, requires more diverse products, and has grown at a pace of 24% on average over the past 3 years. It is expected to grow more over the next several years. WatchDog is currently gaining market share in the security alarm market.

Although ABT dominates the security alarm market at this point, the market is still not that concentrated. The market still has several small, but active, players. There have been many local providers that use equipment made by international manufacturers.

Watchdog’s new product SecureIQ is very different compared to the existing products in the security alarm market. Its “brain” is a strikingly different technology that is similar to the “black box” found on the airplanes. This highly differentiated technology makes SecureIQ a very diverse product. Therefore, this market could be a great opportunity for WatchDog to capture a larger chunk of the overall market in comparison to their current share in the lock market.

**WatchDog’s Positioning Statement**

_For people who value the environment and the safety of their loved one, WatchDog is your house's brain that watches and warms when you cannot, so that you can control the safety of your home, even on your phone._
Positioning Map for the Alarm Category

For our positioning map, we decided that the two categories we should focus on would be marketing directly and indirectly to the customers. Looking at the positioning map it is clear that ABT holds the biggest market share and markets directly to the customers, whereas WatchDog channels its marketing indirectly to its customers and also has the smallest market share compared to the other three firms. The market share for the companies Securo and Simplar are accurately shown. Unsure of the data regarding their marketing efforts and who it was directed toward, we placed it towards the middle of the Positioning Map. We intentionally put Securo and Simplar to compare WatchDog not just to the company with the biggest market share in the industry, but also to certain other firms in the market to gain a better understanding of where WatchDog stands in the industry.
Positioning Strategy

*With the introduction of our new product SecureIQ we intend to achieve a “more-for-more” approach as our overall positioning strategy.*

To obtain this positioning strategy, WatchDog needs to have a comparative advantage compared to its competitors. To attain this comparative advantage, these are the areas in which WatchDog must differentiate themselves:

**Distinctive and Superior:** Compared to other security systems in the market, SecureIQ will be the most “un-hackable” of them all. Milo, the person who created it, used to be a hacker and therefore made sure that the system cannot be hacked easily. SecureIQ has a “brain” which connects the video to the audio, remotes, and relays between all entry points and cameras. It is molded into a nearly indestructible box, like an airplane's “black box.” It also provides an extremely strong backup and ensures that the customer is covered with an insurance that goes along with the product.

**Preemptive:** For now, it is estimated that with SecureIQ, WatchDog will enjoy the “First-mover advantage.” However, there’s uncertainty of how long it will take for competitors to reverse engineer and enter the market.

**Profitable:** SecureIQ was built as a high quality product and thus WatchDog expects a higher customer perceived value for this product.
Evaluating Segmentation and Targeting

Segmentation Bases to Reach Target Customers

Considering that people would demand more of these security systems in cities where high crime rate is prevalent, our product offers a desired solution. Therefore, we decided that one of the segments to target would be based upon geography. We decided to target cities with a high crime rate.

Since we want to target high-net-worth individuals with a significant investment in personal real estate, demographic segmentation would seem most effective to reach these sophisticated clients.

Under this Demographic Segment we will focus on other three sub-categories: Age, Income, and Gender.

Age: With SecureIQ, we are leaning more towards “smart systems” for which the estimated market penetration is 7% in the U.S. Moreover, the demographic that would demand these “smart systems” more would fall in the young to middle aged adult category.

Income: WatchDog is looking to attract more sophisticated clients than it already has. With its product, SecureIQ, WatchDog is looking to target high-net-worth individuals with significant investment in personal real estate. To reach the target market, we should keep in mind income as a sub-category to the demographic segment.

Gender: While targeting high-end homeowners, WatchDog will need to keep in mind that for these customers, women influence most home purchase decisions.
While deciding a target market, this sub-segment of our main demographic segment should be kept in mind.

The Target Market

We need to select a target market which will be well suited with our overall positioning strategy of “more-for-more.” WatchDog currently has its consumer base divided into several groups; these are “Established Empty Nesters,” “Younger-Up-and-Comers,” and “Middle-of-the-Roaders.”

Established Empty Nesters: These include people with a household income of $125,000+ and fall into an average age of 54 years. These people are very well established, will pay monthly bills, and will sign a long-term contract.

We decided not to abandon this customer base, but keep in mind to not focus too much on this segment. This segment is mostly locked in with a long-term contract so we can assume that they might not demand our new product as much as we would want.

However, they still aren’t out of our target market because they still invest heavily in personal real-estate and have average incomes that makes it easier for them to afford our new product, SecureIQ.

Younger Up-and-Comers: People with an average income of $80,000, and fall in average age group of 35 years. These people would have moved into their new residence and would want to be armed with a “Smart System.”

The Younger Up-and-Comers is our target market. WatchDog should try to make this its main target market considering the new product it is launching. These
are the customers that would want a “smart system.” They understand our product and see value in it. This customer base mostly includes a younger generation who, according to our chief marketing officer, are the ones who are most concerned about the risk of hacking and are more likely to buy a “smart system.” This fear makes them a good target market because the smart system has a market penetration percentage of about 7% in the US.

Moreover, their average income number indicates that they will be able to afford WatchDog’s new product, SecureIQ, or will at least try to purchase it, considering the perceived value they are assumed to place on this product.

Assuming that we know about the customer base this category could mostly comprise of parents going out for work or away from their home for some considerable amount of time. They will get assurance that their loved ones and personal possessions will be safe in their absence.

**Middle-of-the-Roaders:** People with an average age of 40, with a household income of $60,000. Often buy a basic system and look more for necessity or true added value.

It would be better to expand and consider the higher-income target market living not just in small high crime areas, but consider high crime rate cities.
Evaluating Sales and Distribution Channels

Customer Service Representatives and Marketing

Human Resources believes that their salesforce is a very valued asset. However, the salesforce is not particularly complying with the marketing team on some levels. The sales people are suspicious that the new customers that they acquire through the internet, i.e. “The Internet Folks,” do not want “good relationships” that the sales reps desire to get out of them. They are sometimes pressured to not follow up on internet leads as much as the ones created through personal connection. There have been instances where the marketing team did not pass on internet leads to WatchDog sales team because recently the sales team have been failing to follow up with the inquiries that these clients have.

For the new Customer Service Rep team that Milo will lead, it will not be a very good fit for the existing sales reps. Patrick, the Human Resources Director, wants to build a team with a more technical core. This will be very effective and helpful for the current marketing team because these people will be able to take responsibility for Milo’s app, and will be able to troubleshoot and update the system at any time. This will definitely be aligned to make SecureIQ a high-end product because the customer service reps will provide them with high quality service. This will help the marketing team to build better relationships with the customers brought in through the internet, which was previously not handled very well by the sales reps.

Finally, this would help the marketing team to attain our goals of reaching more to our target market and complying well with our “more-for-more” positioning strategy. This is because our target market focuses on the younger generation who
think more about the risk of hacking and are more likely to place a higher perceived value on SecureIQ. We assume this will increase more if they have the ease of accessing SecureIQ using a mobile app.

**WatchDog’s Sales Channels**

**Security Products Distributors**

We recommend that WatchDog considers using distributors alongside their sales reps. While sales reps give the product a good face upon launching SecureIQ, we believe that a solid distribution chain will give the product needed exposure. Our target market consists of tech savvy people, some of whom may not want to encounter a salesperson while purchasing the product. Using distributors would allow for us to successfully meet people in this category. There might also be some small customers that sales reps might not consider very important, this is when SDPs will be most useful. The disadvantage that is associated with using the SDPs is that they sell a variety of security products to their customers, while our products represent only a small part of this. However, WatchDog already came up with a solution to this problem by providing its channel partners with margins or markups that exceed the ones offered by their competition. We can also mitigate the risk of differentiating SecureIQ because of the non-imitable technology it uses which makes it difficult to hack into the product’s system and duplicate the product.

**Sales Representatives**

While we do recommend the introduction of a distributor, we believe the sales reps will still play a vital role in the sales of SecureIQ. Sales reps have the ability to
meet with the clients and help them through the process of using SecureIQ. The reps also add a more traditional sale to the mix and help serve our loyal customer base who may want to upgrade. Pat, the Director of Human Resources for WatchDog, believes that they can help leverage many of the competencies their sales staff has already developed as they launch SecureIQ. Sales reps also handle most of the customer service responsibilities and serves the governmental clients.

Patrick believes that our sales reps are “not just sales reps” and add value to the company. Since customers appreciate having “their” representative who serves as a liaison for all their needs, whether they are technical or related to other matters such as billing, getting rid of them will probably be a bad organizational move. Even though, with the advent of the webpage, they might not be able to make direct sales, they will still be required to retain our existing customer relationships. One really important thing we need to consider is that the target market we decided for SecureIQ will focus on women who influence these purchase decisions. These women prize relationships and mutual respect in their choices and hence our sales reps would be a perfect fit for that. With that, the existing reps are the face of our company and have the opportunity, if they wish, to mold to the new sales technique necessary for SecureIQ.

**WatchDog’s Distribution Channels**

We believe that WatchDog should sell both directly through their website and through retailers. Both of these options give us a different advantage and help us
reach a different market than the other. Marketing on the internet gives us the clear advantage of selling to our direct target, while vice versa with retailers.

A well-designed company website allows our product, SecureIQ, to provide a high quality experience to better communicate with the tech savvy, upper middle class that makes up a majority of our target market. Assuming that we know our customer base, these are the people who don't want to be bothered by a salesperson and would rather deal with the sale on their own time.

Retailers give us the opportunity to reach customers that our sales team would not otherwise pursue. We deem these people the “little guys,” considering their commission to a sales force would not be as substantial as a large buyer. We have found however, that large sales only make up a small portion of overall sales for a company. For example, imagine a beer distributor has a contract with a major-league baseball team to sell their beer in the stadium. Often, high-level executives and seasoned sales teams will spend their time on that account. Imagine, at the same time, that distributor sells triple the amount out of several local liquor stores.

Looking forward, WatchDog can counterbalance this by focusing effort on retail stores. However, we need to keep in mind to choose selective retailers so that we can attain our selective promotion strategy and hence meet our “more-for-more” positioning strategy with our new product SecureIQ.

**Effect on Product Position**

We suggested WatchDog to use a “more-for-more” position strategy. For this first and foremost, we need to focus on high quality product, which SecureIQ will successfully deliver. WatchDog needs to charge a high price to maintain the “more-
for-more” positioning strategy that we suggested. Next, since we decided to use SDPs and retailers, we need to keep in mind that we use only high-quality dealers. We also decided to focus on our company’s website, which in the past, has been a good advertising method for the customers and successfully provided them with information regarding our product. To build and maintain the positioning strategy, we suggest WatchDog to improve its website to provide high quality media advertising. Also, in order to maintain this high quality image to reach our target customers, high-net-worth individuals, WatchDog will need to hire and train additional service people. This will effectively be done by our management team and they will make sure to get the right people using the right job descriptions.

**Customer Relationship Management and WatchDog**

**Using Customer Relationship Management Technology**

WatchDog should explore the benefits of using Customer Relationship Management (CRM) Technology. First, it will help WatchDog to differentiate between its acquired customers and potential customers which will further help WatchDog to use different strategies to attract and retain customers. With the potential customers, WatchDog can implement strategies to efficiently attract them. With acquired customers, they will be able to determine how to optimize profits coming from them.

Once more, WatchDog can further segment the acquired customers. These customers can be segmented on the basis of infrequent profitable purchases, frequent profitable purchases, infrequent low profit purchases, and frequent low profit
purchases. By dividing acquired customers into these categories, we will be able to know which segment to focus on more and how to better attract the infrequent and low profit customer. Then, move them towards high profit, frequent customers.

The CRM Imperative

<table>
<thead>
<tr>
<th>Acquiring the Right Customer</th>
<th>Crafting the Right Value Proposition</th>
<th>Instituting the Best Process</th>
<th>Motivating Employees</th>
<th>Learning to Retain Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to do it?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Identifying most valuable customers, high net-worth individuals with significant investment in personal real estate.</td>
<td>- Studying what the customer needs today and what they will need tomorrow: Using app WatchDog created, Website selling</td>
<td>- Deciding how to get products to the customers, including alliances, technologies invested in, service capabilities acquired</td>
<td>What tools do the employees need to foster customer relationships? We suggest that sales reps could build direct personal relationships with the customers. - Customer service reps could be there for the customers if they have trouble using the website or the app How to boost employee loyalty: Assure the sales reps that they will still be needed even though we would use a website</td>
<td>- Learn why customers defect and how to bring them back - Learn what your competitors are doing to win your high-value customers and compete - Monitor customer defection metrics consistently</td>
</tr>
<tr>
<td>- Analyze how much they are spending for your goods and services</td>
<td>- Surveying what products or services your competitors offer today and will offer tomorrow</td>
<td>- We suggest using both Sales Reps and SDPs and use both the internet and personal selling</td>
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</tbody>
</table>
Preventing Failure of CRM

First, the management needs to keep in mind that CRM is not a software tool to help WatchDog manage its customer relationships. It is only a tool that will give us very useful data, but it is up to us to interpret this data and build customer relationship keeping the data in mind.

CRM will only work if we have a good customer strategy planned out before implementing the CRM. Here is where the suggestions mentioned in the report come to play. CRM needs good old fashioned segmentation analysis. We came up with different segments to focus on earlier in this report. It also needs marketing goals, and therefore we decided to mostly market our old customers using our sales reps who have already developed close relationships with them. Use the company website and the app to attract new customers.

CRM should be used only when the organization is already customer focused. Just having a strategy will not be enough, the key business processes that relates to

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<th>Learning to Retain Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>How will CRM help?</td>
<td>- Analyze customer revenue and cost data to identify current and future high value customers</td>
<td>- Capture relevant product and service behavior data</td>
<td>- Process transactions quicker</td>
<td>- Track customer defection and retention levels</td>
</tr>
<tr>
<td>Target your direct marketing efforts better</td>
<td>- Create new, efficient distribution channels</td>
<td>- Provide better information to the front line</td>
<td>- Deploy knowledge management systems</td>
<td>- Track customer service satisfaction levels</td>
</tr>
<tr>
<td></td>
<td>- Develop new pricing models</td>
<td>- Manage logistics and supply chain more efficiently</td>
<td>- Catalyze collaborative commerce</td>
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customers, i.e. customer service and order fulfilment, need to be in place. Here, the management team plays a very important part because they have to come up with the job descriptions, performance measures, compensation, and training programs for these customer service employees. After this restructuring takes place, only then will implementing CRM system benefit WatchDog. The fact that WatchDog will use an app for its new product SecureIQ will also be very helpful while implementing CRM because this process will be very customer focused and will highlight the company’s effective customer service.

Before implementing CRM, WatchDog needs to focus on internal structure and make any changes necessary. This is when we suggest changing the compensation system for WatchDog’s sales reps. Instead of paying them commission based on the dollar size of the order, their commission should be focused on the number of customers acquired and on the profit margins.

While implementing CRM, WatchDog must keep in mind not to build relationships with disinterested customers, and approach the customers who are actually interested in building these relationships. Here, our suggestion would be to ask our sales reps to maintain the relationships that they have already established throughout these past years while not ignoring the online customers who want to build a relationship with the company. The sales reps in WatchDog have been trying to avoid these online customers assuming that they are not interested in building relationships with the company at all. This is how the company will lose potential loyal customers. On the other hand, constantly contacting the customers who have shown interest in our website or our app once or twice would not be a very good idea.
Instead, the customer service reps can occasionally call them and ask them if they are satisfied with our service and what changes they would like to see in the future.

**CRM and Channel Partner Relationships**

Before implementing the CRM technology, WatchDog will have to revise its internal structures which includes its channel partners. The relationship between WatchDog and its channel partners would have to be more customer focused and will be developed around providing high quality customer service. WatchDog can adopt CRM technologies to put web servers in the equipment. After implementing CRM, there might be some technological changes that would affect these channel partner relationships. For example, if there is a technological glitch in any part of the security system the web server related to the equipment will sense the damage and will figure out where the damage took place. The server would then send an email to a customer service rep at WatchDog. It will also send an email to the channel partner for replacements of the damaged parts and another to a contractor, requesting for customer service to be present to fix the glitch in the equipment.

By the time a customer service rep is there to fix the equipment, a replacement for the equipment will already be present there. This will allow for us to save time and unnecessary communication. This means that CRM will make WatchDog work close to its channel partners and develop better relationship among them because they will be working together at all stages to provide high quality customer service, which again will help WatchDog’s positioning strategy for SecureIQ.
Promotion Decisions

Forms of promotion

Advertising

First, we must decide on a method for piecing together the advertising budget. We have decided to follow the **Objective and Task Method**. This method has two dimensions:

1. **Defining Specific Objectives**: We need to reach a more sophisticated customer base than we already have.

2. **Determining the Tasks Needed to Achieve These Objectives**: To support our “more-for-more” overall positioning strategy, we will need to provide our customers with high quality customer service.

   For this, we will need the customer service reps to build a very communicative and interactive website as well as keep the app from defaulting. We are also trying to directly advertise to our customers using TV ads. We hope that these ads will drive sales and add increased customer perceived value to our product.

   We will also advertise using the trade magazines, which in Cindy’s opinion, have worked very well in the past for other WatchDog products.

   **Outdoor Advertising**: Placing ads on the digital touch screens at bus stations and set up billboards in high crime rate cities that say, “You’re here, do you know what’s going at your home?” Providing users with a choice of placing “WatchDog Security” signs in their front yards to further prevent thieves from breaking in as a scare tactic.
Estimating the costs of performing these tasks: At this point we haven’t quite gotten clear figures for these tasks but it wouldn’t be hard as long as we have the tasks decided.

Public Relations

These six aspects of Public Relations are our hope to reach the public to drive an increase in our brand equity:

1. **Press relation or press agency:** We hope to get in front of the camera as much as possible to relay success stories that SecureIQ creates.

2. **Product publicity:** Emphasizing on user reviews for our new product SecureIQ.

3. **Public affairs:** Sponsor a free system for a school building or hospital in a low-income area. The building must be either getting broken into or vandalized often.

4. **Lobbying:** Partner with a lobbyist firm to promote increasing safety in particular areas. We will do this to lobby representatives to communicate to their constituents the importance of having a security system in this day in age. With increasing cyber-attacks and home invasions, it is important to have a high-tech security system that will combat these situations.

5. **Investor relations:** We are positively impacting investor relations through the enhancement of our new customer service team. The investors are not currently thrilled with WatchDog’s management team and are looking to drive sales through
the introduction of a new product. With the introduction of the new SecureIQ, we hope to strengthen the relationship.

**Personal Selling**

This element of promotion mix will be carried out by our valuable assets, our sales reps. WatchDog can use the relationships that these sales reps have developed over the years with the client and explain to them how SecureIQ is not just another security system, it’s the future of security systems.

**Sales Promotion**

We decided to stray away from Sales Promotion while directly advertising to the consumers because sales promotion is not a very good way to develop brand equity in the long-run. We want WatchDog to be a high-end product and if we offer constant sales promotion directly to our customers, they might perceive SecureIQ as a cheap commodity. However, we might need to use sales promotion to better reach our SDPs because they distribute products from our competitors too. We might have to rely on some cash rebates or quantity discounts in order to attract them to sell SecureIQ. Since our sales are projected to grow at an annual rate of 20% for years two and three, Cindy believes that the margins for SecureIQ will be stronger for our SDP partners than the margins provided by our competitors. At that point, we will not have to rely on sales promotion to attract the SDPs.

With our new product, SecureIQ, we are seeking to use both **Push** and **Pull** promotion mix strategies:
**Pull Strategy:** By placing Google ads, ads on the television, digital touch ads in bus stations, and developing an interactive and high quality website, we are planning on marketing directly to our final customers, inducing them to buy our product.

**Push Strategy:** The Push Strategy will come into play while working with our SDPs. Our projected sales growth for SecureIQ shows how we can provide higher markup incentives to our SDPs, hence, it will work well toward a push strategy. This will induce our channel members to carry SecureIQ and promote it to our final customers.

When it comes to balancing our different forms of promotion, we will make sure all of our promotion strategies are directed towards our suggested target audience and is consistent with our “more-for-more” positioning strategy.

Trying to reach the specific target market, we decided upon using these different promotion tactics. For example, when placing our outdoor ads, we plan to place them in upscale areas where our target market is best reached. Google ads will allow us to be seen by people who search the internet for security systems as a whole. The price will be present in these ads to give people an idea of the quality of the product.

Being consistent with our “more for more” positioning strategy in all of our promotions elements helped us achieve fluidity throughout the mix. We will make sure to differentiate our product, SecureIQ, to our customers in all of our ads so that the customers can easily place a higher perceived value for SecureIQ. In addition, we will be using a selective distribution system by using a few number of SDPs in order
to be consistent with our positioning strategy. This will help reduce bad public relations immediately while promoting positive ones.

**Our Advertisement**

1. The character hook will be our “WatchDog” himself. It will be a human body with a dog's head (Figure M5.1).

2. Our repeatable theme will be our “WatchDog” handling different chaotic situations when people call in to our customer service center.

3. Our work hook will be: “Get the ‘brain’ for your house. Let SecureIQ be your WatchDog. It’s security on the go!”

4. The design aesthetic (our consistent brand layout) will be the same call center every time. However, there will be different places that people call from, such as a different house or apartment.

In order to achieve the highest level of influence on potential customers, we believe that WatchDog should use all of these promotion tactics. They all individually help promote our brand and engrave into the minds of consumers. We believe they will work cohesively together, where one will not be as effective if the others are not present. It will help us change our image from a serious, lock company, to a friendly security company. This will help reach our target market, which includes women, who prize relationships and mutual respect in their choices.
Web-Page Template Description

Our web-page template can be viewed in the appendix at Figures M5.2-M5.6. Our home page would contain the story of how safe our products have been coming from our own Marketing Director, Sam, who was one of the sales reps in the past. It will also include our positioning statement, which will help us to convey to our consumers why we are different from our competitors, and what should their understanding of our product be, as in, how should they perceive the value of our products.

The home page would have a selection of tabs on the top (Figure M5.2). This would include the “Home” tab and “Meet the WatchDogs” tab, under which we would have the names of our executives and the WatchDog story, and how it became the company it is now. Moreover, we can view some success stories that WatchDog has. The other would be “Products,” under which we detail about all our products (Figure M5.5). We decided to group the products into several categories: Security Alarms, Key-and-Keyless Locks, and Build Your Own, where the customer can put in their individual specifications and get an individualized experience. Additionally, there are “Contact” and “FAQ” tabs. Most importantly, we decided to put “SecureIQ” in its own tab to emphasize our new product. The SecureIQ tab will lead to a page where it will specify what SecureIQ will do for our customers and why should they purchase it (Figures M5.6 and M5.7). That page will also have a button where our customers can conveniently download our mobile app. The bottom for every page will contain our contact information, work hours, and if our customers want to provide feedback or subscribe to get more information they can also enter in their email addresses.
IMC Effects on Positioning

The Integrated Marketing Communication plan that we built is essentially a way to tie in all our promotional strategies to provide a consistent and clear message. We made sure that our product, SecureIQ, will be positioned advantageously compared to the different security systems in the market.

Creating a Better Brand Equity

All of our promotional efforts support our idea of SecureIQ being a high-end product. With the “more for more” strategy, we are confident that we are delivering enough quality for the high price we are charging. If we can deliver with quality, we will enhance our brand equity, and thus, justify the high price that we charge for the product. This will be vital to the overall success of launching SecureIQ. If consumers do not believe that SecureIQ is a high brand equity product, then we will not be successful.

The information on our website and in our ads would clearly explain “un-hackable” technology that SecureIQ uses. We would also include the information in these promotion elements about how our product comes with an insurance plan. This will make sure that even when the technology makes some mistake, they will always be covered. Thus, solidifying the high perceived value of our product.

We will also explain to our SDPs why they should distribute and sell our products. Also, how its differentiating factor will enable them to make a greater profit margin. As a result of this, we can direct our SDPs efforts at indirectly marketing to our final customers and increasing SecureIQ’s perceived value in their minds.
These are the areas where using effective IMC would help us reach to our desired “more-for-more” positioning strategy:

1. **Inform:** WatchDog’s website will be the primary point of contact to inform our customers about SecureIQ. We believe that this is a good platform to detail out the different features and benefits that SecureIQ has over its competitors.

2. **Remind:** WatchDog will remind its customers of SecureIQ through their TV and outdoor ads. Being such an important part of a successful product launch, WatchDog should spend serious time and money in their marketing strategy.

3. **Persuade:** As a company that has relied heavily on its salesforce in the past, we believe the sales team will be a primary factor in persuading customers. While they will be the main engine, we believe some customers will be persuaded through product promotion that we hope to cover with public relations.

4. **Building Relationships:** Providing high quality service, as a security system company, WatchDog has to maintain a strong relationship with their clients. Providing high quality service to each and every customer will allow us to build and maintain strong relationships. We want to be thought of by our clients as a protective friend who will be there in any situation.

Our IMC plan is not just transactional selling, but building relationships with customers by creating value for them. In the past, WatchDog has seen problems that arise from building relationships, but not delivering the value. We want to really drive the idea of value based selling into our approach.
Marketing Appendix

Figure M5.1 – The “WatchDog”

Figure M5.2 – “Home” Tab

"Pick up my gun and try... just try... to blow apart a WatchDog lock." The bullet hit but the lock held, and this was Sam’s (WatchDog’s Chief Marketing Officer) favorite way to explain how truly strong WatchDog products are.
Figure 5.3 – Sam’s Quote

"Pick up my gun and try... just try... to blow apart a WatchDog lock." The bullet hit but the lock held, and this was Sam's (WatchDog's Chief Marketing Officer) favorite way to explain how truly strong WatchDog products are.

For people who value the environment and the safety of their loved ones, WatchDog is your house’s brain that watches and warns when you cannot, so that you can control the safety of your home, even on your phone.

Figure M5.4 – Communication

Contact Us

Tel: (673) 733-4789
Fax: 123-456-7890
12 Rose Avenue, Santa Barbara, CA 93106

Visit Us

Monday - Friday: 11.00 - 18.30
Saturday: 11.00 - 17.00
Sunday: 12.00 - 16.30

Tell Us
Figure M1.5 – “Products” Tab

WE ARE NOT JUST A COMPANY WE ARE YOUR SECURITY PARTNERS

“Pick up my gun and try... just try... to blow apart a WatchDog lock.” The bullet hit but the lock held, and this was Sam’s (WatchDog’s Chief Marketing Officer) favorite way to explain how truly strong WatchDog products are.

Figure M1.6 – “SecureIQ” Tab

WHAT WILL IT DO FOR YOU?

- Both doors and windows can be secured, along with garage and outbuilding access.
- Breach and fire monitoring systems can be set to notify authorities directly or to notify a designated official from the client. (You can set this online or by our app to rotate through different people during different days and hours)
- Extensive but wireless connectivity
- Nearly invisible cameras also wireless can be monitored online or through our mobile app
Figure M1.7 – “Why Should You Get This?” Statement

WHY SHOULD YOU GET THIS?

Environment Friendly: Less wiring than before.

Hack Proof: Keeping in mind the increasing crime rates WatchDog has come up with this new security system that is virtually Impeccable.

Indestructible: The system is molded into an indestructible box just like an airplane’s “black box”

Strong Backup Battery which wouldn’t go off even when the power source has been cut

Choose your own desired footage!

CONTACT US
Tel: 6760 733-6789
Fax: 123-456-7890
12 Rowe Avenue,
Santa Barbara, CA 93106

VISIT US
Monday - Friday: 11:00 - 18.30
Saturday: 11:00 - 17:00
Sunday: 12:30 - 16.30

TELL US

This site was created using Mox.com. Create your own for FREE.
Operations Analysis

Team 20
Capacity Management

Evaluating Best Production Methods

Based on our assessment, we believe that the machine-based production process is the most viable option to implementing SecureIQ. This is the best option due to less variation and lack of errors that come with a machine-driven assembly line. Our analysis was built from three components: costs that we can predict accurately, unpredictable costs, and non-financial elements of both processes. This analysis led us to believe that a stable workforce with variable hours would prove to be the most efficient and economical aggregate plan to follow. Following a six-year plan, we assumed that growth in sales of the new product were likely to happen and growth is fixed throughout our analysis.

To begin, we chose the stable workforce aggregate plan with elements of a level plan because of the specialized product we are producing. With low inventory costs, we felt that it was not necessary to choose a plan that involved attempting to hire and fire our highly-trained workers in order to “chase” demand. Also, we did not think that we need to produce at a level rate over six-years because of the growth that we are predicting for this product. However, we did hold a small amount of inventory every year in order to prevent backorders and have a safe amount of stock to hold for busy periods. We chose stable workforce primarily due to the fact that we will have highly specialized workers that will be trained to work on and with the machine-driven assembly processes. It would be better to vary their hours than to retrain and/or find new workers capable of working with our product line.
Predictable Financial Costs

In the financial component of our analysis, we used many assumptions in order to drive accurate decisions based on economic reasons. We chose to have an outlook of a six-year period assuming that demand will reasonably grow to its potential in the amount of time. Therefore, we can see not only the high mark, but the initial production necessities needed to implement our product. Our six-year demand estimates came from our financial analysts who predicted a growth rate of 20% the second and third years, 10% the fourth and fifth years, and 5% for the sixth year and on through the remainder of the product’s life cycle. We chose this demand rate because we believe that our financial analysts hold the most logical opinion on the growth of our previous products in the past and know the current market for the SecureIQ. Since we are using these demand growth rates in other sections of our entire case, we felt it was best to keep these demand rates constant in our production planning as well, since our operations processes are the key to a successful outcome.

Both machine-paced and worker-paced processes involved a growth rate in production due to learning curves of the workers and consistency. This is done through the natural ability of humans to produce parts faster as they learn. With the machine-paced process, as the workers who manage it become more familiar and efficient with its processes, experiencing their own learning curve in a different way. However, it is probable that the machine-paced process is easier to predict the production growth rate than the worker-paced process because of human error and variation. The machine-paced process held a consistent growth rate of 5.9%. This growth rate was spread out over six years (See Figures P1.1 and P1.2).
represents what our current production process will grow to be without adding any capacity. The worker-paced process had a 35% chance of a 6% growth rate and a 65% chance of 5%. We decided to take a weighted average of that growth rate based on a decision tree methodology, which produced a growth rate of 5.35%.

**Optimal Production Capacity**

We started our processes with a production of 7,600 with an assumed production capacity of 9,000. We did this because of the estimated average of the first-year capacity given was 7,500 units with a 100 unit standard deviation. Given that our demand was 7,500, we thought it was best that we not run at full capacity due to the unlikelihood of not having defects and other issues. We feel that the machine-paced system is likely to provide a higher capacity than a worker-paced system due to its potential to essentially work without stopping if necessary. With a production capacity level of about 84.4% and WatchDog’s high quality standards, it is possible to maintain such a level.

However, with a certain growth in demand, capacity must be added in order to accommodate for that growth. We grew our added production to ensure that our ending inventory was growing at the same rate as our demand. We felt that this was necessary because with a product such as this, with lower inventory holding costs and a highly-specialized mean of production, it is safe to ensure that you have safety inventory on hand to accommodate for defects, unexpected growth in demand, and general installation errors that arise. Our added capacity and production would come from extended hours in the first two years of growth, then at year four, we would buy another machine-paced assembly line to put in our factory. This is a heavy financial
decision to make, but necessary, considering the machinery ages quickly and would more than likely be unable to meet increasingly high demand requirements by itself as it ages. Therefore, we believe at year four, the difference between demand and natural production growth reaches a limit that would be unattainable for one machine that has aged for three years.

**Total Production Costs**

Based on our predictions, we are able to find an estimated cost for our production system over six years. The machine-paced system provides a fixed implementation cost of $1,275,000. This fixed cost would be incurred twice over the six-year period in order to adjust to the demand growth that was previously mentioned. Variably, we were given that it has a 45% chance of being $26.00 and a 55% chance of being $28.50. Like with the growth rate, we took a weighted average of these numbers and produced an estimated variable cost of $27.38 per unit. The worker-paced system would cost about $900,000 for each implementation. Like machine-paced, this system would require a second implementation at year four to accommodate for a growing demand that would require not only more workers, but another assembly line to make sure that we are giving the workers enough space to produce more. We were given that the worker-paced production process will have a 40% of $29.95 variable cost per unit and 60% of $32.50 variable cost per unit. Again, we took the weighted average and determined a variable cost of $31.48.

Understanding the costs behind each system is essential to understanding the cumulative cost over the six-year period. Variable costs for both systems consist of
workers’ hours, materials, and overhead to run the factory. As expected, the machine-paced system has a lower variable cost due to the fact that there are less workers necessary to operate on the machine. However, the fixed implementation costs are what ultimately makes the machine-paced process a more expensive option. These costs for both processes come from purchasing equipment, assembling the line, and paying workers to construct it. With all these production costs considered, the worker-paced system would be the most economically sound decision based purely on cost ($3,062,032.33 vs. $3,155,115.00).

Unpredictable Financial Costs

However, there are more costs that cannot be predicted. With the machine-paced process, we must consider breakdowns, maintenance, defective parts, and aging. The worker-paced process is even more complicated in deciding how unpredictable costs will arise. It is human nature that workers will be late, have sick days/days off, and days where their production will not be at their optimal level. These costs will be more opportunity costs than physical costs because the workers will not produce their most efficient output level over a year’s time. Also, there is the chance that demand could grow more than predicted, which would lead to higher overtime hours in both situations, and in extreme cases, having to implement an entire new production line before the previously predicted year four. With historical data, it is likely that this could be a predictable measure. However, predicting these financial costs is out of the scope of this new project.
Non-Economic Costs

Also, there are benefits and drawbacks that cause financial issues, but are not financially dependent themselves. For example, variation in the quality of products produced differs between the two production processes. With machine-paced system, it is most likely to produce products that consistently meet our quality standards in a consistent amount of time. The worker-paced system involves humans, who are naturally prone to errors and defects that would affect the production process, no matter how much their learning curves improve, a human is more likely to have a higher variation in quality produced than a machine.

Also, the worker-paced process would have highly variable time to completion compared to the machine-paced. In addition, the training behind each process system varies. If we train employees to be efficient with our machine-based process, not only would we be training fewer employees, we would expect a lower turnover rate due to their highly-specialized trade. However, there is the issue when someone leaves that a highly-specialized gap is left in production that must be filled as soon as possible. Whereas, if we have a worker-paced system, the employees will need specialized training, which tends to lead to a higher turnover due to the fact that typically selection does not focus on the most qualified candidates. However, it is easier to fill the gaps in production when one leaves.

Conclusion of Analysis

With all predictable, unpredictable, and non-economic costs considered, we believe that the best choice lies with the machine-paced production process. We chose this system not due to the numerical data, but for all the risks involved in a
worker-paced production process. While the machine-paced process may cost almost $200,000 more over a six-year term, it is likely that the consistency and ability to ramp up production of the machine-paced process is highly favorable compared to the highly variable and difficult to speed up, worker-paced process.

**Order Policy**

**Economic Analysis of Suppliers**

When determining what supplier to continue our business with, we considered the purely economic reasons behind both Mona Manufacturing (M2) and Pine Peak Products (P3). The following calculations were performed and documented in Figures P2.1 and P2.2. Both held similar costs with about $30 difference, but this proved to be one of many factors that were considered. The number of orders needed to produce our product proved to be vastly different with M2 needing around 25 orders and P3 needing around 46. However, it must be considered that our Fixed Order Quantity (FOQ) is almost half of our Reorder Point (ROP). This proves to be an initial issue due to the fact that our product has not been produced yet, meaning that our beginning inventory for raw materials is essentially zero. With this assumption, we are able to say an initial order of 1,500 would provide sufficient cushion from the ROP to cover the early testing, beginning quality errors, and other unpredictable errors that arise from the implementation of a new product.

Our data (see Figure P2.3) estimates that the initial order for the 1,500 units would cost $421,050 for M2 and $470,350 for P3 with holding, setup, and purchasing costs being considered. It should be noted that this would be a one-time purchase in
order to establish a cushion for our initial demand and production. The trend continues when we look at the annual costs incurred from choosing M2 vs. P3. Looking at the FOQ for M2 (298 units) vs. P3 (163 units), we are able to say that a higher FOQ leads to less orders, but higher holding and setup costs due to the large volume that must be stored and ordered. However, it must be taken into consideration that these setups can be shadowed by the high purchasing cost per unit that P3 holds compared to M2 ($285 vs. $255, respectively). The difference can be shown through the total annual costs. M2 has a total annual cost of $1.928 million compared to P3 which has a cost $2.147 million, a difference of roughly $200,000.

**Lead Time Cost**

Another important consideration is lead time. Lead time for the M2 supplier would be 20 days and P3 would be 30 days. While the difference may look insignificant, when the numbers are considered, the cost of lead time is brought to light. Lead time creates a fixed amount of time that leaves us vulnerable to an uncertain amount of demand. To fight the uncertainty of lead time, we keep increased stock on hand in order to ensure that no backorders are created during a time when we are waiting on a supplier to deliver the product. The difference in lead time between M2 and P3 leads to more orders having to be placed with P3 because of the high projected demand during lead time. This leads to costly setups and a high reorder point that increases the uncertainty that we will be able to meet demand during our lead time.
However, lead time in itself can be traced back causing one direct cost: safety stock. Safety stock is held as the necessity to fight that uncertain demand; therefore, it is incurring holding costs on our shelves. Taking the cost of the original product multiplied by the holding percentage gives you our annual holding cost. The difference between our reorder point and demand during lead time gives us our safety stock that we are holding. The safety stock for M2 and P3 is 4 and 5, respectively. If we take the safety stock and multiply it by the annual holding cost we get the estimated cost directly related to lead time to be $204 for M2 and $285 for P3.

**Project Management**

**Crashing the Project**

After analyzing the activities for the project using the Critical Path Method (CPM) we determined that the project has a normal or expected time of 35 weeks. The target time is 27 weeks, making the current normal time unacceptable. From Figure P3.1, we are able to see that there is significant slack time for many activities, some of which reach double digits. This gave us room to reduce the time that some activities were scheduled to take.

To visualize the data, look at the Gantt chart and CPM Diagram before any crashing occurred (See Figures P3.4 and P3.6). It is easy to see that the project was significantly in need of reducing and had the means to do so. The critical path falls on activities: G, I, K, N, R, and S. This critical path helped determine where to begin looking to reduce our time of the project. While reducing our critical path, at week 29 we ended up having two critical paths in which we had consider reducing both at
the same time. The new critical path consisted of activities: C, J, R, and S. From this point, we must consider costs of reducing both paths while remaining under the administrative costs.

The administrative costs were calculated from the staff time devoted to completion of the project in normal time. In 35 weeks, it would cost $90,000 in staff time. This translates to $2,571.43 per week in administrative costs. However, with savings there is a cost incurred. These crash costs come from estimated overtime cost and additional personnel on hand, expediting costs associated acquiring new material, and additional overhead incurred in reallocating resources. Since every activity is different, every activity holds its own crash costs. Some activities that are within such a short time frame find crashing impossible. Finding the least expensive crash costs is critical in order to save the project time and money. We shaved 9 weeks off of the project and saved $13,617 in Net Administrative Costs.

Referring to our crashing data below (Figure P3.7), you can grasp the process that we followed in order to save money on the project. We decided to end crashing costs on week 26 because crashing by a week would force us to crash only one critical path and not both due to the fact that path CJRS could physically not be reduced by one more week. Although crashing the path GIKNRS is possible, it would not be relevant due to the fact that we would still incur the administrative costs of the 26th week.

To conclude, we found that the most economically responsible decision is to shorten the project to 26 weeks. Doing this, will not only save time and resources, but will save money that can be redistributed to other aspects of another
project. Also, reducing the time that this project takes makes the SecureIQ available at an earlier date than expected. This can allow us to do more testing or reach the market sooner.

**Quality Management**

Quality is arguably the most important aspect of products. According to Deming, cost should be considered under quality; therefore, you should not give your business to the lowest bidder, but the most consistently sound. Evaluating quality involves comparing samples of data to themselves and to other samples through the use of charting. Also, quality before the product is even released to the customer. We believe in extensively working on preventing quality defects before the product is even made in order to reduce costs in the long-run. Therefore, the quality of the supplies that we are receiving must meet our high standards.

The control chart is the best way to evaluate the quality of the samples that we obtained from our suppliers M2 and P3. We evaluated the variation of the thickness of the connection interface of the M2 and P3 data sets that were provided from samples we tested. The data is plotted between two control limits that are calculated using the average of the samples and the average range multiplied by a factor determined by the number of observations in the sample. When looking at the samples, we want to see slight common cause variation that can be explained through the variable nature of any production process. However, there are certain criterion that need to be met in order to be “in control.” To be considered “out of control,” the sample’s chart must have one or more of the following errors:
1. A single sample statistic outside of the control limits
2. Two consecutive sample statistics near the control limits
3. Five consecutive sample statistics above or below the central line (the average of the averages of the sample)
4. A trend of five consecutive sample statistics
5. Any erratic behavior

Evaluating Mona Manufacturing’s Quality

Evaluating M2 against this criterion reveals that there are no signs of behavior that we would consider calling the sample “out of control.” Looking at Figures P4.1 and P4.2, the first sample has one set of five consecutive sample statistics trending in the downward direction on the R-Bar Chart. While this would normally be a red flag, we believe that it can be looked over considering that the data set is otherwise “in control.” The random nature of the X-Bar and R-Bar charts prove to us that the data set should be regarded as “in control” because the variation is fair. The second sample (Figures P4.3 and P4.4) delivers perhaps the most convincing argument for a sample that is considered “in control.” Both the X-Bar and the R-Bar charts show no signs of behavior that is considered “out of control.” The X-Bar chart reveals a randomness that is considered almost perfect for evaluating the quality of sample from control charts.
Evaluating Pine Peak Production’s Quality

Evaluating P3 against this criterion provides a different view than M2. There are numerous sample statistics that we should consider for our decision. Looking at the first sample (Figures P4.5 and P4.6), we found that the X-Bar and R-Bar Charts are “out of control.” The X-Bar chart has multiple examples of having five consecutive points above AND below the central line. Looking at Observation #2 of the R-Bar chart, we see a major outlier deviating almost two times the upper control limit from the central line. If we were to consider using P3 based on the first sample, we would need to evaluate and consider these worrying points in the data. Looking at the second sample (Figures P4.7 and P4.8), the data is once again “out of control.” In both charts, we see Observation #12 causes a point of worry because the point exceeds the upper control limit. With the X-Bar chart, that is the only concerning data point. However, after analyzing the R-Bar chart, there are ten consecutive points that are below the central line and considerably close to the lower control limit. These points are followed by the erratically out of control observation that causes major concern. If we were to go with P3, there would be major concern in the consistency of the quality of products we would receive.

Explaining Variance

While looking at the variance of the data, we must look at what the data is varying around. The average X-Double Bar for M2 samples was 1.0611 and 1.0694, respectively and X-Double Bar for P3 samples was 1.0582 and 1.056. The .01-millimeter difference in both averages could possibly be of concern, but the difference in the variability makes M2 superior. Consistency is more important to our
production process as long as the difference between what we have and what we need is not drastic. Therefore, the slightly better X-Double Bar of P3 does not lead us to favor it more than M2.

**Numerical Evaluation Conclusion**

With these evaluations of the quality of M2 vs. P3, we have determined that M2 has the vastly superior consistency of quality that is necessary for our production of SecureIQ. Due to the numerous red flags within P3’s quality data, we cannot reasonably rely on the supplier’s product if we are basing this decision on quality. For the most part, M2 consistently produced product that had a healthy amount of variation in every sample. Although the R-Bar chart (Figure P4.2) had one small issue of the downward trend of five consecutive points, compared to the issues with P3, the red flag is almost negligible. Therefore, M2 should be our choice in supplier based on the quality of their product.

**Six Sigma**

Quality goes beyond looking at the data provided by suppliers. It starts with our quality and the quality of our operations processes. Six Sigma is one of the leading methodologies in the world. We use a Six Sigma standard in order to ensure that our products are meeting our quality requirements. Quality is important because of the underlying costs that come with defective products. Preventing quality defects before the product reaches the consumer is essential. Therefore, quality starts before the product is even produced.
Six Sigma is important in our production process because of the critical nature of ensuring that the thickness of the width of the circuit board is close to one millimeter. If this demand is not met, it will cause internal and external failures when implemented into our products and will end up costing us more money in the long run. Ensuring that 99.9996% of all circuit boards produced carry no defects, will save the financial and time costs that come with replacing parts that do not fit our product. If a circuit board is too thin, the metal contacts will not fit properly causing unit failure. If too thick, the circuit board will stress the spring clips that secure the board which will also cause failure. Therefore, unit failure happens during the actual production process. This not only destroys a circuit board, but a final unit product, both of which will need to be replaced, costing more money.

**Internal Quality Management**

The internal quality process starts with ensuring that we have a defined quality standard that must be met based on our customer’s priorities. Next, we need to define a set of numerical standards that will be used to measure what is considered acceptable quality in our internal processes. We have already decided that the thickness of the circuit board is the most important quality feature and the easiest to measure on a consistent basis. Then, we must keep a constant analysis of this data. WatchDog already maintains SPC charts at individual workstations to measure critical processes and maintains Pareto charts with the most common defect causes. This is a great first step into analyzing the effectiveness of our quality and clearly defining how to avoid the common causes of defection. However, the 100% inspection of finished goods prior to shipment, is concerning. According to Deming’s
14 Points, inspection is not an effective tool for implementing quality. You cannot inspect quality into a product. Therefore, WatchDog would be better off considering taking random sampling of batches of production in order to ensure that our quality standards are consistently being met.

However, the recent acquisition of the ISO 9000 certification proves that WatchDog’s internal processes are to an exceptional level. Since the ISO 9000 is rapidly becoming a standard for many countries, this provides for a possible expansion into the European Community. The documentation and performance of the internal processes have earned WatchDog the high standard ISO 9000, but there is always a way to improve. Improvement is important to Six Sigma through finding the causes of defects and eliminating them. WatchDog’s Pareto diagrams are a great first step to initiating improvement. The diagram reveals that theoretically 80% of all defects come from 20% of all problems. Also, the ongoing training of all personnel is important for those who work on the machine-paced line to notice potential defects and stop them before they happen. It is important to make the employees feel comfortable and aware of how to stop the process to stop quality defects from occurring in a rapid pace.

External Quality Management

While it is considered most important that you focus on your internal quality processes, quality management also must involve external quality processes meeting our high-quality standards. WatchDog has many effective policies in place to ensure quality from external sources. Requiring SPC charts from suppliers on all shipments,
requiring an ISO 9000 certification, conducting unannounced audits of suppliers, and conducting acceptance sampling of shipments based on military standards are all highly effective ways of ensuring that your quality standards are consistently met. In our previous analysis of M2 vs. P3, we were exercising a SPC chart analysis of the shipments that the suppliers were providing. These samples showed us that M2 was closest to our external and internal quality standards. If WatchDog continues this process into the future, they will be able to maintain and monitor the supplier’s quality to ensure that they are consistently producing “in control” to our standards.

**Final Quality Consideration**

After analyzing all quantitative and qualitative considerations, it is with confidence that we can say the M2 supplier is more qualified to meet our quality standards and produce the best parts for SecureIQ. While P3 may have had samples that were “in control” the outliers and patterns were too noticeable to be considered a qualified supplier. All in all, WatchDog’s high quality management should not be only internally focused, but they must also ensure that they are receiving high quality materials for our new product.

**Supplier Selection**

When determining which supplier to use, a company must consider the quality and cost of all opportunities. In the case of WatchDog, we had to choose between M2 and P3. M2 is our current supplier of our circuit boards that would be used in the SecureIQ. However, just like with any business decision, we must always look for
the best quality and price options that are available to us. Breaking down the individual pieces of cost and quality data revealed to us which of the suppliers would be best moving forward in the implementation of our new product.

Considering cost is an easy way to get a quick economical decision that provides a baseline as to judge our final decision. The final costs of the M2 supplier were about $2.35 million with the high initial order and total annual costs being considered. The final costs for P3 were about $2.62 million, for a difference of roughly $300,000. While the difference may not look astonishing at first, P3 costs about 10% more than M2. Based on a strictly economic decision, our current supplier M2 continues to be the frontrunner for our supplier options. However, cost is not the only, nor the most important factor to consider when comparing suppliers.

Quality is perhaps the most important aspect of our supplier decision making. While a low order cost could make one supplier appealing, it could end up costing more in the long-run for defects, lead time, and lost sales due to poor quality products. The closer the quality defect is to the customer, the more expensive it is fix. Therefore, ensuring that we are making high quality purchase decisions from suppliers is important in order to ensure that quality is being implemented into our products. To measure the quality of M2 and P3 we used acceptance sampling of two batches of circuit boards from both suppliers. We compared the two using control charts based on the thickness of the boards. The control charts measured the variance of the thickness across the samples through X-Bar and R-Bar charts. Also, we took into consideration an extensive quality discussion based upon the ideals of Deming, Crosby, and other notable quality experts, as shown in our “Quality Management”
section. The results of our acceptance sampling and quality discussion lead us to believe that our current supplier M2, again, held the higher standard that WatchDog is accustomed to. From issues such as multiple outliers exceeding the upper control limits, we could not consider P3 to have a quality standard that we can count upon in our new implementation of SecureIQ.

After considering both cost and quality in our analysis of our suppliers, the most qualified supplier continues to be M2. When implementing this new product, it is important to make things as cheap as possible, but also take the aspect of quality seriously in order to ensure a steady implementation phase for the operations side of WatchDog.

**Operations as a Value-Added Function**

Operations management relates to anything directly involved with the making of a product or providing a service. Therefore, when it comes to reducing costs, operations takes the lead making sure that this is done efficiently while minimizing errors. For WatchDog, the operations decisions involved in this case are deciding the best supplier based on costs and quality, choosing the proper fixed order quantity, scheduling projects for the most economical duration, and managing capacity for the next six years. Each of these individual issues affects the production process of WatchDog’s new implementation of the SecureIQ. No matter how successful the SecureIQ might be in sales, if their operations fails to meet exceptional requirements, then we will not meet demand.

Effective businesses know how to manage their operations effectively and to their advantage. Without effective operations, producing goods can be a nightmare
due to high costs, low quality, and more defects. All of these aspects reduce a company’s profit margins and essentially ruin any chance of having money to invest in other opportunities. Knowing how to produce goods or perform your service more effectively than the competition is the backbone to some of the most highly regarded companies in the United States, such as Amazon, FedEx, and Walmart.

One of the first things we touched on for WatchDog was our capacity management. Capacity is the amount that a business can produce over a specific time period and the more we can produce, the more our margins will increase if we can perfect our output. Choosing the most effective production process does not mean choosing the lowest initial cost. Finding the best system means knowing what it will be capable of producing in the future and knowing what variable costs go with producing these products over time. In our case, the decision between worker-paced and machine-paced systems came down to the fact that we assumed that the machine-paced system would end up costing less in the future due to the fact that fewer defects would be produced with less variation in the quality produced compared to worker-paced systems.

Knowing your production system’s potential capacity is important to feeling confident in your ability to accommodate any surges in demand that might happen. If there were to be a surge in demand for WatchDog’s new SecureIQ, we felt more confident in the ability of a machine-paced system to accommodate the high demand rate surge we might see. If your production system could not handle demand, this could mean backorders, which means more cost to the business in potential lost customers and/or last second desperation costs in order to produce more as quickly as
possible when you were previously not prepared. As WatchDog learns about our production process over the next six years, we should be able to find out what our best production method is and feel even more confident in the production capabilities of our processes.

Being able to plan projects for the most economical duration is essential for ensuring that products are released on time, money that could be saved is being saved, and understanding what activities are critical to the completion of the project as a whole. The critical path of a project is the essential length of time to complete a project. In the case of WatchDog, the critical path to the release of SecureIQ was originally 35 weeks long, but we were able to crash the project down to 26 weeks. By doing this we saved almost $14,000. Had WatchDog ignored their project management capabilities, the project would have been released late and they would have been spending $14,000 they did not have to spend. Therefore, understanding project management is essential for saving time and money on projects.

Companies who effectively cut costs and save time, know that you must spend money to save money in the long run. When incurring crash costs, you are able to ensure that you will not incur costs from daily, weekly, monthly, etc. costs of doing business. Also, most businesses implementing a new product will have the need for time constraints in order to meet marketing demands. Also, being able to cut the plan down to a certain time frame leaves space for any activity that may take longer than previously expected, which is bound to happen for something as uncertain as the implementation of a new product. Knowing the slack of some activities is important so you know how delegate resources among the project as a whole. Therefore,
knowing how to effectively manage our projects will save our company money and time, and make us reach the market as quickly and efficiently as possible.

Perhaps the most important aspect of operations management is choosing the right suppliers that will be producing parts for your product. In the case of WatchDog, we evaluated the cost and quality of two different potential suppliers for our circuit boards. While cost reduction is perhaps one of the most important benefits of operations management, choosing the cheapest supplier is not always the right decision. The companies who wield the best results, tend to choose a balance of quality and cost. In our case, WatchDog was fortunate enough to find a supplier who was both the most cost effective and highest quality choice for our circuit boards. Knowing when to order and how much to order is important for controlling costs and making informed inventory purchase decisions in order to ensure that demand will be met, safety stock will be held for uncertain demand, and lead time will be effectively managed.

W. Edwards Deming valued the fact that quality is more important than cost when choosing the materials that go into your production process. Also, Phillip Crosby coined the well-known phrase that “Quality is free.” Both of these operations experts believed that evaluating quality before production process even began would prevent errors from occurring later on. The closer the error or defect is to the customer and the further away from the original supplier, the more expensive that error or defect will be. Companies such as WatchDog that are producing a high end, high valued product cannot afford to produce products that have errors that are not realized until they reach the customer. So, making sure that all products are receiving
the best possible quality control is important to managing costs. By evaluating the quality of suppliers, we are practicing prevention costs which are indirectly correlated with internal and external costs. Therefore, when we are spending more for prevention, we are saving ourselves from incurring the highly expensive costs that occur in the production process or with the customer’s final product.

Six Sigma is one of the most widely practiced forms of quality control management. There are numerous books, classes, and consultants in place to teach business professionals on the importance of understanding Six Sigma’s nature. The best companies know how to use Six Sigma to their advantage and use it as an operational weapon for producing high quality products in order to minimize defect costs. In our quality management section, we touched on important Six Sigma ideals such as DMAIC (Define, Measure, Analyze, Improve, Control) to relate our quality standards to do a functional and ever changing production processes. The idea behind Six Sigma is that a 1% defect rate is not good enough. If that were the case, there would be 20,000 articles of lost mail per hour, no electricity for 7 hours per month, etc. While 100% defect-free production is unrealistic and unattainable, we strive to be as close to 100% as possible, or having all products produced within six sigmas. Within this range, there is on average only 3.4 defects per million products produced. Therefore, this number is highly more appealing than the latter.

Arguably the most important business function for a healthy and profitable business is operations. As a company becomes larger, knowing how to produce your products, where to put your resources when, and understanding the impact of quality is important for maintaining growth and ensuring that a business can sustain
profitability. Without operations, a business could spend millions or billions, depending on their size in defects, lost time, and fixing errors in the production process. Therefore, it is best to make sure that all production aspects are carefully examined and continue to improve quality and standards throughout the production process. An effective operations process can produce new products and get them on the market before the competition, produce high quality, defect-free products and know how to fix these defects when they arise, and minimize costs without sacrificing quality in order to save the company money to invest in other ventures. Knowing how to use your operations management skills to your advantage can make it a weapon that will help you beat out the competition in the market place.
# Operations Appendix

## Figure P1.1 – Worker Paced Production Plan

<table>
<thead>
<tr>
<th>Periods (Years)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning Inventory</td>
<td>0</td>
<td>100</td>
<td>120</td>
<td>144</td>
<td>159</td>
<td>175</td>
</tr>
<tr>
<td>Demand</td>
<td>7,500</td>
<td>9,000</td>
<td>10,800</td>
<td>13,068</td>
<td>13,721</td>
<td>14,407</td>
</tr>
<tr>
<td>Production Growth</td>
<td>7,600</td>
<td>8,007</td>
<td>8,435</td>
<td>8,886</td>
<td>9,362</td>
<td>9,862</td>
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<tr>
<td>Added Production</td>
<td>-</td>
<td>1,013</td>
<td>2,389</td>
<td>4,197</td>
<td>4,375</td>
<td>4,554</td>
</tr>
<tr>
<td>Ending Inventory</td>
<td>100</td>
<td>120</td>
<td>144</td>
<td>159</td>
<td>175</td>
<td>184</td>
</tr>
</tbody>
</table>

| Production Costs | $239,248.00 | $283,937.01 | $340,738.04 | $411,852.84 | $432,440.76 | $453,815.68 |
| Implementation Cost | $900,000.00 | $ - | $ - | $900,000.00 | $ - | $ - |
| Cumulative       | $1,139,248.00 | $1,423,185.01 | $1,763,923.05 | $3,075,775.89 | $3,508,216.65 | $3,962,032.33 |

- Growth Rate: 0.0535
- Variable Costs: $31.48
- Fixed Costs: $900,000.00

## Figure P1.2 – Machine Paced Production Plan

<table>
<thead>
<tr>
<th>Periods (Years)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning Inventory</td>
<td>0</td>
<td>100</td>
<td>120</td>
<td>144</td>
<td>159</td>
<td>175</td>
</tr>
<tr>
<td>Demand</td>
<td>7,500</td>
<td>9,000</td>
<td>10,800</td>
<td>13,068</td>
<td>13,721</td>
<td>14,407</td>
</tr>
<tr>
<td>Production Growth</td>
<td>7,600</td>
<td>8,048</td>
<td>8,523</td>
<td>9,026</td>
<td>9,559</td>
<td>10,123</td>
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<tr>
<td>Added Production</td>
<td>-</td>
<td>972</td>
<td>2,301</td>
<td>4,057</td>
<td>4,178</td>
<td>4,293</td>
</tr>
<tr>
<td>Ending Inventory</td>
<td>100</td>
<td>120</td>
<td>144</td>
<td>159</td>
<td>175</td>
<td>184</td>
</tr>
</tbody>
</table>

| Production Costs | $208,050.00 | $246,922.50 | $296,307.00 | $358,147.13 | $376,050.38 | $394,638.00 |
| Implementation Cost | $1,275,000.00 | $ - | $ - | $1,275,000.00 | $ - | $ - |
| Cumulative       | $1,483,050.00 | $1,729,972.50 | $2,026,279.50 | $3,659,426.63 | $4,035,477.00 | $4,430,115.00 |

- Variable Costs: $27.38
- Growth: 0.059
- Fixed Costs: $1,275,000.00
Figure P2.1 – Annual Total Cost of Inventory

<table>
<thead>
<tr>
<th>Annual Costs</th>
<th>M2</th>
<th>P3</th>
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<tbody>
<tr>
<td>Cost</td>
<td>$255.00</td>
<td>$285.00</td>
</tr>
<tr>
<td>Holding Costs</td>
<td>20.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Ordering</td>
<td>$300.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>Lead Time (Days)</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Demand</td>
<td>7500</td>
<td>7500</td>
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<tr>
<td>Service Level</td>
<td>95.0%</td>
<td>95.0%</td>
</tr>
<tr>
<td>St. Dev. (per Day)</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Operating Days</td>
<td>260</td>
<td>260</td>
</tr>
<tr>
<td>Econ. Order Quantity</td>
<td>298</td>
<td>163</td>
</tr>
<tr>
<td>Total Annual Holding Costs</td>
<td>$7,599.00</td>
<td>$4,645.50</td>
</tr>
<tr>
<td>Total Annual Setup Costs</td>
<td>$7,550.34</td>
<td>$4,601.23</td>
</tr>
<tr>
<td>Total Annual Purchasing Costs</td>
<td>$1,912,500.00</td>
<td>$2,137,500.00</td>
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<tr>
<td>Total Annual Costs</td>
<td>$1,927,649.34</td>
<td>$2,146,746.73</td>
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</table>

Figure P2.2 – Lead Time and ROP

<table>
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<tr>
<th>Uncertain Demand</th>
<th>M2</th>
<th>P3</th>
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</thead>
<tbody>
<tr>
<td>Demand During Lead Time</td>
<td>577</td>
<td>866</td>
</tr>
<tr>
<td>St. Dev. During Lead Time</td>
<td>2.2361</td>
<td>2.7386</td>
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<tr>
<td>Number of Orders</td>
<td>26</td>
<td>47</td>
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<tr>
<td>ROP</td>
<td>581</td>
<td>871</td>
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<tr>
<td>Safety Stock</td>
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</table>
### Figure P2.3 – Initial Order Cost

<table>
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<tr>
<th>Initial Order</th>
<th>M2</th>
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<tbody>
<tr>
<td>Initial Holding Cost</td>
<td>$38,250.00</td>
<td>$42,750.00</td>
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<tr>
<td>Initial Setup Cost</td>
<td>$300.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>Initial Purchasing Cost</td>
<td>$382,500.00</td>
<td>$427,500.00</td>
</tr>
<tr>
<td>Initial Total Cost</td>
<td>$421,050.00</td>
<td>$470,350.00</td>
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<tr>
<td>Initial Order Quantity</td>
<td>1500</td>
<td>1500</td>
</tr>
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</table>

### Figure P3.1 – Pre-Crash Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Early Start</th>
<th>Early Finish</th>
<th>Late Start</th>
<th>Late Finish</th>
<th>Slack Time</th>
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<tbody>
<tr>
<td>A</td>
<td>Set-up Cost and Financial Accounts</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>27</td>
<td>24</td>
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<tr>
<td>B</td>
<td>Develop Budgetary Controls</td>
<td>3</td>
<td>8</td>
<td>27</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>C</td>
<td>Design Advertising Media Plan</td>
<td>0</td>
<td>14</td>
<td>3</td>
<td>17</td>
<td>3</td>
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<td>D</td>
<td>Design Packaging</td>
<td>0</td>
<td>2</td>
<td>23</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>E</td>
<td>Develop Trade Distribution for Items</td>
<td>2</td>
<td>4</td>
<td>26</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>F</td>
<td>Organize Introduction of Product to Sales Force</td>
<td>4</td>
<td>5</td>
<td>28</td>
<td>29</td>
<td>24</td>
</tr>
<tr>
<td>G</td>
<td>Acquire Production Equipment</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>Install Equipment and Train Personnel</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>I</td>
<td>Acquire Raw Materials</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>J</td>
<td>Develop Advertising Copy</td>
<td>14</td>
<td>25</td>
<td>17</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>K</td>
<td>Manufacture Prototype Items</td>
<td>12</td>
<td>27</td>
<td>12</td>
<td>27</td>
<td>0</td>
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<tr>
<td>L</td>
<td>Develop Packaging Literature</td>
<td>14</td>
<td>16</td>
<td>25</td>
<td>27</td>
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<tr>
<td>M</td>
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<td>16</td>
<td>21</td>
<td>29</td>
<td>34</td>
<td>13</td>
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<tr>
<td>N</td>
<td>Distribute Samples to Distributors</td>
<td>27</td>
<td>28</td>
<td>27</td>
<td>28</td>
<td>0</td>
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<tr>
<td>O</td>
<td>Produce Initial Stock for Warehouse</td>
<td>16</td>
<td>19</td>
<td>29</td>
<td>32</td>
<td>13</td>
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<tr>
<td>P</td>
<td>Coordinate Invoicing System with Warehouses</td>
<td>19</td>
<td>21</td>
<td>32</td>
<td>34</td>
<td>13</td>
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<tr>
<td>Q</td>
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<td>20</td>
<td>33</td>
<td>34</td>
<td>14</td>
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<td>28</td>
<td>34</td>
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<td>34</td>
<td>35</td>
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</table>
Figure P3.2 – Post-Crash Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Early Start</th>
<th>Early Finish</th>
<th>Late Start</th>
<th>Late Finish</th>
<th>Slack Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Set-up Cost and Financial Accounts</td>
<td>0</td>
<td>3</td>
<td>15</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Develop Budgetary Controls</td>
<td>3</td>
<td>8</td>
<td>18</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>C</td>
<td>Design Advertising Media Plan</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>Design Packaging</td>
<td>0</td>
<td>2</td>
<td>15</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>E</td>
<td>Develop Trade Distribution for Items</td>
<td>2</td>
<td>4</td>
<td>17</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>F</td>
<td>Organize Introduction of Product to Sales Force</td>
<td>4</td>
<td>5</td>
<td>19</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>G</td>
<td>Acquire Production Equipment</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>Install Equipment and Train Personnel</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>I</td>
<td>Acquire Raw Materials</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>J</td>
<td>Develop Advertising Copy</td>
<td>12</td>
<td>22</td>
<td>12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>K</td>
<td>Manufacture Prototype Items</td>
<td>6</td>
<td>21</td>
<td>6</td>
<td>21</td>
<td>0</td>
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<tr>
<td>L</td>
<td>Develop Packaging Literature</td>
<td>14</td>
<td>16</td>
<td>18</td>
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<td>21</td>
<td>22</td>
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</tr>
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<td>O</td>
<td>Produce Initial Stock for Warehouse</td>
<td>16</td>
<td>19</td>
<td>20</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>P</td>
<td>Coordinate Invoicing System with Warehouses</td>
<td>19</td>
<td>21</td>
<td>23</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>Q</td>
<td>Distribute Items to Warehouse</td>
<td>19</td>
<td>20</td>
<td>24</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>R</td>
<td>Open Initial Advertising Program</td>
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<td>22</td>
<td>25</td>
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</tr>
<tr>
<td>S</td>
<td>Perform Final Interfunctional Coordination</td>
<td>25</td>
<td>26</td>
<td>25</td>
<td>26</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure P3.3 – Pre-Crash Gantt Chart

Activity | Activity Description | Number of Weeks
----------|----------------------|-----------------|
A | Set-up Cost and Financial Accounts | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
B | Develop Budgetary Controls | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
C | Design Advertising Media Plan | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
D | Design Packaging | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
E | Develop Trade Distribution for Items | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
F | Organize Introduction of Product to Sales Force | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
G | Acquire Production Equipment | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
H | Install Equipment and Train Personnel | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
I | Acquire Raw Materials | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
J | Develop Advertising Copy | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
K | Manufacture Prototype Items | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
L | Develop Packaging Literature | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
M | Sales Force Training | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
N | Distribute Samples to Distributors | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
O | Produce Initial Stock for Warehouse | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
P | Coordinate Invoicing System with Warehouses | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Q | Distribute Items to Warehouse | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
R | Open Initial Advertising Program | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
S | Perform Final Interfunctional Coordination | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Duration
Week
Figure P3.4 – Post-Crash Gantt Chart

<table>
<thead>
<tr>
<th>Activity</th>
<th>Activity Description</th>
<th>Number of Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Set-up Cost and Financial Accounts</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26</td>
</tr>
<tr>
<td>B</td>
<td>Develop Budgetary Controls</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Design Advertising Media Plan</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Design Packaging</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Develop Trade Distribution for Home</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Organize Introduction of Product to Sales Force</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Acquire Production Equipment</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Install Equipment and Train Personnel</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Acquire Raw Materials</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Develop Advertising Copy</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Manufacture Prototype Item</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Develop Packaging Literature</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Sales Force Training</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Distribute Samples to Distributors</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Produce Initial Stock for Warehouse</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Coordinate Invoicing System with Warehouses</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Distribute Items to Warehouse</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Open Initial Advertising Program</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Perform Final Interfunctional Coordination</td>
<td></td>
</tr>
</tbody>
</table>

Figure P3.5 – Pre-Crash CPM Diagram
Figure P3.6 – Post-Crash CPM Diagram

Figure P3.7 – Crash Schedule

| Crashed Activity | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|
| Cost             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| $750.00          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Administrative Savings | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 | $5,751.43 |
| Net Savings      | $1,821.43 | $1,771.43 | $1,771.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 | $1,746.43 |
| Cumulative Savings | $1,821.43 | $3,592.86 | $5,364.29 | $7,110.72 | $8,857.15 | $10,603.58 | $11,875.01 | $12,746.44 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 | $13,617.87 |

Primary Critical Path: GIKNRS - 35 34 33 32 31 30 29 28 27 26
Secondary Critical Path: CJRS - 32 32 32 32 31 30 29 28 27 26
Figure P4.1

![M2 Sample 1 X-Bar Chart]

Figure P4.2

![M2 Sample 1 R-Bar Chart]
Figure P4.3

M2 Sample 2 X-Bar

Average Thickness (millimeters)

Figure P4.4

M2 Sample 2 R-Bar

Range of Observations (millimeters)
Figure P4.5

P3 Sample 1 X-Bar

Figure P4.6

P3 Sample 1 R-Bar
Finance Analysis

Team 20
Project Financial Data Form (PFD)

Project:  New Project for WatchDog

Depreciable Expenditures (total)  ($1,985,000)

Effective Cost (total)

of Fixed Asset Expenditures  ($1,895,903)

Non-Depreciable

Expenditures (pre-tax)  ($2,840,000)

ICF  ($4,325,207)

Project Beta  1.128

Project Cost Of Capital  10.47%

IRR  12.62%

NPV  $952,634

Recommendation  PURSUE the New Project
Financial Analysis for New Project

To analyze whether a project is worth launching, we need to make sure

1) its net present value is larger than zero OR

2) its internal rate of return is larger than the cost of capital.

Given Data

According to the case, we already have: forecasted unit sales for the 1st year, price, variable cost factor, total fixed expenses over 10 years, non-depreciable expenditure cost in project cash flows chart, unit impact per 100 units of the new security system, and after tax contribution margin per unit in side effects chart.

Opportunity cost- If WatchDog rejects the new project, it would not have to incur $610,000 for the machine purchased for the project. Therefore, this is the opportunity cost at time point zero. Also, there will be $500,000 after tax decline on the innovation return of existing products for the first two years if WatchDog pursues the new project. Thus, there is $500,000 opportunity cost for the first two years.

Calculation

Tax rate- We calculate average tax rate based on given data for last five years.

Sales revenues- Based on sales revenue on first year (price*forecasted unit sales for 1st year) and given annual growth rate for following years, we calculate the forecasted sales revenue for following ten years.

Units Sold- We calculated units sold by dividing forecasted sales revenue by price.

Total Variable Expenses- Annual sales revenue * variable factor.

Side Effects- To calculate the side effects of launching the new project on existing ones, we need the overall after tax margin.

• Net after-tax margin per 100 units: We multiplied unit impact per 100 units by after tax contribution margin for five existing products.
- **Overall after tax margin per 100 units**: We summed up all net after tax margin per 100 units, we got the overall after tax margin per hundred units for implementing the new project.

- **Units sold (in hundreds)**: We divided the units sold each year by 100 to get the factor.

- We finally got the side effects of implementing the new project on existing ones by units sold (in hundreds)*overall after tax margin per 100 units.

*Effective cost*: Effective cost is the net present value of all depreciable assets today. To calculate that, we used a discount rate of 4.5% and all cash flows from time point zero (beginning of the project or T0) to 10 (end of the project or T10).

At T0, the initial cash flow is the cost of each depreciable asset (ED). For the following years, there will be tax savings (DT) on depreciation unless the asset has already been fully depreciated. In addition, tax savings is the product of the annual depreciation (Cost/Recovery Period) and tax rate. Since WatchDog will replace depreciable assets every five years, at T5 and T10, there will be effects from selling the asset, which is net salvage value (NSV). We used NSV5=MV5+(BV5-MV5)*t to calculate net salvage value. The book value (BV) is the original cost of a asset minus its accumulated depreciation to that point, end of year 5 in this case. Since the book value cannot be negative, we use an IF function and take the recovery period of the asset as a condition. Once the recovery period falls below 5, its book value will be zero. Lastly, at time point 5, there will be an extra cost from purchasing the new asset of each category.

To sum up, At T0, the initial cash flow is the expenditure cost. From T1-T4 and T6-T9, the cash flow is just tax savings. At T10, there will be net salvage value (NSV) and tax savings, if the asset has not been fully depreciated. At T5, it will include all cash flows at T10 plus extra cost of purchasing new assets. After analyzing the cash flows of each depreciable asset, we use the NPV function to calculate the total effective cost of $1,895,903.
After-Tax Effect: Take the annual sales revenue and subtract it by all expenses (fixed and variable). If the number is positive, we will multiply it by \((1-\text{tax\%})\) for after tax profits. Otherwise, we calculate the loss only and assume there is no tax effect.

**IRR**-Adding (+) after-tax sales profits/loss and side effects and subtracting (-) opportunity cost, expenditure cost from non-depreciable assets and effective cost from depreciable assets, we get total cash flow from the implementing the new project for each year. We used the IRR function and got the internal rate of return for the project, which is 12.62%.

**Cost of Capital**-To calculate the project cost of capital \((r)\), we used the function \(r=R_f+EP*\beta\).

- **\(R_f\)**-With available data about three different treasury debts, we used RATE function to calculate their yield to maturity rate. We believed the YTM rate of the 73 days is the most appropriate one to indicate the return of a safe investment and used it as our \(R_f\).

- **\(EP\)**-We used company’s historical equity premium (EP) 6.25% to indicate how much money we would get from investing in the stock market than T-bills.

- **\(\beta\)**-According to the case, the project beta is similar to that of project R. To calculate the beta for project R of WatchDog in the market, we needed the unlevered company beta first.

- **\(\beta_L\)**-We got the levered beta for WatchDog by simply using SLOPE function to compare the regression of WatchDog’s security returns with that of the market’s (S&P 500).

- **\(\beta_U\)**-We used \(\beta_U = \beta_L / [1+(d/e)(1-T)]\) function and took out the funding effects of WatchDog. We have detailed information about the debt to equity ratio and tax rate of WatchDog over last five years. We used the average tax rate and average debt to equity ratio in the calculation because historical tax rate relates to the company’s historical return.

- **\(\beta_e\)**-We used SLOPE function and compared monthly revenue of each project with market’s return (S&P 500) to find the sensitivity of project R in the market (Row 142). We first
calculated the average monthly revenue of all projects of WatchDog (Row 139) and divided each of them by that of the company’s average revenue. Thus, calculating a percentage showing how each project weighted in revenue (Row 140). We multiplied the sensitivity data (Row 142) by the monthly revenue in percentage (Row 140) to get weighted sensitivity (Row 144) of each project in WatchDog and summed all up for a weighted company sensitivity in return (H144). Then, we divided the project sensitivity (Row 142) by overall company sensitivity (H144) and got a percentage representing the return of each project compared to WatchDog (Row 145). In other words, if WatchDog makes $1 in profits, each project will make $1 multiplied by the percentage we calculated in profits in the market. Lastly, we multiplied the weighted project sensitivity to the company by unlevered beta of WatchDog and got the beta for project R in the market (E148).

Since project has less liquidity than mutual fund, we decided to add the extra liquidity risk premium 1.20%. Then, we used the \( r = R_f + E_P \beta + 1.20\% \) for a project cost of capital 10.47%.

**Pursue the Project?**

Yes, we believe company should pursue the project because internal rate of return (12.62%) > Project cost of capital (10.47%) and NPV is positive. In order words, according to our analysis, WatchDog can earn $952,634 in profits from this project compared to investing in a mutual fund with similar risk.
Addressing Mr. Budreaux’s Concern

Dear Mr. Budreaux,

Thank you for requesting to help us improve our analysis of the project. After revising our models numerous times, we believe this project is profitable and worthy of investment. The following is our analysis for this project.

The actual launch cost of this project is $4,325,207, which consists of 3 different components.

1. The Market value of our equipment: $610,000. If we reject this project, we can immediately sell this equipment and receive $610,000 cash from this equipment.

2. After-tax, non-depreciable expenditures, which is $1,819,304. The expenditure includes expenses needed to launch this new project such as: employee training cost, lawyer’s consulting cost, and so on. We calculated these costs taking into account the tax amount that we would have to pay and the tax savings that we will make. We will save taxes on the expenses we incur because it is deducted from our profits, and hence, we do not have to pay the taxes on the profit that we did not actually get (because we subtracted the expenses from that profit amount). That’s how we calculate the “after-tax” amount of these non-depreciable expenditure.

3. “Real cost” of depreciable assets we would use. Under current accounting principle, we need to even out these expenses over several years, which means these expenses will reduce our profit and save taxes every year. Therefore, the “real cost” of the equipment is lower than the purchase price of the equipment, which is $1,895,902.

<table>
<thead>
<tr>
<th>Opportunity Costs</th>
<th>(US$610,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditures: Non Depreciable</td>
<td>(US$1,819,304)</td>
</tr>
<tr>
<td>Effective Costs</td>
<td>(US$1,895,903)</td>
</tr>
<tr>
<td>Total Cash Flow</td>
<td>(US$4,325,207)</td>
</tr>
</tbody>
</table>

Figure F1.1
The second part is about annual profit or loss on this project. The calculation of the annual profit and loss is composed of four parts.

1. **Sales revenue**, which is the amount of money our salesman make for the company every year. We use the past data to predict the growth of sales. We believe that sales growth will be 20% for years 2-3; 10% for years 4-5; 5% for years 6-10.

2. **Total fixed and variable cost**, which represents the manufacturing and general operating cost of this new project.

3. **Side effects**, which indicates the changes of sales of other projects of the company relating to the new project. For example, in year 1, the side effect of $189,825 indicates that we estimate this new project will satisfy the demands of clients and increase the reputation of the company, which helps other projects to increase profits by $189,825.

4. **Opportunity costs**, which indicates potential value lost due to this project. The $500,000 of opportunity costs in the first two years is caused by increasing demands of new research and relating training cost.

When we summed up these revenues and expenses every year, we got the annual profit and loss. As it turns out, in the first two years, the company will experience loss. However, as the sales increase over the year, the company will start to earn profits.

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units Sold</td>
<td>7,500</td>
<td>9,000</td>
<td>10,000</td>
<td>11,000</td>
<td>12,000</td>
<td>13,000</td>
<td>14,000</td>
<td>15,000</td>
<td>16,000</td>
<td>17,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Sales Revenue</td>
<td>$500,000</td>
<td>$510,000</td>
<td>$520,000</td>
<td>$530,000</td>
<td>$540,000</td>
<td>$550,000</td>
<td>$560,000</td>
<td>$570,000</td>
<td>$580,000</td>
<td>$590,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>Total Fixed Expenses</td>
<td>$300,000</td>
<td>$310,000</td>
<td>$320,000</td>
<td>$330,000</td>
<td>$340,000</td>
<td>$350,000</td>
<td>$360,000</td>
<td>$370,000</td>
<td>$380,000</td>
<td>$390,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>Total Variable Expenses</td>
<td>$200,000</td>
<td>$210,000</td>
<td>$220,000</td>
<td>$230,000</td>
<td>$240,000</td>
<td>$250,000</td>
<td>$260,000</td>
<td>$270,000</td>
<td>$280,000</td>
<td>$290,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>Side Effects</td>
<td>($100,000)</td>
<td>($110,000)</td>
<td>($120,000)</td>
<td>($130,000)</td>
<td>($140,000)</td>
<td>($150,000)</td>
<td>($160,000)</td>
<td>($170,000)</td>
<td>($180,000)</td>
<td>($190,000)</td>
<td>($200,000)</td>
</tr>
<tr>
<td>Opportunity Costs</td>
<td>($50,000)</td>
<td>($60,000)</td>
<td>($70,000)</td>
<td>($80,000)</td>
<td>($90,000)</td>
<td>($100,000)</td>
<td>($110,000)</td>
<td>($120,000)</td>
<td>($130,000)</td>
<td>($140,000)</td>
<td>($150,000)</td>
</tr>
<tr>
<td>Effective Costs</td>
<td>($150,000)</td>
<td>($170,000)</td>
<td>($190,000)</td>
<td>($210,000)</td>
<td>($230,000)</td>
<td>($250,000)</td>
<td>($270,000)</td>
<td>($290,000)</td>
<td>($310,000)</td>
<td>($330,000)</td>
<td>($350,000)</td>
</tr>
<tr>
<td>Annual Profit/Loss</td>
<td>$300,000</td>
<td>$290,000</td>
<td>$280,000</td>
<td>$270,000</td>
<td>$260,000</td>
<td>$250,000</td>
<td>$240,000</td>
<td>$230,000</td>
<td>$220,000</td>
<td>$210,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Units sold (in hundreds)</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>110</td>
<td>115</td>
<td>120</td>
<td>125</td>
<td>130</td>
<td>135</td>
<td>140</td>
<td>145</td>
</tr>
</tbody>
</table>

**Figure F1.2**

The third part is analyzing if this project is worth investing in, which means we need to analyze if the company can earn enough profit from this project to cover risks involved during the project life period. In other words, if we can earn more money by investing in this
project compared to other investment opportunities with similar risk, we believe this project worth investing in.

The first step is that to calculate the required return rate of this project, which is minimum average return we want to receive from this project. To do that, we first evaluate how the company’s return relates to the average market return. From results of regression analysis (a statistical tool), we got the results that the company’s return is 0.01% more volatile than the average market. This means that when the average market achieves 1% return, company will achieve 1.01% return, and vice versa. After that, we need to mitigate the effect of company’s debts to the return company receives because if WatchDog achieves a low profit by borrowing a high amount of debts, it is not that worthy. By mitigating the effect of the company’s average debt levels, we got the real volatility of the company’s asset, which is 0.88.

Then, we used the weighted average method to evaluate the return of this project compared to the overall company’s return. We chose to evaluate the volatility of the existing project R because several of the company’s analysts believe this project’s risk is similar to that of project R. After analyzing, the volatility of project R to the overall market return is 1.128.

<table>
<thead>
<tr>
<th>Project Sensitivity to Market</th>
<th>1089649.18</th>
<th>1890082.895</th>
<th>2159207.214</th>
<th>1465899.41</th>
<th>1589502.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Project Sensitivity</td>
<td>64.45%</td>
<td>111.80%</td>
<td>127.72%</td>
<td>88.71%</td>
<td>94.02%</td>
</tr>
<tr>
<td>Beta of Project R to the Market</td>
<td><strong>1.128</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After that, we used the historical equity premium 6.25%, which indicates how much money we would get from investing in the stock market rather than investing in a safe investment like government treasury bond. In addition, since investing in this project initially costs a lot of money and you are not allowed to just withdraw your money at any point like
you can with a mutual fund, we require additional 1.2% return. Once more, we use the 1-year government treasury bond to evaluate the return of a safe investment because we believe there is no doubt that US Government will ever default. To get the return we want from this project, we will take the risk our project poses (1.128) and multiply it to the market’s return (6.25%) in order to amplify or subdue its effect based on our project’s sensitivity. We then added it to the risk-free return, 2.2% (safe investment which comes from the government’s treasury bills) because this is a risk that can never be avoided for every investment. So, to summarize it, we multiplied 1.128 to equity premium 6.25% and added 1.2% return needed for this less flexible investment and 2.2% return of safe investment to get the minimum return we want to get from this project, which is 10.47%.

<table>
<thead>
<tr>
<th>Project Decision Metrics</th>
<th>Benchmark CAPM Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project IRR</td>
<td>12.02%</td>
</tr>
<tr>
<td>Project β</td>
<td>1.128</td>
</tr>
<tr>
<td>Project Cost of Capital</td>
<td>10.47%</td>
</tr>
<tr>
<td>Project NPV</td>
<td>952,634</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Free Rate</th>
<th>Equity Premium for Market</th>
<th>Extra Risk Premium (liquidity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2%</td>
<td>6.25%</td>
<td>1.20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treasury Debt Data</th>
<th>Maturity</th>
<th>Current Price</th>
<th>Coupon Rate</th>
<th>Face Value</th>
<th>YTM</th>
<th>Maturity (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 days</td>
<td>$996.62</td>
<td>9.00%</td>
<td>$1,000</td>
<td>2.210%</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>5 years</td>
<td>$1,022.31</td>
<td>5.20%</td>
<td>$1,000</td>
<td>4.069%</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10 years</td>
<td>$992.16</td>
<td>5.47%</td>
<td>$1,000</td>
<td>5.91%</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**Figure F1.4**

Furthermore, we calculated the actual value of our project. We already calculated the average annual return rate of this project, which should be at least 10.47%. Then, we used this required rate and the annual profit/loss we calculated above to get the actual value of this project to be $952,634, which means we will earn $952,634 more from this project than from other investments with similar risk.

Based on the analysis above, we believe that this project is worth investing in because we will earn $952,634 more from investing this project compared to other investments. If you have additional questions, please don’t hesitate to email or call me anytime.

Best Wishes,

WatchDog Financial Department
Leasing vs. Purchasing

For the lease of Asset B, WatchDog needs to pay $100,000 security deposit and will get it back at the end of project with 0% interest rate. If WatchDog leases the equipment, there will be a charge of $148,230 at the beginning of each year. At the end of each year, there will be a tax saving from expenses which is $148,230*39.6%(tax rate)=$58,699.

- At time point 0 and 5, WatchDog will need to pay $100,000 security deposit.
- At time point 5 and 10, WatchDog will get the $100,000 deposit payback.
- From time point 0 to 9, there will be a lease expense $148,230 for lease expenses at the beginning of each year.
- From time point 1 to 10, there will be a tax saving $58,699 at end of each year.

We summed up the cash flow from each year and used the NPV function with discount rate 4.50%. We finally got the net present value of ($796,820.77) for leasing.

According to the Effective Cost page, the effective cost for depreciable asset B over 10 years is ($756,823.93).

\[-756,823.93 \ < \ -796,820.77\]

*Effective Cost for purchasing < Net Present Value for leasing*

Therefore, our group suggests PURCHASING Asset B.