REIMAGINING LUXURY

The potential of Digital Product Passports (DPPs) in accelerating circularity

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STRGL commissioned a master’s thesis from Aalto University in 2024 to explore the potential of Digital Product Passports within circular business models in the high-end fashion industry. The research was conducted by Matti Kuusela.

Research goals and questions

This research was conducted to deepen insights into the circular business models supported by Digital Product Passports (DPPs) within the luxury fashion sector.

Research topic

This research examines the transformative potential of DPP in advancing circular economy business models (CEBMs) within the fashion industry in the EU. The focus of the study is on the high-end fashion segment, based on its unique potential in terms of high reuse and resale value. Moreover, this study explores the opportunities related to DPP adoption by fashion brands and consumers, as well as their attitudes and DPP features that could solve current issues in the high-end second-hand fashion market.

Research questions

RQ 1: How can Digital Product Passports for textiles accelerate circular business value creation for brands and consumers in the high-end fashion market?

RQ 2: How can tokenized DPP assist in generating new revenue streams and create added value for consumers in the luxury second-hand market?

BACKGROUND

Fashion industry is currently based on linear consumption

Circular economy business models (CEBMs) are one of the suggested solutions to tackle the negative sustainability impact of the fashion industry.

Sustainability challenges of the fashion industry

The fashion industry is a complex industry with multiple challenges. Some of the main challenges identified in the study are the industry's **environmental impact**, especially carbon emissions and waste generation, a lack of **transparency** in the supply chains, and **overconsumption** caused by fast and ultra-fast fashion (e.g. 1, 2).

Circularity in the fashion industry

EU's Circular Economy Action Plan (3) focuses on the textile industry to develop more sustainable markets and business models. Circular solutions help keep products and materials "in-the-loop" for longer, facilitating extended utilization, repair, reuse, repurposing, and recycling, while generating business opportunities (e.g. 1, 4, 5).

(Number-coded sources are found in the references list at the end of this document)

The benefits of digital product passports for high-end fashion brands

Luxury fashion is a specific segment of the fashion industry and it can benefit from the DPPs significantly, mainly due to its exceptional resale value and innovativeness of the sector.

Luxury fashion

The luxury sector is often reported as one of the fastest-growing industries in the world. In 2014-2019 the global luxury industry grew by around 150% to 1,3 trillion euros, with personal luxury being the second largest segment. Current luxury market growth is connected to expanding price and brand spectrum, innovative distribution channels, and the rise of second-hand luxury retailers and rentals (e.g. 6, 7, 8).

Consumer attitudes towards second-hand luxury

Critical motivating factors that drive consumer preference for second-hand luxury are sustainability, resale value, functionality, and uniqueness (e.g. 8, 9). On the surface level, circular business model innovation with DPP has the potential to answer these needs better than ever before, but their optimal integration into retail remains to be determined.

DPPs and the fashion industry

The DPP can accelerate circularity in fashion through five key utilities: detailed product info, authenticity certification, lifecycle management, CRM capabilities, and digital twins. In addition, tokenization could increase the usefulness of DPPs, fostering a stronger bond between brands and consumers by boosting confidence in second-hand markets and improving access to after-sales services. (10, 11).

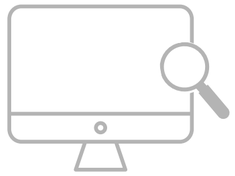
RESEARCH METHODOLOGY

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The research was conducted in three phases



Literature review

- Current sustainability issues in fashion
- Luxury fashion trends and Second-hand Market
- Circular Business Model Innovations
- Digital Product Passports and EU Legislation

Summary in Appendix 1.



Interviews

- 4 fashion industry profeassionals from case companies.
- 10 consumers participating in the second-hand luxury market.



Analysis

- Using the Gioia methodology to analyze brand cases and consumer interviews

KEY FINDINGS

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Research Question 1: Key findings

How can Digital Product Passports for textiles accelerate circular business value creation for brands and consumers in the high-end fashion market?

More specific information	The findings highlight how DPPs could extend product lifecycles by providing more specific information on materials and care. This is consistent with reports (1, 12, 13) , which emphasizes rethinking fashion to enhance circularity through increased lifespan of goods and more circular materials.
Increased transparency and traceability	The case firms regarded the DPP as a useful, standardized instrument for gathering relevant data for their supply chains. This presents an opportunity to establish transparency as a norm in the fashion sector. DPPs serve to improve overall transparency in high-end fashion, increasing trust overall
Importance of legislation	Both earlier research and this study recognize the role of legislation in establishing better supply chain transparency in the fashion industry. The research reveals that businesses are planning for legal compliance while looking for potential economic benefits.
Circular service offerings	Two of the case companies, Alpha and Beta, underline DPP's role in promoting new CEBMs, aligning with the important goal of extending garment lifespans in the EU and creating new circular revenue sources in fashion (e.g. 5). The brand interview results recognized the possibility of providing customisation and repair services through DPPs digital twins.

Research Question 2: Key findings

How can tokenized DPP assist in generating new revenue streams and create added value for consumers in the luxury second-hand market?

Under-utilized clothes	The results imply that DPPs could support and facilitate better reuse and redistribution models by directing under-utilized clothes to reuse, reinforcing frameworks by different researchers (e.g. 1, 9, 14) on the importance of detailed information and better systems for the circular economy.
Authenticity	Several participants mentioned that current authentication services are typically expensive and unreliable. DPPs could eliminate these problems by easily integrating authentication into the item's digital twin. This added trust could inspire sceptical customers to participate more confidently in the second-hand market.
Product history	Many respondents stated they wanted to access comprehensive product history, including usage, repairs and alterations. Such information empowers purchasers to make better-educated decisions, decreasing the uncertainty that frequently comes with acquiring second-hand luxury products.
Easier product listings	Tokenized DPPs provide a solution for these issues by pre-filling key details, including size, condition, material, and authentication for the product. The research participants recognized the value of tokenized DPPs in simplifying listing items online with pre-filled information, lowering the barrier for consumers to participate in the luxury resale market, supported by previous industry insights (e.g. 15, 11).

Consumers and brands see DPPs beneficial for the luxury market.

CONSUMERS

Selected quotes
“Ownership, repairs, and modification history are interesting pieces of data. DPP would guarantee authenticity and remove the need for additional services. All the extra information would make selling and buying easier than ever “ – Man, 29 “DPP could incentivize better choices for consumers and encourage them to list second-hand items more easily due to correct data from DPP. I would consider buying high-end items online if the system was more trustworthy with seamless authentication and better information about the products” – Man, 30 “Easier listing and buying, repair information and additional services for upkeep interest me personally, as I want to extend the lifetime of loved quality items” – Woman, 28.

BRANDS

Selected quotes
“Certificate of authenticity is the biggest benefit for luxury second-hand, I do not fully trust the current systems where an expert inspects the items for extra cost” – Delta “I hope that DPP solves these issues with barriers of entry – the luxury experience should be enjoyable in all channels. The features of DPP hopefully bridges this gap and makes it easier to buy and sell second-hand” - Beta “The general problem with DPP is that it's all still so vague, when and how it will it actually come into force, and what is required…if you go to a terrible extent of creating a DPP solution now, what if the final EU system and information requirements are very different? Detailed efforts do not make sense until everything becomes clearer.” -Alpha

CONCLUSION

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Summary of results

CONSUMERS

Challenges	DPP as a solution
• Fake items and insufficient product information are the main issues that hinder participation in the current second-hand market • Consumers struggle with selling items due to the high effort related to listing	• Authentication and detailed product information provided by DPP improves trust • Tokenized DPPs could help with lowering the barrier for listing items online • Textile lifetime extending services facilitated by DPP (resell, modifications, repairs etc.) are interesting for both brands and consumers.

BRANDS

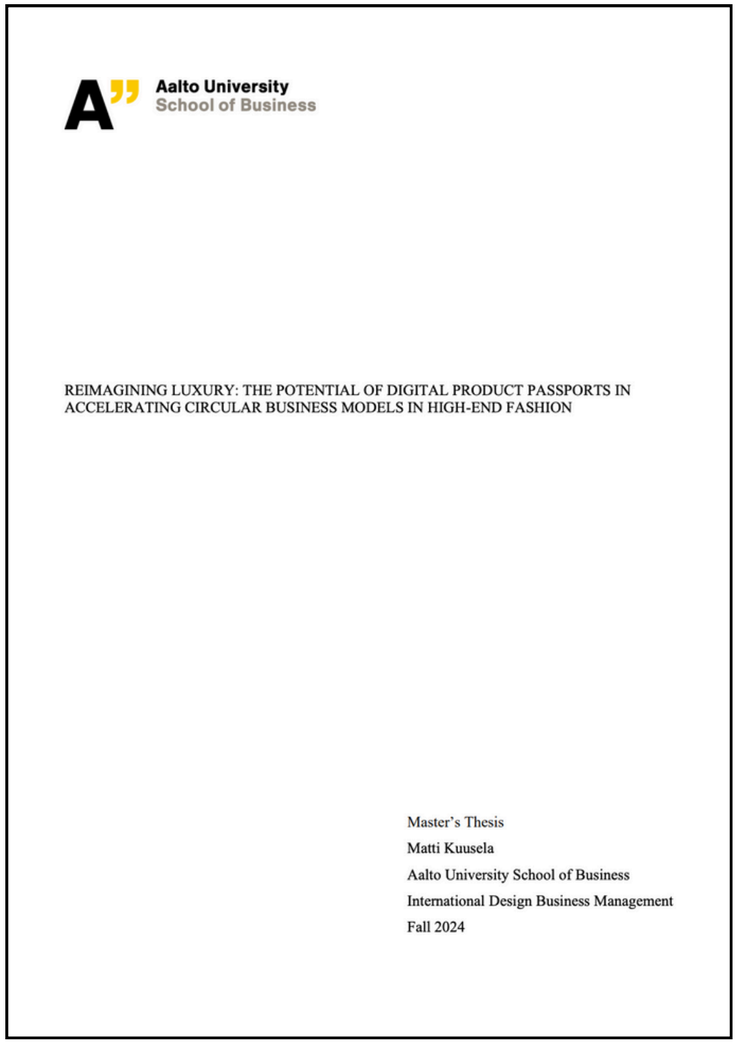
Challenges	DPP as a solution
• Possibility of higher data management costs: DPP integration difficulties with existing systems, and uneven digital maturity across the supply chains. • Diverse expectations: All case brands see DPPs potential, but their views on efficiency and implementation varies based on their business models and strategy.	• DPPs could improve supply chain transparency. Improved data management and resource efficiency allows brands to track products and manage inventory and production. • DPPs are generally seen as instrumental in enabling CEBMs by promoting practices such as recycling, resale, and repair, thereby extending the lifecycle of garments. • High-end brands view DPPs as a growth opportunity in the resale market, advancing circular fashion markets.

Managerial implications

This study provides insights into the practical aspects of DPP implementation and service design for fashion brands in CEBM for value creation.

DPP as a strategic tool	First and foremost, organizations should view DPPs as a strategic tool to improve transparency and authenticity verification, which can lead to higher customer trust and active involvement in the circular economy. This circularity strategy not only extends the lifespan of luxury garments but also aligns with growing consumer preference for sustainability.
Using data to improve processes	The DPP enables brands to use additional data for product development, optimization of processes, and differentiation via unique DPP features. The interviewed brands acknowledged DPPs' potential for improving supply chain transparency, traceability, and risk management.
Offering after-sales services	Especially tokenized DPPs and the associated "digital twins" of items could potentially open new avenues for engaging customers through after-sales services like reselling, repairs and customization. This study supports the notion that DPPs could generate more value by engaging customers beyond the initial purchase point through innovative service offerings.
Collaborations	To ensure a successful transformation, the DPP should be implemented collaboratively with various stakeholders, including suppliers and internal operations.

Want to find out more?


Aalto University
School of Business

REIMAGINING LUXURY: THE POTENTIAL OF DIGITAL PRODUCT PASSPORTS IN ACCELERATING CIRCULAR BUSINESS MODELS IN HIGH-END FASHION

Master's Thesis
Matti Kuusela
Aalto University School of Business
International Design Business Management
Fall 2024

Read the full thesis here.

Kuusela, M. (2024). Reimagining luxury: The potential of digital product passports in accelerating circular business models in high-end fashion. Master's thesis. School of Business, Aalto University. Commissioned by STRGL.

SOURCES

SOURCES

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APPENDICES

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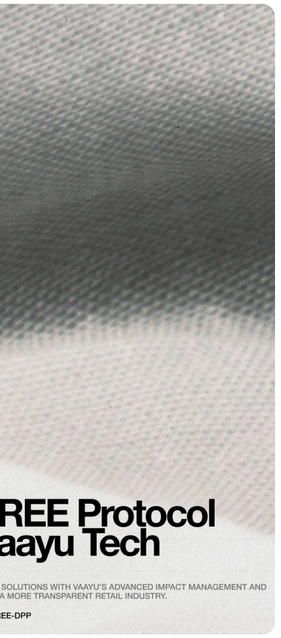
APPENDIX 1

The most relevant literature supporting the research goals		
Authors	**Research topic(s)**	**Supporting findings for the study**
Vehmas et al., 2018; Turunen & Leipämaa-Leskinen, 2015; Turunen & Pöyry, 2019; Vehmas et al., 2018	Fashion consumption trends, second-hand markets in Europe.	Justifies using the Nordics/EU market for empirical research focus. Customer behaviour insights and attitudes explored. Explains consumer acceptance towards circular fashion and second-hand in Europe.
Niinimäki et al., 2020; EMF, 2013, 2017, 2020	Discussing current issues and emerging sustainable (and circular) trends in fashion	Underlining the need for circular principles in fashion and supply chain transparency, materials etc. Emphasizes the importance of extending fashion product lifecycles, which is central to the thesis (slowing down the resource loops with reuse and repair).
Kessous & Valette-Florence, 2019; Dion & Borraz, 2017; Kapferer & Valette-Florence, 2021; Adisorn et al., 2021; Heikkilä et al., 2021; Stolz, 2022	The dynamics of the current luxury second-hand market, as well as current issues identified	Impact of sustainability on luxury consumption choices, identifying motivations and barriers that affect purchasing decisions. The importance of product information and authenticity to add trust in reuse markets. Online channels recognized as most important for growth.
Bocken et al., 2016; Lüdeke-Freund et al., 2019; EMF 2017; Fontell & Heikkilä, 2017	Different ways to interpret and implement circular economy business models and the "4Rs" in fashion	4R's of circularity (Re-use, Repair, Refurbishment, Recycling) frameworks introduced, essential for analyzing findings for fashion. Exploring CEBM opportunities for different sectors. CEBM innovations that slow the resource loops and to extend the lifetime of garments.
European Commission, 2022a; 2022b; CIRPASS, 2023, 2023b, 2024; STRGL, 2023, BCG, 2023	Discusses the regulatory framework and technological solutions related to DPPs.	Outlining the expected benefits of DPP for added transparency and sustainability in the fashion industry. Underlines CEBMs for reuse enabled through implementing DPPs.
Adisorn et al., 2021; Saari et al., 2022; Jansen et al., 2023; Charnley et al., 2022; Ospital et al., 2022; Huynh, 2022;	The benefits of improved product information for circularity, and the potential of DPP solutions for CEBMs.	Demonstrating what type of features of DPPs can enhance trust and utility for second-hand markets. Product information, and authenticity certification through DPP recognized as important for reuse of fashion. Extending product lifespans through data and new services.

FURTHER INFORMATION

Tree® Protocol

We’ve curated a collection of valuable resources for understanding the broader context of DPPs. Dive deeper into how Tree is leading the way in transforming product transparency and consumer engagement.





WEBSITES

Tree	docs.treeprotocol.xyz
STRGL Insights	strgl.xyz
Vaayu & Tree	vaayu.tech

ARTICLES

Launch	strgl.xyz
Vero & PRH	yrityksendigitalous.fi
Sitra	sitra.fi
STJM	stjm.fi

RESEARCH

DPP and European Identity	docsend.com
DPP Technology Study	docsend.com
Implementing DPP	docsend.com

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Questions, concerns? Please reach out.



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