

GNG2101
**Design Project Progress Update
Deliverable B**

GROUP E1.3

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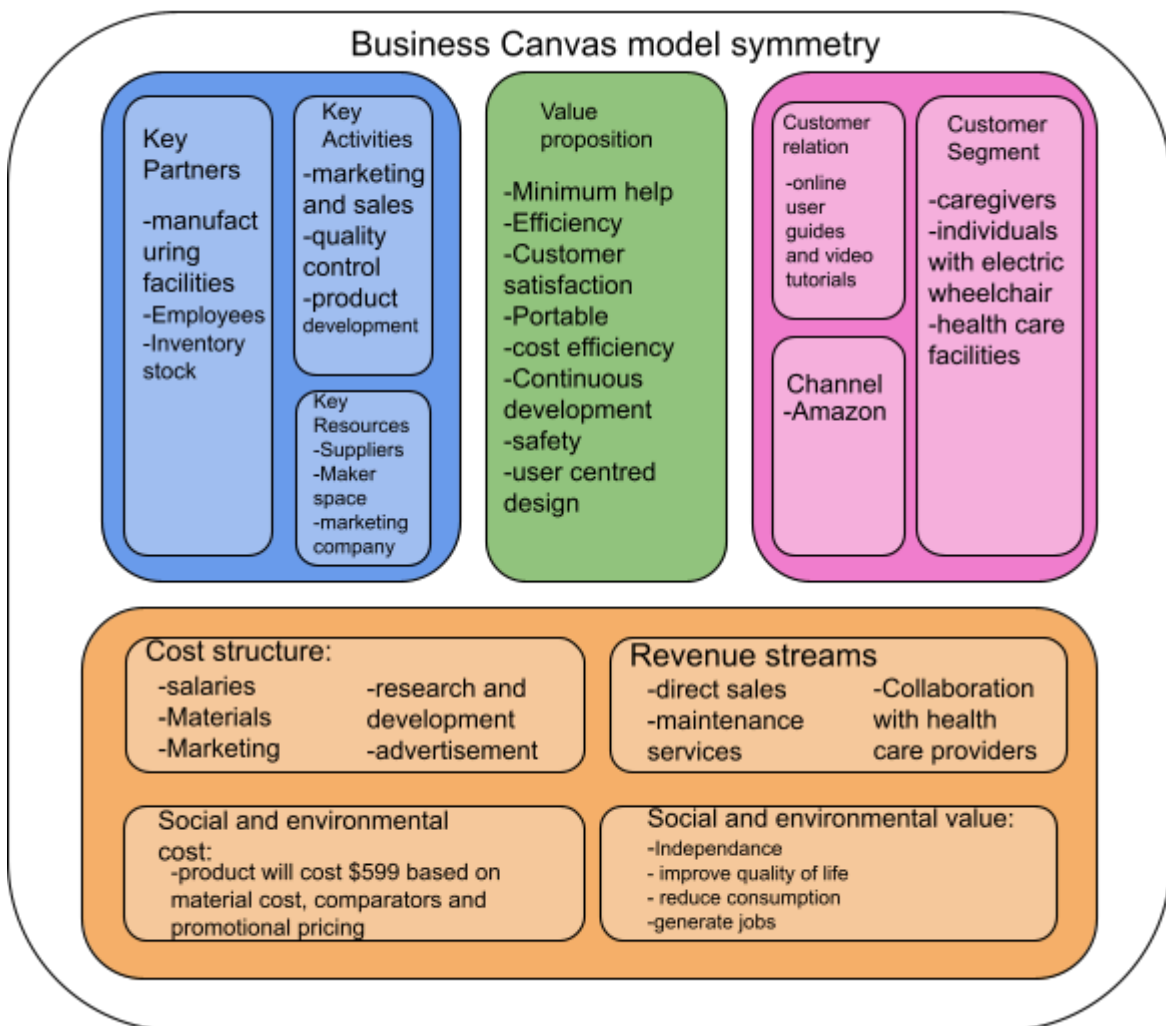
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1 Introduction

This deliverable delves into a sustainability report about our device and states the five most important factors in our design. The sustainability report contains an analysis of the possible social, environmental, and economic impacts that a lifting device made for people with a disability could create. This includes positive and negative impacts. The design considerations are preliminary and based on the client statements the team gathered during the first client meet.

2 Business Model Canvas and DFX

2.1 Business Canvas



- **Who:**

1. **Customer Segment:**

- Individuals with mobility impairment who use an electric wheelchair.
- Hospitals and health care facilities.
- Most importantly, family members who are caregivers or caregivers to people with disabilities.
- A business can create value for several areas. This business needs to be manufactured, and designed, needs to have customer service, provide technical guidance, maintenance on its usage, and more, therefore the business can create many employment opportunities. This business can also create value for suppliers that the business goes to for materials or services.
- Most importantly, the business creates value for the customers and users. This business provides a device that can help and give the chance to improve the quality of life of users with mobility impairments and users who might be caregivers. Due to a wide range of people who may be caregivers, the device should be easily used for a general regardless of physical strength.

2. **Customer relation:**

By integrating online guides, video tutorials, and responsive customer service into our business model, we aim to establish a strong and supportive relationship with our customers, individuals with disabilities. Through comprehensive online guides, we provide users with accessible resources to navigate the setup and operation of our wheelchair attachment independently, promoting their sense of empowerment and self-reliance.

Additionally, our engaging video tutorials offer visual demonstrations of the attachment's functionalities, catering to diverse learning styles and accessibility needs. Moreover, our commitment to responsive customer service ensures that users receive timely assistance and support, fostering trust and reliability in our brand.

By prioritizing the needs and experiences of our customers, we strive to cultivate a lasting and meaningful relationship built on mutual respect and understanding, ultimately enhancing their overall satisfaction and confidence in our product.

3. **Channel:**

The product will be sold and delivered using Amazon given the services provided including storage, delivery, and vending platform with Amazon Web Services (AWS) supporting any online components. Our physical items will benefit from smooth storage, packaging, and shipping procedures thanks to the use of Amazon Fulfilment Services (FBA). We'll reach a big client base via Amazon Marketplace and take advantage of Amazon's vending platform for automated retail solutions. Furthermore, Amazon

Advertising will be employed to improve awareness and expand the client base. In general, we hope to increase the reach and accessibility of our product and optimize operations by utilizing these services.

- **What:**

- **Value proposition:**

Our product is an assistive device designed to provide immediate support and assistance to individuals with disabilities when they experience a fall. Unlike traditional methods, which can be cumbersome and rely on external help, our innovative solution empowers users to regain their independence quickly and safely.

With our product, users can confidently navigate their daily activities knowing that they have a reliable lifeline in case of a fall. Our device offers:

- **Minimum Help:** Our product offers support and assistance to individuals with disabilities in the event of a fall, requiring medium to minimal help (one caregiver available to set up a device). Unlike traditional methods that often necessitate the caregiver to use physical force to bring the user back up to sitting position or to their wheelchair, our device is a mechanism that allows the caregiver to set up the portable slide, the winch attachment to the wheelchair. This feature not only reduces the burden on caregivers but also allows users to navigate daily challenges with greater confidence.
- **Efficiency:** Our product is designed for optimal efficiency in assisting individuals with disabilities after a fall. With its intuitive design and quick response mechanism, our device minimizes downtime and maximizes the user's ability to get back on the wheelchair. By streamlining the process of getting back up, our product reduces the strain on both the user and any caregivers involved, allowing for a smoother and more efficient lift. Furthermore, its portable design ensures that assistance is available wherever it's needed, enhancing efficiency and convenience in everyday life. With a focus on efficiency, our product enables users to navigate their daily activities with greater confidence, reclaiming valuable time and energy.
- **Customer Satisfaction:** Our commitment to customer satisfaction is unwavering. From the initial purchase to ongoing support and maintenance, we prioritize the needs and feedback of our users at every step of the journey. Our dedicated customer service team is available to assist, answer questions, and address concerns promptly, ensuring a positive experience for every user. Additionally, we offer comprehensive warranties and support programs to guarantee the reliability and performance of our product, further enhancing peace of mind and satisfaction for our valued customers. With a focus on building lasting relationships

and exceeding expectations, we strive to not only meet but exceed the needs and desires of our users, fostering trust and loyalty in our brand.

- **User-Centered Design:** From conception to execution, our product prioritizes the needs and preferences of individuals with disabilities. We would need extensive user research and collaboration with accessibility experts to ensure that every aspect of the device is tailored to the unique challenges faced by its intended users. From intuitive controls to ergonomic design elements, every detail should be carefully considered to maximize usability and comfort for individuals with diverse abilities.
- **Safety Assurance:** Safety is paramount in the design and functionality of our product. Extensive testing protocols and design considerations ensure that users can rely on our device to assist without compromising their well-being. From robust construction materials, our product is designed to minimize the risk of injury during the process of lifting, offering peace of mind to users and their caregivers alike.
- **Portable:** Our product is built to withstand a high amount of use and being portable for maximum convenience. Whether at home, at work, or on the go, users can easily carry our device with them, ensuring assistance is always within reach. Its durable construction and long-lasting battery life make it a reliable companion for individuals with active lifestyles, providing reassurance and support wherever their journey takes them.
- **Cost-Effectiveness:** Our product offers value for money compared to some other existing solutions available in the market. Unlike costly alternatives or ongoing service fees associated with some assistance programs, our product provides a one-time investment that delivers long-term value and peace of mind. Furthermore, its durability and low maintenance requirements ensure that users can maximize their investment over time, making it a cost-effective solution for individuals and families seeking quality assistive technology.

- **How:**

1. **Key activities**

- **Marketing and Sales**
 - Due to the large number of people who might need to use this product, this department needs to do market research on the needs and preferences of the main target demographic, which is people with limited mobility, limited core strength, and arm strength.
 - The team would also have to do market research on the costs and services provided by other companies selling products with the same function.

- This department should also create digital marketing for the products because we are aiming to sell our products through a third party such as Amazon, there will be no personal website. Through social media, we can promote our products and have contact with our customers through this portal.
- Manufacturing and Quality Control
 - Manufacturing would have to be in charge of sourcing and developing the most efficient ways of processing raw material into usable products, including the best method to reduce waste, reduce cost, but maintain quality.
 - Manufacturing would need to also take care of the testing and inspection of the device to ensure performance and reliability. This part is significant especially due to our product's need to be safe and rugged to prevent injuries or defects when the user is being lifted with the product.
 - For the product to be consistent with its quality and safety, quality control would need to ensure that each product adheres to standards. There would ideally have strict quality assurance procedures and inspections to prevent any defective products or products that do not fit company standards getting to a customer.
- Maintenance and Customer Support
 - The business should have maintenance for a limited amount of time as a warranty. Due to a high amount of cost and time needed to maintain warranty services, only a limited warranty would be able to be offered.
 - Customer support for the usage of the device should be provided to the customers as well. Due to the high cost of maintaining this service, there would have to be company hours during business days where customers can contact a customer service representative.
 - In terms of maintenance of the company, the department should provide support and training for the employees of the company to ensure consistent quality and information.
- Product Development and Design / Engineering
 - Due to the nature of the products we are selling, we need to ensure consistent and continuous improvement and development of the device with the changing needs and preferences of customers.
 - This department would need to continuously take note of the changing products and innovations within the market for similar products.

- The standards and certifications for the products we are designing and developing are important to be able to ethically sell this product in the market and ensure safety and quality. Therefore, this department would need to design in adherence to the standards.
- The device could also continuously be optimized in terms of the materials used, the design of the physical form, the electronic parts, etc. as the business grows to reduce waste, work more efficiently, and increase safety.

2. Key resources

- Manufacturing facilities
 - Because the company is planning on manufacturing the metal frame/the winch attachment of the device, there will need a factory for the production/manufacturing of this subsystem
 - The plastic components, which make up the slide, would be planned to be outsourced, so the company only takes care of the metal components.
 - The plastic slide would be manufactured using injection molding
- Employees:
 - Engineers and designers
 - Customer service representatives
 - Manufacturing technicians
 - Accountants and financial professionals
 - Managers (project managers, supply chain managers or managers in charge of external communication with outsourced services and manufacturing, etc.)
- Inventory stock:
 - Assuming we are manufacturing the metal frame within in company, we need the bulk stock of metal and all relevant materials involved in the production of the winch attachment
 - Logistics team and supply chain workers are needed to keep track of the inventory and to keep the materials needed to produce the device
 - Depending on the department, this team would need to distribute different items to the respective departments, for example, distributing and keeping track of which power tools manufacturing needs.

3. Key partners

- Suppliers
 - Metal: To supply custom-cut metal parts that align with our measurement

- Winch suppliers: To buy winches in bulk. Buying high-quality winches that can lift a minimum of 250lbs.
- Maker space: Makerspace offers us a place to test our ideas and use the machinery we need for prototype testing along with support and help from the TAs.
- Marketing company: We are assuming we will not be doing the marketing ourselves. We will be using a company to make marketing companies for our product.

- **How much:**

- 1. **Cost structure**

- **Employees salaries:**
 - **Fixed:** Base salaries.
 - **Variable:** Overtime pay, bonuses.
 - **Economies of Scale:** Lower average cost per employee with higher production.
- **Materials cost:**
 - **Variable:** Directly tied to production levels.
 - **Economies of Scale:** Bulk discounts, lower unit costs with larger purchases.
- **Marketing expenses:**
 - **Variable:** Campaigns, advertising.
 - **Fixed:** Salaries, rental fees.
 - **Economies of Scale:** Reduced unit costs for larger campaigns.
- **Production cost:**
 - **Fixed:** Facility rent, equipment depreciation.
 - **Variable:** Utilities, maintenance.
 - **Economies of Scale:** Lower average production costs with higher output.
- **Research and Development (R&D) expenses:**
 - **Fixed:** R&D personnel salaries, facility overhead.
 - **Variable:** Prototyping, testing.
 - **Economies of Scale:** Innovations reducing per-unit R&D costs.
- **Administrative expenses:**
 - **Fixed:** Salaries, office rent.
 - **Variable:** Supplies, travel.
 - **Economies of Scale:** Centralization, and shared services reducing per-unit costs.

2. Revenue stream

Our primary revenue stream will derive from direct sales of our innovative product designed for electric wheelchairs. This product, crucial for enhancing the safety and independence of individuals with mobility issues, facilitates users being lifted back into their wheelchairs with minimal assistance. Given its unique value proposition—enhancing the quality of life for wheelchair users—direct sales to consumers, healthcare institutions, and mobility aid retailers will form the backbone of our revenue model.

In addition to direct product sales, we plan to establish a limited comprehensive maintenance service package. This secondary revenue stream will ensure long-term customer satisfaction and brand loyalty by offering ongoing repair, support, and upgrades for our products. The maintenance service will include check-ups, repairs, and periodic upgrades to accommodate the evolving needs of users and advancements in this technology. This service not only enhances the product's life cycle but also provides a consistent revenue stream beyond the initial purchase.

Additionally, we will explore partnerships and collaborations with healthcare providers, insurance companies, and mobility aid organizations. These partnerships could lead to referral programs, subsidized pricing models, or bundled offers that could introduce additional revenue streams while increasing market penetration and product accessibility.

Overall, our revenue system is designed to ensure a balance between upfront product sales and long-term service-based income, creating a sustainable business model that prioritizes customer needs and safety.

3. Social and environmental cost

For setting prices, we're planning to take a few key factors into account. First, we'll look at the cost of making our product, which includes the materials, manufacturing, and any other expenses related to getting the product ready for our customers. In this preliminary business model, the focus will be on the material cost. We want to make sure we cover this cost and also make a reasonable profit, so we'll add a margin on top of these costs. Given that our product cost for materials is \$476.28, our product will be \$599 to account for profit.

Next, we'll check out the competition. We need to see how much similar products are selling for. We don't want to price ourselves too high and lose potential customers, but we also don't want to go too low and undervalue our product. Our price point of \$599 far outshines competitor products, all of which retail for a cost upwards of \$3000, which complete the same task, yet at a much higher price point.

We're also thinking about our target customers. We need to consider how much they are willing to pay for a product like ours. This might mean doing some surveys or focus groups to get a better idea. Plus, we're considering different pricing tiers for different levels of service or features, which could make our product more accessible to a wider range of people.

Finally, we're looking into promotional pricing for the launch and special deals, like discounts for early birds or bundles that include both the product and a maintenance service package. This could help get the word out and attract more customers initially.

So, to sum up, we're setting our prices based on our costs, what the competition is doing, what our customers can afford, and some strategic promotional pricing to kick things off.

4. Social and Environmental Value (sustainability report):

- **Independence:** The minimal help could build a sense of independence in the individual using it.
- Improve the quality of life.
- **Reduce consumption:** having a product that adapts to a worsening disability will save the user the need to buy a new device every once and a while.
- **Generating jobs:** due to the need for employees in manufacturing, design, and transportation.

2.2 Business Canvas Assumptions

- We are assuming in the creation of the device, we will be outsourcing the manufacturing of the plastic for the slide and manufacturing in-house for the metal frame and final device. This is to ensure that the quality is standard with the company. This assumption is somewhat feasible. Other factors affect this assumption, such as the cost of in-house manufacturing and the cost to hire new employees. For outsource manufacturing, there will also be another cost for the company that we are outsourcing from. Still, there would need to have a more in-depth economic analysis to determine which is really more profitable/suitable.
- Assumption that the design and manufacturing of the device is in adherence to safety and wheelchair standards. This is a core assumption that allows the company to sell, market, and manufacture the device.
- We are also assuming that there will be the budget and the resources to employ several employees for the production and maintenance of the device. This assumption is not very feasible but this assumption will be valid for an ideal business model.

- We are assuming that there will be a consistent sourcing of the materials and services needed to produce the device. The feasibility of this assumption will depend on the supply chain, the economic situation, the capabilities of the company to employ economic professionals, and the reliability of the chosen supplier.
- Assuming the suppliers will make custom-cut pieces that fit our product using custom molds for the slide and custom length for the metal. This idea is feasible because there are manufacturing companies that accept custom-made products as long as the budget allows.
- Assuming we will not be marketing the product ourselves. This assumption is feasible due to the lower need for marketing in comparison to safety of devices, so there will not be an extremely high budget assigned to marketing. Outsourcing the marketing will streamline the tasks the business has to take care of.

2.3 Sustainability Report

	Positive Impact	Negative Impact
Social	<ul style="list-style-type: none"> ● More independence for users to lift themselves when fallen. This avoids the need to reach out to anyone to help out. ● Improved quality of life by reducing barriers users may face in mobility. A user interface with simple controls and clear feedback mechanisms. 	<ul style="list-style-type: none"> ● The possibility of reducing the need for caregivers and social work which would decrease human interaction. ● Possible unethical sourcing and manufacturing of material. ● While it produces great accessibility, they may also pose financial challenges for those who cannot afford them or lack access to adequate healthcare resources. ● The need for new wheelchairs to accommodate worsening disabilities can sometimes lead to delays in having necessary equipment, as individuals navigate. This delay can impact accessibility and mobility, potentially limiting individuals' participation in various activities

Environmental	<ul style="list-style-type: none"> • Reduced need to buy new wheelchairs to accommodate worsening disability. • The usage recycled parts (when possible) minimizes environmental impact 	<ul style="list-style-type: none"> • Manufacturing process of the device could increase waste and increase environmental footprint and increase the environmental waste. This aid would harm the environment which would eventually harm the user.
Economic	<ul style="list-style-type: none"> • Cost reductions from less injuries and less need for a constant caregiver. For example if someone a caregiver won't have to be present all the time. This would decrease the need for the caregiver to be there and will reduce the cost. • Due to growing need and demand for accessibility devices, jobs can be generated in manufacturing, design, and transportation 	<ul style="list-style-type: none"> • Depending on the cost of the device, there may be economic and cost accessibility barriers for the target demographic. It may be out of budget for the user. This all depends on the materials used and how costly they are.

2.4 DFX

	DFX	Explanation
1	Design for safety	<ul style="list-style-type: none"> • Lift is used to help fallen individuals on their own so that no injury is encouraged if the person were to have help outside of the device. • Needs to be reliable enough to prevent any injuries and accidental falls • Will not cause any sort of harm to the user. Therefore a clear user manual will be provided to prevent any misuse of the device. • Hazards
2	Design for portability	<ul style="list-style-type: none"> • Device need to be brought to any room, environment and space to

		<p>make the user experience admirable.</p> <ul style="list-style-type: none"> ● Device needs to be moved by anyone, meaning lightweight and therefore facile for the user to use it or if bystanders need help. ● Compact; which facilitates the usage of the device.
3	Design for accessibility	<ul style="list-style-type: none"> ● The device can be used by a wide range of individuals (so that more ranges of disabilities could use it), ● Can adapt to the disability since disabilities change over time (get worse or better). ● Cost is reasonable and aligns with the financial needs of the targeted audience to ensure the complete success of the product and the access of the tool to the population in need. ● The design would be crafted in such a way that it considers the utmost disability scenarios, ensuring that it seamlessly accommodates not only severe impairments but also caters to individuals with minor disabilities. Meaning almost anyone in the realm of disabilities could use it. ● Ergonomics: The device is comfortable and used for extended periods.
4	Design for maintainability	<ul style="list-style-type: none"> ● The device needs to last for a long time, so that the user benefits from it and that the compartments don't have to be replaced regularly (decreasing cost as much as possible). ● The device needs to handle going outside, other levels in the house ● Adapt to different environments ● Easily maintained by user/ caregiver ● Power efficiency needs to be at a good level so that it lasts longer and prevents the need to swap around the components.
5	Design for ease of use	<ul style="list-style-type: none"> ● Users can lift themselves with limited help/alone ● Helpers should also easily use devices to lift user

3 Conclusion

In conclusion, our deliverable presents the preliminary analysis of the device that the team will be designing. We express the possible societal, environmental, and economic impacts of the device, as well as create the foundation and set the scene for the design of the device with the establishment of the DFX.