UBC Social Ecological Economic Development Studies (SEEDS) Student Report

An Investigation into UBC Bookstore Renting Options

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ABSTRACT

Currently, the UBC bookstore offers book rental services, which saves students up to 55 percent off the retail price for every book that is rented. It has proven to be successful and the bookstore is therefore looking for ways to expand this service. This report proposes a new product to be used in the rental services. Through surveys and investigations, our group has decided that a good product that can be successful in this renting service is compact-fridges. This investigation conducts a TBL analysis and assesses the feasibility and sustainability of starting this new renting service.
The social impact as well as the demand of this service has been evaluated through a survey conducted to UBC students that live on-campus as well as off-campus. A constraint of the survey was its small sample size, which produced some uncertainty on the results. However, the survey served to provide a rough view of the future social impacts and the market of this service.

The economic assessment was evaluated with the help of equations that took into consideration many different factors. These factors are: the rental price, rental duration cost per unit, storing cost, and maintenance cost. There were also constraints such as demand uncertainty and market potential.

Our investigation demonstrates that there is an existing demand for compact fridges rental and it also provides a solution for the problems of shared fridges between students. This proposed service will also generate the profit that the UBC bookstore has requested and is a better economic choice for students. For the environmental factor, the fridge that is proposed in this report also shows to be more environmentally friendly compared to the shared fridges as well as the fridges that students own.

There are different factors that indicate that renting compact fridges will be less harmful for the environment. One factor is that the production of fridges will reduce since fridges are reused, which will reduce the amount of energy used for production. Students can also replace the shared fridges because they are almost never used. In this case they can disconnect their fridges and save energy.

It is recommended that the UBC Bookstore use compact fridges for its rental service. The proposed fridge for the rental service is the Frigidaire - 3.3 Cu. Ft. Compact Refrigerator.The rental price recommended is 45% of the retail price and the rental period is an academic term (4 months) or any multiple of this.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

1.0 INTRODUCTION

The UBC Bookstore rental service has provided affordable prices to students by offering books that can save up to 55 percent off the original price of the book. It is also sustainable, since books are rented again instead of being disposed of. The bookstore has requested for a triple bottom line analysis for new products to be used for renting.

Our group has investigated different items to be rented, including clothing, transportation devices, and furniture. Compact fridges have shown to be the most suitable product because it has a demand and it provides benefits in the social, economic, and environmental factors. These benefits will be discussed in the report.

This report investigates, analyzes, and recommends the use of compact fridges for the UBC Bookstore rental services, as well as the strategies that should be used when implementing this service. The recommendations presented in this report are based on a TBL analysis and a survey conducted on UBC students. This report will first analyze the economic factor of this product for the rental services. This section uses different equations that will help determine a good rental price and rental period for our recommended product. The social section of this report presents the results of a survey conducted to UBC students. These results give an idea of the demand of this product and the social impacts that may arise. Finally, the environmental section of this report will analyze the energy wastes produced by this product. This analysis will be used to make a comparison between this fridge and the fridges that are currently been used by students.

2.0 ECONOMIC ANALYSIS

2.1 Economic Model

In order to successfully model a rental program it must be modeled after an existing program structure. There are two widely popular methods of administering a rental service. These generally differ on who dictates the start, duration and end of the rental period. The first group includes car rental companies and hotels in which the rental duration is pre-specified by the rental companies (Tang, pg. 806) Alternatively the second group has its period of rental dictated by the customer. As the program will be catered to students who are attending class for a pre specified period of time it is logical to model after a company specified rental period.

One of the main guidelines put in place by the stakeholders is that the proposed program must yield a profit. The degree of profit is not of as much concern as the service provided to the students and its impact on the UBC community but still plays a role in decision-making. Many of the variables needed to calculate a precise demand and profit model require massive amounts of existing data from previous rental periods. Therefore many of the formulas and variables discussed in this section will allow program administrators the tools to fine-tune the program in future years once data has been recorded and analyzed.

2.2 Price

The stakeholder suggested that the program should be model after the existing textbook rental service. This would involve setting the rental price at 55% of the initial investment per semester. This allows for a quick return on the investment and a pure profit situation after just two rental periods. However the duration of need for compact fridges is typically longer than that of textbooks. Therefore a change of price to %55 of unit value of the initial investment per eight-month period and 35% per four-month period was proposed. This will be referred to as price set #1. The addition of the four-month period

would also allow the service to be offered during summer months and to students taking courses for single semesters. The decision to have a higher price for the four month in comparison to the eight month is result of the following 2 equations.

$$Dt = \mu(p,r) + \varepsilon \qquad (1)$$ (Tang, pg. 809)

$$\mu(p,r) = \alpha - p\beta - \gamma/r \qquad (2)$$

Where p is the rental price, r is the rental duration and c is the cost per unit. These are varying parameters used to determine Dt (rental demand). The rest are constants to be determined when analyzing existing data. They include ε (demand uncertainty), α (market potential), β (rental price sensitivity) and γ (rental duration sensitivity) (Tang, pg. 809-810). From equation (2) it becomes apparent that demand increases when price decreases or rental duration increases. Therefore there will be a higher charge rate for shorter rental periods.

Based on the price of $169.99 per unit out rates would be $95 for eight months and $60 for four months. Based on our survey we found that majority of student were willing to pay $50-$100 for and eight month semester and felt that 30%-40% was an appropriate rate at which to charge. Based on this we decided to put forth a second pair of possible prices at 45% for eight months and 30% for four months price set (#2). This would make the prices more attractive to students at $76 and $50 respectively. The one drawback to this strategy is the amount of time taken to return the initial investment. The potential for unit loss and other unforeseeable factors also discourage this longer time frame strategy. However the chosen product for this program was selected with durability and longevity in mind. Therefore if the product does not deteriorate and losses are minimal then this course of action can be a viable option.

With regards to the costs associated with this service we turn to equation (3) (Tang, pg. 813).

- $$\Pi = \frac{(\alpha - \frac{\gamma}{r} - \frac{\beta c n_1(r)}{T})^2}{4\beta} - (h+s)(\Phi)(z)(\sigma)(n_2(r)) \qquad (3)$$

This equation models Π (profit) by subtracting costs from revenue. Also, this equation models the potential for loss with factors such as h (cost of storing and maintenance of units) and s (potential loss from unmet demand). Cost of maintenance includes cleaning costs (supplies and labor), storage costs and repair costs. The cost of cleaning has been calculated to be $5.25 per unit. This assumes a charge of $12/hour at a rate of 3 units per hour. In previous meetings with the stakeholders, they have established that there will be no storage costs. In terms of repairs, depending on the severity of the problem the unit will either be recycled or fixed depending on the cost. Therefore the profit values will be as follows:

Price Set #1	Revenue	Costs	Profit
Four Month	$60	$5.25	$54.75
Eight Month	$95	$5.25	$89.75

Price Set #2	Revenue	Costs	Profit
Four Month	$50	$5.25	$44.75
Eight Month	$76	$5.25	$71.75

From these numbers it becomes apparent that with price set (#1) we will return the initial investment in 16 months. With price set (#2) the initial investment will be returned in a longer period of 16-20 months.

2.3 Other Possibilities

There exist one other possibility that would allow for reduced costs to students and increased profits for the bookstore. The program could instead choose to acquire the unit's through second hand purchasing. Since it is prefer to obtain them at low cost it would be logical to purchase them at a time of high supply and low demand. Therefore purchasing units on residents move out dates would be ideal. Units meeting certain

standards could be purchased for $20-$30 in massive quantities. Many students are reluctant to store or move their compact fridges with them and treat them as disposable goods. Therefore this strategy would take advantage of the problem our service is trying to eliminate. The low initial cost would allow lower prices and therefore generate higher demand. The one drawback to this system is that the quality, durability and efficiency of the product we have selected will not be present in many of our units. Therefore it is important that we understand what our aim is and what type of service we want to provide and be known for.

3.0 ENVIRONMENTAL IMPACTS AND CONSIDERATIONS

Renting furniture reduces the negative environmental impacts caused by production and disposing of furniture. If a piece of furniture is rented, it is more likely that it reaches the end of its lifecycle before getting disposed. In fact, lower number of furniture can meet the needs of certain number of people. Producing less furniture results in a lower consumption of fossil fuel and saves more natural resources. Compact-fridges are amongst the most popular furniture. These appliances are supposed to meet strict standards because they consume a lot of energy and contain environmentally harmful gases that must be carefully recycled or removed in the disposing process.

3.1 DISPOSAL PROCESS OF A COMPACT-FRIDGE

After renting compact-fridges for a certain period of time, it is necessary for the UBC Bookstore to replace the old compact-fridges with new ones. According to the US government website, old fridges usually consume two or four times more energy than new ones. (USEPA) Mostly, the new fridges emit a lower amount of greenhouse gases by meeting strict guidelines. In addition to energy efficiency, disposing compact-fridges is very important for our environment, since they contain harmful gases. The disposal process of a compact-fridge includes the removal of environmentally harmful gases, refurbishing or recycling. (USEPA)

One possible way of disposing an old compact-fridge is to refurbish and rent it again. Sometimes, most parts of the fridge are in working condition. The broken or energy inefficient parts are merely replaced with new parts that will extend the lifecycle of the product. Then, the product can be either sold or rented as a refurbished item. Unfortunately, most of the refurbished items do not meet the energy efficiency standards and usually consume large amounts of power. Thus, the refurbished items

are mostly sold to developing countries where their ultimate disposal is less likely to take place responsibly.(USEPA)

Another disposing method is recycling the old products. The recycling process usually consists of the recovery of refrigerants and the removal of harmful gases. Then, the evacuated item will be shredded. The metal, plastic and glass parts are sorted and the rest will be landfilled. Even though the United States Government buries the plastic and glass in landfills causing ozone depletion and global climate change, (USEPA) the Canadian Government has an extensive program to recycle glass and plastic wastes. According to the data collected by the Canadian government, Canadians do have access to the government's recycling programs.(Statistics Canada) In British Columbia, for recycling fridges, the ozone-depleting substances such as Freon must be removed from the fridge by a licensed technician. Fortunately, many local landfills and transfer stations have the facilities to recycle fridges. Moreover, the old compact-fridges can be picked up by private recycling or disposal companies. Most of the municipalities in British Columbia also pick up fridges for free. (RCBC) The 3.3 Cubic feet compact-refrigerator made by Frigidaire is recommended to the UBC Bookstore because its body is made from recyclable materials such as metal and glass. Therefore, the UBC Bookstore is able to recycle its compact-fridges easily and with a high rate of success without threatening the environment.

3.2 ENVIRONMENTAL ADVANTAGES AND DISADVANTAGES OF USING COMPACT-FRIDGES IN UBC DORMITORIES

UBC will have more sustainable dormitories by using the UBC Bookstore's compact-fridges. Currently, UBC provides students with a shared normal-sized refrigerator in each floor of the dormitories. Beside the limited space available for use in the refrigerators by each student, the refrigerators are always plugged in even if very few students use them. By renting the compact-fridges, not only do the students have their own place to keep their food refrigerated, but also a large amount of electricity is

saved as students are able to easily turn off the compact-fridges when not needed. Moreover, fewer students live in the dormitories during the summer term compared to the winter term, however, many of the shared refrigerators still work for possibly few users. If the few students who study during the summer use the compact-fridges, a reasonable amount of power will be saved since all of the large refrigerators can be turned off. Thus, UBC can save more electricity and money by using the UBC Bookstore's compact-fridges instead of the current normal-sized refrigerators during the summer. In conclusion, the bookstore could protect the environment and make a reasonable amount of money by renting mini-fridges.

Although the efficiency of large fridges is sometimes slightly higher than the efficiency of compact-fridges (Leigh), the energy wasted by normal refrigerators is larger than that by compact-fridges. One way to compare the energy efficiency of both devices is to examine the amount of energy wasted when the fridges' doors are open. To illustrate, given that the number of times the door of a fridge is opened is the same during the day, since the size of a normal refrigerator is much larger than a compact-fridge, the overall energy wasted by opening the door of a normal refrigerator is larger.

3.3 SUMMARY OF ENVIRONMENTAL IMPACTS AND CONSIDERATIONS

In this section, it is discussed that by renting appliances, more energy and resources are likely to be saved. Then, the main disposal scenarios that are likely to happen after the compact-fridges become old are described. Fortunately, by taking advantage of government's recycling programs, it is possible to recycle most parts of the compact-fridges such as metal, glass and plastic at a low price. Then, the environmental advantages and disadvantages of using compact-fridges in the dormitories are discussed. In conclusion, renting compact-fridges not only does not impose any threat on the environment but also help saving more electricity and having more sustainable dormitories.

4.0 SOCIAL IMPACT ANALYSIS

The purpose of this paper is to utilize the concept of the triple bottom line and conduct a sustainability analysis of a project under those guidelines. In order to fully understand how sustainable the proposed project is, not only do the economical and environmental aspects of the project have to be considered, but the social aspect of the project must also be taken into account to complete the trio. The social analysis of this Bookstore rental project will look into how this rental service may affect the Bookstore and UBC's students (such as how students might react to the program, how their behaviour might change, as well as the results of those changes), as well as how socially responsible the manufacturer of our recommended solution is.

With regards to the Bookstore and UBC's students, our survey findings have shown that there is an interest within UBC's student body to rent compact fridges, among other types of furniture. Compact fridges are also being widely used by many students living on campus dormitories, and preexisting external compact fridge rental services. Piecing the two together, there is clearly a market demand for our proposed service, and by meeting that demand the UBC Bookstore can become more integrated into the student lifestyle, and ultimately converge towards becoming a “one-stop-shop”, resulting in more community involvement from the Bookstore. The system will also provide convenience for students in the sense that after their term(s) of study, students do not have to worry about storing, selling, or returning the compact fridge – a process so cumbersome that many students living in dormitories opt to simply leave their compact fridges in their dorms, to be disposed of by UBC. In addition, by renting a compact fridge during their time in school, they will gain experience renting, as they are likely to do in the future after leaving UBC. However, if this project is adopted by the UBC Bookstore and becomes widely used by students on campus, then there may be certain environmental and economical drawbacks related to the program becoming more popular, such as

maintenance and repair fees, loss in damages, increased electricity consumption, and increased landfill use from broken and unrepairable units.

Looking up the supply chain, one can notice that our recommended solution is of the Frigidaire brand, a household brand name with a reputation of reliability. The Frigidaire brand is owned by Electrolux, and an investigation of their social responsibility was conducted. A few key concerns had to do with workplace regulations, occupational ethics, stakeholder inclusion, and engagement with their own supply chain.

After the investigation, it was found that Electrolux was a company that was making a conscious effort to be both environmentally and socially sustainable. They have a training program that informs staff of their Workplace Code of Conduct, and ensures that each and every employee is informed and upholds their Code. Their Workplace Code of Conduct, (documented as “The Electrolux Workplace Standard”) has codes and regulations in place that ensure child and forced labor are not used in their manufacturing process, and that all employees at the workplace are safe from social abuses and health dangers. There also exists “The Responsible Sourcing Program”, which ensures that all suppliers working with Electrolux non-negotiably adhere to their Workplace Code of Conduct as well. Electrolux also releases an annual operations report, which meticulously describes their operations, financial and strategic milestones and targets. They have also openly stated that they are focused on building a relationship with the communities around them, and value their involvement and input.

This transparency in Electrolux's operations, combined with their impressive Workplace Code of Conduct are signs that Electrolux is a group that takes pride in being triple bottom line sustainable. Their ongoing involvement with not only shareholders but stakeholders and their communities result in a company that is aware of its place and role in the global community.

Having conducted this analysis on the social impacts that revolve around the proposed rental service, it is found that the service adheres to the idea of social sustainability presented by the triple bottom line. Not only does it bring the Bookstore closer to the student lifestyle, it also makes a positive social impact by releasing the students from the stress that they would normally undergo in order to dispose of their compact fridge at the end of their schooling. In addition, Electrolux seems to be a very sustainably conscious group, not only making sure that their own employees are up to the standard of their Code of Conduct, but also any external suppliers that they may interact with. If partnered with UBC, their standards will also be adopted into UBC's environment, and may result in an even more sustainable UBC. It can be concluded that the impact that the proposed project may have on UBC's society is a positive one, and that the adoption of the compact fridge rental program from the Bookstore can be encouraged.

5.0 DATA ACQUISITION AND SURVEY RESULTS

This section discusses the data acquisition method and the results in gathering data for the investigation regarding the viability of a furniture renting service at the UBC Bookstore. In this investigation, an internet survey was created using Google Forms and distributed to UBC students through email. This section will discuss why internet surveys were chosen as the primary means of data acquisition and discuss the question structure that was chosen and demographics, and will provide the internet survey results that were found.

5.1 DATA ACQUISITION METHOD SELECTION

When considering methods of data acquisition suitable for the investigation regarding the furniture renting service at the UBC Bookstore, it was found that surveys would be the most appropriate means of gathering data. Various survey methods were considered including in-person interviews, telephone interviews, internet surveys and paper questionnaires. However, out of all the various options available it was deemed that internet surveys would be the best option.

The advantages of using internet surveys is that they provide a quick and easy completion process for respondents, allow for an easier means of distribution, and provide a more efficient approach in analyzing and polling results. There is a visual aspect to internet surveys that, if used with care, can facilitate the completion of the survey for the respondents. The use of radio buttons and drop-down menus allows for a smoother and quicker completion process, one that is far superior to other methods of conducting surveys, primarily paper questionnaires that are to be manually filled out. Internet surveys also allow for a quicker and more efficient approach in analyzing and polling results, which can be directly processed and are far less error-prone compared to manually tallying up results, which would be evident in surveys such as in-person interviews, telephone interviews, or paper questionnaires.

However, there are certain drawbacks or challenges of conducting internet surveys, some that were evident in our investigation. One of the main challenges of internet surveys is that of nonresponse. The approach on how the survey is distributed usually plays a big factor in the choice people make in filling out the survey or not. People also do consider the credibility of the source of the survey, and would more likely be willing to respond to surveys that originated from trustworthy sources, as in this age, one can never be too certain whether a link received in an email is legitimate or will introduce computer viruses onto their systems.

5.2 QUESTION STRUCTURE AND DEMOGRAPHICS

In order to gather data for use in the investigation, an internet survey was created where questions covered general aspects of renting services and renting services pertaining to furniture. Our main demographic was UBC students, primarily those that lived in residences on campus, as they would most likely be the people that would be interested in a furniture renting service if the UBC Bookstore were to provide one, however students that lived off campus were also targeted in order to determine their level of interest in such a service.

The internet survey questionnaire was designed in such a way as to keep the UBC Bookstore stakeholders' interests in mind, as well as provide a means for meaningful data to be analyzed. Certain considerations were made when creating the survey such as keeping the objective of the survey clear for respondents, making sure the language used in the survey was appropriate for the target audience, and structuring the questions in a logical progression.

5.3 SURVEY RESULTS

Before presenting the results of the survey, it is important to note that the sample size of the survey was 29 students and about 80% of these 29 students were those that lived off campus. In order to gather more meaningful data for the viability of a furniture renting

service at the UBC Bookstore, further surveys will need to be conducted in order to gain a larger sample size, as well as a more balanced sample population in terms of students living on campus and students living off campus.

After analyzing and compiling the survey results, it was found that out of the 29 students that responded to the survey, only about 42.9% of the population were interested in the notion of a furniture renting service at the UBC Bookstore (see Figure 1). Even though the percentage indicates that a majority of the sample population are disinterested, it is important to take into account that 80% of the sample population reflects the views of students that live off campus. It was also found that 89.3% of the sample population had not used furniture renting services in the past and 82.1% responded that they had not considered using furniture renting services.

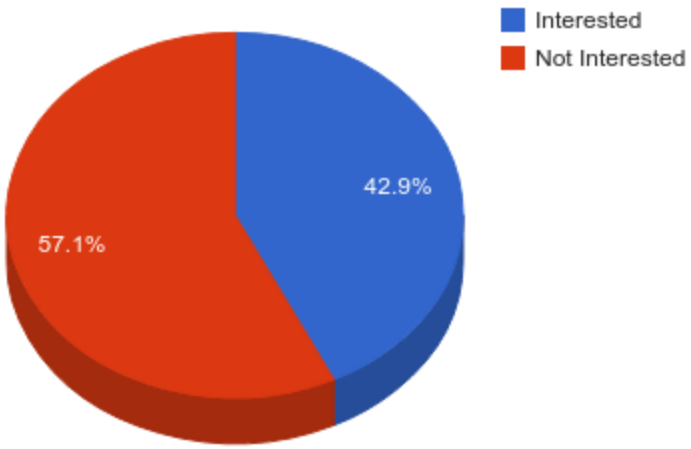

Figure 1 - Interest in Furniture Renting Service at UBC Bookstore Pie Chart

In terms of the furniture including appliances that people would be interested in having in their rooms, it was found that fridges and compact-fridges were the most popular items relative to the rest. Figure 2 shows a pie chart that illustrates the percentage distribution.

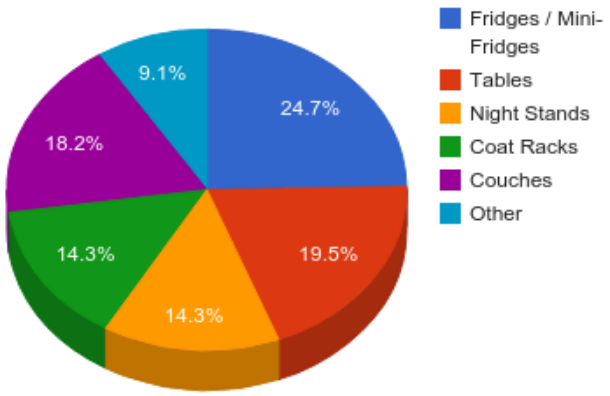

Figure 2 - Furniture Interested in Having in Room Pie Chart

Furthermore, based on the furniture that students were interested in having in their rooms, the items that most people were interested in renting were fridges or compact-fridges and night stands. The percentage distribution is shown in the pie chart in Figure 3.

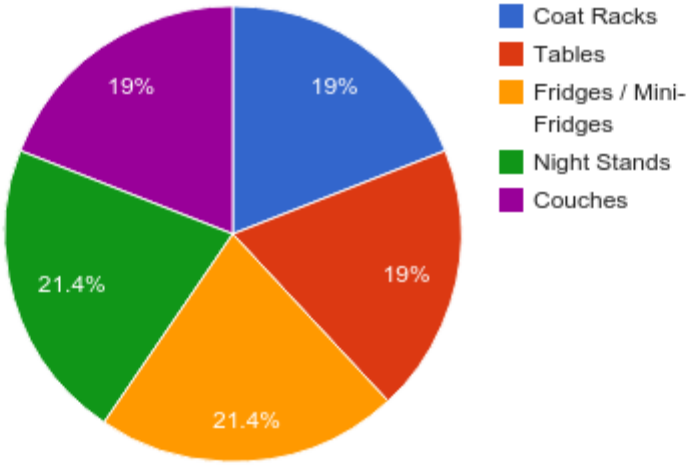

Figure 3 - Furniture Interested in Renting Pie Chart

When asked what would the primary concerns would be for renting furniture, most people responded that price and condition of the item were their main concerns, while maintenance and size of the items were not too much of a concern. Figure 4 shows the percentage distributions.

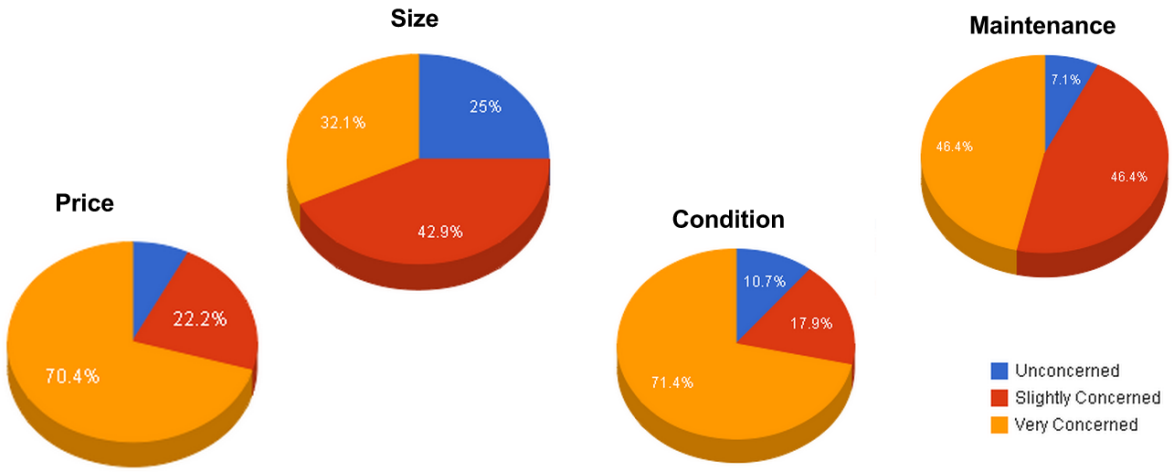

Figure 4 - Furniture Renting Concerns Pie Chart

In terms of pricing, it was found that most students were willing to spend about $50 - $100 on furniture rentals per semester, and that about 75% of the sample population thought that rental prices should be about 30% - 40% of the original retail prices of the furniture. Figure 5 and Figure 6 illustrate the percentage distributions.

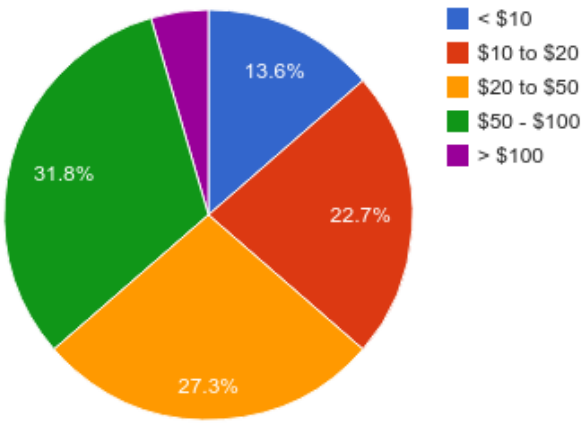

Figure 5 - Amount Willing To Pay Per Semester Pie Chart

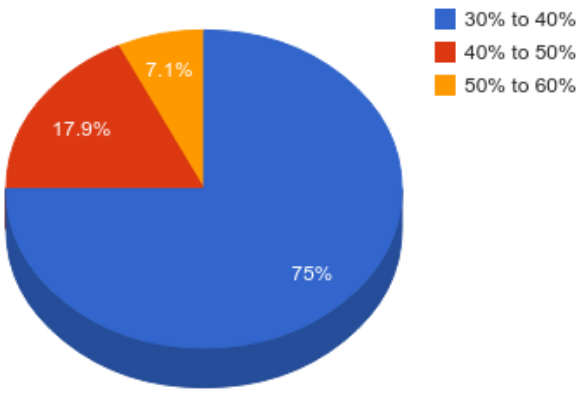

Figure 6 - Percent of Original Retail Price That Is Fair Pie Chart

When asked the ideal duration renting period, most students responded that one academic term or 4 months would be the ideal renting period. The percentage distributions are illustrated in the pie chart in Figure 7.

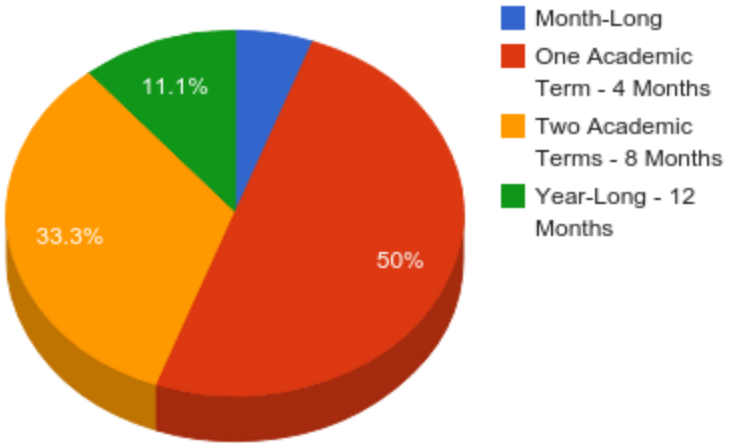

Figure 7 - Duration of Renting Interested In Pie Chart

6.0 CONCLUSION

The fridge that our group proposes for rental is the Frigidaire - 3.3 Cu. Ft. Compact Refrigerator (FFPE33B1QM). Our investigation has shown that this fridge will be viable in the economic, social, and environmental factors.

Through the use of different equations that take parameters such as demand uncertainty, market potential, rental price, rental duration cost per unit, storing cost, and maintenance cost, our group has arrived to the conclusion that the use of compact fridges for the UBC Bookstore rental service is economically viable and will generate profit for the bookstore. It is recommended that the compact fridges are rented at 45%-55% of the retail price. This will generate suitable profit while not lowering the demand.

Compact fridges rental also has a positive social impact because it provides a solution to problems cause when students have their own fridges. Many students complain that shared fridges are not very safe to use and as a result, shared fridges are never really used. Students who move temporarily also have problems finding storage for their fridges, which are usually too expensive. Compact fridges rentals provide an easy and fast solution for these problems.

Renting compact fridges also reduces the amount of fridges that are produced. As a result, there is less energy used and wastes produced for the production of fridges. It also solves the problem of fridges disposal. Overall, compact fridges rental provides environmental and sustainable benefits.

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