

Strategy models for upcycling. How to create a systemic change through practice potentialities.

Original

Strategy models for upcycling. How to create a systemic change through practice potentialities / Nastasi, Roxanne; Proietti, Giulia; Marino, Cristina; Remondino, Chiara Lorenza. - ELETTRONICO. - (2023), pp. 695-703. (PLATE2023 The 5th Product Lifetimes and the Environment Conference Espoo (FIN) May – 2 June, 2023).

Availability:

This version is available at: 11583/2981226 since: 2023-08-24T11:06:03Z

Publisher:

Aalto University

Published

DOI:

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

Editors Kirsi Niinimäki and Kirsti Cura,
Aalto University



PLATE

Product Lifetimes
And The Environment

PROCEEDINGS

5th PLATE Conference
Espoo, Finland

31 May – 2 June
2023

A?

Aalto University
School of Arts, Design
and Architecture

Aalto University publication series

ART + DESIGN + ARCHITECTURE 3 / 2023
ISBN 978-952-64-1367-9 (electronic)
ISSN 1799-4861 (electronic)



PROCEEDINGS

5th PLATE Conference

Espoo, Finland

31 May – 2 June, 2023



Aalto University publication series

ART + DESIGN + ARCHITECTURE 3/2023
ISBN 978-952-64-1367-9 (electronic)
ISSN 1799-4861 (electronic)

Images: Jere Aalto / Aalto University
Layout: Oona Rouhiainen

PLATE2023

**The 5th Product Lifetimes and the Environment Conference in
Aalto University, Espoo, Finland, 31 May – 2 June, 2023**

The 5th international PLATE conference (Product Lifetimes and the Environment) addressed product lifetimes in the context of sustainability. The PLATE conference, which has been running since 2015, has successfully been able to establish a solid network of researchers around its core theme. The topic has come to the forefront of current (political, scientific & societal) debates due to its interconnectedness with a number of recent prominent movements, such as the circular economy, eco-design and collaborative consumption. For the 2023 edition of the conference, we encouraged researchers to propose how to extend, widen or critically re-construct thematic sessions for the PLATE conference, and the paper call was constructed based on these proposals. In this 5th PLATE conference, we had 171 paper presentations and 238 participants from 14 different countries. Beside of paper sessions we organized workshops and REPAIR exhibitions.

Conference Chair:

Associate Professor Kirsi Niinimäki, Aalto University

Conference academic committee:

Professor Conny Bakker, TU Delft
Professor Minna Halme, Aalto University
Associate Senior Lecturer Jessika Richter, Lund University
Associate Professor Mikko Jalas, Aalto University
Coordinator Yumiko Henneberry, TU Delft

Local organizing committee in Aalto University:

Postdoctoral Researcher Kirsti Cura
Postdoctoral Researcher Emmi Pouta
Master student Chloé Hartmann
Fashion/Textile FUTURES research group

THE PLATE CONSORTIUM

Aalborg University, Denmark
Aalto University, Finland
Delft University of Technology, The Netherlands
Lund University, Sweden
Nottingham Trent University, United Kingdom
Fraunhofer Institute for Reliability and Microintegration (IZM), Germany
University of Limerick, Ireland



Table of Contents

Keynotes 2023

- 14 **Knowledge and power: The evolution of research into product lifetimes**
Tim Cooper
- 15 **The hidden environmental costs of consumer product returns**
Tamar Makov
- 16 **Future Adaptive Design - designing products for circular business models**
Thomas Nyström; Anneli Selvefors

Panel Discussion

- 19 **Product Design in a Circular Economy**
Susanna Horn; Paula Sarsama; Nina Teufel; Martin Charter

Articles

(In alphabetical order of first authors)

A

- 22 **Co-creating a Vision for the Circular Economy: A Case Study of the Polyurethane Foam Industry via Backcasting**
Abadian Mona; Russell Jennifer D
- 28 **Key global challenges and opportunities for scaling up upcycling businesses in the world: Interpretive structural modelling workshop preliminary analysis**
Abuzeinab, Amal; Sung, Kyungeun; Moalosi, Richie; Satheesan, Ashwathy; Garba, Bilkiyu; Adeg, Funto; Lim, Hye-Won; Baek, Joon Sang; Njeru, Sophia N.
- 34 **Fostering product lifetime extension practices among young consumers: Implications for policymakers from a consumer behavior perspective**
Ackermann, Laura; Walcher, Dominik; Salbrechter, Sybille
- 40 **Sustainable Business Models for the Second Use of Electric Vehicles Lithium ion Batteries in an Ecosystem Context: A Review**
Ahmed, Saad; Verhulst, Elli; Boks, Casper
- 49 **Deducing environmental implication of clothing rental from consumer voices and behaviors: a social experiment in Japan**
Amasawa, Eri; Kimita, Koji
- 53 **Secondhand shell jackets are better than users think: A comparison of perceived, assessed and measured functionality throughout lifespans**
André, Hampus; Swenne, Louisa
- 60 **Safe and Circular Design - A design method for dealing with substances of concern in products**
Arriol, Julieta Bolaños; Subramanian, Vrishali; Bakker, Conny; Balkenende, Ruud
- 71 **Consumers' concern about chemicals in clothing – Environment, skin contact, and the materiality of colour**
Autio, Minna; Poikolainen, Janne; Sekki, Sanna; Ruiippo, Lotta & Räisänen, Riikka
- 77 **Circular economy in critical value chains: the case of hydrogen electrolysers and fuel cells**
Axt, Marie; Baldassarre, Brian; Kirchherr, Julian; Vestergaard, Jakob

B

- 84 **Rebound effects of circular business models on the consumer level: a review**
Bączyk, Michał; Tunn, Vivian S.C.; Corona, Blanca; Worrell, Ernst
- 91 **Barriers and Enablers for the Implementation of Design for Sustainability in Flemish Design Agencies**
Beerten, P. ; Ostuzzi, F; Brosens, L.
- 101 **Digital battery passport information content for end of (first) battery life management support**
Berger, Katharina; Baumgartner, Rupert J.; Weinzerl, Martin; Bachler, Johann; Schöggel, Josef-Peter

- 109 Chair a Story – What Repurpose-Driven Design can contribute to upcycling more dining room chairs**
Berglund, Moa; Bystedt, Sofia; Eklöf, David; van den Bosch, Martijn; Wever, Renee
- 116 Incorporating social lifecycle assessment in circularity metrics to avoid the unintended consequences of circular economy**
Bhatnagar, Anubhuti; Niinimäki, Kirsi
- 125 Towards a shared design research agenda for reusable packaging systems**
Bradley, Charles G.; Terzioğlu, Nazlı; Franconi, Alessio; Wilson, Garrath T.; Clark, Nikki; Greenwood, Sarah C.; Fleet, Katherine; Salvia, Giuseppe; Ceschin, Fabrizio; Iacovidou, Eleni; Corsini, Lucia
- 139 From colouring excels by hand to using advanced algorithms: Digital technologies as enablers of the circular economy**
Bücker, Christian; Pantel, Julia; Geissdoerfer, Martin; Kumar, Mukesh
- 149 Circular economy in EU critical value chains: The case of titanium metal in defence and civil aviation**
Buesa, Aleandro; Garbarino, Elena; Saveyn, Hans; Baldassarre, Brian
- 155 Design and implementation of an innovative business model based on repair as a hobby**
Bunodiére, Alex; Duflou, Joost

C

- 161 The variables of the circular rebound effect phenomenon from a circular value recovery ecosystem perspective**
Castro, Camila G.; Cavioli, Lucas; Trevisan, Adriana H.; de Carvalho, Amanda D.; Mascarenhas, Janaina
- 168 The interior architectural design framework for shaping interior components to optimize the lifetime of building products**
Celadyn, Magdalena; Celadyn, Waclaw
- 174 Developing Samples of Small-Scale Remanufacture from Pre-Consumer Textile Fallout**
Child, Emmeline
- 181 Understanding product hibernation periods with children's products and exploring motivations for product care to encourage their reuse**
Choi Yoon Jung; Kennedy, Brook
- 187 Measuring long-term perceived quality in sports t-shirts: A comparison of two study designs**
Claussen, Lars; Lloyd, Alex; Ruiz, Daniel; Havenith, George
- 195 Durable Apparel in the Circular Economy: Exploring the effect of post-industrial material waste on garment lifetimes**
Claxton, S.
- 203 Modeling effects of smartphone reuse on market-level lifetime and environmental impacts informed by consumer survey data: preliminary results**
Clemm, Christian; Amatuni, Levon; Mogollón, José M.; Matsumoto, Mitsutaka
- 209 A socio-technical critique on the future use of digital technologies for clothing manufacturing**
Cox, Rachel S.; Benstead, Amy V.; Boardman, Rosy; Hayes Steven G.

D

- 218 Does Resale Extend the Use Phase of Garments? Exploring Longevity on the Fashion Resale Market**
Dalgaard Nielsen, Mette; Skjold, Else
- 224 A qualitative framework for mapping rebound effects of different circular business model archetypes**
Das, Ankita; Bocken, Nancy; Konietzko, Jan
- 231 Exploring paradoxes to scaling circular business models in cascading systems in the textile and clothing industry**
Dehghannejad, Mohammadreza; Pa, Rudrajeet
- 237 Repairing reality: from artificial biomechanics devices to bioinspired fixing kit for existing conventional products**
Dominguez, Julia Bonilla; Sierra-Pérez, Jorge; Talens Peiró, Laura

244 Methodology for Holistic Circular Product Creation combining Strategy Measures and Life Cycle Assessment

Druschke, Jan; Nissen, Nils F.; Stobbe, Lutz; Schneider-Ramelow, Martin

E

250 The BIO TEN Design Guidelines: Inspiring biobased, local, durable and circular innovation in fashion textiles

Earley, Rebecca; Forst, Laetitia

257 Seeing Complexity in the Circular Economy: A Product Packaging Case Study

Eng, Nathan; Aurisicchio, Marco

267 Designers Shaping Strategies for Fashion Remanufacturing: Case Studies from Melbourne/Naarm*, Australia

English, Julia; Borchardt, Miriam

275 Understanding the Social Mechanisms behind Sustainable Practices to Extend Clothing Lifespan

Eroglu, F. Suhendan

283 User Influence on Product Lifespan: A Case Study of Toys based on Material Qualities

Eroglu, F. Suhendan

F

290 Circular economy and sustainability of cellulosic materials in the clothing industry

Ford, Fiona; Henninger, Claudia E.; Schmi, Alejandro Gallego

297 Lifecycle Design: A method for supporting design decision-making with LCA knowledge in an interdisciplinary research project

Forst, Laetitia; Goldsworthy, Kate; Hildenbrand, Jutta; Domene, David Sánchez

303 Everyone does it: Product-related Resell Strategies of Professional Second-hand Retailers

Frahm, Lea Becker; Laursen, Linda Nhu; Tollestrup, Christian

310 Smells Like Grandparents: Consumers' Barriers and Motivations to Second-hand Shopping

Frahm, Lea Becker; Laursen, Linda Nhu; Boks, Casper

316 Co-creating sociotechnical visions for a circular metal economy transition in the UK

Franconi, Alessio; Ceschin, Fabrizio; Godsell, Janet; Harrison, David; Mate, Orsolya-Anna; Konteh, Tamba

324 Defining alternative recovery strategies for reuse: An analysis of multiple case studies under the reuse umbrella

Franconi, Alessio; Ceschin, Fabrizio; Terzioğlu, Nazlı; Corsini, Lucia; Ghoreishi, Malahat

332 Circular economy through the lens of the forest metaphor – a teaching and learning perspective

Fromberg, Emma H. E.; Bakker, Conny A.; Entsminger, Joshua; Grantham, Chris; Lusby, Adam; Peck, David; Webster, Ken

G

340 The influence of dynamic norms on the effectiveness of sufficiency-promoting messages

Gossen, Maike; Tröger, Josephine

346 What measuring the environmental impact of Circular Business Models means for the clothing industry

Grayab, Sarah; Druckmanb, Angela; Sadhukhanb, Jhuma; Jamesa, Keith

351 Performance assessment tool for repair companies in terms of providing a service with the potential to increase demand for repairs

Güsser-Fachbach, Ines

360 Mapping the potential intended and unintended consequences of Circular Economy policy measures: the common charger initiative

Guzzo, Daniel; Rasmussen, Stine M. B.; Pigosso, Daniela C. A.

H

366 The Strategic Durability of Digital Product Passports: A New Perspective to Raise the Ambition

Haase, Louise Møller; Lythje, Line Sand; Skouboe, Esben Bala; Petersen, Morten Lund

- 373 Designing customer experiences for circular products and services**
Haines-Gadd, M., Salter, N., Muranko, Z., Brockmann, J., Le Fouest, L., Shelton, H.; Maguire, S.
- 380 Learning Circular Design from within the Fashion Industry: A ReSuit project case study**
Hall, Cathryn Anneka; Hasling, Karen Marie; Ræbild, Ulla
- 386 Recycled Colour: an exploration of colour sorting strategies for the imperfect design of waste textiles**
Hall, Cathryn Anneka; Larsen, Astrid Tolnov
- 394 Authentic Pre-loved luxury – sustainability concern?**
Henninger, C.E.; Amasawa, E.; Brydges, T.; Hanlon, M.; Yan, S.
- 398 Repurposing and production – So what’s the issue? Reflecting on how the production system can be affected by new circular material flows**
Henriksson, Fredrik; Jonsson, Marie
- 404 A diary study set-up to identify thresholds for repeated usage of reusable products**
Herweyers, Laure; Moons, Ingrid; Du Bois, Els
- 409 Can you fix it? An investigation of critical repair steps and barriers across product types**
Hjorth, Nielsen; Aisha, Susanne A.; Laursen, Linda Nhu; Tollestrup, Christian
- 417 Love at first sight: Immediate emotional attachment of volunteers in repair cafés**
Hjorth, Nielsen; Aisha, Susanne A.; Laursen, Linda Nhu
- 424 Promoting sustainable consumption in online shops through information on reparability**
Hoffmann, Marja Lena; Trajanovska, Ivana
- 429 The role of experimentation and emergent strategies in developing and scaling circular business models**
Hultberg, Emelie

I

- 434 Restoring Sustainable Growth for Second-Hand Clothing Markets**
Irving-Munro, Abigail; James, Alana

J

- 439 The Influence of a Hypothetical Eco-Score on Purchasing Mobile Phones: Conceptual Considerations and Preliminary Findings**
Jacobs, Kathleen; Bergener, Jens; Gossen, Maike
- 444 Coping with the challenges of battery logistics: Analysis and application of supply chain decision indicators for sustainable and circular logistics for vehicle batteries**
Jarmer, Jan-Philipp; Joachimsthaler, Charlotte
- 451 Circular Economy in the construction industry: Analysis of the usage of RC-concrete in precast production**
Jegen, Pauline; Faulstich, Martin
- 457 Business models for sustainability impact, not potential: A literature review of the life-cycle impacts of business model strategies**
Johnson, Emma

K

- 468 Environmentally responsible customer solution design for small-scale businesses**
Kälviäinen, Mirja; Kumpulainen, Kati; Palokangas, Anna; Eloranta, Enna
- 474 Consumption patterns of construction workwear and circular strategies to prolong its lifetime**
Kambanou, Marianna Lena; Gagnerud, Karin; Lindahl, Mattias
- 480 Thoughtful: Towards the longevity of wooden buildings for climate change mitigation and adaptation**
Kantele, Saara; Hughes, Mark
- 486 Ethical Consumption in Sweden and Iran: A Cross-Cultural Analysis**
Karimzadeh, Sara; Boström, Magnus
- 492 Teaching Fashion Design for Multiple Lives and Users**
Khamisani, Noorin
- 499 Regulating Fast Fashion out of Fashion**
Klepp, Ingun Grimstad; Hvass, Kerli Kant

- 505 Thinking beyond circles: Developing visual research methods for circularity in design education**
Knight, Laura; Goldsworthy, Kate; Visser, Sanne; Hall, Cathryn Annika
- 512 Agent-based simulation for circularity assessment of consumer durables: consequential environmental impacts, product flow and stock, and user behaviours**
Koide, Ryu; Yamamoto, Haruhisa; Nansai, Keisuke; Murakami, Shinsuke
- 518 Layers of repair increasing the emotional durability of fashion and textiles**
Konovalov, Marta; Valle Noronha, Julia; Kuusk, Kristi
- 524 Circular Product Design Strategies, Principles and Guidelines for the Metal Sector**
Konteh, Tamba; Ceschin, Fabrizio; Harrison, David; Franconi, Alessio; Minton, Timothy
- 532 Digital Solutions for Enabling Rapid Transition to Circular Lifestyle**
Korsunova, Angelina; Kurilova, Marina; Viholainen, Noora; Råberg, Mirka; Lundberg, Pii; Nenko, Oleksandra; Galaktionova, Anastasiia
- 539 How can repair businesses improve their service? Consumer perspective on operational aspects of repair services**
Kraßnig, Verena; Lechner, Gernot; Güsser-Fachbach, Ines
- 544 The weakest link: how technical lifespan extension can be counter-effective for climate goals**
Krych, Kamila; Pettersen, Johan B.
- 551 Mending is not that simple. What set of competencies can enable mending practices, and how can we learn them?**
Kucher, Iryna; Ræbild, Ulla

L

- 558 Stability studies of biocolourants**
Laaksonen, Päivi; Helander, Roosa; Jordan, Juha; Virta, Nea
- 563 Why won't you complain? Consumer rights and the unmet product lifespan requirements**
Laitala, Kirsi; Løvbak Berg, Lisbeth; Strandbakken, Pål
- 569 Clothing care practices: from an LCA perspective**
Letien, E.; Benkirane, R.; Pichon, N.; Perwuelz, A.
- 578 Narratives of product longevity: a business vs. consumer perspective**
Løvbak Berg, Lisbeth; Hebrok, Marie
- 584 Communicating the benefits of sustainable packaging: a discourse analysis of Big Food**
Lumby, Natalia

M

- 592 A software tool for manufacturing companies based on material flow cost accounting – An enabler for a resource-efficient and sustainable circular economy**
Magalhães Wiedmann, Caeté; Hendrich, Aline; Preiß Marlene; Lenard, Patrick; Steinert Tobias; Hedemann, Jan; Dos Santos, Maria
- 596 Producers' consumption behaviours: Are they looking for durability in products?**
Mahajan, Deepti; Cooper, Tim; Smith, David; Kent, Anthony
- 604 A duty of care for sustainable products: can EU product safety legislation inspire new thinking for the circular economy?**
Maitre-Ekern, Eléonore; Wiig, Kirsten Daae
- 610 Studying clothing consumption volumes through wardrobe studies: a methodological reflection**
Maldini, Irene; Haugrønning, Vilde; de León, Lucrecia
- 617 Ecodesign considerations to promote the circularity of plastics from electronics, vehicles, and construction and demolition**
Marttila, Tatu; zu Castell-Rüdenhausen, Malin; Scoones, Hannah
- 626 Design of e-textile and printed electronics applications for their life cycle**
Marwede, Max; Smolander, Maria; Hakola, Liisa
- 638 The 'right to self-repair' or a 'comprehensive guarantee'; why should 'iFixIt'?**
Maycroft, Neil

- 643 Identifying barriers and enablers for circular ICT practices: An exploratory study**
McMahon, Kathleen; Hultink, Erik Jan; Mugge, Ruth
- 649 The Circular Techno-Aesthetics of Woven Textile-forms: A Material and Process-driven Design Exploration**
McQuillan, Holly; Voorwinden, Milou; Arts, Bente; Vroom Barbara
- 660 The sharing economy is not always greener: A Review and consolidation of empirical evidence**
Meshulam, Tamar; Goldberg, Sarah; Makov, Tamar
- 673 Engaging consumers in reusable packaging systems: An exploration of factors influencing the adoption**
Miao, Xueqing; Magnier, Lise; Mugge, Ruth
- 679 Making circuits more circular: An overview of main obstacles of the independent electronics repair sector and the possible policies to promote their operation**
Molnár, Magdolna
- 686 Understating the Processing Challenges of Biobased, Biodegradable Polymers used for Packaging Applications**
Mondoa, Anindita; Ein-Mozaffari, Farhad; Behzadfar, Ehsan

N

- 695 Strategy models for upcycling. How to create a systemic change through practice potentialities**
Nastasi, R.; Proietti, G; Marino, C; Remondino, C.
- 704 Wearer-clothing Relationships as a System (and where to intervene)**
Neto, Ana
- 710 Transforming sustainable business as usual: A tool encouraging businesses to go further**
Niessen, Laura; Bocken, Nancy
- 716 Nostalgia, gift, or nice to have – an analysis of unused products in Swedish households**
Nilsson, Karin; Strömberg, Helena; Rexfelt, Oskar; Ljungberg, Elin; Sköld, Sandra
- 722 A proposal for an exnovation process to ‘design away’ unsustainable practices in sustainability transitions**
Noëth, Esther; Moons, Stine
- 731 Circular business models and supporting policies for reusing of photovoltaic modules in the EU**
Nyffenegger, R.; Baldassarre, B.; Bocken, N.

O

- 738 Understanding long lasting design through tangible tokens**
Özçelik, Ayşegül; Löchtefeld, Markus; Tollestrup, Christian

P

- 742 A Review of Repurposing Lithium-ion Batteries for Household Applications**
Pantelatos, Leander; Boks, Casper; Verhulst, Elli
- 751 Young Danes dressing the part: A heedless or mindful use phase?**
Petersen, Morten Krogh
- 756 Scope and relevance of circular economy indicators for the sustainable lifetime management of batteries for electric vehicles**
Picatoste, Aitor; Justel, Dani; Mendoza, Joan Manuel F.
- 764 Digital technologies for a circular economy: Mapping sectoral applications and their environmental, social and economic impact**
Piscicelli, Laura
- 769 Is second-hand clothing all the same? Understanding swapping events in relation to charity retail in the UK**
Pocinkova, Lucie
- 775 Towards Durability and Extended Lifespan – Caring for Clothes as a Sustainability Practice**
Poikolainen, Janne; Sekki, Sanna; Autio, Minna; Kettunen, Henna; Räisänen, Riikka

- 780 Digital technologies for LCA – A review**
Popowicz, Martin; Schöggel, Josef Peter; Baumgartner, Rupert J.
- 788 Designing valuable GOODbyes: A review of state-of-the-art 'Design for Divestment' literature and its implementation in practice**
Poppelaars, F. A.; de Ruiter, M. T.
- 795 How Blockchain Technology can contribute to Digital Product Passports for a Circular Economy**
Preut, Anna; Kopka, Jan-Philip
- 802 Resource-efficient luminaires – learnings from product re-design in context of lifetime**
Proske, Marina; Knoche, Sebastian; Schwarz, Jürgen; Nissen, Nils F.
- 808 Policy Mapping for a Thriving Circular Fashion Industry: The Case of the European Union**
Puglia, Michela; Parker, Lindsay; Demirel, Pelin; Clube, Rebecca K. M.; Aurisicchio, Marco

R

- 822 The devaluation of stockings**
Rasch, Tone; Haugrud, Ingrid; Laitala, Kirsi; Hegnes, Atle Wehn
- 828 Textile Aesthetic Dialogues of Garment Mending**
Ravnløkke, Louise
- 836 Durability of wind turbines – part of a sustainable energy transition**
Remmen, Arne; Rønno Olsen, Sofie Nygaard; Søgaard Jørgensen, Michael
- 842 Circular Colour: Reusing Colour from Previous Textile Lifecycles in Textile Finishes**
Ribul, Miriam
- 848 A Social Practice Theory analysis of the impact of clothing fit on the use phase**
Richardson, Clare; Boardman, Rosy; Gill, Simeon
- 854 Potential Rebound Effects of 1.5° Lifestyles**
Richter, Jessika Luth; Mont, Oksana; Plepys, Andrius; Lehner, Matthias
- 862 Practices of Motherhood: Embodied Experiences of Everyday Fashion**
Rigby, Emma; Connor-Crabb, Anja
- 869 Drivers and barriers for bio-based plastics in durable products**
Ritzen, Linda; Bos, Puck; Brown, Phil; Balkenende, Ruud; Bakker, Conny
- 876 Making materials for packaging circularity**
Rotondo, Benedetta; Santi, Romina; Sossini, Lia; Marinelli, Andrea; Del Curto, Barbara
- 886 Too much information? Which labelled product property influences customers' purchasing decisions most**
Rückschloss, Jana; Schischke, Karsten; Schlegel, Moritz-Caspar; Zöllinger, Jonathan
Use of mixed-fiber textile waste as reinforcement in mycelium
- 893 Use of mixed-fiber textile waste as reinforcement in mycelium composites: assessment of material features and life cycles**
Ruiz, Alejandra; La Saponara, Valeria; Mak, Jacques; Rowe, Allison

S

- 901 Mindfulness in apparel consumption: A perspective of Gen Z**
Sahni, Harleen; Chopra, Nupur
- 910 The main factors affecting the environmental sustainability of reusable packaging solutions**
Salo, Minna; Hylkilä, Eveliina
- 915 Assessing Product Circularity in Practice: Insights from Industry**
Sanchez-Moreno, Lilian; Charter, Martin
- 923 Introducing Feedstock-Material-Product Combinations: Revaluing Wastewater Into Bio-composite Materials And Meaningful Applications**
Sauerwein, Marita; Mooij, Peter R.; Picken, Stephen J.; van Loosdrecht, Mark C. M.
- 932 Kicking the can down the Circular Economy Road – Basic needs in Standardization for Electronics- and ICT-products**
Schlegel, M.-C.; Giegerich, J.
- 937 Chaos and synergies: Review of the first three years at the "Haus der Materialisierung"**
Scholz, Johannes; Ordonez, Isabel; Miels, Paula; Rotter, Vera Susanne

- 950 Wellbeing Wardrobe: A wellbeing economy approach for the fashion and textile industry**
Sharpe, Samantha; Brydges, Taylor; Retamal, Monique; Pugh, Rhiannon; Lavanga, Mariangela
- 956 Circular Consumption of Household Water: A Critical Literature Review**
Sikhwil, R. K.; Aurisicchio, M
- 965 From Soil to Garment: Missing Links in the Assessment Criteria of Textiles**
Skjold, Else; Richardy, Jesper
- 972 How to promote product life using the European Digital Product Passport?**
Skouboe, Esben Bala; Løkke, Søren; Møller Haase, Louise
- 979 Environmental Analysis of Multiple Food Packaging Formats in University Campus Food Services: Case Study at Toronto Metropolitan University**
Snyder, William Ralph; Park, Jonghun
- 993 Consumers' repair practices and acquisition of new and used products identify the dynamics of resource flows in a society**
Soegaard Joergensen, Michael; Lindeburg, Alexander; Remmen, Arne; Dorland, Jens
- 997 The Never-ending LCD Story: Transitioning the Electronics Industry in Ireland to a More Circular Economy**
Sondogar, Pratik; Mitchell, Sinéad
- 1004 Write to Repair: Lessons learned from developing an EU reparability scoring system for product policy**
Spiliotopoulos, Christoforos; Alfieri, Felice
- 1010 Access-based business model for washing machines: Evidence from consumer testing**
Štangová, Radmila
- 1017 The Repair Shop 2049: Co-Designing Sustainable and Equitable Transitions for Smart Device Repair with and for Local Communities**
Stead, Michael; Pilling, Matthew; Macpherson-Pope, Tom; Coulton, Paul
- 1025 Development of a flexible Life Cycle Assessment tool for product designers: A case study for lithium-ion traction batteries**
Stiefmann, Michaela; Gornik, Marvin; Haenel, Frauke; Funk, Michelle; Langbehn, Pauline;; Ott, Denise; Dos Santos, Maria
- 1029 Well packaged: Tradeoffs in sustainable food packaging design**
Sumter, D.X.; Oskam, I.; Poldner, K.; Zuidberg, A.F.
- 1035 How to understand and teach upcycling in the context of the circular economy: Literature review and first phase of Delphi**
Sung, Kyungeun; Moalosi, Richie; Satheesan, Ashwathy; Brosse, Christopher; Burton, Elizabeth; Lim, Hye-won; Cheung, Kevin; Debrah, Ralitsa; Lettmann, Sabine; Gaukrodger-Cowan, Sally
- 1041 A Multilevel Circular Economy Repair Society Model: Understanding system-wide implications of normalized product repair from the perspective of the Product User**
Svensson-Hoglund, Sahra; Russell, Jennifer D.; Richter, Jessika Luth
- 1051 The Role of Repair as a Resource for Resilience: Case Studies on the Effects of Repair Outcomes of Essential Products**
Svensson-Hoglund, Sahra; Russell, Jennifer D.; Richter, Jessika Luth

T

- 1058 Cutting the life of reusable products short: Understanding overconsumption behaviour for refill at home FMCGs**
Tassell Catriona; Aurisicchio, Marco
- 1064 Flawed or redundant: products with long lifespans against the odds**
Throne-Holst, H.; Laitala, K.
- 1069 What sustainable fashion retailers presume about consumer motivations and how they try to persuade consumers to purchase their product**
Toebast-Wensink, A.; van den Broek, K.L.; Timmerman, T.
- 1076 Squaring the Circle on PPE: a Systemic Approach to Designing and Repurposing Gowns**
Townsend, Katherine; Dawson, Tom; Salter, Eloise; Harrigan, Karen; Šterman, Sonja
- 1083 Futuring alternatives biobased colour systems – testing possibilities of fading and redyeing with (SMC) Danish lifestyle companies**
Tønder Jensen, Louise Permiin; Gjøderum Hartvigsen, Monica Louise

1089 Buy, use, sell, repeat – Resale companies' role in sufficiency-based circular economy
Turunen, Linda Lisa Maria

**1095 Reuse and repair ecosystems:
analysis of the emergence of the tensions between the stakeholders**
Tyl, Benjamin; Pottier, Aude; Allais, Romain

V

**1101 The Emerging Landscape of Urban Upcycling:
identifying manifestations in a city context**
van Hees, Marco; Oskam, Inge; Bocken, Nancy

**1108 The influence of a modular design and facilitating cues on
consumers' likeliness to repair electronic products**
van den Berge, Renske; Magnier, Lise; Mugge, Ruth

**1115 Spinning out of control – reflections on the (non)sense of repurposing
as a circular economy loop**
van Kuijk, Jasper; Wever, Renee

1122 Feasibility of On-demand Additive Manufacturing of Spare Parts
van Oudheusden, Alma; Buijserd, Arjan; Doubrovski, Zjenja; Flipsen, Bas;
Faludi, Jeremy; Balkenende, Ruud

**1130 The state of clothing donations and its links to overconsumption of fashion
– case of Geneva, Switzerland**
Vladimirova, Katia Dayan; Sahakian, Marlyne

W

**1136 Gender roles as barriers to sustainable fashion lifetimes:
How a deconstruction of norms can extend the use phase of garments**
Wallaschkowski, Stephan

1141 Electrochemistry as a tool for improved circular economy of metals
Wang, Zulin; Halli, Petteri; Yliniemi, Kirsi; Lundström, Mari

1148 Lifespan extension of clothing products: Exploring emotional attachment to actively worn garments
Wang, Ziqing; Brubacher, Kristina; Yao, Yao

1154 3D Fashion Design Software as a Critical Design Tool for the Remanufacture of Sportswear
Wetherell, Sophie; Nicholson, Tim; James, Alana

1160 New Metaphors for Plastic Packaging
Wilson, Garrath T.; Baird, Harriet M.; Beswick-Parsons, Rorie; Clark, Nikki; Eman, Saima;
Gavins, Joanna; Greenwood, Sarah; Lilley, Debra; Mattinson, Paul; Webb, Thomas L.;
Woolley, Elliot; Woy, Princess; York, Nicola

**1168 Identifying Opportunities to Increase Food-To-Go Packaging Lifetimes
Based on the Current Conceptualisation of Food-To-Go**
Woy, Princess; Wilson, Garrath T.; Cockbill, Stuart

Y

1175 Unfolding Openness: Critical reflection on the open design projects in Turkey
Yazirlioğlu, Lilyana; Sarisaltık, Ayşe Kaplan; Doğanay, Demet

Z

1182 Measures to Enhance a Circular Plastic Economy in Europe
zu Castell-Rüdenhausen, Malin; Marttila, Tatu

EXHIBITIONS

1190 REPAIR Exhibition

1196 PLATE Workshops

Strategy models for upcycling. How to create a systemic change through practice potentialities

R. Nastasi^(a), G. Proietti^(a), C. Marino^(a), C. Remondino^(a)

a) Politecnico di Torino, Turin, Italy

Keywords: Upcycling models, Fashion system, Systemic Innovation Design, Sustainability.

Abstract: Upcycling has accelerated considerably during the pandemic, where excess inventories for the spring/summer 2020 collection exceeded 140 billion and are increasingly being explored worldwide (Chan, 2020). The practice involves recycling waste materials of various kinds, intending to make products that are not only sustainable but that, through an appropriate design process, acquire added value compared to the source materials. Applying a specific *forma mentis* - systemic design - the contribution explores new realities explicitly shaped to be part of the re-fashion sector, established companies that have started in their attempts to reconvert even a part of their system, and aims to define a framework starting from waste to levels of integration of the latter in parallel supply chains. In this case, the Systemic Innovation Design approach represents a methodological approach (Barbero & Tamborrini, 2015) and a sustainable design practice to apply knowledge to systemic problems with the aims of co-designing products, systems and business models for sustainable services (Jones, 2014). Cases of this kind were collected and analyzed to capture and return the salient aspects of each upcycling process. A tripartite form was drawn up with three criteria: sustainability, communication and the intrinsic emotions that the brand wants to convey to the consumer in its upcycling model. The research shows that although upcycling does not yet have a precise connotation (Cassidy & Han, 2015), it is a widespread phenomenon continuously being experimented with by both individual consumers and brands. The contribution attempts to offer a critical overview of some of the realities currently on the market and to highlight how, from the same practice, completely different business models can emerge.

Introduction

The fashion industry is a large-scale economic sector. McKinsey's report estimates that comparing this industry's revenue to the single countries' GDPs, it would be ranked as the seventh-world economic power (McKinsey, 2016). Such a big industry indeed has a great environmental impact. It is, in fact, reported that in 2015 the fashion industry consumed 79 billion cubic meters of water, has emitted 1715 tons of CO₂ and 92 million tons of waste of various kinds. It has been estimated that, at this rate of growth, these figures are going to double by 2030 (European report, 2019).

Before 2020 the industry's total revenue was between 1,7 and 2,5 trillion dollars. (McKinsey, 2020). The Covid 19 pandemic forced the world to stop and rethink how to approach goods production. This new scenario can be described with the term New Normal, meaning a situation where routines are disrupted, and the extraordinary becomes ordinary (Sacchi, 2020).

This global change indeed touched the fashion industry. It has been estimated that the "excess inventory from spring/summer 2020 collections were more than double the average", with a total value between €140 billion to €160 billion (Chan, 2020). This deadstock provided the opportunity to experiment with sustainable ways of doing business.

In recent years entrepreneurs are reflecting on the "excessive speed that has not translated into positive change or evolution" (Sacchi, 2020); it follows that the new requirement for goods is high durability. In the fashion field, words such as seasonless, timeless and carry-over appear (Sacchi, 2020). New studies have also shown that buyers are gradually more aware of their actions and choices. They can now be defined as active subjects, overturning the most important economic theories of the last century (Sacchi, 2020).

In addition to the challenges brought by the pandemic, the industry is now facing the consequences of geopolitical instability and inflation. Therefore, the general expectations are pessimistic despite the recovery in 2021 and part of 2022. Two-thirds of the executives are considering nearshoring to mitigate the effects of inflation and the possibility of disruptions in the supply chain. In addition, 75% of executives want to reduce their inventory, and 16% think implementing sustainability represents a significant market opportunity (McKinsey, 2022).

All the previous premises suggest that it could be the right time to work on alternative ways of conceiving businesses. A profitable direction could be a business model based on tackling the massive amount of waste the industry produces, slowing manufacturing processes, considering the consumers' newfound critical voice and resisting geopolitical fluctuations. The upcycling technique, "to treat an item that has already been used in such a way that you make something of greater quality or value than the original" (Oxford Advanced Learner's Dictionary), could be an effective way to satisfy all the previous requirements.

This contribution intends to provide general guidelines for creating a sustainable upcycling strategy in the fashion field. After a detailed analysis of the fashion scenario and the post-pandemic tendencies, the research focuses on finding a theoretical foundation for sustainable upcycling businesses by defining three main criteria: sustainability, communication and emotions. Lastly, in addition to the guidelines, the paper outlines a general system as a base for constructing a sustainable upcycling model.

Methodology

Upcycling has had considerable experience in the fashion industry, so it was necessary to analyse what has already been done in this field. Firstly, it was essential to define a suitable method for collecting data, outlining companies' systems and identifying their strengths and weaknesses.

Definition of parameters

Considering the scenario, it is necessary to pay attention to the sustainability of companies and the proper development of communication.

However, we also wanted to analyse the human dimension during this work. Indeed, emotions constitute an immutable constant that evolves but does not disappear throughout people's lives.

Sustainability is not only about the environment. Designing a production system "means meeting our needs without compromising the ability of future generations to meet their own needs" (UN Brundtland Commission, 1987); therefore, social rights and economic development are crucial aspects to consider.

Communication encompasses what a brand decides to tell about itself. Through the tone of voice, a company uses for its storytelling and the choice of verbal or iconic language, it is possible to generate specific imagery and successfully engage the right target audience. Finally, **emotions** are the most underestimated criterion yet the most crucial element in creating consumer affection.

How parameters work

Parameters are meant to work together symbiotically with the right balance. Each element must exist apart from the other but must be present and structural. In our analysis, Sustainability, Communication, and Emotions are equally important (Figure 1).

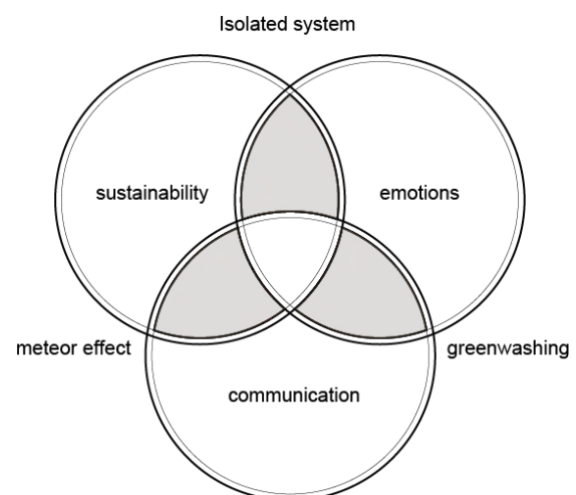


Figure 1. Functioning of parameters and intersections.

When sustainability is not involved, businesses tend to incur "behaviour or activities that make people believe that a company is doing more to

protect the environment than it is” (Cambridge Advanced Learner’s Dictionary & Thesaurus, n.d.). This phenomenon is known as Greenwashing: the user is hooked by a well-crafted communication strategy based on sustainability. However, as soon as the fraud arises, his affection will undoubtedly become outraged.

When Communication is missing, a business cannot reach out to the masses despite noble intentions. Therefore it is destined to create an isolated system and be confined to a small niche.

When Emotions are excluded, Communication and Sustainability must engage more with the consumer, and the business will be able to stand out among its competitors.

Case studies’ analysis

These parameters constitute the structure for the case studies analysis, which explores brands’ systems, focusing on every element involved in reaching success in the upcycled fashion industry.

Every case study is introduced by a text providing basic information (who founded the brand, when and where, the category of items it sells, and the mission). Then, a radar scheme reports the influence of each parameter (Figure 2). It uses three axes, one for each variable: it is assigned a score of 0 to 5 to each value, assuming 0 as “not at all” and five as “completely”: thus, assigning an objective rate based on deep analysis; it generates a triangle, through whose shape it is possible to summarize the trend of the brand.

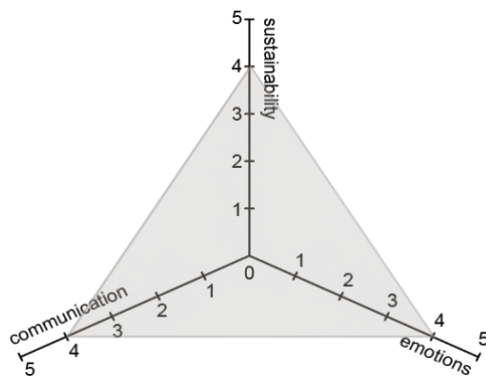


Figure 2. Radar scheme (with an hypothesis of the triangle generated after the evaluation).

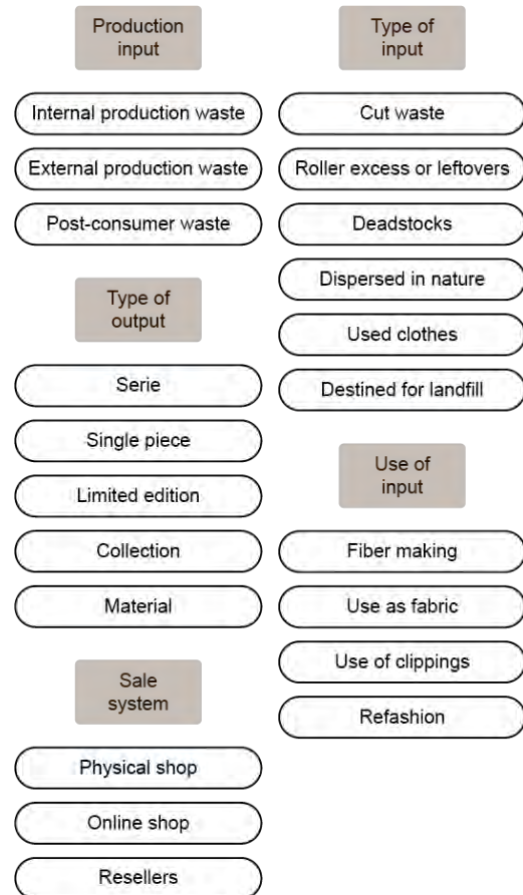


Figure 3. Evaluation tags for Sustainability.

The sustainability part uses tags to define the inputs adopted and the outputs produced (Figure 3). The central part is the visual reproduction of the business’ system (from sourcing raw material to selling the final product and, where possible, to post-consumption or disposal).

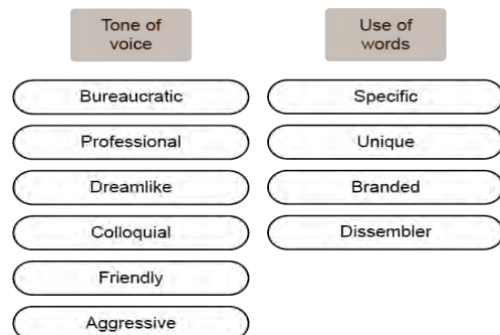


Figure 4. Evaluation tags for Communication.

The Communication part reclaims tone of voice parameters studied by Valentina Falcinelli in “Testi che parlano” (Falcinelli, 2018), and again, thanks to simple tags, it defines both visual and verbal languages adopted (Figure 4).

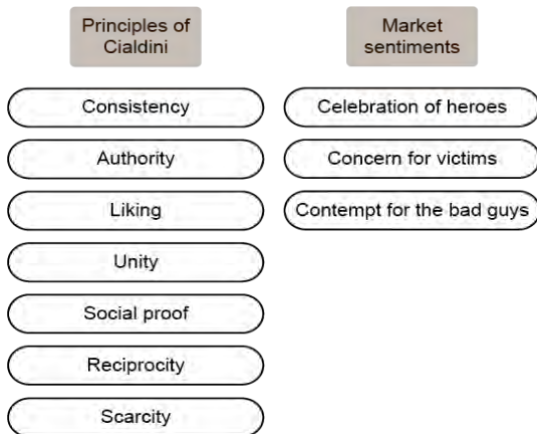


Figure 5. Evaluation tags for Emotions.



Figure 6. Emotions' evaluator from Plutchick's Wheel of Emotions.

Finally, emotions are described by the Market Sentiments, the Principles of Persuasion by Roberto Cialdini (Cialdini, 2007) (Figure 5) and an evaluator inspired by Plutchick's Wheel of Emotions (Plutchick, 1991) (Figure 6). In this case, businesses must be studied on two levels: the first analyzes the feelings the brand is trying to recall, and the second one tries to understand what final users receive.

The review of each brand must consider the target too. For that, it has been used a division based on generations (Figure 7).

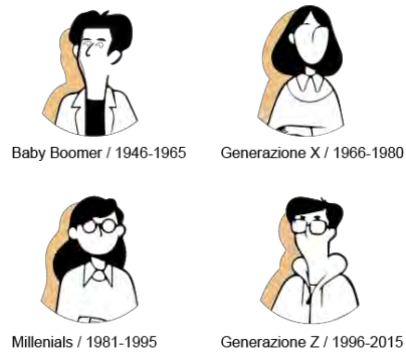


Figure 7. Division based on generations.

Many recent sociological studies have shown that distinctive features developed in relation to the historical period in which one grew up that unite groups of people belonging to the same generation. It cannot precisely describe the target of the brand; anyhow, it allows us to identify the age range of the final users and their vision of the world (Istat, 2016)

Findings

As a result of deep research in upcycled fashion, 34 businesses have been selected and analyzed. Most of the cases adopt the upcycling model as the primary production system (Figure 8), which can differ by the type of inputs (Figure 11) and outputs (Figure 9) and the type of production (Figure 10).

All the cases are actual functioning companies from all over the world (Figure 14).

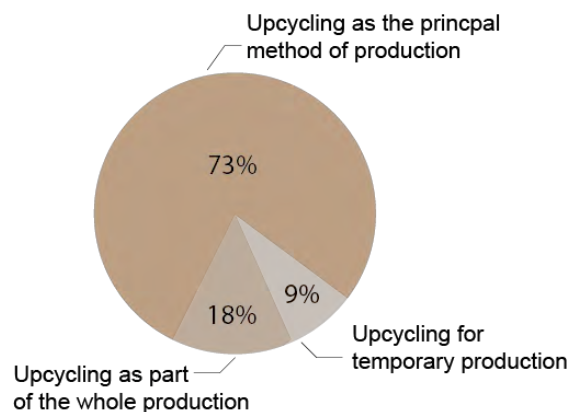


Figure 8. Upcycling as the main core business versus upcycling for exceptions (referred to the 34 cases).

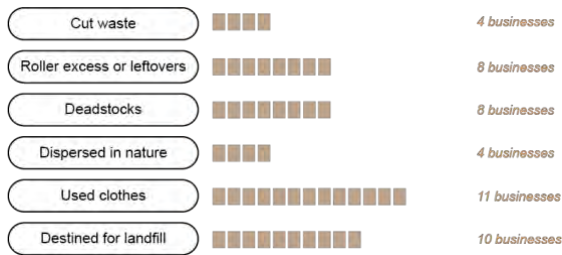


Figure 9. Inputs the 34 businesses adopt.

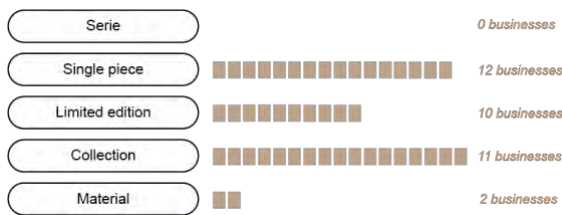


Figure 10. Outputs the 34 businesses produce.

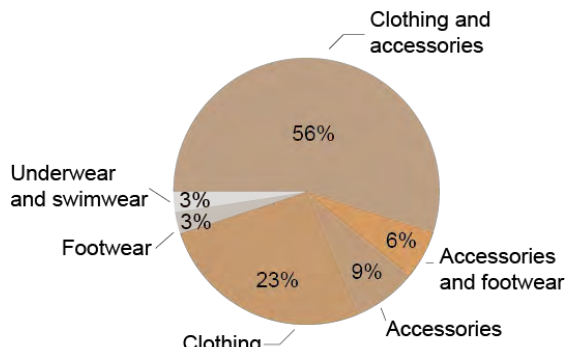


Figure 11. Type of production of the 34 cases analyzed.

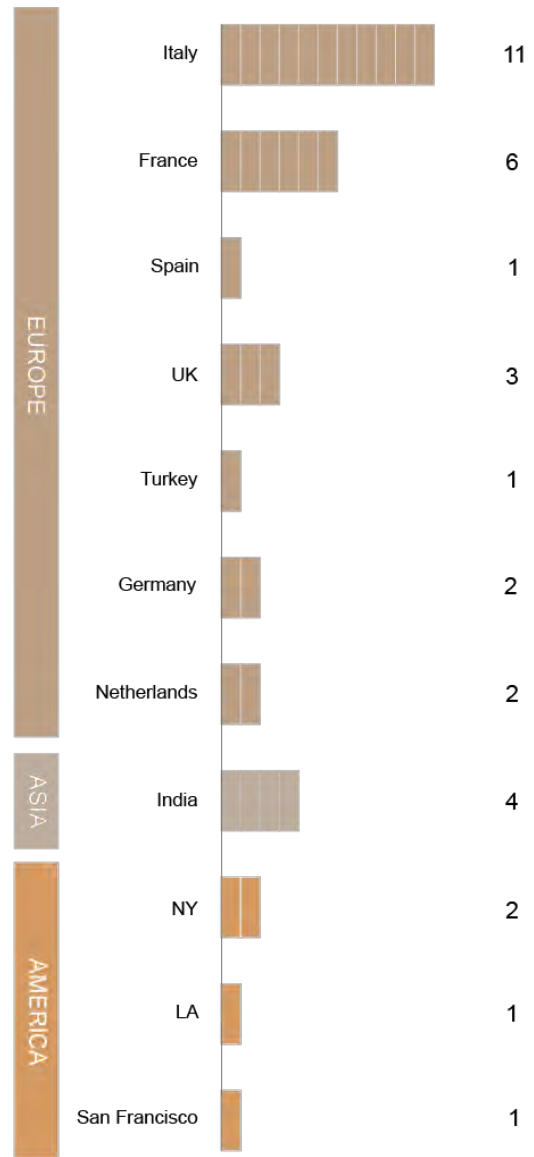


Figure 12. Cases analyzed (referred to the 34 cases).

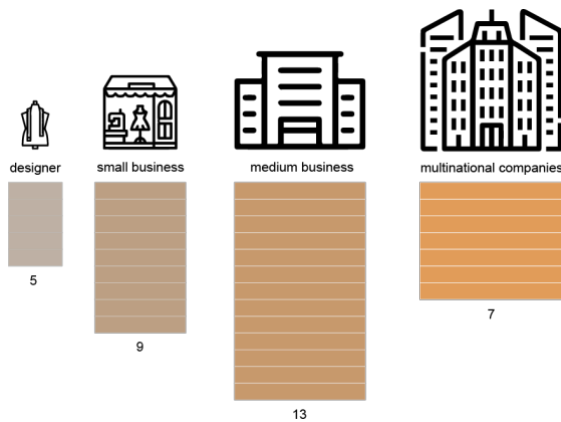


Figure 13. Cases analyzed by dimension (referred to the 34 cases).

The analysis shows that only a small percentage is balanced (or semi-balanced) according to the tripartite scheme. In particular, this percentage is composed of medium-small companies (Figure 15) with a clear target and strongly independent from the fashion market trends. All the other brands considered, on the contrary, manifest a strong imbalance towards one of the parameters (Figure 16).

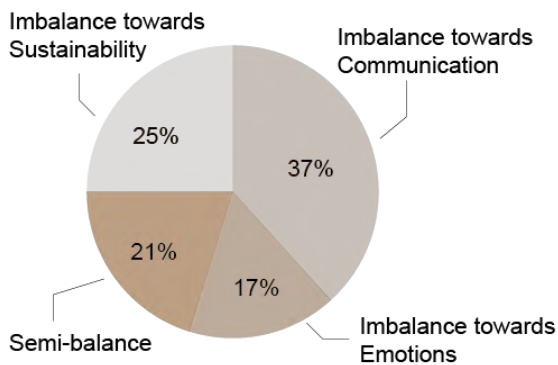


Figure 14. Analysis of businesses' results.

Thus, a categorization based on the weight of a specific parameter guides the identification of four groups.

Imbalance towards Sustainability

Cases included are niche businesses with highly-specialized productions, with a defined type of inputs and outputs. Moreover, they refer to a defined target, apparently not contemplating enlargements because of undeveloped communication strategies (Table 1).

% of the category	Properties and characteristics
28,6	Very high level of sustainability Absence of balance on the triangle Niche businesses
64,3	High level of sustainability Imbalance on the triangle Niche businesses: strong specialization of the production
7,1	Medium level of sustainability 2 parameters balanced on the triangle Niche businesses: poor communication

Table 1. Imbalance towards Sustainability's data.

Imbalance towards Communication

Cases included involve some of the most famous brands in the fashion industry: whether it is a coincidence or not, it is always about limited editions or temporary collaborations. Furthermore, data confirm that these actions mainly aim at trends and market needs (Table 2).

% of the category	Properties and characteristics
50,0	Very high level of communication Significant absence of balance on the triangle Limited edition / temporary collection
50,0	High level of communication Imbalance of the triangle Limited edition

Table 2. Imbalance towards Communication's data.

Imbalance towards Emotions

Cases included are little-known niche business realities. This group involves brands with a very defined production, mainly based on the uniqueness of the items. It is mostly about one-piece outputs attributable to luxury or high fashion (Table 3).

% of the category	Properties and characteristics
33,3	High level of emotions Significant absence of balance on the triangle Niche businesses: strong specialization of the production
33,4	High level of emotions Imbalance on the triangle Niche businesses: on piece
33,3	Medium level of emotions Imbalance on the triangle Niche businesses: little or unknown brands

Table 3. Imbalance towards Emotions' data.

Semi-balance

Cases include primarily designers' actions, who work in their atelier with strong motivations leading to courageous choices in fashion panorama. Also, there is particular care at every step of the system. Each reality has strong specialized production, is constantly improvable, and is transparent in every stage of creation. (Table 4).

% of the category	Properties and characteristics
30,0	Balance on the triangle Very defined target Growing businesses
70,0	Unsignificant imbalance Very defined target Businesses with great chances to grow and improve.

Table 4. Semi-balance's data.

Guidelines

Despite the existence of a small percentage of successful businesses, not many realities are worthy of becoming a model for aspiring to. Unfortunately, upcycled fashion businesses remain niches known exclusively by some conscious consumers.

A significant problem nowadays is that sustainable business models must consider circularity in their systems. Focusing on inputs and outputs is not enough. Creating raw materials (inputs) and disposing of final objects (outputs) are both very expensive and impactful. Upcycling allows them to downsize their impact, relocate their role inside a production system and, more importantly, convert them into connection points. These

stages generate empowering relations among different systems instead of just being the initial and the final phases of a potentially unsustainable process.

Structural guidelines

Starting from the criteria covered previously, the research will now focus on defining general guidelines (Table 5) that a sustainable fashion brand that chooses the upcycling technique should follow.

Guidelines	Description
Enhance the history	In order to create real affection with the product, its communication should be created around the waste's history.
Phigital district	A sustainable brand should be part of a more complex system, where one business' outputs can become another's inputs. These connections should be implemented through digital means.
Local supply chain	To maximize sustainability, the supply chain and the production should be limited to a small area.
Shared knowhow	A sustainable brand should provide platforms to share knowledge. This way businesses, and ordinary people as well, can be empowered and generate positive impact.
High quality's raw material	A sustainable brand should use only high quality's material, so that garments can have a long life cycle
Designed end-of-life	To create a circular system, a sustainable brand should design the last part of their products' life, reintroducing them to their system or making sure they are going to enter in others.

Table 5. Description of guidelines.

System's guidelines

After defining the guidelines, it is possible to draw a generic system with the fundamental components for a sustainable upcycling brand and its relations. This could represent a base point for more complex business models (Figure 15).

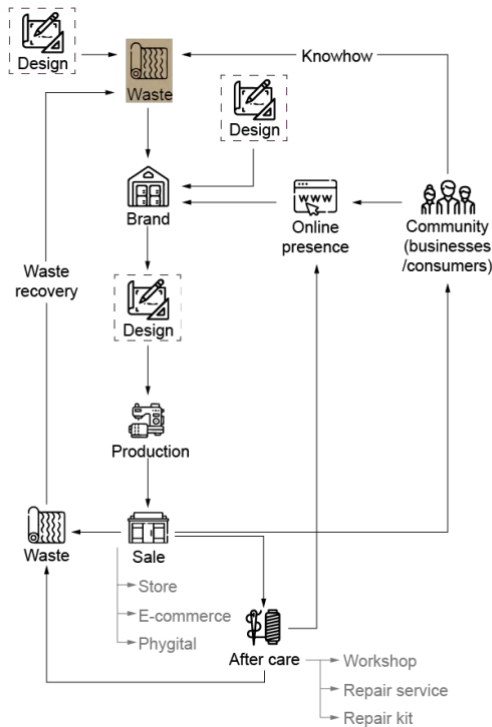


Figure 15. Processes of general system.

The process originates from the section “waste,” a general definition of the system’s inputs. These inputs can be various; the only requirement is that they must not be of new production. The brand then collects the waste. The “design process” needs special mention. It is possible to see that it is positioned in more than one place because, depending on the brand’s business model, this process can occur at different times.

The next step is production, followed by sale, which can be managed physically, digitally or, more effectively, in both ways. Finally, the brand needs an online presence to interact with the community and share and collect know-how.

The final part of the system covers the post-consumer phase. According to the previous guidelines, the products’ end-of-life must be

designed, and a sustainable brand should predict at least two ways to do so. The first is allowing the consumer to repair or modify the garment to postpone disposal. The second one is designing the path the waste will follow, ensuring it will be reintroduced as an input in a productive system.

Conclusions

As specified at the beginning of the research, the paper aims to provide strategies and best practices to businesses that aim to be sustainable. The three parameters represent a dual resource for designers, giving them both a structural direction and a toolkit to draw from for innovation.

According to the scenario outlined, times are favourable for introducing new sustainable production models, and upcycling is an optimal solution. Adopting the practice as the primary production strategy would allow businesses to think from a systemic perspective and to find opportunities in what now is seen as a waste. To achieve higher levels of sustainability, companies should no longer perceive themselves as separate entities from the surrounding environment, but they should aim to connect their systems to existing ones. Implementing the right connections is crucial.

This research’s findings report that this mindset is already present in many businesses but is too often confined to the input phase. There are, in fact, multiple examples of the different ways a business can source leftover fabrics, but not many models suggest how to tackle the post-production and post-consumer waste generated by their systems. This unexplored area could be a breeding ground for innovation for designers looking for effective and unprecedented solutions to “close the circle”.

Research’s limits and future goals

This research takes a systemic design perspective; its aim is not to provide detailed production techniques but to analyse and suggest flow management strategies and provide insights to innovate the fashion industry.

The three parameters result from an analysis that places humans at the centre before any other element; however, it is, of course, just one

of the many possible ways to provide an innovative and sustainable point of view.

Furthermore, the cataloguing based on these parameters uses evaluation tools supported by literature or, in some cases, based on qualitative criteria. The goal is to refine the method to implement the analysis's objectivity, involving the analyser's subjective aspect as little as possible.

Finally, although, at the moment, this research is only theoretical, the next step would be to apply the system and guidelines and test them empirically.

References

- Chan, E. (2020, 23 November). Upcycling Is The Biggest Trend In Fashion Right Now Vogue UK <https://www.vogue.co.uk/fashion/article/upcycling-trend-ss21>
- Han, S. L., Chan, P. Y., Venkatraman, P., Apeageyi, P., Cassidy, T., & Tyler, D. J. (2017). Standard vs. upcycled fashion design and production. *Fashion Practice*, 9(1), 69-94.
- Barbero, S., & Tamborini, P. (2015, October). Systemic Design goes between disciplines for sustainability in food processes and cultures. In Proceedings of the 7th International Aesop Sustainable Food Planning Conference, Torino, Italy (pp. 7-9).
- Jones, P. H. (2014). Systemic design principles for complex social systems. In G. Metcalf (Ed.), *Social systems and design* (pp. 91-128). Springer. https://doi.org/10.1007/978-4-431-54478-4_4
- Cassidy, T. D., & Han, S. L. C. (2017). Upcycling fashion for mass production. In *Sustainability in fashion and textiles* (pp. 148-163). Routledge.
- McKinsey & Company. (2016). *The State of Fashion 2017* <https://www.mckinsey.com/industries/retail/our-insights/state-of-fashion#section-header-2017>
- McKinsey & Company. (2020). *The State of Fashion 2021: In search of promise in perilous times* <https://www.mckinsey.com/industries/retail/our-insights/state-of-fashion#section-header-2021>
- European Parliamentary Research Service. (2019). *Environmental impact of the textile and clothing industry* [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI\(2019\)633143_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI(2019)633143_EN.pdf)
- Ro, C. (2020, 11 March). Can fashion ever be sustainable?. In BBC <https://www.bbc.com/future/article/20200310-sustainable-fashion-how-to-buy-clothes-good-for-the-climate>
- Chan, E. (2020, 23 November). Upcycling Is The Biggest Trend In Fashion Right Now Vogue UK <https://www.vogue.co.uk/fashion/article/upcycling-trend-ss21>
- Sacchi, S. (2021). *La fenice e il camaleonte nella moda e nel design: Recycling e upcycling*. Franco Angeli.
- McKinsey & Company. (2022). *The State of Fashion 2023: Holding onto growth as global clouds gathers* <https://www.mckinsey.com/industries/retail/our-insights/state-of-fashion#/>
- Oxford Advanced Learner's Dictionary (n.d.) n Oxford Dictionary. Retrieved March 21, 2023 from <https://www.oxfordlearnersdictionaries.com/definition/english/upcycle?q=upcycling>
- United Nations Brundtland Commission. (1987) *Report of the World Commission on Environment and Development: Our Common Future* <http://www.un-documents.net/our-common-future.pdf>
- Cambridge advanced Learner's Dictionary and Thesaurus. (n.d.) in Cambridge Dictionary. Retrieved March 17, 2023 from <https://dictionary.cambridge.org/dictionary/english/greenwashing>
- Falcinelli, V. (2018). *Testi che parlano*. Franco Cesati Editore.
- Cialdini, R. PhD (2007). *Influence. The psychology of Persuasion*. HarperCollins e-books.
- Plutchick, R. (1991). *The Emotions*. University Press of America.
- Istat. (2016). *Classificazione delle generazioni* <https://www.istat.it/it/files//2011/01/Generazioni-nota.pdf>



Aalto University
School of Arts, Design
and Architecture

Aalto University publication series

ART + DESIGN + ARCHITECTURE 3 / 2023
ISBN 978-952-64-1367-9 (electronic)
ISSN 1799-4861 (electronic)