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Taking ownership – exploring the need for a blockchain based intellectual property system for fashion designs.

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Abstract

This paper investigates the integration of blockchain at the design stage of garment manufacture and the positive effects its application can garner, including IP protection, opportunities in the digital realm, and better management of designs. This exploratory research uses a multi-method qualitative methodology formed from semi-structured interviews with industry professionals working on blockchain based start-up companies in the UK and focus groups with UK-based emerging fashion designers. This research demonstrates the varied opportunities for emerging designers which exist outside traditional wholesale and adherence to the fashion calendar model. It also evidences the potential for strengthened copyright protection from blockchain. The numerous benefits of this strategy are shown alongside an analysis of the potential barriers against application. Each designer was able to foresee the rewards of improved IP protection and management, but some demonstrated concern for the actual integration of blockchain into existing design and development processes. As such, this research revealed two things: firstly, a clear need for blockchain to be shown as an adaptable technology which can seamlessly integrate into pre-existing design structures; and a further need for a simple implementation strategy which can be offered to designers working in the fashion industry.

Key words: blockchain, intellectual property, copyright, emerging designers, evidence database.

Brief abstract

This paper investigates the integration of blockchain at the design stage of garment manufacture and the positive effects its application can garner, including IP protection, opportunities in the digital realm, and better management of designs. This research demonstrates the varied opportunities for emerging designers which exist outside traditional wholesale and adherence to the fashion calendar model, and it also evidences the potential for strengthened copyright protection from blockchain.

Introduction

The value of the British fashion industry is estimated to reach more than £75 billion by 2026 (Statistica, 2023), with a total contribution to GDP predicted to be greater than £50 billion (Fashion District, 2021). As a multi-billion-pound industry, the fashion world is a space of continual evolution: constantly shifting in response to consumer trends, rapid globalisation, and digitisation (Badhwar, Islam and Tan, 2023). The UK also has a growing profile of design-led, ‘next generation’ fashion brands fostered by its internationally acclaimed system of arts education. In recent years, this system has found itself at the centre of numerous high-profile funded research projects (CSF, 2020). Much of this research has concluded that next generation designers are seeking to defy the status quo of the fashion industry; through innovative business models, they are reifying an alternative vision for the future of fashion (Elf, Werner and Black, 2021; Prieto-Sandoval et al., 2019). A third of the UK’s small fashion businesses are putting down roots in the thriving East London Fashion District, which has proved itself to be a haven for new designers (Gornostaeva, 2023; Fashion District, 2021). Most recently, the impact of these ‘next generation’ British designers has been acknowledged by the Secretary of State for Culture, Lucy Frazer, who announced an investment of £2 million into the British Fashion Council’s NEWGEN scheme, which allows emerging designers to showcase during London Fashion Week (Gov.uk, 2023).

The role of emerging designers in the British fashion industry

The expression 'emerging designer' is defined by Karra (2023) as a micro or small enterprise (MSEs) with a turnover of under £250,000. Within this, an emerging designer might be one of three things: an individual guided by an artisanal business structure (designer-driven aesthetic motivation); a creative partnership (two creative individuals); or solo categories of business operating in the fashion sector (individual designers focused on growth). As implied by the term 'emerging', these designers are often in the early stages either of their careers or their brand, with the majority having only recently graduated from university. Growth in the number of emerging designers in London has a positive correlation to the success of arts institutions such as the Royal College of Art, London College of Fashion, and Central Saint Martins (Adams, 2023; Black, 2020). In 2022, higher education data ranked University of the Arts London as the institution with the highest number of student and graduate start-ups (HESA, 2022).

The group of emerging designers establishing itself in London has been cited as the driving force behind many recent examples of fashion innovation and originality (Black, 2020, 4), which in turn play a crucial role in the research and development of wider industries. Recognition of their increasing importance to the British fashion industry has been demonstrated by an increase in the funding directed to East London's Fashion District, allocated for the accelerated development of skills, studio spaces, and research and development (Fashion District, 2021).

Even aided by funding, emerging designers still face numerous challenges throughout their pre-launch, launch and sustained-growth stages. A traditional fashion calendar which requires biannual showcases and trade through the fashion wholesale system imposes numerous barriers for small, emerging brands: expensive showcase schedules and a ceaseless demand for absolute originality are the first of such problems. In a 2023 paper, Gornosteva demonstrates how showcasing can present significant financial obstacles to this most vital group of designers, who are subsequently barred from crucial industry access due to insubstantial funds. Listing fees for inclusion in the London Fashion Week schedule start in the thousands of pounds (British Fashion Council, 2022). The current demand for funding to support first-season showcases is vast, but in reality, this demand far outweighs available resources. This is not, we can agree, a welcoming space for graduate designers and, as such, new businesses moving into their first season are relying increasingly on unpaid internships and other similarly unsustainable business models. While such strategies might allow designers to gain recognition, they do not often cultivate healthy profit margins.

Emerging designers and their intellectual property

Fashion is an industry which relies wholly upon the creativity of its designers, but it is also an industry defined by the culture of copying (Vézina, 2019). The term ‘intellectual property’ refers to “unique, value-adding creations of the human intellect that results from human ingenuity, creativity, and inventiveness” (Kalanje, 2005). This, when simplified, includes designs, artistic works, and images that we create. Brands can make use of trademarks to protect their logos and brand names, while design rights and copyright can protect select elements of their designs and garments (Burbidge, 2019). Emerging designers – and much larger brands – must construct layers of rights to protect their designs effectively, often relying on unregistered rights such as copyright and design rights (Brewer, 2019).

When launching and growing a brand, strong and recognisable branding is a pre-requisite. A large part of the success of large fashion brands is due to their brand management and the subsequent licensing of that recognisable branding onto more accessible product lines such as perfume and sunglasses (Olivier, 2022). Trademarks are a fundamental element in building this brand image and value. Prada’s triangle logo is a fine example of a characteristic image used across garment and accessory categories. In AW22, Prada released a line of dresses and shirts replete with this image, and without the Prada name; the eponymous triangle now becoming as impactful as the complete logo. In the early stages of launch, protection for branding is vital for building and then strengthening recognition.

While trademarks are useful for protecting logos and brand names designs must rely on unregistered design rights and copyright for protection for their designs. Yet, in an industry characterised by ingenuity, copying continues to be a significant problem for emerging designers.

In addition to brand recognition, copying of designs is a substantial IP issue in the fashion industry. Alongside the various financial difficulties which accompany the launch of a brand, emerging designers often lack the resources to challenge the copying of their designs. Large corporations can take advantage of emerging designers’ vulnerabilities and lack of financial resources. For emerging designers, the widespread access to fashion designs proffered by social media is a double-edged sword; emerging often lose out to the sudden rush to copy popular designs once garments go viral (Olivier, 2022). In 2020, Diet Prada reported on the direct copying of a blouse designed by mother and daughter creative Maison Cleo which was sold by Shein for a fraction of the original price. Then, in 2021, AirWair International, the company behind Dr Martens, filed an infringement suit against that same fast fashion giant (quickly followed by Ralph Lauren) for using a similar image on their signature logo. These cases are just two of the many reported examples of fast fashion copying on social media and blogs; a crisis which has devastating impact on emerging designers (Dazed, 2021).

This paper explores the potential of blockchain to support the protection and management of IP for emerging designers. The primary research has been conducted through semi-structured interviews with industry professionals working in blockchain-based start-up companies and designers involved in innovative approaches to design and innovation management.

Literature review

Much of the previous literature to consider blockchain application restricts its treatment to the copyright sphere, overlooking both the issues of copyright specific to the UK fashion industry and the opportunity for blockchain integration at the design stage. Indeed, given the recent surge of start-up companies which offer solutions to designers, there is evident need for more research which explores the ways that IP can be managed by emerging designers.

Intellectual property protection for fashion designs

McKinsey's 2019 paper on the growth of the British Luxury fashion market claims that very few British luxury brands are able to generate profit, draws the difficult reality of the fashion industry into sharp relief (Berg et al., 2019). In the UK, there is no specific IP right which protects fashion designs or garments in their entirety, though designers can take some benefits from registered and unregistered design rights and copyright. The UK operates a closed-list copyright system providing eight categories of protectable works. Fashion designs are not designated a specific sub-category, meaning that garments only qualify for copyright protection as works of "artistic craftsmanship" (s.4(c) Copyright, Designs and Patents Act, 1988). To receive copyright protection a design must be both 'artistic' and a 'work of craftsmanship' but case law reveals the difficulty in defining "artistic" especially with regard to garments. UK unregistered design rights protect the shape and configuration of a design but excludes surface decoration and a design must be original and not common place to qualify. In many cases both copyright and unregistered design right protection are relied upon.

Copyright and design rights are unregistered categories of IP rights and consequently reliant on evidence to prove ownership of the work. Should the creator of a fashion design wish to rely on copyright, they would need to ensure that they have sufficient evidence to show that they are the *first* creator of that design. However, there is not currently a system or best practice in which to record this evidence, which is why we are seeing (even in 2023) designers being advised by lawyers to mail individual copies of their designs to themselves, thus creating a post stamp with an affixed date as valid evidence for the moment

of creation. That designers must go to such lengths to protect their designs clearly demonstrates the need for radical innovation in this area of IP management.

In the UK, copyright is an unregistered right with neither formal registration nor cost for protection. It is, therefore, ostensibly advantageous to emerging designers. However, in order to rely on it as a form of unregistered protection, a designers should maintain a valid record of their design process during the creation of a garment. Case law makes clear that this evidence is crucial; numerous cases without it have been quickly dismissed, while cases accompanied by compelling evidence of design development have strengthened the case for other appellants immensely (Rockett, 2018). One example, in the case of *John Kaldor v Lee Ann* (2014), the case was dismissed due to lack of evidence for the design process with the case now serving as a reminder for print designers to evidence the stages by which they came to produce a design. In the case of *G-Star Raw v Rhodi* (2015), however, the clear, dated evidence led to success. It is, therefore, crucial to establish ideation or proof of creation alongside ownership. Yet, in practice, it can be challenging for fashion designers to evidence effectively (Bonnet and Teuteberg, 2023).

Emerging designers often lack the funds to challenge IP theft or copying. Likewise, “the tendency of fast fashion companies to mimic traditional designers poses real threats to the integrity, value and viability of other designers” (Brewer, 2019, 4). Historically, fast fashion giants have targeted innovative ideas from emerging designers, knowing that such designers are often powerless to prevent or solve copying issues. Much of what we are seeing emerging designers do with their IP is reactive rather than proactive. This quasi-vigilante approach sees designers naming and shaming perceived misappropriators on social media channels. Adler and Fromer (2018) examine five case studies involving such ‘self-help’ measures and their success as an alternative to a ‘cease and desist’ letter from a lawyer.

Copyright and blockchain

Blockchain is a distributed ledger technology in which transactions are grouped into blocks. These groups are chained to each other, building an immutable record across a network. Blockchain made its global debut in 2008 when it was applied to create bitcoin (Panda, Jena, Swain and Satapathy, 2021; Badhwar et al., 2023). To date, blockchain has been used across the fashion industry as a technology embedded into supply chains, thus supporting the enhancement of transparency and evidence of provenance (Montecchi et al., 2019). The technology has adopted to distributed ledger system meaning that the digital data can be spread across different institutions and sites with no centralised administrative set up. Cryptography-based hash functions are employed to facilitate the storage of digital data with a blockchain, which in turn

ensures traceability. Upon validation within the network, this block is then permanently incorporated into the immutable blockchain ledger. The key characteristics of blockchain – record of transactions and the benefit of data distribution – mean that it provides a robust system to track ownership, trace the origin of products, and certify their authenticity. Across the industry, we are seeing application of a variety of blockchain systems for tracking and tracing including within start-up companies such as Lyftime, Retraced, circularity.id, xyz.exchange and Arianee. The impact of blockchain on the inner workings of the fashion industry is ever expanding, most notably within fashion supply chains (Chen, 2023).

Since 2018, we have witnessed a dramatic increase in academic works which treat the intersection of copyright and blockchain technology and analyse the influence of the technology on the protection and management of IP rights. Blockchain coverage in the fashion industry began to take off in the press including MacDowell (2019), Zerbo (2019) and Bloomberg (2019). Notably, a substantial portion of this blockchain research tends to adopt non-specific industry focus, often drawing insights from case studies in sectors where IP protection for products and services is relatively unambiguous. These insights are made in marked contrast with the nuanced landscape of the fashion industry. Blockchain, non-fungible tokens (NFTS) and smart contracts are key elements of this research, creating a potentially promising application of technology to support the management of ownership rights. Blockchain, with its key immutability, public verifiability, and transparency benefits, has potential to be applied in a way that supports ownership chains in matters of copyright. It can also enable enhanced control over digital works (Wang et al., 2023). Its main advantage, however, has been the increased visibility and information availability provided by blockchain through ‘trusted timestamping’ (Savelyev, 2018).

There is an emerging branch of research which explores the problem-solving potential of blockchain with respect to IP rights in fashion. Yanisky-Ravid and Monroy (2020) explore the use of blockchain “to create a crypto-legal structure of endogenous protective laws administered through a decentralized system of self-executing smart contracts” to fill the current IP-protection gap (11). The aim of blockchain integration in this case was to allow emerging brands to continue to prosper when they typically lack the financial resources to defend their own IP. However, it is possible for designers to regain control. Indeed, they are incentivised to continue creative work and spur their own economic growth. Additionally, though it does not discuss IP directly, Montecchi et al., (2019) outlined the impact of blockchain for enhancing provenance gained from four areas: origin assurance, authenticity assurance, custody assurance and integrity assurance. The authors discussed the capacity of blockchain for its traceability, certifiability, trackability and verifiability and the increase provenance gained from the additional information

gathered. Origin assurance links to Yanisky-Ravid and Monroy's (2020) discussion of gathering evidence from the design process to prove the owner of the work, a key aspect in demonstrating copyright for designers.

Additionally, we are yet to hear the fashion designers' perspective on this development; a gap which this research aims to fill. This paper seeks to explore the connection between emerging designers' reliance on copyright as one of the few ways to protect their designs and the necessity of strong evidence of design development required to have a successful copyright claim.

Research gap and research questions

Yanisky-Ravid and Monroy (2020) investigated the US perspective on the potential of smart contracts to 'cure' the IP protection deficiency which urged designers to adopt blockchain technology to improve control over designs, fee collection and protection from infringement. There is a gap in research from a UK perspective. This research specifically explores blockchain integration into the design stage of development rather than starting at the product stage as many current blockchain innovations in industry do and similarity in academic research. Both Bonnet and Teuteberg (2023) and Savelyev (2018) examine blockchain for the management of IP, Savelyev more specifically copyright only but these papers are not industry specific and do not look at fashion design. IP protection for fashion designs is a difficult area of IP management at the best of times without there being one single IP right that protects fashion designs in their entirety in the UK.

The aim of this research is to explore opportunities that blockchain integration at the design stage could bring to the protection of fashion designers' designs and garments.

Research question 1: How are emerging designers protecting their intellectual property currently and how are these methods managed in practice?

Research question 2: What benefits can blockchain integration into design management provide for emerging designers?

Research question 3: What are the limitations or barriers to integration of blockchain integration for emerging designers?

Methodology

Given the paucity of extant literature on copyright and blockchain within the UK fashion industry this research takes an exploratory qualitative approach which made use of focus groups and interviews. 12 participants took part in two focus groups of emerging designers based in London and a total of six semi-structured industry interviews were undertaken with founders of blockchain-based start-up companies working within the fashion industry. Each interview lasted around 45 minutes and the focus groups took around 90 minutes, they were conducted within the same week in May 2023.

Focus groups are a widely adopted method of research in social science to elicit rich discussion on a specific topic from a range of participants (Coule, 2013). The industry experts represented were purposively selected from a group of those involved with blockchain based start-up companies in the UK, again associated with East London and involved in events hosted in East London at the end of 2022. In addition to the industry interviews the research was supported by whitepapers used by the startups to communicate their mission statement and what their business offers to consumers and potential investors. Bonnet and Teuteberg outline the importance of whitepapers within the blockchain start-up community as a key method to outline their unique selling point and differentiated business model hence the importance of these papers to this research (2023). Similarly, to Bonnet and Teuteberg's methodology this research supported whitepapers with information from the start-up websites, blogs and social media posts to ensure the most contemporary information was used.

The focus groups and interviews took place in May 2023. Designers were recruited using purposive sampling from a range of emerging designer support and funding initiatives based in East London. To ensure that two focus groups of six participants could be recruited snowball sampling was used to reach additional participants that met the criteria (Carson et al., 2001). The designers were selected based on their experience and understanding of use of either design management software or blockchain-based product management software. Prior to selection a group of 40 emerging designers were asked whether they had experience using either of these types of software and 12 participants were selected who met the required criteria. The focus group framework and interview questions were developed based on the themes highlighted in the literature review: intellectual property protection for emerging fashion designers, copyright and blockchain and future creative economies.

The sample size in this exploratory study is acceptable due to the focused nature of the study and the need to determine detailed descriptions of designer's experiences to support this exploratory research in an emerging field (Patton, 1999). Following the completion of interviews and focus groups the data was transcribed then thematically analysed and categorised, lastly key quotes were drawn out from the

transcripts. In line with the exploratory approach of the research the aim was limited to new themes relevant to the UK fashion industry within the topic of copyright and blockchain.

Findings and discussion

The data was grouped into themes identified in relation to the three research questions highlighted above. RQ1 themes were the lack of education and reactive rather than proactive approaches to IP protection. RQ2 themes were the creation of enhanced collaboration, evidence for copyright and connection sourcing with distribution. Concepts in RQ3 were connection to design software, efficiency and adaptability and selective sharing. The findings are presented here in relation to literature previously discussed.

How are emerging designers protecting their intellectual property (IP) currently and how are these methods managed in practice?

Designers were asked about what they understand their IP to be and whether they have integrated or registered anything to support the protection of their intellectual property. Lack of IP education was the first theme to arise from the analysis, many designers being unsure or lacking confidence when it came to knowledge around their IP. Designers explained that they knew their designs, garments and branding were their IP, but they were not aware of how to protect these – especially when it came to protecting garments. Most of the designers involved in the focus groups had received some support regarding setting up their registered limited company and registering a trademark from lawyers or business consultants as part of their start up support and more than half of the focus group participants had a domain name and registered trademark for their brand. But they felt that their support and information was much more focused on brand protection and registering a logo and brand name whilst being inadequate on issues regarding design protection. Of the 12 total focus group participants 10 were unsure how copyright worked in practice and whether they had to register it for it to be a viable protection method; many of those who explained their lack of understanding of copyright originated from outside of the UK and their understanding of copyright was confused between different jurisdictions.

From the designers there was significant concern about finances in relation to IP and registration. Those who had not yet registered a trademark in the UK or elsewhere were interested in doing so but limited due to the cost of registration. Additionally, some of the designers were unsure about which jurisdictions to register in due to their manufacturing being outside of the UK and this was their prohibiting factor in registering a UK trademark. It was interesting to hear that the designers had often done research about

where to register and how the process worked but did not feel confident enough to go ahead and initiate their decisions. Participant 4 shared that they 'want to make sure it's done right and without mistakes so when I have the funding then I will hire a lawyer to do it' and are not confident to do it without the reassurance of legal advice.

Given the gaps in understanding copyright protection and how it works in practice, designers were limited in their understanding the need to collate evidence to support their copyright claims. In practice this meant that there were weaknesses in the automatic protection afforded for designs due to lack of evidence of their ownership from a record of the creation process. There was reassurance shown throughout the focus groups when the designers understood that recording their process was important for copyright protection and aided their likelihood of successfully proving the origin of garment or design. Impact reporting demonstrated an excellent improvement in understanding of copyright and the need for collecting evidence throughout the design process from the first focus group to the second focus group, held at the end of the designer's involvement in programmes to support their businesses. Savelyve demonstrates the copyright benefit of blockchain in 'trusted timestamping' - an approach to keep track of the creation and modification of a document, which could be embedded into design software to record modifications of a design (Savelyve, 2018).

Overall, the focus group demonstrated that much of the designers' IP protection is *reactive rather than proactive*, 'I worry about sharing designs especially in reels or TikToks so they can see how I create the prints' (R12). Due to limiting factors highlighted by designers included finances, lack of legal understanding and uncertainty about registration jurisdictions. Many in their early stages were operating without trademark protection and a lack of knowledge of how copyright works.

When the industry professionals were asked about the current level of IP management across the emerging designer brands that they support the responses were similar to that of the designers themselves. The industry partners were concerned about the lack of brands trading without trademarks registered in the UK or the jurisdictions that they are selling in, which included Spain and Japan. Two of the professionals interviewed were co-founders of a blockchain start-up company and they stressed the fundamental need for designers to understand the copyright requirements alongside the compilation of a detailed record of the design process from first concept. The partners emphasised that with this record, designers can have confidence in their reliance on copyright as the main IP right for protecting their designs and garments in terms of both physical and digital fashion. Some extant literature agrees that blockchain based digital designs 'are highly secure and are not prone to copyright infringements'

(Mukherjee and Pradhan, 2021; 221). Whereas, much of the research within computer science outlines the challenges for blockchain as a 'solution' to copyright evidence and transparency issues including storage of metadata, disputes over immutability and network effect issues (Savelyev, 2018).

What benefits might blockchain integration into design management provide for emerging designers?

Blockchain, whilst relatively well understood, was seen as a useful addition but not essential technology to embed in early-stage fashion businesses by designers. Their experience mostly lies with blockchain for tracking and tracing with a sustainability focus which aligns with much of the published academic work at present and the leading blockchain start-ups in fashion (Montecchi et al., 2019). Participant 7 shared that: 'I've seen brands use blockchain for demonstrating their certification and showing provenance for their customers'.

Contributing to the creation of enhanced collaboration dimension, designers suggested that the addition of blockchain to design approaches could bring added benefits when working with others to develop garments. The current disjointed nature of collaboration was a sticking point for some, struggling with the onerous and time-consuming need to send iterations of designs via email to download large files and upload to different pieces of software. Similarly, Savelyev (2018) outlines the difficulties involved in getting authors compensated fairly and the benefits that blockchain can bring to solving this issues. He outlines the complexities and formalities involved in recovering licensing fees in this ever-digitizing space which aligns with the designers want to credit collaborators fairly for their involvement in the fashion design process.

One of the most significant benefits outlined was the *connection between sourcing and distribution*, allowing designers to create a more streamlined approach to the way that they work in design development and and taking this forward into manufacturing and distribution. Designers understood that they would reap additional benefits from beginning the process of embedding blockchain in the design stage, well before the product is complete thus seamlessly connecting more of their processes. and that it would seamlessly connect more of their processes. 'It makes sense for it [blockchain] to start with design because it connects all parts of my brand rather than being product first I can also benefit from my digital designs' (P3).

Much of the discussion about copyright was based on ignorance of the how the IP right worked in practice. This lack of understanding made it difficult for the designers to comprehend quite how blockchain might

prove beneficial as a design evidence database. However, by taking copyright out of the equation over half of the participants were interested in recording iterations of their designs as this would be useful to their ever-evolving design processes. Emphasis was towards developing knowledge of IP in practice and having support that answered their questions in a more affordable way than traditional legal advice.

Conversely, all of the industry professionals cited *evidence for copyright* as a key benefit of fashion brands adopting blockchain into the fundamental workings of their brand. This is a relatively new reason for fashion brands using blockchain – most of the industry case studies seen so far are sustainability related tracing and tracking purposes. These findings align with Bonnet and Teuteberg's case study analysis which outlined 'proof of authenticity / provenance – 42.3% of cases' and 'proof of ownership – 42.3% of cases' (2023; 15). Regarding proof of ownership, the cases of Arianee and AgriDigital were referenced as providing a detailed transaction history as 'a solution to the problem of content ownership and copyrights' (Bonnet and Teuteberg, 2023; 15).

What are the limitations or barriers to integration of blockchain integration for emerging designers?

Practicality was the subject of much discussion in the focus groups with designers needing reassurance that the benefits of blockchain were not outweighed by the disadvantages. The group highlighted disadvantages from their perspective of lack of efficiency, creating additional workload, adaptability for different design methods and connection to existing design software.

It was interesting to hear about the design methods used by the individuals as there was a wide variety listed from digital design software such as Browzwear, Clo-3D, MarvelousDesigner and GN3RA through pen and paper hand sketched designs. Ten of the designers worked with digital design tools for their final designs and discussed that this gave them the ability to share their designs with others and create patterns more efficiently. By contrast two of the designers worked with paper patterns and hand drawn design sketches on paper, only leaning into digital design tools when they were 100% necessary. In the sampling and production of their garments digital design tools were preferred due to the nature of manufacturers and what they required from the designers in order to create first samples.

The designers were asked about integrating blockchain into the design stage of their work and the majority, working most closely with digital design software were very interested in the integration. They were able to envisage how the software could be connected to blockchain technology and how this would provide an additional benefit to the way they already design. By contrast the two designers using more

traditional methods of design and development feared that uploading designs or transitioning to digital design would affect their efficiency and involve them learning many new skills. Their chief concerns were around potential duplication of work with the addition of digital design on top of their current successful methods possibly requiring a completely new way of working.

The analysis demonstrated that the designers use digital tools to support their design and development processes, highlighting efficiency, pattern pieces, collaboration and sharing as central to this process. Of the design software used by the participants many allow for the development of pattern pieces from a garment design mock up on an avatar. The designers highlighted this as a key benefit that eliminated the need to hire a pattern cutter to produce paper patterns, allowing a single digital file to be sent to the factory. Sharing was viewed as both a benefit and a potential issue with blockchain integration.

The findings showed that participants felt it essential that they could choose who to share information with as they did not want their patterns or early iterations of designs getting into the public domain. Some were concerned that the transparency often quoted as a benefit of blockchain might actually be a disadvantage if they could not select which information was shared and which was kept private. One participant gave the example of their customers being able to see exactly what went on at every point during their supply chain from design iterations through to which factories were used and was concerned about other potentially taking advantage of this detailed information. Similarly, Heim (2022) discusses SMEs sharing data with perceived competitors as being a common obstacle to adoption of blockchain technology. The author concludes that this occurrence is likely due to a misunderstanding of the capabilities of blockchain and how designers would manage access to information.

The concept of *enhanced copyright* was discussed by most of the blockchain industry experts with their software, solutions and apps being targeted at collating the evidence to support copyright and unregistered design right evidence. Their feelings towards blockchain integration and the usefulness of the software for the emerging designer market was mostly positive with only one participant mentioning legal concerns. The concerns raised revolve around the way that copyright works in practice the current informalities and lack of assurance of the true copyright owner. These concerns align with the challenges outlined by Savelyev (2018) who outlines that 'rights to a copyrighted work appear in a very informal manner and the circumstances associated with their appearance are not visible' and thus no one can be certain that the person indicated as the copyright owner is the true owner. Savelyev goes on to discuss that most copyrighted works are not created from scratch often based on pre-existing works which aligns

with the trend-based IP research in fashion that we have seen from Raustiala and Sprigman (2006) and Rosenblatt (2011).

Impact and future implications

This is one of the first known studies to investigate blockchain integration for enhanced IP management and protection both in the UK fashion industry and with emerging designers. Therefore, it makes several managerial and theoretical contributions. The research corroborates similar studies based on the legalities of different jurisdictions – namely the US – in demonstrating the potential that blockchain has for copyright evidence records (Yanisky-Ravid and Monroy, 2020; Montecchi et al., 2019). Evidence for copyright, connection between sourcing and distribution and enhanced collaboration potential emerged as new dimensions benefited designers looking to embed blockchain into their design and development processes. From an industry expert perspective, blockchain was seen as a leading technology for enhanced copyright and systems or software being developed by leading start-ups interviewed have the potential to provide this to designers. In doing so, this research advances extant studies through providing industry specific examples in an area where IP is much less tangible than other more straightforward industries (Savelyev, 2018 and Bonnet and Teuteberg, 2023).

Given the existing gaps in research in the field, this study contributes new knowledge on the approach to blockchain integration and the practicalities of this integration for emerging designers and their ways of working. We recognise that as a growing and developing technology, blockchain integration is evolving at speed and studies must continue to delve into the potential of software integration and investigate the impact that the software has on different groups of designers. Based on the findings of this study subsequent research is encouraged to build on the initial research carried out with this group of designers to further enhance the investigation into emerging designers and their challenges and barriers within the industry.

In contrast to previous studies, which predominantly focused on challenges related to acceptance or integration grounded in legal and technical facets of the technology, this study examines practical application barriers through the lens of the user. Providing actionable benefits to start-ups looking at emerging designers as key target groups for use of their software. Many of the barriers and challenges discussed by designers can be overcome through further IP education which this study demonstrates is an essential need for showing the designers how this technology to protect and manage their IP in practice. This need for education demonstrates the importance of designers understanding how to

manage their IP then using the developing software to support and aid their IP protection; especially as we move towards a digital future within fashion.

Whilst the paper has made an impact and valued contribution to its field, there are some limitations namely limited by location, sector and access. The findings are restricted to emerging designers within a specific area of London who are associated with funding and business support systems in the areas. Which narrows the field of impact and future studies should look to involve different size businesses and those who have not received the same kind of business support to draw further conclusions. Further, a global perspective looking comparatively at the different IP systems – especially between the US and UK – would benefit a larger group of designers from start-ups all the way through to group owned luxury brands. There is merit in taking a longitudinal approach to further studies to demonstrate the impact that use of blockchain technology and software is having on designers and the growth of their businesses over time.

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