Product Report:

RotoRinse

DSGN 308 - Team 2 - 12/07/2016

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Problem Definition

Brushes are the most common tool for makeup application for both casual and professional users. A key component of makeup brush ownership is the upkeep of these products. Routinely cleaning brushes helps to maintain the integrity of brush bristles, helping users protect their investment. Brushes accumulate pigment, dirt, and bacteria over time, which can worsen skin conditions that makeup users are already struggling with (such as acne and eczema). To protect the health of their clients, it is protocol for many professional makeup artists to wash, disinfect, and dry their brushes on an almost daily basis, according to Tom Pecheux, a professional runway makeup artist. A good set of makeup brushes can be good investment, such as Artis Makeup Brushes that can cost upwards of $200 for five. Therefore, keeping them in good shape can be a worthwhile endeavor.

Greg Goodman, a dermatologist at the Dermatology Institute of Victoria recommends a daily cleansing of brushes to remove excess pigment and bacteria. He notes that “Make-up is designed for coverage, so it sticks together to some extent. Brushes are also very good at allowing layer after daily layer to stick to bristles, letting dirt and bacteria to get trapped within.”[1] Supermodel Anthea Page complained that unhygienic makeup brushes caused illness on a number of occasions, demonstrating that the lack of makeup brush hygiene is not just an issue amongst the common consumer, but also professionals who rely on said brushes for their livelihood. Page contracted a staph infection, which is caused by the bacteria Staphylococcus aureus, frequently found around the skin and mouth areas. Anthea stated that this was “not my first time receiving an ailment from a dirty makeup brush and unfortunately in my line of work I doubt it will be the last but please be aware of this if you ever come close to a makeup kit so you can keep yourself safe and healthy.”[2]

However, despite having anecdotal evidence of infections, acne lesions, as well as professional advice regarding the cleansing of brushes, most makeup users still have unhealthy makeup brush cleansing habits. Interviews with users of makeup indicated that people tend to avoid cleaning their brushes due to their inability to reshape brush hairs after washing, the lengthy drying process, as well as the time it takes to individually wash the brushes by hand. Many users also confessed that they were simply unaware that brushes had to be cleansed at all.

Visual artists whose careers rely on makeup brushes essentially face the same problem. One thing we noticed is that many people stayed away from paint as a medium because it is messy and cleaning up brushes is a hassle. Paint artists also articulated that they

needed their brushes to be clean very quickly and could not wait overnight like with makeup users due to their need to rapidly switch between pigments and mediums.

Opportunity Selection

The team believes that we have thoroughly scoped out this problem and we are excited to present a new product that is capable of washing makeup brushes in a way that overcomes many of the challenges associated with traditional or mechanical applications. Through our brainstorming and personal testing, we found that washing brushes can be a pain. Not only are current solutions time consuming, require a lot of effort, and occasionally abrasive to skin (when scrubbing against one's hand), but also because they make brush washing an unpleasant experience. These same problems also exist in washing paint brushes used for leisure painting, wall painting, and art classes.

A large percent of the population (women and other users) interact with brushes on a daily basis and yet there is still no current market solution that is capable of efficiently washing a high volume of brushes. Whether it be makeup, art, or painting related, manually washing brushes can take upwards of 30 to 60 minutes and can be a tedious task. In a world focused on time management, quick solutions, and efficiency there is a significant need for a fast and effective brush washer capable of handling large volumes of dirty brushes produced by daily beauty regimes, personal art projects and more extreme examples like painting classes. It should be noted that the cosmetics and paint industries are very large. It has been estimated that the market value for cosmetics will exceed 62 billion USD in 2016[3]. Additionally, in 2015, the US demand for paint and coatings was valued at approximately $26.2 billion.[4] For this reason, there are many opportunities for products in this domain to succeed.

From a recent 2015 survey, it was found that 61% of women who own makeup brushes clean their brushes less than is recommended. 65% of women who clean their brushes do so to avoid bacteria, breakouts and blemishes. Even those who understand the consequences often don't clean them as often as recommend. 39% of women who use current makeup cleaning tools clean the brushes less than once a month. 22% of users admitted to never cleaning them, according to a recent online survey conducted by Harris Poll on behalf of Anisa International, a global leader in the design and creation of unique beauty tools and solutions. 22% say it takes too long to clean them or for the brushes to dry. 21% weren't aware they needed to, 19% just buy new brushes and 17% don't know how to clean them properly. Narrowing down the population to just millennials and that number jumps to 31%.[5]

There’s a noticeable gap and dissonance between user values and actions, and it seems that current methods for brush cleaning is not filling in that gap efficient. Most users don’t have time to research how to do it properly, or invest time to actually clean the brushes. Some brushes can be extremely expensive and washing the brushes incorrectly can not only damage the brush but also may affect hygiene. At the end of the day, users are looking for a solution that can clean brushes until there’s no color leak, clean multiple brushes, clean brushes quicker than hand washing, be less expensive than $30, and provide an overall favorable user experience. The existing solutions simply are not cutting it. We are confident that our current product design has the ability to address these issues and we are excited to continue developing a viable product capable of making a big impact in the brush cleaning market.

Need Finding Research

Stakeholder Research

The follow is a compilation of all possible stakeholders involved in the production, distribution, product support, and usage of our brush cleansing device. This compilation is intended to highlight several of the key players in our product development process.

- Primary Market - Makeup users
    - Professional
        - Personal makeup artists
        - Fashion/runway makeup artists
        - Photography makeup artists
        - Film, theatre, television makeup artists
        - Cosmetics schools
    - Semi-professional
        - Performers who apply their own makeup
        - Beauty supply store employees
        - YouTube makeup “gurus” and bloggers
    - Recreational users

- Secondary Market Opportunities
    - Artist paint brushes
        - Schools (day care and high or middle school level)
        - Adult classes
        - Enthusiasts
        - Professionals
    - Industrial scale painters
        - House painters (inside + out)
        - Furniture painting

- Production, Distribution, and Support
    - Retailers
        - Large cosmetics focus stores (Sephora, Ulta)
        - Smaller beauty supply stores (Sally Beauty, individual owned, etc)
        - Online retailers (beautylish, Birchbox)
        - Television retailers (HSN, QVC)
    - Manufacturers
    - Customer support

5 Why Analysis – Understanding the Need

The team conducted a 5 Why analysis to try and dive down to the root cause of why existing makeup brush cleansers are not perfect. From this analysis, it was concluded that there are no existing products on the market that engineered well enough to balance key cleaning factors such as speed, maintaining brush integrity, cleaning efficiency, and the ability to clean multiple brushes of varying sizes. This analysis was very useful in guiding the teams thought process and tailoring our idea of what an improved makeup brush cleaning product would look like. The following is the result of our exercise:

Observation - Cleaning makeup brushes is a hassle.
Q: Why is cleaning makeup brushes such a hassle?
A: You have to exert a high amount of effort to adequately sterilize and remove color pigment.

Q: Why does it take so much effort to sterilize and remove color pigment?
A: Current cleansing solutions are unable to provide benefits within realistic time and effort expectations.

Q: Why are current cleansing solutions inadequate?
A: Current solutions are not robust enough to fully to eliminate both bacteria and color pigment.

Q: Why are current solutions not robust enough?
A: There are a multitude of different makeup brushes available on the market. Engineering a solution that can balance key cleaning factors such as speed, maintaining brush integrity, and cleaning efficiency for all types of brushes is difficult.

Q: Why is engineering an ideal solution difficult?
A: An optimized cleaning methodology that balances these key factors for different types of brushes has not been developed.

Survey – Inquiring into User Needs

Our team conducted a survey that aimed to gain deeper insight into what users are looking for in an ideal product. Our survey was sent to individuals who either regularly use or are familiar with makeup brushes and the makeup brush cleaning process. The survey gathered key information including how often users apply makeup, how often they clean brushes, how they clean brushes, how long they spend cleaning brushes,

what they would be looking for in an improved product, and how much they would be willing to spend on an improved product. The results from this survey were incredibly useful for the team to shape and develop our product concept. Key learnings from this survey that were incorporated into our design process were that the users we interviewed, on average, owned 10 brushes, were looking for a product that cleaned brushes in under 11 minutes, and that cost under $26. Overall, our survey gleaned several important insights that were critical in the way that we approached our product's design.

User Centered Design Research

"Why should washing makeup brushes take longer than me loading my laundry?"
-Xiaomei Sun

Through user surveys and interviews, we found that the top priorities for users included user interaction time, overall washing time and overall drying time. According to our survey, the main reason 31% of users don't clean their brushes is because it's too much of a hassle and 25% say it's because it takes too long to clean. Through user observation we found that users struggle to know how to best dry their brushes, often just leaving them at the edge of a table to dry. This was an unarticulated need that we tackled through our addition of the brush holders on the back of the device. Our design allows the brushes to not only dry quicker, but also maintain their shape as well as prevent the loss of glue holding the bristles in. We later found from our survey that once drying is mentioned users realize how much of a pain point that is in the process. We found that the main competitor, the Lilumia, took an average of 12.5 minutes of user interaction for the six brushes that it cleaned, meaning that each brush took over 2 minutes of user interaction. Our product only takes 15 seconds per brush with an additional 30 seconds total of set up, teardown and cleaning, bringing the average time per brush to 20 seconds if washing six brushes. Users also didn't like how you had to clean the Lilumia after using it, so we designed our product to require minimal cleaning and incredibly easy disassembly of main components to allow for fast cleaning. Our product can be cleaned simply with one swoop of a sponge, taking at most ten seconds.

Surveying the current market for brush cleaning technologies, there appear to be a few prevailing, unmet user needs. Users are looking for a fast, simple, and cheap solution that can effectively clean brushes and prevent staining. Major drawbacks of current technologies are that they are highly time and labour intensive. However, in the current marketplace, these drawbacks are not enough to overcome the need for a cheap cleaning solution. It seems very plausible that there would be a large customer base for an autonomous brush cleaning technology, but the price point of such a technology would prevent too many from the purchase of the product. Simply put, there is a great user need for a brush cleaning technology that is inexpensive, effective and quick. Our product hits all these user needs with a production cost estimate under $10.

Figure 1: A word cloud generated from the feedback we received from a survey of 31 users.

Competitive Landscape

Aside from manually washing the brushes by hand, the most common solution to makeup brush cleaning is the use of scrubbing pads. These pads are typically composed of silicone, are antibacterial, and are roughly the size of the palm of the hand. They rely on a highly manual process in order to produce clean brushes. Silicone pads are typically placed in or attached to the palm of one hand while the other hand wipes the brush bristles across a jagged or textured surface. These silicone pads are relatively easy to use, are portable, and can be purchased for under $10. The manual cleaning process can be both tedious and strenuous, especially if multiple brushes are being cleaned. While it may be difficult to compete with silicone pads on a pricing level, a reasonably priced solution that can remove the physical requirements of the current process would have significant appeal.

There also exist “automatic” brush cleaners such as the Lilumia ($149) and the BrushPearl ($99) which take advantage of motors to vibrate or spin the brushes in solution to clean them. However, these solutions are pricey and can only be purchased online and in select retail stores. In addition, user reviews of both devices are mediocre at best, suggesting that the products do not live up to their expectations of efficient and sanitary cleansing. The most often critique of the products is that they requires multiple runs to fully clean the brushes. Furthermore, from user observation, users are unaware of how to properly setting them up. This allows the brushes to either not get cleaned thoroughly or to damage the bristles.

Competitive Benchmarking

Three existing solutions - manual hand washing, manual hand washing with the help of silicone pads, and the Lilumia - were benchmarked to determine cleansing efficiency and user input in order to help guide the process of the design.

In order to perform the benchmarking, six brushes were soiled with makeup, left to dry over the course of twelve hours to allow the longwearing pigment to set, and then cleansed using one of the three methods using a typical brush shampoo until there was no visible leftover residue on the brush. A table of the results can be found below:

Cleansing Method	Total Time Consumed (minutes)	Total User Interaction Time (minutes)	Time consumed/brush (minutes)
Hand-washing	5.3	5.3	0.88
Silicone pad washing	3.3	3.3	0.55
Lilumia	26.5	12.5	2.08

From these results, it was evident that the Lilumia raised the user interaction time by 1.2 minutes per brush compared to traditional hand-washing, demonstrating that it is a device that lacks efficiency. Furthermore, user testing of the Lilumia conveyed that the overall user experience was a negative one. Users disliked the amount of time they had to invest into the cleansing experience, as well as the bulkiness and inefficiency of the product in terms of how long it took to set up and take down. Finally, power users expressed frustration that the Lilumia could only realistically clean 6 brushes at once, and said that they would instead prefer a streamlined process that is faster than manual scrubbing, even if it required more user interaction.

Prototyping/User Testing

Following the user survey and benchmarking, we created three potential ideas to pursue that emphasized simplicity and efficiency. We tested these ideas in the form of low-fidelity prototypes with frequent users of makeup and used the findings to narrow down the direction we wanted to pursue.

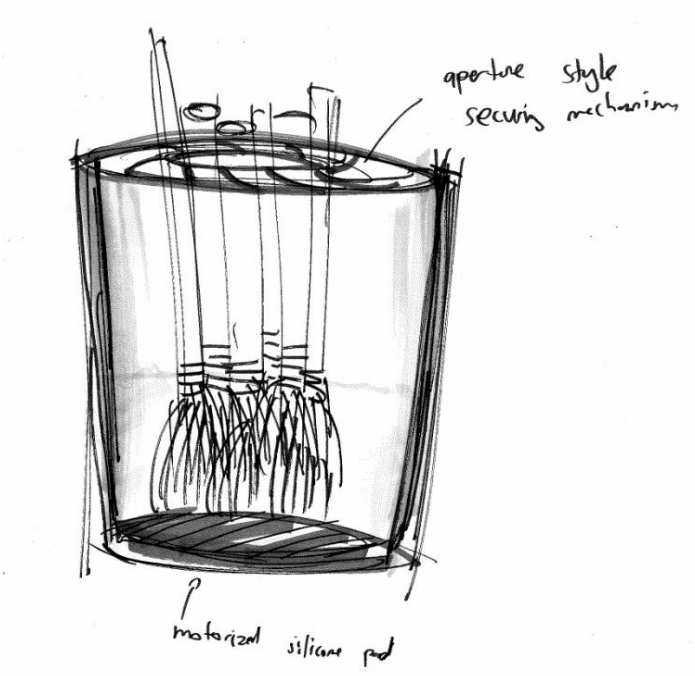

Figure 2: First concept proposal - tubular design

This tubular design was inspired by existing solutions and features an aperture-like mechanism that holds the brushes in place while a motorized silicone pad cleanses the brushes. Users noted that the design looked bulky and difficult to maintain and clean due to its cylindrical shape. In addition, users expressed concerns regarding the battery of the product and whether or not it would need to be plugged in in order to function.

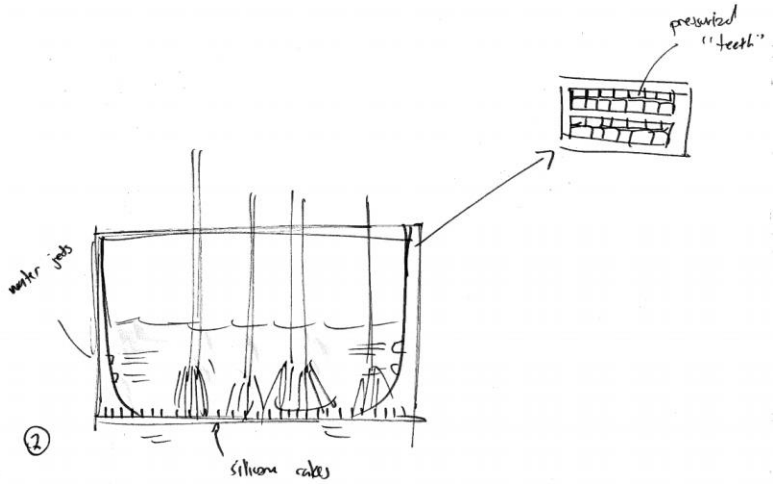

Figure 3: Second concept proposal - deep cleanse design

This concept was designed for deep cleansing and would hold brushes with pressurized teeth instead of an aperture mechanism. Users thought that the device looked like it would clean brushes better than the first concept and that the brushes would remain more stable. However, users expressed concerns that the design looked even bulkier than the first, and the battery issue still persisted.

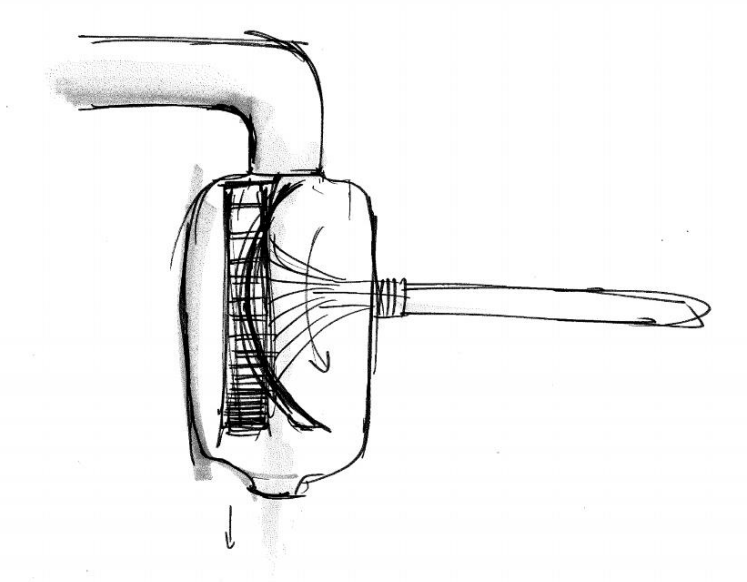

Figure 4: Third concept proposal - faucet powered design

This concept was created under the knowledge that users were looking for something small and portable, unlike existing solutions. Users were receptive to the streamlining of the design, and expressed a desire to see the cleaning action. Users were also concerned that the pressure from the faucet alone would not be able to power the scrubbing motion adequately.

Value Chain Analysis

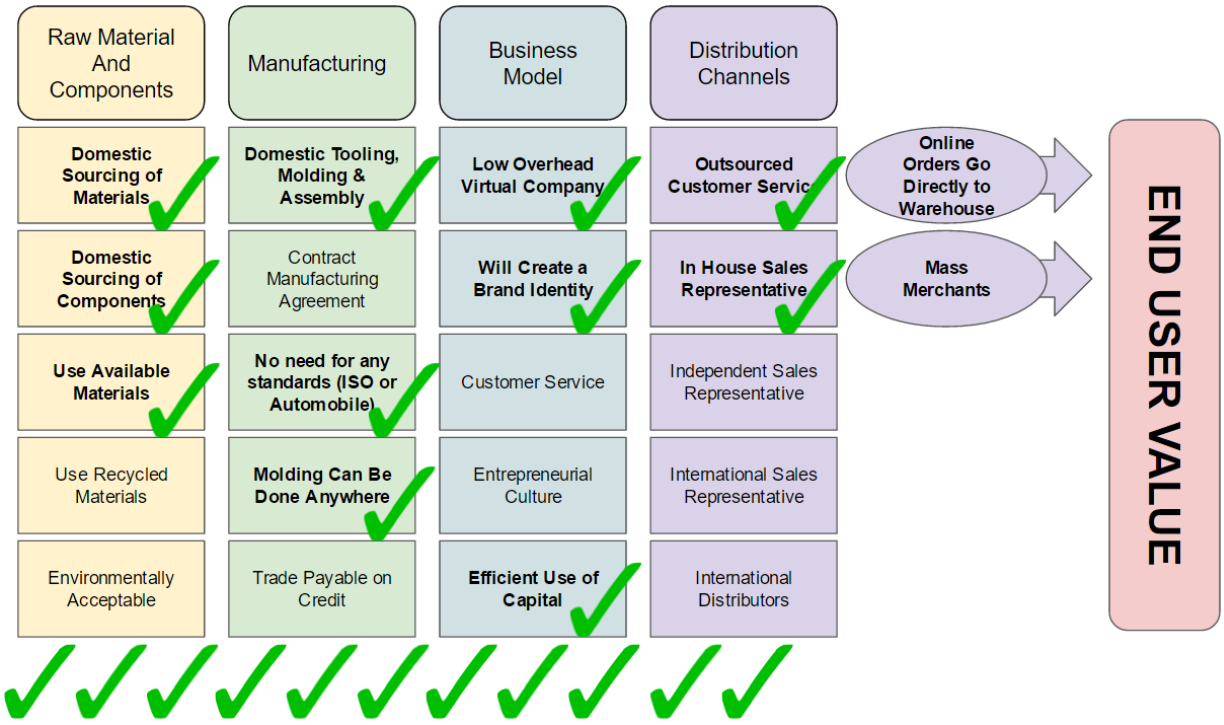

Figure 5: Value chain analysis diagram

Starting with the raw materials and components, we can very cheaply acquire almost any cheap plastic for molding. We can get these domestically from many suppliers as the plastic can be an extremely common one like ABS or whatever the supplier has and the manufacturer wants to use. For the manufacturing, we can do it all in the US as all our parts are small and have been designed for injection molding, with no side action required. The assembly of the product has been designed to be incredibly simple and to allow bottom up assembly. The process is outlined below:

1. Slip faucet attachment tube over top cup nozzle
2. Snap back wheel plate onto wheel
3. Snap wheel into cup

This process should take 15 seconds to complete and can be done in a process layout or a line layout, whatever the manufacturer prefers and is cheapest. Alternatively, if our product does extremely well, this process could be automated easily, but most likely that won't be necessary. Our molds will be consumer products with pretty loose tolerances on most parts meaning the tooling can be done by anyone with no need for ISO or Automobile standards. This will bring down the price. Finally, because the molding is so simple, we can do it essentially anywhere. This is an advantage because we can then

pick our manufacturer based on who gives us the best agreement. Another advantage is we can pick a manufacturer close to a supplier or close to wherever we want to hold inventory or an amazon shipping center for cheaper shipping. These all reduce cost. The Supply Chain portion of the Value Chain wasn't included as it will depend on what manufacturer we pick, but we should be able to get a great deal due to the simplicity of our part and vast options. Figure 6 shows just the top ten injection molders in the US who do consumer products. According to Plastic News, an industrial news source, estimates that there are over 100 from all around the country.[6]

Rank	Company	Top injection molding official	Injection molding sales (millions $)
3	Berry Plastics Corp.[P] Evansville, IN	Jonathan Rich Chairman & CEO	1,400[E]
5	Newell Brands Inc.[P]b Atlanta, GA	Michael Polk CEO	950[E]
7	Nypro Inc. Clinton, MA	Courtney Ryan CEO & Exec. VP	690[E]
9	BWay Corp. Atlanta, GA	Kenneth Roessler CEO & President	590[E]
12	Technimark LLC[d] Asheboro, NC	Brad Wellington CEO	408
14	Tech Group Inc. Tempe, AZ	Mike Treadaway President, contract mfg.	400[E]
16	Letica Corp. Rochester, MI	Anton Letica President	395[E]
17	Cascade Engineering Inc. Grand Rapids, MI	Mark Miller CEO & President	360
18	Phillips-Medisize Corp.[jj] Hudson, WI	Matt Jennings Chairman, CEO & Pres.	355.4
25	Royal Technologies Corp. Hudsonville, MI	Jim Vander Kolk CEO & President	283
26	Westrock Co.[h] Richmond, VA	Kevin Clark Executive Vice President	280
27	MedPlast Inc.[i] Tempe, AZ	Harold Faig CEO	275[E]
31	Tessy Plastics Corp. Elbridge, NY	Roland Beck President	255[E]
34	EG-Gilero Columbus, OH	Larry Jutte COO & President	240[E]

Figure 6: The top few of many possible injection molders from Plastics News

For our business model, we plan on establishing a brand identity to allow us to bring more products to market within the same field. We could then tackle a better drying solution, a motorized washing solution or other brush cleaning products with our brand already established. We already have a graphic designer on staff to design a logo and

we have two teammates with web design experience to create a stunning, responsive website. As we wouldn't be owning a literal store, we could keep the maintenance of the company very cheap with just the small cost of owning a website. Any profits would be directly put into further product development to continue to expand our reach.

Finally, we will sell our product through our own website as well as large retailers. We may try something like QVC to get our product some initial visibility. To allow this, we will need customer service for our ordering page and a sales representative to find large retailers and work out agreements on price. The customer service will be outsourced as it wouldn't be worth our time to have a full time representative in house. There are many companies that provide this service like SupportNinja for example. The sales representative will be able to work from home on their own schedule and could potentially even be done by a current member of the team.

The two biggest areas where we add value from our design are the price and the usability of the product. Our product cleans brushes faster than high end, $150 cleaners at a much lower price, estimated at $25. Not only this, but it will be so clear to use that any user will be able to immediately see how it's used. This was an area where many users struggled before as very few users understand how often they should clean their brushes or how.

White Space Synthesis

Inclusive Design White Space

A key feature of this brush cleanser product is the inclusiveness of the design. It has been designed with the intention of reaching a wide audience while still achieving a high level of performance. The target stakeholders for the creation of an optimally designed project are the makeup artists who need to thoroughly wash brushes quickly in order to accommodate clients. By making the product with inexpensive components, it will be accessible to the larger audience of everyday makeup users due to the relatively low price. This technology could also become very popular in art classrooms where brush cleaning takes up class time and where the paints used can be rather difficult to clean. Another extreme user is your common industrial-scale painting operation. Painters responsible for painting large buildings and walls apply large volumes of paint and subsequently need effective solutions for rapidly and effectively removing large amounts of residual paint on brushes. These are also target areas where we can expand our product line into with more specific products, such as different sizes of cups and disks. To help make all users experiences more friendly, our developed product is lighter than three pounds and it should be transportable with one hand. Three pounds was selected as its the approximate weight of a DSLR camera, which is comfortebly held and maneuvered for minutes at a time.

Technical Design White Space

Based off the design of our product, it seems very feasible that our team would have success obtaining a patent. Considerable effort was put into analyzing the patent landscape and trying to understand what areas our team could leverage in the design process. Stepping back and taking a look at the final prototype that was developed, there appear to be products in the market that utilize patents that have features reminiscent of our prototype, however we still feel confident that our design and application is unique enough to secure protection under a patent. The most similar patents found were primarily scrubbing brushes intended for the cleaning of automobiles and industrial equipment. Looking to the future, there may be concern that our final design could be replicated, but that is all the more motivation to thoroughly assess and optimize the design of our product and work to capture a wide customer base. This may be easier said than done, but a key component to the success of any product launch is to become the most recognized and utilized product in your area.

User Experience White Space

The interviews and surveys conducted by our design team found that the user experience surrounding cleaning makeup brushes is critical. Two main user-related components that were found to be the most important were how effectively a product can clean brushes and how expensive the product is. An analysis of these components as they relate to existing solutions clearly identifies a white space that we believe our product is primed to take advantage of. As demonstrated by the orange box in the following white space figure, there is ample white space for a makeup brush cleaning solution that is both highly effective and can be offered at relatively low cost. The images included in the figure below include (from left to right, roughly) silicone scrubbing pads, traditional hand washing, the Brush Pearl brush cleaner, and Lilumia brush cleaner.

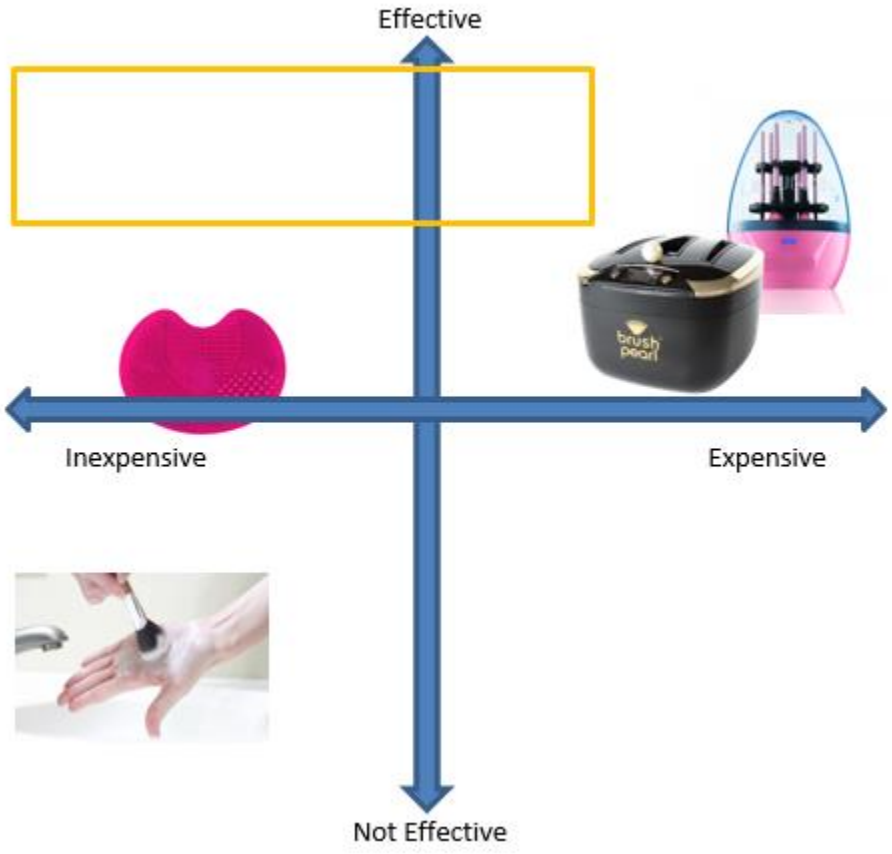

Figure 7: User Experience White Space

Business Model

Key Partners

Our key partners will be injection molding manufacturers since this product likely will not require any advanced technology beyond that. The utilization of standard logistics organizations will suffice for partnerships and the motivations of these partnerships are primarily to drive manufacturing or service based revenues.

Key Activities

The focus of this product line is lean manufacturing with a focus on scalability. The intent is to create a high quality product that can carefully balance the tradeoff between being "cheap" and produced with excessive cost. Before mass distribution and production, the product must be tested and approved by key opinion leaders in the makeup and fashion space. The main distribution channels will be beauty boutiques, department stores that carry makeup products as well as makeup cleaning products, and shopping aisles in wholesale or clearance stores such as, but not limited to, Wal-mart, Target, Marshall's and TJ-Maxx. We project that basic product marketing online will be critical to success in the beginning.

Key Resources

Physical: Garage or small workshop for temporary storage, functional injection molding machine to produce all parts of the product, and raw material supply.

Human: Functioning like a small startup, the company could sustain with the current four staff divided between the tasks of product creation and refining, and marketing through sales and brand representatives (Youtube, blogs, etc.). A full time sales representative could be brought in if we were unsuccessful on our own. An outsourced customer service company will be utilized to assist our online ordering.

Intellectual: Brand building ability through social media, website database for selling and marketing the product, and patent for technology.

Financial: Online bank to facilitate online purchases and orders.

Cost Structure

The cost structure will cover the basics of production including manufacturing partnership, shipping partnership, and marketing and publicity expenses. Products in the elementary stages of development and refinement will be made on a small scale. Once a

final product is reached, production will shift to mass production via factories and outsourcing to save wholesale costs. The payroll could eventually expand to include engineers, designers, research and development teams, product managers, financial analysts, and sales representatives.

Estimation for the product if all parts are self made/purchased in bulk:
Faucet Attachment Component - <$2
Scrubbing Pad - <$.50
Injection molded body, wheel and back - ~$.50 (plastic)+ $1 (molds) = ~$1.50
Entire product can be produced with costs around $5.

For the prototype the supplies that were bought to assemble the model were as follows:
Faucet Attachment: $5
Pad: $3
These prices would go down if we either made the parts or bought in bulk with estimates shown above.

Value Proposition

Will have the functional expectations of pigment removal, ability to dry brush and handling multiple brushes at the same time while have the user expectations of being under $25 and visually appealing. It proposes to solve the problem of tedious and abrasive hand-washing, all the while making washing brushes more convenient by combining the scrubbing and rinsing process, with drying capabilities. It makes benchmarks to competition by offering higher valuations in time, price, efficiency, yet it strays from the extremes of a full on machine with marginal functionality such as past precedents of the Lilumia and Brush Pearl.

Customer Relationships

The product’s customer outreach approach is to increase the machine and brand’s social media presence in order to promote branding of product, and reach out to possible customers through social media channels such as Instagram, YouTube, Facebook, etc while gauging interest and gaining feedback on the product.

Channels

Start marketing through social media outlets, send products to people with prominent social media presence for review (minimal costs if any). The initial flagship store will be online in order to shorten the supply chain. Over time, we will begin to develop distribution channels for supplying product. We will begin by establishing a presence on

major websites such as Amazon. Next, focus on beauty/fashion-centric stores and getting product stocked on shelves.

Customer Segments

Makeup users constitute roughly half of the civilized global population, with frequent makeup users constituting 58% of teenage girls, and approximately 20 million people in America alone.[7] The product also targets professional makeup artists, of which there are around 3000 in the US standalone.[8] In addition, there are dancers and performers, which total around 20,000 in US,[9] theater performers and makeup crews, makeup crews for movie and TV productions, and drag queens and models. These numbers are growing by the day.

Revenue Streams

Semi-professional artists are willing to pay $30-50 while everyday makeup users are willing to pay up to around $25. Through testing and surveys we found that customers are willing to pay to simplify and speed up brush washing process. They are also willing to pay in order to promote and increase cleanliness with an easily accessible, storable, and movable product. If product retails at $20-30, there is an approximately $10-20 gross revenue. Initial sales and marketing costs are estimated to be low due to social media promotion and the exclusively online store. SuperDrug, a large beauty store from the UK, states that an average makeup user spends about $12,000 on makeup products in their lifetime.[10] While the product may not seem like of pinnacle importance to those outside of the beauty industry, through trial runs and testing the product may be able to gain popularity as the prices are not outrageously out of range with current spending trends in the beauty industry.

Intellectual Property Synthesis

Patent Application Summary

A patent landscape analysis was conducted in order to identify what existing patents may interfere with the patentability of our device. To begin, the patents of existing brush cleaning devices were analyzed. It was quickly discovered that competing products such as the Brush Pearl or the Lilumia have very different functionalities and there is little concern that there would be any risk of infringing. Following, a broader patent search was conducted in order to find any patents that may mirror functionalities found within the RotoRinse. It was found that patents within the classification A46B13 (power-driven carriers with reservoir or other means for supplying substances with brush driven by the supplied medium) were most similar to the RotoRinse prototype. While several patents within this classification contained key features such as the water-driven rotor for scrubbing pads, the team could not identify a competing patent similar enough to RotoRinse that was not expired. We believe that our patent application will cover several product features that should prove to be patentable. Examples of potentially patentable features of the RotoRinse include its water splitter, the rotating wheel within the rinse cup, and rinse cup design to name a few. Another potentially patentable aspect of our design is the application of known technologies like a waterwheel for the use of brush cleaning. The draft patent application for our RotoRinse prototype can be found as a separate pdf attachment named “RotoRinse Draft Patent Application.”

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