An Investigation into Sustainable Swag

Jak Ji, Katherine Babcock, Rayan Al-Shaibani, Sadaf Sheikh Zeinoddini, Trevor Fisher

University of British Columbia

APSC 262

April 09, 2015

An Investigation into Sustainable Swag

Rayan Al-Shaibani
Katherine Babcock
Trevor Fisher
Jak Ji
Sadaf Sheikh Zeinoddini

Date Submitted: April 9, 2015
APSC 262: Technology and Society II
Tutorial Instructor: Paul Winkelman

Abstract

The following report covers an investigation into the sustainability of swag provided to UBC students by the Chinese Varsity Club (CVC), and recommendations about whether or not to change the swag they give away. The items provided by the CVC this year were a clipboard and a reusable plastic water bottle. This report also provides a framework to be used by the CVC, or any other organization on campus, when selecting swag items to give away in the future. The research for this report was conducted primarily through secondary sources, with information about the CVC gathered through primary sources.

The results of the investigations into the CVC's swag are that, although the items are not necessarily ideal, they have the potential to satisfy the idea of sustainable with a few minor changes. The water bottle helps to reduce waste produced by consumption of bottled water on campus, and the type 2 plastic used is environmentally the best material assuming a short life expectancy. If the bottle has a long term life expectancy, then it is recommended that the CVC look into sustainable stainless steel water bottles. The clipboard offers clear utility to students, and is something that would likely be purchased in any case, if not received as swag. Furthermore, the current clipboard offers the most utility to students. However, it is recommended that they consider using clipboards made from recycled materials in upcoming years. Three other potential swag items are listed as potential alternatives: wood USBs, seed packets and mints in mint boxes.

The swag evaluation framework is based on triple bottom line assessment. It considers the following criteria: manufacturing sustainability, end of life sustainability, social equity, cost, reliability, usability and promotional value. The criteria are then weighted according to the organizations values, and then potential swag items are ranked using a weighted decision matrix. It is believed that this evaluation will yield clear, simple and useful information on the sustainability of swag.

Table of Contents

List of Illustrations

1.0 Introduction

This project looks into the sustainability of swag handed out by the UBC Chinese Varsity Club using a Triple Bottom Line (TBL) assessment. This investigation can assist UBC with becoming a global leader in campus sustainability by providing information on best practices for selecting these free give-aways in terms of minimizing the negative environmental, economic and social impacts and maximizing the positive ones. Environmental, social and economic indicators, or measures, are provided to use as part of a decision framework for evaluating swag using TBL. A number of gaps between swag given away and the sustainability values of the organizations giving them away have been identified, and therefore, the main objectives of this project are to provide recommendations for what swag items should be procured or avoided, and how a swag selection process can be aligned with organizational and sustainability values. There are a number of operational units at UBC that can benefit from the information included in this report, such as the UBC Campus Sustainability Office, UBC Sustainability Initiative, Sustainability + Engineering, Campus + Community Planning and Alma Mater Society of UBC. Research into both primary and secondary sources was conducted as part of this investigation, and the information gathered was collaborated to form the recommendations provided at the end of this report.

2.0 Background on Swag

Swag, also known as promotional items, are free objects given away that bear the name or logo of the distributing organization (Iliescu & Thorpe, 2010). Swag is used as advertising; it is intended to remind you of the organization that has put its name/logo on the object. On average, most swag items are thrown out in the first six months after receiving them. This is a very short life when compared to the social and environmental costs associated with manufacturing and disposal. Another issue associated with swag is that it leads to overconsumption. People are attracted to free items, even if they don't need them. Once a price is added to something, how people consume it changes; they will consider if they need it and if they will use it. A shift needs to be made from quantity to quality to prevent overconsumption. In 2010, the promotional industry in Canada was estimated to be worth $4 billion and steadily increasing. Figure 1 below shows how consumption is directly correlated to waste generation, and since promotional items are part of the growth in consumption it is important to evaluate the quantity and quality of swag (Iliescu & Thorpe, 2010).

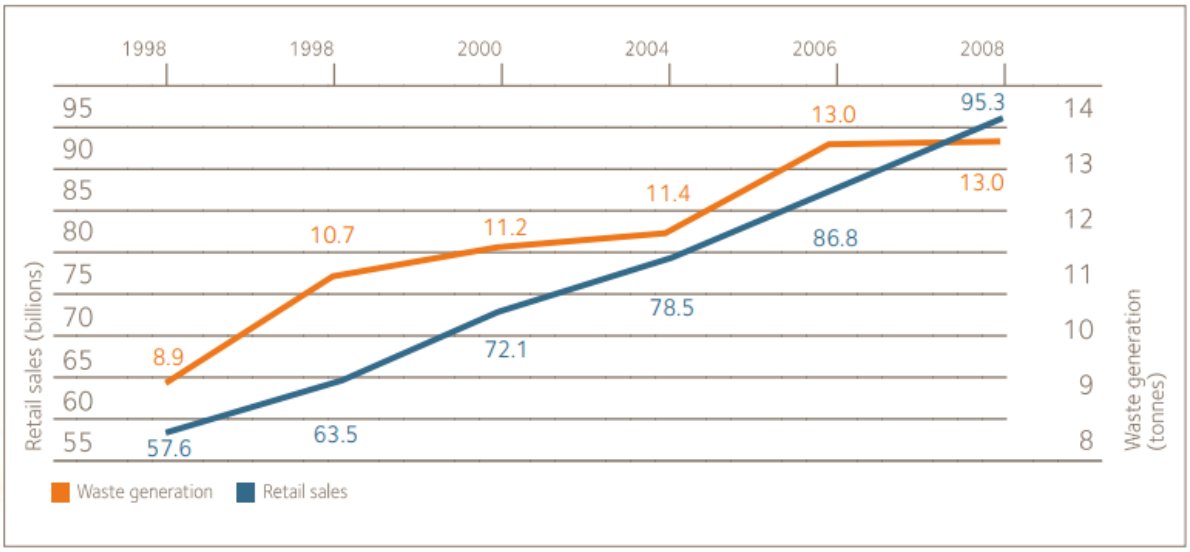

Figure 1 – Graph of Correlation between Retail Consumption and Waste Generation
Source: http://www.equiterre.org/sites/fichiers/divers/guide_to_sustainable_promotional_products.pdf

A wide variety of promotional items are given away in Canada (Iliescu & Thorpe, 2010). Figure 2 shows the division of the promotional product sector of Canada in 2009. Many of the objects can be made from materials that consume a lot of energy in the manufacturing stage, are not recyclable and are made by people exposed to poor working conditions. However, the benefit to these objects is that they are cheap. An increasing number of products are being evaluated and companies are shifting towards selecting items that are environmentally friendly and socially beneficial (Iliescu & Thorpe, 2010).

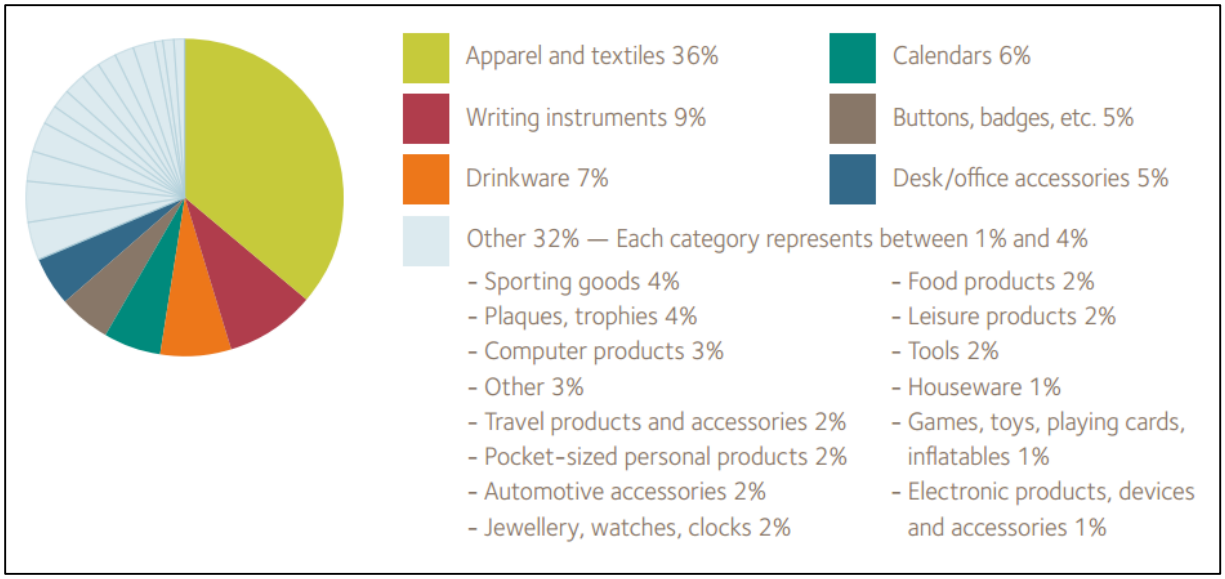

Figure 2 – Division of Promotional Product Sector in Canada
Source: http://www.equiterre.org/sites/fichiers/divers/guide_to_sustainable_promotional_products.pdf

3.0 UBC Chinese Varsity Club Information

The UBC Chinese Varsity Club (CVC) is the largest club on campus, consisting of 300 to 600 members per year, and has been around for 85 years. They give away two swag items per year, a clipboard and a yearly item. The clipboard is tradition and has been handed out for as long as they can remember. Their yearly item this year is a reusable plastic water bottle. In the past they have given away other items such as pens and bottle openers. CVC's colours are black and yellow, and their symbol is the banana. In addition to their logo, they like to incorporate these features into their swag.

CVC values building a community on campus that is welcoming to all students. They are the largest club, yet they want to keep expanding. They hold a wide range of events throughout the year including cultural events, athletic events, trips, educational tutorials, social events and more. Sustainability is not a direct focus of the club, but they do take it into consideration. They do their best to support campus initiatives, and this year they chose to give away reusable water bottles to support the UBC Tap That campaign, which is a campaign working towards eliminating bottled water on campus. The two swag items that they give away are beneficial to all students; everyone drinks water and almost every student uses a clipboard. The clipboard is the same as the ones given away by the UBC Bookstore, and it contains a map of the UBC campus on the back. The water bottle is a small size and therefore easy to carry around.

4.0 Water Bottle Evaluation

4.1 Water Bottle Utility

The main idea behind the plastic water bottle as a swag item for CVC is to support UBC's long term goal, to have a bottled water free campus. Bottled water has been an important topic of discussion on campus for the past few years. According to the Tap That Campaign web page, extensive research has been conducted by both UBC Food Services and students in the SEEDS Program. The waste and costs associated with bottling, transporting, and selling water have significant negative implications for the environmental, social, and economic wellbeing of the UBC community [1].

UBC provides an abundant sources of tap water, so there's no need to spend money or promote disposable water bottle use on campus. Because of this, a free reusable water bottle proves to be useful for students. Furthermore, by providing reusable water bottles as a swag item, the CVC shows its support to Tap That Campaign and the development of a sustainable campus.

4.2 Comparison of Available Water Bottle Materials

The 3 general types of water bottles that can be used as a swag item (stainless steel, plastic and glass) are described below. Each has their own advantages and disadvantages.

i. Stainless Steel

Stainless steel is North America's number 1 recycled material. It is light, durable and able to hold hot liquids. Stainless Steel has a long life span without breaking or corroding. High quality stainless steel bottles have no nickel leaching (safer for consumers and shouldn't taste metallic like aluminum). Chromium (added to make the steel harder and corrosion resistant) displays passivation and rebuilds itself in the presence of oxygen (scratches), Gives the bottles long life (many guaranteed for life). However it is energy intensive during production, 1 stainless steel bottle is equal to 50 disposable plastic bottles in energy consumption in manufacturing, 500 repeated usages are required to beat plastic in all environmental aspects.

ii. Glass

Glass bottles are the easiest to clean. They produce similar carbon emissions as a PET plastic bottle (disposable water bottle) during manufacturing. However, it is very fragile, and many come with a silicone sleeve to protect them from breaking. Because it is breakable, it has shorter expected life. The recycling rate is low; only 33% recycle rate in North America.

iii. Plastic

Plastic is cheap, light and flexible. Greenest for production and manufacture (around 80% less impact than worst performer in the three categories: water use, global warming and solid waste) compared to stainless steel, glass and aluminum, but it is manufactured from non-renewable sources derived from oil. Some health concerns still exist in plastics. Plastic water bottles have

a short life cycle compared to other materials. Plastic production and manufacturing are still energy intensive and pollute.

Most swag items are not intended for long time use, therefore plastic would be the most optimal choice compare to stainless steel and glass due to its lessen environmental impact during production.

4.3 Comparison of Types of Plastics

Not every plastic can be used as water bottle material. Plastics can be categorized into one of the seven plastic resin types represented by plastic codes.

Type 1 polyethylene terephthalate (PETE): Do Not Reuse
- sometimes absorb odors and flavors from foods and drinks
- commonly recycled
- Disposable water bottles use this material

Type 2 high-density polyethylene (HDPE): Safe
- not known to leach any chemicals into foods or drinks
- commonly recycled
- a relatively stiff plastic
- high resistance to cracking
- safe to refill and reuse

Type 3 polyvinyl chloride (PVC): Avoid
- not often recycled
- can be harmful if ingested
- should not come in contact with food items
- may also contain phthalates
- Some phthalates are hormone disruptors that have been linked to possible reproductive problems and birth defects
- PVC workers have higher cancer rates

Type 4 low-density polyethylene (LDPE): Safe
- not commonly recycled, but it is recyclable in certain areas
- tends to be both durable and flexible
- not known to release harmful chemicals into objects in contact with it
- safe choice for food storage

Type 5 polypropylene (PP): Safe
- can be recycled but is not accepted for recycling as commonly as PETE or HDPE
- strong and can usually withstand higher temperatures
- good chemical resistance
- does not leach harmful chemicals into foods or liquids

Type 6 polystyrene (PS): Avoid

- can be recycled, but not efficiently
- plastics can leach styrene, a known neurotoxin with other negative health effects
- commonly used in disposable coffee cups, plastic food boxes, plastic cutlery, packing foam, and packing peanuts

Type 7 Other: Avoid

- difficult to recycle
- may contain harmful chemicals
- Avoid, unless it is labeled as one of the new bio-based plastics

Only type 2, 4 and 5 are 100% safe to be used as reusable water bottle material, where 2 and 5 are more commonly recycled. Many sources suggest type 5 plastic due to its high temperature resistance. The Chinese Variety Club made a good choice by using type 2 plastic as their water bottle material.

5.0 Clipboard Evaluation

5.1 Clipboard Utility

On the UBC campus, a clipboard has a great deal of usability for the CVC's target demographic. The CVC's demographic is university students, most likely new students, and they will very likely find having a clipboard very helpful at some point in their university career. Furthermore, the CVC has added a convenient and simplified map of the UBC Vancouver campus to the back of the clipboard. It shows the locations of parking areas, green areas (lawns), coffee shops, places to relax, etc. which makes the clipboard more desirable to newer students.

5.2 Promotional Value of Clipboard

The clipboard provides a great deal of promotional value for the CVC. It provides a great deal of space to advertise the club (the current version has the logo as well as links to the website and their Facebook, Twitter and Instagram accounts). Furthermore, since the clipboard is likely to be used on a regular basis for a long period of time, the logo will be seen repeatedly by the person with the clipboard as well as by those around them which will spread awareness of the club.

5.3 Comparison of Clipboard Materials

Paperboard covered in vinyl (current clipboard):

- *Sustainability*
    - Paperboard is easily recyclable
        - Would have to peel off the covering in order to recycle the board
        - Many stores offer clipboards made from entirely recycled paperboard
    - Vinyl manufacturing releases carcinogenic fumes
        - Dioxins in particular
        - Requires use of chlorine gas to manufacture (Largest use in the world)
    - ~50% of vinyl is made of renewable salts, while the other half is derived from petroleum
    - Vinyl is recyclable, but it is somewhat difficult due to additives (~1% is recycled, only one company in BC recycled vinyl)
    - Can find versions that are made of recycled materials
- *Cost*
    - Very inexpensive

Plastic:

- *Sustainability*
  - Reusability depends on the plastic used
  - Derived from petroleum
  - Likely made of PP
- *Cost*
  - Relatively inexpensive to produce

Masonite:

- *Sustainability*
  - Biodegradable
  - Manufactured from recycled wood materials that would otherwise be disposed of
  - Requires petroleum based adhesives to manufacture
  - Absorbs carbon during its life to offset production emissions
- *Cost*
  - Cheaper than other wood products

Aluminum:

- *Sustainability*
  - Produced from bauxite (Al ore) rolled into sheets
  - Raw materials plentiful
  - Aluminum production is very energy intensive (requires a lot of electricity) and generates significant greenhouse gas emissions
- *Cost*
  - Most expensive alternative

Overall, the current clipboard option seems to be the most appropriate. Although vinyl is not particularly environmentally friendly, each of the alternatives also have environmental impacts. Furthermore, the current type of clipboard is quite commonly made from recycled materials, which offsets a great deal of its negative aspects. Finally, the vinyl wrapped paperboard is the only clipboard that offers a cover to protect papers, which makes it far better suited to use by students who will be repeatedly placing it in their backpacks.

6.0 Swag Assessment Strategy

One of the critical components of this project is creating a systematic approach to selecting effective swag without compromising the environment and social equity. We therefore tried to create a general method that could be used to select swag adequately. This method is general enough that it can be applied to different organizations with different goals and beliefs. But it is specific enough to produce exact recommendations. We decided to make use of our understanding in design decision making and utilize a Weighted Decision Matrix.
We assessed the current swags that CVC club is using, and provided them with three alternatives and their rankings based on our framework.

6.1 Swag Evaluation Criteria

Initially we brainstormed various factors that should be considered when selecting swag. We then converged to the following list of evaluation criteria that considers the triple bottom line framework:

1. Sustainability: Before choosing a swag item, research must be done on the sustainability of the product being considered.
   The following are the key points to consider:

   1.1. Manufacturing: the methods used to transform basic materials into the products being considered. There are basic factors to consider when analyzing the manufacturing process behind a swag:
      1.1.1. Energy: Whether the process behind manufacturing the swag was efficient and how much energy was used.
      1.1.2. Pollutants: Whether the manufacturing process produced CO_2 emissions or other toxic chemicals that were released to the environment.

   It is very hard to quantify the above characteristics, but qualitatively we can characterize the manufacturing process behind the swag according to the sustainable standards followed by the producer. Products that comply with the following standards or their equivalent should be preferred over those that do not. Examples of recognized standards are the following:
      - Life Cycle Assessment (LCA): evaluates the environmental effects and benefits of the product throughout its entire life cycle.
      - Global Reporting Initiative (GRI): Frames out global sustainability on economic, environmental and social aspects.
      - Nordic Swan Ecolabel: Distinguishes products with a positive impact on the environment, by considering factors such as CO_2 emissions.

   1.2. End of life assessment: the methods of handling swag product after its useful life. There are two key factors to consider:

1.2.1. Recyclability: Whether most or all of the material used in this product can be reused to produce other products.

1.2.2. Disposability: In case a material is not recyclable, can it be disposed in an environmentally friendly way and therefore, is it biodegradable?

It is relatively easy to research the material used in the swag if the swag is not made out of many components and the materials used are disclosed to the customer. Most metals are recyclable. Plastics can be identified based on the *Resin Identification Code.* The buyer can research the code, each code gives a unique polymer family and information on its level of recyclability. Ceramics are generally not recyclable, thus they should be avoided. Composites should typically be avoided as well.

If a material is not recyclable, the buyer should research the disposability of the product. Is it biodegradable? Can it be used as fuel to produce energy? Does it have to go to a landfill? One way to evaluate the disposability of a product is checking whether it is biodegradable through different standards such as Biodegradable Products Institute (BPI).

2. Social equity: When choosing a swag, research must be done on the social aspect of the product being considered. The following are the key points that must be considered:

2.1. Conditions of workers: Conditions of workers include but are not limited to workers age, working conditions and how much they get paid. It is difficult to backtrack to these conditions throughout the supply chain of the product. For the buyer of the swag, it would be easier to research if the producer follows International Labour Standards or not. This standard includes consideration of justice, pay, age and similar things. Fair Trade and Fair Labor Association are examples of organizations that certify different manufacturers that follow their standards.

2.2. Supporting local producers: Purchasing products from local businesses usually results in an increase in cost, but it is more desirable to support the locals if possible (if it fits within the budget)

3. Cost: is one of the most important factors in choosing a swag. For a certain level of sustainability, usefulness, and promotional value, we would like to pay the least amount.

4. Reliability: For the sake of selecting swag, useful life is the best measure of reliability. When looking into reliability we should answer these questions:
   - How long can this product serve its purpose?
   - Is it of acceptable quality or will it fail prematurely?
   - What is the guaranteed life from the producer?

   Sometimes making a nice looking product that is cheap enough to fit within the budget takes away from the quality of it.

5. Usability: It is important that the swag fulfills the needs/desires of the targeted students. If it doesn't, no matter how sustainable or cheap it is, it is wasteful. Swag such as pens and water bottles can be used by all students. Handing out products that only apply to a certain group of students may not be a good idea unless the organization has a specific targeted group to whom the particular swag applies.

6. Promotional value: The main purpose of handing out swag is to promote the organization's values or popularity. Sometimes having unique swag can help with promotion as more people will notice them. It is also important that there are clear labels and logos of the swag providers on the product.

6.2 Weighted Decision Matrix

The weighted decision matrix is used to evaluate the different options and choose the best one. The weight column gives different importance to the different criteria mentioned above. Depending on the Club or Organization, the weights can be adjusted. For example, if supporting local businesses is of no importance to a certain club or company, they can delete it from the "Values" section or give it a weight of 0.

Values from 0-10 could be given to different options based on how they meet the criteria. Ten is the best score, 0 is the worse. The following are some guidelines on how to quantify the different scores:

1. Sustainability of Manufacturing: Give a basic score of 0, 5, or 10. Zero is considered "unacceptable" or "lacking standards", 5 is "currently acquiring approval for following some standards", and 10 is "meeting one or more of the mentioned standards".
2. Sustainability, End of Life: If the product is not recyclable or biodegradable it gets a 0, if it is not recyclable but biodegradable it gets a 5, and if it is recyclable it gets a 10.
3. Social Equity and the Conditions of the Workers: If the producer follows International Labour Standards, Fair Trade, Fair Labour, or any equivalent standards they get a score of 10, otherwise they get 0.
4. Local Production: If the product is produced locally it gets a score of 10, otherwise a 0.
5. Cost: The cheapest choice gets a score of 10, the rest of the options get a score of: 10*(cheapest option/considered option).
6. Reliability: The longest guaranteed life product gets a score of 10, the rest of the options get a score of: 10*(considered option's life/longest life option).
7. Usability: The usability of different products could be evaluated relative to each other. The most useful product for a targeted group gets a score of 10 and the least useful a 0 and the rest of the options range from 0-10 intuitively.
8. Promotional Value: This score is also very intuitive, thus a product that is very unique will get a score of 10. Otherwise, it would get a lower value. If a product is very basic and is normally given out by any Club or Organization it gets a score of 0.

7.0 Swag Alternatives

In order to do a proper assessment on the swag items used by CVC, we made use of our Weighted Decision Matrix to evaluate and compare the swag to similar items from a sustainable producer as well as a few alternative swag.

The alternative swag items are: wood USB, seed packet, mint in mint box. Figures 3-5 show examples of the alternative swag options.

Figure 3 - Alternative Swag: Wood USB
Source: www.fairware.com

Figure 4 - Alternative Swag: Seed Packet
Source: www.fairware.com

Figure 5 - Alternative Swag: Mints in a Mint Box
Source: www.promotionalproductscanada.com

The current products were also compared to similar, sustainable versions of the same products: recycled letter clipboard and stainless steel water bottle. These can be seen in Figures 6 and 7.

Figure 6 - Alternative Swag: Recycled Clipboard
Source: www.fairware.com

Figure 7 - Alternative Swag: Wide Mouth Stainless Steel Water Bottle
Source: www.fairware.com

Table 1 illustrates our assessment of different swag items and their rankings. It can be seen that the swag items that are currently used by CVC ranked fairly low compared to others. The similar more sustainable clipboard and water bottle had the highest rankings, which shows that it is not about the product itself, but how and with what material it is made. However, this assessment also assumed that the costs of the current CVC swag items was identical to those of the more sustainable versions. As cost is the most highly weighted metric, if the actual costs are different then the results would change.

Table 1 - Swag Evaluation Weighted Decision Matrix

Values	Weight	A: Wood USB	B: Seed Packet	C: Mint in Mintbox	D: CVC Clipboard	E: Sustainable Clipboard	F: CVC Water bottle	G: Sustainable Water bottle
Sustainability: Manufacturing	10	5	10	10	5	10	10	5
Sustainability: End of Life Assessment	10	5	10	10	10	10	10	10
Social Equity: Conditions of workers	7.5	10	10	0	0	10	0	10
Social Equity: Local Production	5	0	0	0	0	0	0	0
Price	*N/A*	$12.65	$0.81	$1.03	$4.44	$4.44	$5.05	$5.05
Cost	20	0.64	10.00	7.86	2.32	10.00	8.79	10.00
Reliability	15	10	10	10	10	10	7.5	10
Usability	15	10	2	8	10	10	10	10
Promotional Value	17.5	8	2	5	10	10	2.5	10
	Score:	627.81	690.00	714.78	643.24	773.20	526.65	787.92
	Rank:	6	4	3	5	2	7	1

8.0 Conclusion and Recommendations

Since promotional items are part of the growth in consumption that is leading to increased waste production it is important to evaluate the quantity and quality of swag. An increasing number of products are being evaluated and companies are shifting towards selecting items that are environmentally friendly and socially beneficial

The two swag items that the CVC gives away are clearly beneficial to all students; everyone drinks water and almost every student uses a clipboard. The clipboard is the same as the ones given away by the UBC Bookstore, and it contains a map of the UBC campus on the back. The water bottle is a small size and therefore easy to carry around.

The suggested framework for swag evaluation produced valid recommendations as shown above in Table 1. Thus it can be concluded that it is a valid systematic approach to selecting appropriate swag on the basis of triple bottom line assessment.

Overall, the swag items given away by the CVC are both good choices. They made a good choice by using type 2 plastic for their water bottle, though plastic still energy intensive and causes pollution during production. If it is expected that the lifetime of the water bottle will be significant than the sustainable stainless steel water bottle is recommended in future years. If the lifetime is expected to be a few months, then we recommend that they continue with the plastic water bottle. The clipboard is an excellent choice as a swag item to give away on the UBC campus, and we appreciate that it is a traditional item. However, in future years it is recommended that the CVC look into purchasing the sustainable clipboard made of recycled materials.

References:

Banas, T. (2015) *Which plastic container can I safely use?* Retrieved April 1, 2015 from http://www.livestrong.com/article/158674-which-plastic-containers-can-i-safely-use/

Bergman, R. (2014, May 1). *Gate-to-gate Life-Cycle Inventory of Hardboard Production in North America.* Retrieved March 24, 2015, from http://www.fpl.fs.fed.us/documnts/pdf2014/fpl_2014_bergman005.pdf

Bigam, S. (2013) *Student petition to ban bottled water at UBC.* Retrieved April 1, 2015 from: http://ubyssey.ca/news/bottled-water-151/

Bloch, M. (2009, January). *PVC plastic's environmental impact*. Retrieved March 24, 2015, from Green Living Tips: http://www.greenlivingtips.com/articles/pvc-and-the-environment.html

Bottled Water Free UBC? Retrieved April 1, 2015 from http://planning.ubc.ca/vancouver/news-events/newsletter/2013-10-21/bottled-water-free-ubc

CVC Members. (25 March 2015). Interview.

EPA. (2000, January). *Air Toxics Web Site - Vinyl Chloride*. Retrieved March 24, 2015, from United States Environmental Protection Agency: http://www.epa.gov/airtoxics/hlthef/vinylchl.html

Epa.gov. (2015). *Life Cycle Assessment (LCA)* | *Sustainable Technology Research* | *US EPA*. Retrieved 2 April 2015, from http://www.epa.gov/nrmrl/std/lca/lca.html

European Topic Centre on Resource and Waste Management. (2005). *Paper and cardboard - recovery or disposal?* Copenhagen: European Environment Agency.

Fairlabor.org. (2015). *Fair Labor Association*. Retrieved 2 April 2015, from http://www.fairlabor.org/

Globalreporting.org. (2015). *Global Reporting Initiative*. Retrieved 2 April 2015, from https://www.globalreporting.org/Pages/default.aspx

González-Garcíaa, S., Feijoo, G., Heathcote, C., Kandelbauer, A., & Moreira, M. T. (2013). *LIFE CYCLE ASSESSMENT OF NEW BIO-HARDBOARDS USING A.* Retrieved March 24, 2015, from http://conferences.chalmers.se/index.php/LCM/LCM2013/paper/viewFile/541/142

Iliescu, A. & Thorpe, C. (2010). *Guide to Sustainable Promotional Products.* Retrieved April 1, 2015 from: http://www.equiterre.org/sites/fichiers/divers/guide_to_sustainable_promotional_products.pdf

Ilo.org. (2015). *Labour standards*. Retrieved 2 April 2015, from http://ilo.org/global/standards/lang--en/index.htm

Jezek, G. (n.d.). Retrieved March 24, 2015, from What Is Vinyl: http://www.whatisvinyl.com/

Lee, K. (2013) *COMPARING REUSABLE WATER BOTTLES ON SUSTAINABILITY: STAINLESS STEEL, GLASS, AND PLASTIC {INFOGRAPHIC}.* Retrieved April 1, 2015 from http://www.drkarenslee.com/comparing-reusable-bottles-stainless-steel-glass-plastic/

Liu, S. (9 February 2015). Email Message.

McCarley, B. (n.d.). *The Advantages of Masonite*. Retrieved March 24, 2015, from eHow: http://www.ehow.com/info_8326494_advantages-masonite.html

Nordic-ecolabel.org. (2015). *Nordic Ecolabel*. Retrieved 2 April 2015, from http://www.nordic-ecolabel.org/

Ongmongkolkul, A., Nielson, P. H., & Nazhad, M. M. (n.d.). *Life Cycle Assessment of Paperboard Packaging Produced in Thailand.* Retrieved March 24, 2015, from http://infohouse.p2ric.org/ref/37/36487.pdf

Plastic recycling Codes and Resin Identification Code. Retrieved April 1, 2015 from https://www.completerecycling.com/resources/plastic-recycling/codes

Plasticsindustry.org. (2015). *SPI - About Plastics - SPI Resin Identification Code - Guide to Correct Use*. Retrieved 2 April 2015, from http://www.plasticsindustry.org/AboutPlastics/content.cfm?ItemNumber=823

Schueller, G. *What's the Best Reusable Water Bottle?* Retrieved April 1, 2015 from http://www.eatingwell.com/food_news_origins/green_sustainable/what_s_the_best_reusable_water_bottle

[1] *Tap That.* Retrieved April 1, 2015 from http://commonenergyubc.com/events/tap-that/

Thornton, J. (n.d.). *Environmental Impacts of Polyvinyl Chloride (PVC) Building Materials.* Retrieved February 25, 2015, from http://mts.sustainableproducts.com/SMaRT/ThorntonRevised.pdf

Tooley, J. *THE DIFFERENT TYPES OF PLASTICS AND CLASSIFICATION.* Retrieved April 1, 2015 from http://www.qualitylogoproducts.com/lib/different-types-of-plastic.htm

Tufveenson, A. (2011) *Plastic Vs Stainless Steel Vs Aluminium reusable water bottles.* Retrieved April 1, 2015 from http://www.greenlifestylemag.com.au/features/2436/plastic-vs-stainless-steel-vs-aluminium-reusable-water-bottles?page=0%2C0

(2013) *Know Your Plastic.* Retrieved April 1, 2015 from http://healthychild.org/easy-steps/know-your-plastics/