

Scaling Up Upcycling: A Comparative Analysis of Furniture and Object Projects






Appendix 1A: Seating



Company / Brand	Mister Wilson	Dvelas	Veldtwerk	Bike Furniture Design	Traels
Website	mister-wilson.com	dvelas.com	veldtwerk.info	bikefurniture.com	traels.nu
Series/Object Name	Drop Stool	Trimmer Chair	Delino Chair	S-2 Barstool	Airbag Pouf
Price	EUR €139	USD \$606	EUR €420	USD \$600	DKK 550
Waste Material	Broken and discarded skateboards	Decommissioned sails	Natural linoleum covered birch plywood flooring from decommissioned regional trains, linoleum offcuts from building flooring.	Rims and other bicycle parts: used, discontinued, warranty returns	Car airbags, non-compliant mattress latex foam, car seat belt, upholstery leather offcuts
Waste Source Type	Post-consumer	Post-consumer	Commercial / Institutional	Post-consumer	Post-consumer
Uniformity	High	Medium	Medium	Medium	High
Waste Source	Skateshops and individual donations	Sail-makers Individual donations Sailing clubs	Dutch Railways Flooring installers	Local bike shops Individual donations Ebay	Car scrap yards Mattress manufacturer
Incidence	Regular	Periodic	Regular	Regular	Regular
New Materials	Birch plywood, bolts, felt, spray paint, clear coat	Steel tubes Rope Hardware	Hemp, resin, TPU seat mounts, fasteners	New upholstery materials Fasteners	Thread
Design & Production Approach	Standardized structural form with unique artwork for each unit. Outsourced CNC routing of legs. Skateboard deck grip removal, hand tool cutting and contouring of seats. Sanding, painting, clear coating, assembly	Sail cleaning, cutting, sewing to patterns. Steel tube cutting, bending, welding and powder-coating. Rope cutting, assembly, knotting	Train flooring removal of cork, felt, metal, staples, screws. CNC routing of chair frame. Building flooring cutting, milling + vacuum form laminating of seat and backrest. TPU seat mount bracket 3D printing, chair assembly.	Part cleaning and categorization. Cutting, bending, welding, upholstery work, assembly. Custom upholstery and rim options	Airbag washing and disassembly. Bag cutting to pattern and sewing, stuffing with foam, closure, handle sewing
Product Options	Unique artwork on each seat	Special editions with different sails, bar colours	Seat and backrest colours and materials	Seat upholstery material and colours	No (colours depend on material supply)
Production Strategy	Batch (form) + made-to-order components (seat design)	Periodic batches Custom made-to-order or batch to order	Batch (chair frame) + made-to-order components (seat and backrests)	Made-to-order only	Batches to order - (minimum 10)
Production Complexity	Medium	Medium	High	High	Medium
Scalability Enablers	Prevalent material. Own sourcing network. CNC outsourcing. Precision hand cutting tools. Cutting templates	Own sourcing network. Use of new materials facilitates chair frame production.	Abundant flooring materials from trains and building. CNC routing enables efficient batch production of chair frame.	Own material sourcing network. New upholstery materials	Abundant supply of materials. Hygienic quality of non-compliant mattress foam
Scalability Challenges	Design and execution of artwork for each piece is labour intensive	Material transport logistics + costs. Labour intensity	Technical and labour intensive vacuum forming/laminating process	Sourcing increasingly rare used chrome rims and bike parts. Requires special experience with the metalforming process for this material	Multistep process
Viability Enablers	Each stool is unique, with ready-to-ship options on the website + an inventory of over 100 seat designs in warehouse. Option of customer's own skateboard deck. Also works as a mini side table. Strong community of interest	Original design in a category with low innovation. Sailing community of interest. White works in many outdoor settings and can look like new material. Distribution through Architonic and 34 retailers worldwide.	Taps into nostalgia for trains. Promoted by Dutch Railways among other upcycling projects	Strong community of interest among bike and motorcycle enthusiasts. Custom upholstery options increase uniqueness and suitability to different environments.	Employment of workers from vulnerable groups. Sales through sales agents to schools and libraries. Private labeling for other brands
Viability Challenges	Self-distribution only. Several designers producing furniture from skateboards in different countries and selling on Etsy	Unique design may affect perceptions of comfort and ergonomics, requiring in person trying before purchasing.	Dining style chair in a mid-upper range of pricing, but with an unconventional mix of material aesthetics. Self-distribution only	Heavy weight is an obstacle to shipping. Self-distribution only	Danish market size. Currently limited internal sales and distribution resources. Colour availability depends on airbags received
Instagram followers	1,500 +	3,700 +	800 +	1,900 +	3,000 +
Staff size	1	8	3	1	20
Business started	2015	2011	2017	1990	2016






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Appendix 1B: Small Tables

					
Company / Brand	Moogoo	Gym & Classics	Piet Hein Eek	Op Nieuw!	Producer: Miles & More Brand: Lufthansa Designer/Manufacturer: B2L
Website	moogoo-creative-africa.com	gymandclassics.nl	pietheineek.nl	opnieuw.nl	milesandmore.com lufthansa.com b2l.group
Series/Object Name	Post-Oil Stool & Side Table	Tokyo '64	Waste Coffee Cube in Scrapwood	Berlin Table	Upcycling Collection / A320-211 D-AIQH Coffee Table
Price	EUR €179	EUR €1,800	EUR €3,014	EUR €275	EUR €529
Waste Material	Discarded lubricant barrels	Decommissioned gym floorboards and gymnastics equipment	Reclaimed wood, offcuts	Ceiling panels from decommissioned regional trains, chair components from discarded office chairs, coat rack poles	Fuselage skin and stringers from decommissioned aircraft
Source Type	Industrial	Institutional	Commercial	Commercial / Institutional	Commercial
Uniformity	High	High	Medium	Medium	High
Waste Source(s)	Construction, mining and other industrial companies	Gym associations, municipalities, individuals, manufacturers	Renovation projects, mills, woodshops	Dutch Railways Private companies	Lufthansa Technik
Incidence	Regular	Sporadic	Regular	Regular	Periodic
New Materials	Steel sheet pieces	Steel tubes	Fasteners, sheet metal, glue, lacquer	Fasteners, steel for table base plate	FSC/PEFC certified low-emission particleboard, oak veneer, fasteners
Design & Production Approach	Equitably produced in Burkina Faso. Barrel cleaning. Metal cutting, forming, welding, grinding, clear coating.	Floorboard sections selection, cutting, and varnishing. Steel tube cutting, welding + powder-coating Customization options	Application of established designs to available wood: wood sorting, selection, cleaning, removing nails, planing, thickening, drilling, assembly, sanding, finishing	Train ceiling section removal fastener removal and cleaning, CNC routing, table base plate manufacturing. Office chair and coat rack disassembly and parts classification. Table leg cutting to size, table assembly. Powder coating as required	Lufthansa Technik: fuselage skin & stringer sectioning, loading on pallets. B2L: pattern application, cutting to size, edge grinding, cleaning. Panel supplier: panel cutting to size, veneer gluing & coating. B2L: fastener installation and assembly
Product Options	-	Leather top Markings or not	Several pieces to choose from with colour and texture variations. Custom sizing and colour approaches available.	Custom tabletop sizing RAL leg colours	White or bicolour pattern fuselage skin
Production Strategy	Periodic batches	Made-to-order only	Periodic batches Custom made-to-order	Made to order only	Periodic batches
Production Complexity	Medium	Medium	High	Medium	Medium
Scalability Enablers	Abundant, uniform material. Simple production processes using common skills	Large quantities of material from each source. Simple production process using common skills	Well-established material sourcing partner networks. Established design. Batch processes for webshop inventory help efficiency	Abundant ceiling paneling from trains + discarded office chairs. Chair parts dismantled and stocked by type, size, etc. CNC routing enables efficient batch production of tabletop	B2L: design using outsourced wood panels simplifies manufacturing. Miles & More: distribution facilities & systems
Scalability Challenges	Labour intensive	Gym overhaul or demolition projects are relatively rare. Labour intensive	Multistep, labour-intensive production process. Most orders are custom made according to client wishes. Multiple products in the collection means production must be reorganized for each one	Multistep process mostly carried out by hand currently.	Technical process of fuselage sectioning and removal
Viability Enablers	Unique design with dual purpose as a table or a stool. Storytelling through past identity that dramatizes the transformation from pollution to circular material. African design and production adds to social sustainability. Low cost of labour. Competitively priced.	Unique design with dual purpose as a table or a daybed base. Custom design option. Storytelling through easily discernable past identity that leverages nostalgia for school gymnasiums	High past identity salience feeds storytelling. Highly crafted finish adds value. Custom options add uniqueness and environment suitability. Pioneering upcycling designer with a well-recognized name and aesthetic. Collaborations and special projects ensures continuing brand visibility	Adjustable height and casters add useful functionality. Neutral colour that fits in a variety of environments. Price is competitive compared to new office quality side tables. Rated level 3 (highest) in terms of social enterprise performance, employing workers from vulnerable groups. B2B sales team.	Table can be used as a coffee table or turned on its side as "C-type" sofa side table. Relatively affordable table among Lufthansa's upcycling collection. Distribution through Miles & More (36 million members across Lufthansa + partners), 8 physical World Shops, plus in-flight, online & catalogue sales opportunities
Viability Challenges	Rough aesthetic may not fit in a wide range of decors. Distance makes shipping expensive and impacts sustainability. Self-distribution only	Sports aesthetic may not fit in a wide range of decors. High price. Large size make shipping expensive. Self-distribution only	Periodicity of batches & custom sized designs can imply a long waiting time for delivery. Heavy weight can involve high shipping costs depending on location	Only one colour, which may not be the most appealing. Self-distribution only	Relatively limited supply of decommissioned Lufthansa aircraft. Costs of fuselage section removal & transportation. This table is less immediately recognizable as an aircraft component than others in the collection
Instagram followers	1,400 +	200 +	76,100 +	700 +	Worldshop: 11,000 + B2L: 800+
Staff size	8	1	40	40	Miles & More: 300 B2L: 9
Business started	2015	2017	1990	2015	Miles & More: 1993 B2L: 2010

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Appendix 1C: Lighting

					
Company / Brand	Tohuijs Design	Herrwolke	Anti	Rebottled	Manufacturer: Delta Light Designer: MVRDV
Website	tohuijs.nl	herrwolke.com	anti-waste.com	rebottled.com	deltalight.com
Series/Object Name	Bendy	Beute	Desk Lamp	Lamp	High Profile W
Price	EUR €69.95	EUR €380	GBP £160	EUR €49	EUR €516 to €668
Waste Material	Steel fence post + other metal product offcuts. Wooden pallets	Used cardboard packaging	Discarded & lost umbrellas	Used wine bottles	Extruded aluminum profile lighting offcuts
Source Type	Industrial	Commercial	Post-consumer	Commercial	Industrial
Uniformity	High	Medium	Medium	Medium (colour variations)	High
Waste Source	Fence manufacturer + metalshops	Business discards	Street finds Lost & found services	Restaurants	Production offcuts
Incidence	Regular	Continuous	Regular	Constant	Regular
New Materials	Lighting socket, braided wire, LED light bulb, ceiling plate, powder coating	Lamp socket, wire, mounting plate	Recycled plastic Lamp socket, wire Steel bracket, thumb screw, silicone feet	Lighting socket, cork stopper, braided wire, LED light bulb, ceiling plate	Assembly bolts
Design & Production Approach	Fence post cutting, bending, grinding edges, wire bracket welding, powder coating. Wood end piece cutting, drilling, sanding and finishing. Wirecutting, assembly, wire tension adjustment	Cardboard cutting, separating layers. Positioning cardboard shades and graphics. Gluing. Assembly	Umbrellas dismantling, categorization, cutting parts. 3D printing lampshades + base support, cleaning, painting. Assembly	Wine bottle label removal, cleaning, cutting, grinding, polishing, assembly	Cutting profile offcuts to size, grinding edges, drilling, powder coating, assembly
Product Options	4 colours + galvanized versions	–	Silver or black powder coated metal components	–	4 colours
Production Strategy	Periodic batches	Periodic batches Custom made-to-order	Periodic batches	Periodic batches	Periodic batches
Production Complexity	Low	High	Medium	Low	Low
Scalability Enablers	Consistent source of material. Multistep but relatively simple process requiring common skills	–	3D printed parts allow faster assembly	Outsourced production, storage and assembly	Regular generation of profile offcuts. Designed for a simple production process integrated within company's existing operations
Scalability Challenges	Availability of fence post offcuts to respond to periods of higher demand	Labour intensity and experience in cutting pieces and aligning shades and text to create the right patterns	High cost of 3D printing parts using recycled materials	Specialized equipment for glass cutting, grinding & polishing	–
Viability Enablers	Unique design also available with variations. Work outsourced to a correctional enterprise offering vocational training for inmates. Competitively priced. Distributed through website and several online stores.	Distinctive graphics from packaging helps to differentiate from other cardboard lamps. Possibility of customizing graphics to suit customer desires. Light weight for shipping. True and cases	3D printed parts allow faster, cost-efficient assembly. Sleek, distinctive design gives it strong Instagram potential. Two colour options increases ability to suit various environments.	Sustainable packaging materials. Partner workshops employ workers from vulnerable groups. Competitively priced. Distributed through website + multiple retailers and online stores primarily in Netherlands + the EU. B2B sales to hospitality customers.	Production offcut repurposing makes a strong sustainability statement. Distinctive aesthetic aligns with the revival of brutalism in architecture and design. Well-established international distribution network
Viability Challenges	Metal shops often require payment for offcuts. Past identity is not easy to discern and relies on communications. Relatively limited distribution outside of the Netherlands	Labour intensity. Cardboard lamps have become very commonplace. High price compared to most others	Self-distribution. Larger footprint as a desk lamp may be limiting for people with small desks.	Many competitors are producing lamps from wine bottles. The brand and its communications are primarily focussed on drinking glasses. Limited distribution outside of the Netherlands	Non-consensual aesthetic may limit the commercial appeal of the product to very design-forward applications
Instagram followers	8,000 +	–	900+	7,000+	65,500+
Staff size	2	1	1	7	750
Business started	2017	2016	2021	2016	1987

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Appendix 1D: Bags



Company / Brand	Mariclaro	Elvis & Kresse	Salty Bag	Alchemy Goods	Freitag
Website	mariclaro.ca	elvisandkresse.com	saltybag.com	alchemygoods.com	freitag.ch
Series/Object Name	Weekender - Purple Wow Airbus 321	Weekend Bag	Ikaria	Brooklyn Backpack	F306 Hazzard
Price	CAD \$279	GBP £310	EUR €260 to €290	USD \$150	CHF 314.50
Waste Material	Decommissioned aircraft seat leather and seatbelts	Decommissioned fire hoses, and parachutes Used printing blankets Leather offcuts Event banner	Boat cover production offcuts Decommissioned sails	Used bicycle inner tubes	76% upcycled/ recycled: Decommissioned truck tarpaulin, post-consumer PET bottles, B-stock car seat belt
Waste Sources	Aircraft seats and seatbelts	London Fire Brigade, military supplier, printers, Burberry workshop, auction house	Boat cover offcuts: Sunbrella. Sailcloth (Dacron): sail-makers, clubs, individuals	Network of bicycle stores using Alchemy's innertube donation boxes	Truck companies, recycled fabric co., seat belt suppliers
Source Type	Commercial	Commercial / Institutional	Industrial Post-Consumer	Post-Consumer	Commercial
Incidence	Sporadic	Regular	Regular	Regular	Regular
Uniformity	Medium (colour variations)	High	High	High	Medium (truck tarp colours and designs)
Additional Materials	Zipper	Zipper Steel hardware	Polyester mesh, plastic & metal clips & tension-locks, high-tensile polyester yarn, hook & loop closures, metal zipper	Nylon, foam padding, zipper, nylon hardware	Webbing, piping, foam, velcro fastener, tension buckle, zipper, thread, 25% recycled PVC label
Design & Production Approach	From one batch of leather, several one-off pieces of different styles of bags are made over a period of time	Made in UK + outsourced to fairtrade manufacturer in Turkey. Firehoses and other materials cleaned, cut and sewn into bags	Cleaning and cutting material. Cutting and sewing to back sections to pattern, bag sewing assembly, strap threading	Inner tube cleaning and cutting, cutting and sewing to pattern, assembly	Wide variety of versions of each model using different tarps and patterns. Tarp removal + testing, disassembly, washing, drying, bag design, outsourced sewing, quality control, photography, shipping
Product Options	-	4 colour options	2 colour + 2 size options	Zipper colour options	-
Production Strategy	Periodic batches Custom batches to order	Periodic batches	Periodic batches	Periodic batches Custom batches to order (minimum 50 units)	Periodic batches Custom batches to order
Production Complexity	Medium	High	Low	Low	High
Scalability Enablers	Larger quantities of aircraft leather. Same patterns used across various material sources	Abundant waste materials	Located on the island of Corfu, close to sailboats and their material suppliers	Large material sourcing network of bike stores	Scale of operations built up over time with established sourcing network, large scale storage systems, washing machines, etc.
Scalability Challenges	Limited amount of leather from a given source. Process and labour intensity	Technical difficulty of working with firehose material to quality standards makes it difficult to find qualified workers	Labour intensity	Labour intensity	Process and labour intensity
Viability Enablers	Exclusiveness of one-off editions. Better margins for rare materials	Relative uniqueness of fire hose as a material. Established sustainable luxury brand reputation. Affordable prices for luxury quality. 50% of profits donated to charities	Multipurpose bag suitable for casual or professional use, with three ways of carrying. Relatively light materials reduces shipping costs	Relative uniqueness and sleek look of innertubes as a material. Self-distribution + retailers including Amazon + wholesale through 165 retail outlets. Corporate and private label orders with a minimum of 50 units	Iconic sustainable bag brand/ independent Swiss brand. Certified "Advanced" sustainable company across its operations
Viability Challenges	Self-distribution. Certain colours have broader appeal than others	Craft processes and labour intensity limit ability to ensure items are always in stock. Self-distribution + small number of independent stockists, mainly in the UK	Bag with a relatively high price point for a small brand without a high profile or significant marketing support behind it. Limited distribution outside of Europe	Relatively low margins considering those required by third-party distributors, and investments in online advertising	Cost of fair wages in Switzerland and other EU countries + high value of Swiss franc = high prices. Many competitors in other countries making cheaper bags from similar material with much lower cost structure
Instagram followers	9,700+	35,100+	6,600+	3,600	192,000
Staff size	4	30	4	10	250
Business started	2008	2005	2013	2009	1993