

Bracelet Aid – Group 16



Figure 1: Bracelet Aid Design, Featuring Screw to Open Clasps and Cuff to Hold on Wrist

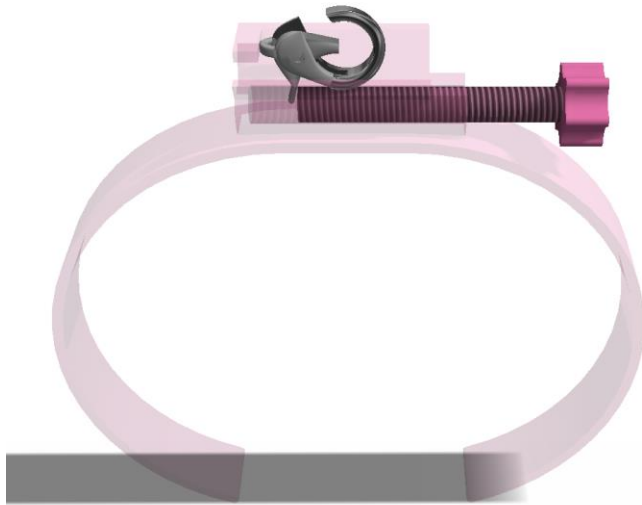


Figure 2: View of Clasp-Opening Mechanism Using Screw



Figure 3: Bracelet Aid Prototype In Use, Holding Opened Clasp in Place on Wrist

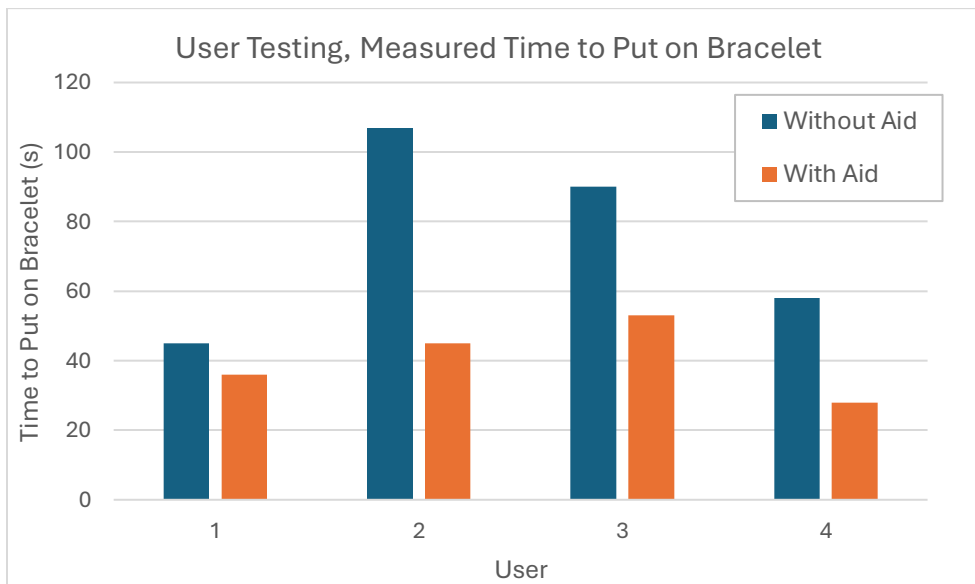


Figure 4: User Testing Results, Comparing Measured Time to Put on a Bracelet With vs Without the Bracelet Aid

What It Does

Our product is designed to help people put on and take off bracelets by themselves, which is often difficult due to small clasps and the action of holding the bracelet in place on the wrist while fastening the clasp. This product opens the clasps of delicate jewellery by turning a screw, which is easier than opening a clasp using your hand, particularly for those with limited finger dexterity or long nails. It then holds the clasp open and can be placed on the wrist using the flexible cuff, which easily slips on and off. This holds the open clasp in place on the wrist while the user fastens the other end of the bracelet to the clasp, and then the product closes the clasp when the screw is unscrewed. The cuff can then be slipped off the wrist, no matter how the bracelet was fastened.

This allows for less awkward or uncomfortable hand positions and less required time when putting on bracelets alone.

Your Inspiration

The inspiration for this product came from a variety of sources, both personally and through family members of the group. All group members have experienced the struggle of putting on a bracelet alone, and have either required help or helped a family member to put on jewellery. Some group members have also watched family members lose the ability to wear bracelets over the years, due to decreasing finger dexterity and mobility. This reminded the group that tasks that can be taken for granted, such as putting on a bracelet, can become frustrating and time-consuming for people with limited finger mobility, dexterity problems, long nails, etcetera. This sparked the desire to create a product that could provide ease and independence in the everyday life of someone who struggles to put on bracelets alone.

How it Works

This design has a small, tapered section with a slot in the bottom, where the clasp of the bracelet sits. The tapered walls accommodate for different clasp sizes, and the handle of the clasp falls through the slot. There is another slot at the back of this section, where the bracelet threads through for added stability, as well as a small ledge at the top to hold the clasp in place while it is being opened. A screw, which is held in place by a small threaded section, sits underneath the clasp, in the slot, and moves towards the clasp when turned. This allows the screw to catch the handle of the clasp, which is sitting in the slot, and push it forward, thus opening the clasp. Due to the threaded section holding the screw, the screw maintains its position when not in use, which allows the clasp to stay open once opened, providing the user the ability to be hands-free.

The product contains a cuff attached to the section where the clasp is opened so that it can be slipped on/off the user's wrist. This holds the open clasp in place on the wrist so that the user can put the rest of the bracelet on. Once the bracelet is securely hooked to the clasp, the screw is turned in the opposite direction thus causing the clasp to close. The bracelet can then be slipped off of the cuff and the cuff can be slipped off the wrist, resulting in a successfully put on bracelet. Due to the open design of the cuff, no matter how the bracelet was put on (whether it was twisted around the cuff or not), it can always be taken off.

Design Process

The design process required several iterations for a feasible final design. First, several clasps were measured to determine a range for the size of the slot in which the clasp handle falls through as well as the angle of the tapered sections. Several initial prototypes were created to test the effectiveness of these dimensions, and the dimensions that fit the largest number of clasps were selected. After initial testing, it was determined that the design was ineffective because the clasp would rotate when the screw was turned, causing it to stay closed. To combat this, a small slot was added at the back of the section that holds the clasp, so that the chain of the bracelet could be threaded through. Further prototype iterations indicated this was not enough to completely prevent rotation, so a small ledge was added to add more security to the clasp, which led the design to become effective at opening the clasp. The final design was created using these dimensions and

considerations, and the geometry was slightly altered to allow for injection molding as this was selected as the manufacturing method for this product.

One more consideration throughout the design process was the size of the cuff, so that it would fit a wide range of users. To determine the optimal cuff dimensions, several users' wrists were measured, and an average was used to create the cuff. Additionally, the cuff was made using very thin PLA to allow for enough flexibility to fit a wide range of users, which was verified during user testing.

How it's Different

Our product stands out from existing solutions by addressing both the difficulty of holding the bracelet in place and the challenge of opening the clasp, something current products fail to do. Current solutions on the market are only able to hold the end of the bracelet in place while the user opens the clasp, which can be very difficult for those with limited finger dexterity or long nails. These solutions may help a little, but they don't truly solve the problem for those who need more assistance. Certain current market solutions are also not portable and can be uncomfortable or tricky to use, requiring a lot of wrist and finger mobility and flexibility.

What makes our product different is how it brings everything together in one simple and portable design. It slips onto your wrist and holds the bracelet in place while a screw mechanism gently opens the clasp for you; there's no need for precise finger work or help from someone else. Once opened with the screw, the clasp stays open, allowing for hands-free movement for the user so that they can take their time and avoid uncomfortable positions. It's comfortable, easy to use, and gives people back a bit of independence in their daily routine.

Appendix A – Prototype Validation

To validate the functionality of the design using the prototype, multiple iterations were created using 3D printing to test the correct slot width, size and location of a lip to hold the clasp in place, wall height, and screw size.



Figure 5: Prototype Iterations

Testing on the final prototype was done using a variety of delicate bracelets, first testing to see how many of the clasps fit properly into the aid. 5 out of 6 (83%) of the tested bracelets fit into the aid and could be opened using the screw. The limitation was the clasp size, as clasps wider than 2.5 mm could not be opened using the aid. Different clasp shapes were also tested, as shown in the figures below.

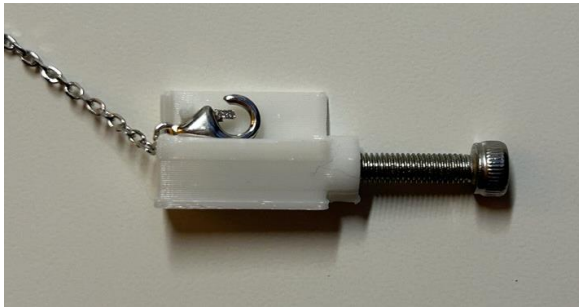


Figure 6: Clasp Testing



Figure 7: Tested Clasp Shapes

The size of the cuff, which holds the open clasp in place on the wrist, was also tested to ensure that its size was appropriate. The designed cuff, which is flexible due to being thin PLA, fit 100% of users tested.



Figure 8: Final Prototype with Cuff and Bracelet

Next, user testing was conducted to assess the intuitiveness and useability of the product. Users were given an explanation about how to use the product, then given an opportunity to try and put on a bracelet using the aid. Once they understood and practiced how to use the product, the amount of time required for the user to put on a bracelet with/without the aid was timed. This was done to accurately compare the amount of time taken for each method. The results of these tests are shown in the table below.

Table 1: User Testing Results

Test	Time to put on bracelet without aid (s)	Time to put on bracelet with aid (s)	Difference (s)
User #1	45	36	9
User #2	107	45	62
User #3	90	53	37
User #4	58	28	30

The testing, as shown above, indicated a consistent improvement in time taken to put on a bracelet using the aid vs without the aid, ranging from 9 – 62 seconds. The user testing also indicated that 100% of users tested were able to put on a bracelet using the aid, although some did require additional explanation. This indicates that the product is not very intuitive to use, and could thus benefit from an instruction card or image on the exterior of the product to indicate its intended use.

Tests were performed to assess the intuitiveness of the product, but 0% of users could figure out how to properly use the product without explanation. To combat this limitation, budget was allocated in the financial plan for an instruction card.

User feedback was collected during the testing and indicated that although the design was not intuitive at first, once understood, it was easy and comfortable to use. It was commented that for the original prototype, which did not have a handle on the screw, the screw was a bit uncomfortable

to turn, so a large handle was added in a later iteration. It was then commented that the handle was too large relative to the size of the cuff, so it was sized down for better comfort.

Appendix B – Business Model Canvas










The Business Model Canvas

Designed for:

Designed by:

Date:

Version:

<p>Key Partners </p> <p>Injection molding manufacturer: To produce Bracelet Aid using flexible plastic molds</p> <p>Amazon (FBA): Handles fulfillment, warehousing, returns and customer delivery</p> <p>Packaging supplier: cost-effective, eco-conscious packaging with custom fit for the product and instructions</p> <p>Legal/IP Advisor: Guides design patent/trademark filing and regulatory compliance.</p> <p>Jewellery brand partners: Sell Bracelet Aid as an add-on or bundled tool with bracelets</p> <p>Physical sales channels: household goods store/ pharmacies etc.</p>	<p>Key Activities </p> <p>Further iterate mechanical design and tolerances of clasp holder, screw and cuff mechanism for higher inclusivity and intuitive easy use. Continue to perform user testing Oversee packaging design, branding and batch production. Listing product on Amazon, setting up inventory and supply chain. Reaching out to retail partners and onboarding. Creating demo content (photos, videos) Planning future website setup and D2C operations</p> <p>Key Resources </p> <p>CAD design & mold tooling: Finalized 3D model files and manufactured molds for injection. Suppliers: for plastic molding, packaging, and fulfillment. Amazon seller account: used to manage inventory and fulfill online orders. Product Branding & Assets: Logo, packaging design, product photos, influencer marketing, digital marketing agency</p>	<p>Value Propositions </p> <p>Hands-free fastening Securely holds one end of the bracelet in place while keeping the clasp open enabling true one-handed fastening. Eliminates the need for awkward balancing or external help, making the entire process seamless and frustration-free.</p> <p>Clasp compatibility The tapered holder is engineered to support a wide range of bracelet clasps, including various sizes of lobster clasps and similar types. Its adaptable design ensures that it works with most standard bracelet styles on the market.</p> <p>Time-saving and convenience Streamlines a task that typically requires two hands, patience, and fine motor control. Bracelet Aid cuts down the time needed to put on a bracelet from minutes to seconds, making it ideal for busy routines or on-the-go use.</p> <p>Inclusive, accessible design The tool's larger, easy-grip screw and ergonomic cuff make it accessible to individuals with limited dexterity, arthritis, or mobility challenges. Designed with inclusivity in mind, it supports independent use for people of all ages and abilities.</p>	<p>Customer Relationships </p> <p>Customer service via amazon or email for basic troubleshooting and reviews. Post purchase engagement: potential follow-up emails (D2C) for review requests or promotions Usage demos and interactive social media platforms to build trust and customer relationships Increased customer communication/engagement and promotions around holidays</p> <p>Channels </p> <p>Amazon (FBA): Primary early channel for fast fulfillment and user trust. Wholesale retail & pharmacies: Local stores with targeted customers who may prefer in-person shopping Future D2C website: higher margins and deeper customer engagement. Social Media: For branding, marketing, usage demonstrations and brand awareness. Jewellery brand partnerships: co-sales through bundled offers</p>	<p>Customer Segments </p> <p>Primary: Bracelet wearers (all genders & ages) Regular users of bracelets seeking a quicker, easier way to fasten them independently. Seniors or individuals with reduced mobility/arthritis etc. may struggle with small clasps due to pain or limited dexterity. Bracelet Aid restores independence in dressing. Individuals living alone with no one to help with bracelet fastening need a reliable solo-use tool to save time and reduce hassle.</p> <p>Secondary: Jewelry Brands (B2B Collaboration): Can bundle Bracelet Aid with bracelets as a value-add. Enhances product usability and customer satisfaction. In-Person Shoppers (Retail / Pharmacy) Likely to purchase based on packaging, practicality and visibility.</p>
<p>Cost Structure </p> <p>Manufacturing and tooling: Costs for injection molding, materials and upfront tooling to enable mass production. Packaging: Includes labor and materials such as poly bags, inserts and branded stickers, designed for both e-commerce and retail display. Branding and website: One-time costs for logo, product visuals and a simple direct-to-consumer website to support future sales. Marketing and advertising: Ongoing investment in influencer outreach, paid digital campaigns, and content production. Logistics and fulfillment: Shipping to Amazon warehouses or retail partners, handling, and delivery coordination. Insurance and legal: Annual liability insurance plus IP protection and business registration/compliance fees.</p>		<p>Revenue Streams </p> <p>Direct sales via Amazon: E-commerce sales targeting individuals seeking a solo bracelet-fastening solution</p> <p>Wholesale to retailers: Bulk sales to gift shops, boutiques and pharmacies for in-store distribution.</p> <p>Jewellery brand collaborations: Co-branded or bundled sales with bracelet companies, adding value to existing jewelry purchases.</p>		

The financial analysis shown below indicates that over a 2-year period, the total NPV will be \$548,000, which is profitable. Explanations of each of the inflows and outflows included in this analysis as well as a sensitivity analysis are also included below.

Injection molding costs		Screw:							
Cuff:									
Materials	\$0.01 /unit		\$0.01 /unit		Assuming tooling cost in first quarter, along with all Amazon units				
Production	\$0.08 /unit		\$0.08 /unit		Assuming production of wholesale orders 1 quarter before they are sold				
Tooling	\$15,972.00 total		\$11,363.00 total						
*from online calculator									
Sales volume per quarter									
	0	3750	7500	7612.5	7688.625	7765.51125	7804.338806	7843.3605	Amazon
	0	0	0	0	30000	0	0	0	Retail (wholesale)
	0	0	0	0	0	0	0	50000	Company collaboration
Average Amazon sales per month:	2500								
Total sales	129964.3356								total
Estimated Amazon growth per quarter:	2	2	1.5	1.5	1	1	0.5	0.5	
^Directly correlated to advertisement costs									
*Amazon sales estimated using other bracelet-helping tools between both US and Canadian markets									
Current sales per month of similar products: 4700 1900									
^Estimating 2500 products sold per month based on these numbers as this product is completely novel but is at a higher price point than some of the similar solutions online									
Also, there are many different versions of the same looking products on Amazon, so the sales are split between each, but our product is brand new so there would be no competition									
Cost per unit	\$20.00								
2 pack jewelry helper	24.99								
Bracelet helper tool	34.8								
Bracelet holder helper tool	9.99								
Fulfillment									
Amazon	\$9.03 /unit US		Amazon fulfillment for direct customer orders, ranging from 5000-20000 /month						
Additional storage	\$139.00 /month		Small storage unit in Toronto for units sold wholesale						
Conversion rate	\$1.30 US to CAD								
Advertising	\$10,000.00								
Influencer Marketing	\$2,000.00		Assume \$35 cost per influencer Product+shipping+packaging - Ship to 60 Influencers						
Digital Marketing Agency	\$8,000.00		Marketing agency includes services like Campaign Setup, Social media ads, and weekly optimization						
*Estimated based on this post: https://www.webfx.com/blog/marketing/marketing-agency-cost/									

a large jewellery company would want to place a large order, in the range of 50,000 units, and that this would not happen until the company was more established at the end of the second year. To account for the time it would take to coordinate and design this, 50 hours of labour for a professional designer was accounted for. The same wholesale price estimation of 50% of the Amazon selling price was used for the collaboration sale price.

Outflows:

Manufacturing:

Using the injection mold cost calculator [2], the tooling, material, and production costs were calculated for both the main product body and the screw. It was assumed that all tooling costs would be upfront in the first quarter, and that all Amazon sales would be produced during this quarter as well to have a surplus of product. All wholesale manufacturing was assumed to happen in the quarter before their sale, so the manufacturing and material costs were accounted for in the relevant quarters.

Figure 9: Manufacturing Cost Estimator- Injection Molding

Advertising:

We allocated \$2,000 to influencer marketing based on a plan to collaborate with 60 influencers for product exposure. The estimated cost per influencer is \$35, which includes the cost of the product (approx. \$14.64), packaging materials (\$0.02 for a bag, \$1.25 for labor, \$0.05 for a business card), a custom sticker (\$0.03), and shipping (estimated at ~\$18 per package using Canada Post). The full calculation is: 60 influencers × \$35 = \$2,100, but this has been conservatively rounded down to \$2,000 to reflect the possibility of bulk shipping discounts or in-kind collaborations.

A digital marketing agency retainer of \$8,000 was budgeted based on industry averages for full-service support. This includes campaign strategy, ad content creation, A/B testing, weekly optimization, and reporting across platforms such as Instagram, Facebook, and Google Ads. This number was derived from market research data on mid-tier agency fees, particularly for eCommerce startups, as outlined in WebFX's marketing cost guide.

Delivery:

To deliver all 70000 bracelet aids in a single shipment, we estimated the cost based on the product's size, weight, and local transportation options within Ontario. Each unit measures approximately 6cm by 6cm by 2cm, giving a total shipment volume of about 5.04 cubic meters. To allow for packaging space, the volume per piece is rounded up to 6 cubic meters. Since each bracelet aid is made of lightweight plastic and weighs roughly 50 grams, the total shipment would weigh around 3500 kilograms. This volume and weight fit comfortably within the capacity of a 20-foot U-Haul truck which can carry up to 45000 kg and approximately 12 cubic meters of cargo.

We assume that the delivery will be done in a single day with one trip for all 70,000 units, 20,000 of which are intended for wholesale distribution, and the remaining 50,000 for a jewellery company. A one-day cube truck rental typically costs between \$300 and \$500, with an additional \$150 to \$250 for fuel, depending on the distance. We also included labor costs for two people working an eight-hour day at minimum wage, totaling \$240. Factoring in these expenses along with a buffer for tolls or incidental costs, the total delivery cost is estimated to be between \$1,250 and \$1,500. This approach provides a cost-effective and efficient solution for transporting the full order in one consolidated shipment.

Packaging:

Each unit is packaged in a clear poly bag at \$0.02/unit (based on a bulk order of 2,000 bags for \$47.60 [4]). Labor is the most significant component, estimated at \$1.25/unit, assuming 5 minutes per unit at a wage of \$15/hour. This allows time for quality checking, folding, and boxing. Additionally, we include a business card with instructions for \$0.05 per unit [6]. Total packaging per unit = \$1.32 CAD.

Fulfillment:

Amazon fulfillment was chosen for Amazon orders due to ease of use, and the cost was estimated using an online calculator [6]. Additional storage was required for wholesale units in the second year, during their production, which was estimated at \$139/month based on storage estimates in the Toronto area.

Branding:

Branding includes multiple elements. First, we budgeted \$0.03/unit for custom product stickers, sourced from Vistaprint. Web development costs total \$2,000, which covers an upfront site build and initial hosting/maintenance fees. Design work includes a \$500 upfront cost for 10 hours of general branding at \$50/hour, and a larger \$25,000 investment for 50 hours of collaborative product design and branding with a jewellery design partner (also at \$500/hour total). This strategic branding ensures the product aligns with jewellery industry standards and aesthetics.

Taxes:

Corporate taxes are estimated at 38% of annual net income, based on federal and provincial corporate tax rates for Canadian-controlled private corporations (CCPCs) [7]. This estimate references [PwC's tax summary for Canada](#). The percentage will be applied to total annual net profit during financial planning and break-even analysis.

Insurance:

A yearly business insurance cost of \$1,000 has been estimated to cover general liability [8], product liability, and warehousing insurance. This figure is based on industry averages, which range between \$450–\$2,000/year for small eCommerce or product-based businesses in Canada. We selected a middle value to account for coverage that includes both digital operations and physical product handling.

Sensitivity Analysis:

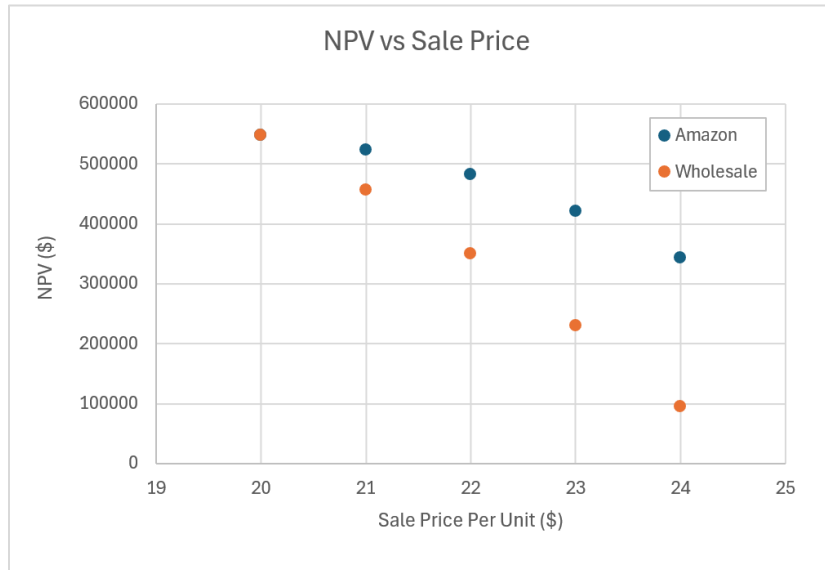


Figure 10: Sensitivity Analysis, NPV vs Sale Price

A sensitivity analysis was done to assess the relationship between selling price and number of units sold vs the NPV. The selling price per unit was increased in \$1 increments, and assumed that each increment would result in 20% less sales. This was done for the Amazon sales and wholesale sales independently; when one variable was assessed, the other was kept at the original selling price of \$20. The results of this show that this would be detrimental to the business as it causes the NPV to decrease, meaning that this business is sensitive to the number of units sold. The NPV in the wholesale selling price/units sold analysis drops off much more quickly than the Amazon analysis, indicating that this financial model is much more sensitive to the number of wholesale units sold than to the number of Amazon units sold.

References:

- [1] Free amazon sales estimator - predict your sales | rank calculator, <https://www.junglescout.com/estimator/> (accessed Apr. 6, 2025).
- [2] “Cost estimator,” Injection Molding Cost Estimator, <https://www.custompartnet.com/estimate/injection-molding/?units=1> (accessed Apr. 6, 2025).
- [3] P. F. 25, “Marketing agency cost: HOW MUCH IT costs to market your business in 2025,” WebFX, <https://www.webfx.com/blog/marketing/marketing-agency-cost/> (accessed Apr. 13, 2025).
- [4] “Bag, poly, clear, 2MIL, 5 x 8" (2000/box),” Allworld Packaging Supplies Ltd., <https://www.allworldpackaging.com/product/00/58pb2/Bag-Poly-Clear-2mil-5-x-8-2000Box> (accessed Apr. 6, 2025).
- [5] “Roll labels,” Design Roll Labels & Custom Sticker Rolls | VistaPrint CA, <https://www.vistaprint.ca/labels-stickers/roll-labels> (accessed Apr. 6, 2025).
- [6] Revenue calculator, https://sellercentral.amazon.ca/revcalpublic?ref_=sd&initialSessionID=145-0695983-4632948&ld=secasoagoog-sitelink-calculator_SOA_PRI_RC2&ldStackingCodes=secasoagoog-sitelink-calculator (accessed Apr. 6, 2025).
- [7] “Canada,” Corporate - Taxes on corporate income, <https://taxsummaries.pwc.com/canada/corporate/taxes-on-corporate-income> (accessed Apr. 6, 2025).
- [8] “Small Business Insurance Ontario,” Zensurance, <https://www.zensurance.com/ontario-business-liability-insurance> (accessed Apr. 6, 2025).