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Chapter 11: Ethical design and algorithmic governance in fintech product development

11.1. Introduction

While the growing adoption of Fintech products is fostering innovation in the global financial and investment ecosystem, interest is rising in ways Fintech can positively impact and contribute to the global achievement of the Sustainable Development Goals. Ethical design in Fintech product development aims to understand and explore the moral implications of design features in financial technology and create innovative digital products that reinforce customers' self-regulation and support them in the pursuit of health investment behaviors in line with their economic and social well-being. Algorithmic governance in Fintech product development informs the overarching decision-making criteria strategy driving the design of product algorithms that analyze data and execute functions within customer relationship touchpoints in ways aligned with the company purpose of creating value for society while responding to the challenges of algorithmic management to help customers achieve their financial goals as part of their life goals (Nowakowski, 2023; Cubric & Li, 2024; Elgendy et al., 2025).

The research presented in this work originally contributes to the discourse on Fintech by outlining a conceptual framework explaining the embodied interrelation of ethical design and algorithmic governance for creating ethical Fintech products that are appropriate, and that do good and do not harm, based on the three tenets of the ethical design theory applied to the Fintech industry. To address the challenge of creating ethical Fintech products, in the original research presented in this work, we adopt the paradigm of the blended or hybrid research model, integrating the Zen and Design Thinking approaches. The framework drives Fintech designers, developers, and managers, in their creative ideation journey of creating ethical products compliant with the ethical values of the company and the customers they serve, to the implementation step, when they release an organized and coherent product system designed to maintain user engagement interaction models aligned with the product goal of producing desired behavior in the

user but not in a way that it becomes harmful for the user or for the community or scenario in which the user operates .

There is a global demand for renewed financial product innovation that creates positive outcomes for consumers, yet news stories repeatedly shine a spotlight on products that create marginalization and damage. Given these current conditions, fintech is perhaps uniquely positioned in this moment in time to explore values-led, socially-conscious practices, as new software-enabled products push desirable products such as loans beyond the boundaries of financial institutions and into unregulated spaces (Rizinski et al., 2022; Yan et al., 2024).

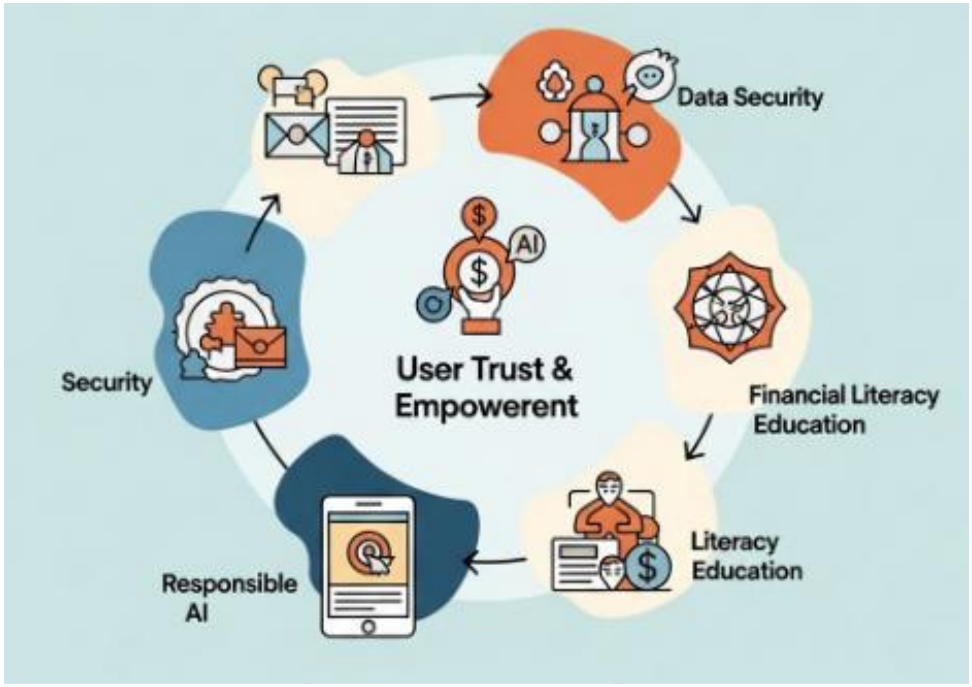

Fig 11.1: Ethical Design and Algorithmic Governance

11.1.1. Background and Significance

The exploratory research presented in this paper starts from the interest that fintech product design, especially in the domain of lending, lacks scrutiny towards values that shape practices. User-centered design does not adequately translate to ethical software design, and as a domain of practice, design in fintech is burdened with the preconceptions and drivers of the financial sectors within which it occurs. The research is further prompted by the increasing use of algorithms to support commercial lending decisions, which has cultivated ethical concerns about trust and fairness. There is a

heightened desire to educate designers on the social impact of their design choices, with particular focus on the implicit and explicit values that shape projects. At the same time, the scrutiny of design activities for evidence that the impact is well understood and accounted for is relatively underexplored. Educational and espoused ethical practices focus on the act of designing while there is significant affordance for design as a lens to see program ideals about people, structure and meanings that are embedded in products at the point of use. From a practice-based perspective, we are seeking to uncover how understanding and negotiation of ethical considerations occurs, and how reflection on those processes influences lending products, both pre- and post-design. We adopted a qualitative research methodology to engage designers from creating institutions on their applied design practice using long-form interviews with exploratory probes. The work seeks to highlight considerations of ethical design and algorithmic governance within companies developing products for use in the payday lending ecosystem.

11.2. Understanding Fintech

The terms fintech, digital finance, and internet finance inform a large number of economic activities due to digital innovations that have taken place since the mid-2000s. They range from long-standing financial service provision, from traditional banks to newly minted types of financial services—like cryptocurrencies and mobile-money-based e-commerce options. The question is whether all of these activities are true? Certainly, not. Fintech refers to distinct ecosystems, infrastructures, or networks of financial services that have digitization and immediate online connectivity with global capital flows that allow for speedier access to capital as their central features. In a fintech ecosystem, digital infrastructures and platforms: (1) allow financial technologies for payments, clearing, capital formation, and loan transfer to exist; and (2) enable each of the connected players to collect data and share it asymmetrically, depending on the statuses, motivations, and interests of the institutions or individuals involved.

While fintech refers specifically to financial front-end activities that harness big data to enhance speed, accessibility, and efficiency to the provision of financial services, the term digital finance also includes data-enabled, tech-driven capital flows into the economy. Fintech as the application of technology to financial services emerged as an area of potential change and improvement in financial services provision during the 2000s, along with technological innovations enabling the miniature relationship between computers and the digitalization and economization of everyday life—especially the rise in internet usage, and later, mobile apps usage—and high computing capability with low-cost automation and data storage. Here, fintech refers mainly to front-end banking and investing services offered by entities other than traditional financial institutions. It became visible during the financial crisis of the late 2000s, with the emergence of

technology-based peer-to-peer lending companies, payment processing entities, and transaction systems. In a digital economy dominated by asymmetries in access to data and data processing as well as in capital, lending and transfer functions have been transformed through additional data streams—alternative scoring used in lending; and transaction processing companies.

11.2.1. Definition and Scope

In order to better understand the design practices visibility requirements our suggested governance patterns respond to, it seems useful to first explore how fintech has been historically defined and characterized. While broad in scope, the term fintech encompasses a wide range of niche markets including banking infrastructure services; payments and money transfer applications; personal finance management tools; financial research and advisor services; insurance technologies; cryptocurrencies and digital wallets. The term was initially coined as shorthand to describe technology-mediated disruption and innovation occurring across the finance industry at large. It has, however, evolved to also encompass ventures that apply traditional business practices in novel technology-enhanced ways, and today, both tech-minded startups working outside the regulatory framework, as well traditional financial institutions who have recognized the disruptive potential of emerging technologies and subsequently incorporated them into their product offerings, are considered part of the fintech ecosystem.

This ambiguous state of affairs makes it difficult to tie down exactly what increases in technological capability and infrastructural resource availability allow for fintech, and what differentiates it from related fields such as the application of tech in medical research, or, that of AI within the legal system. As with other terms that prescribe and delineate intervention and disruption, it is likely that these questions will be encountered and answered differently over the course of years. Our own understanding and definition of the term is one that frames all forms of financial service provision that leverage data analytics, machine learning, artificial intelligence and robotic process automation specifically enabled by the increasing availability of infrastructural resources in a global economy increasingly driven by capital flows as fintech. The product offerings of these financial service companies are not restricted to a niche market or demographic, and the technologies used to build them leverage machine learning, AI, or robotic process automation not necessarily in industry- or task-specific ways.

11.2.2. Historical Context

The history of finance can be described as a series of successive technological revolutions that have enabled economic growth and improved living standards for the

majority of the global population. Each revolution has brought with it both benefits and negative consequences that necessitated regulation. Technology has transformed the way value is stored and transferred, enabling successive improvements at the level of efficiency, the responsiveness of markets to human economic behavior, and increasing access to the services provided by financial institutions, such as societies for the deposit of money, money changers, banks, remittance services, securities firms, and exchanges. In recent decades, the pace of transformation has accelerated through pervasive advances in information and communication technologies.

The technical development of payments and settlements has always constituted the technological basis underpinning the growth of business functions and markets, such as exchange and trade in goods and services, and, subsequently, the storage, transfer, and productive use of capital. However, no financial innovation would have had the impact of technological revolutions without the infrastructure of institutions, legal and regulatory frameworks that have defined the rules of the game. First, the very legal definition of property rights allows for the issuing of money and its acceptance in exchange for goods for the functioning of payment and settlement systems, be they currencies or various forms of digital money. Second, the technological systems put in place by trustworthy public and private infrastructures allow the transmission of different types of assets in a secure and efficient manner, essential for mutual confidence in their value and in the manner of execution.

11.3. Ethical Design Principles

Building on our previous discussion on named constraints, we introduce the concept of ethical design principles, which are features of fintech products or services that balance self-interest maximization with the broader interests of society and the environment and comply with the identified restrictions of fintech product development. Fintech companies engage in the proactive development of ethical design principles to create value in accordance with the constraints of product development. Guidelines that we include in this section are well-known and widely adopted design principles within the tech community, as such increasing the visibility of ethical design that is a live and future concern in governance of fintech product development. While within the design community there are constant debates regarding the formulation and the number of principles, we outline only the most popular ones in the ethical design discourse. We see work related to recent developments in behavioral design recommendations such as dark patterns, the persuasive technology agenda and beyond as strongly related to our agenda.

Most notably from these discussions as well as prior work in the ethics and data science disciplines, we outline two ethical design principles for the fintech domain: (1) user-centric design and (2) transparency and accountability. We envision the offered ethical

design principles playing a meta-role. Meaning, our arguments are grounded in the behavioral design discourse and secure shared meaning of product value during the intertwined design, development, and operation of meaningful products for customers, society, and the environment. While we see all named principles as relevant, we encourage innovative thought in that two may receive specific notice or a single, unique principle be created that resolves prior work tensions.

11.3.1. User-Centric Design

The importance of fostering an organization-wide ethical culture throughout the development of new technologies to empower digital trust among users has been emphasized.

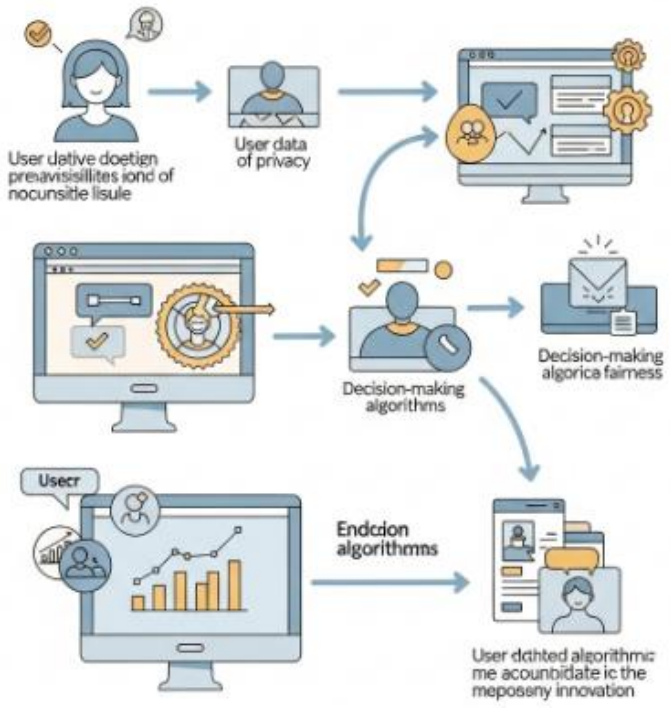

Fig 11.2: User-Centric Design of Ethical Design

However, integrating ethical design into the development processes of technologist organizations is still a challenge. Design thinking can incorporate some of these ethical design principles into product development processes in order to contribute to reducing this gap. Not only do design tools help implement these ethical principles, addressing them at the very early stages of the design process contributes to reducing trial-and-error iterations, therefore optimizing and accelerating the development cycle.

User-centric design, one of the main pillars of design thinking, considers users' behaviors and context to make design decisions. In order to accomplish design that empowers user autonomy, user-centric design must be present during the earliest stages of the design process, such as opportunities identification and value propositions creation. Additionally, at these stages it can be combined with other tools to help uncover users' implicit frustrations and needs. Leaving feedback solicitation to the last stages of product testing can overlook the chance of developing products that truly eliminate user frustration or meet user needs. Such collaboration and support from the end user community is essential to create fintech products that serve users' real goals and needs. Additionally, since users are usually not expert on fintech products, open-group design processes where feedback is solicited from community members can help ensure adherence to user-centric design principles.

11.3.2. Transparency and Accountability

One additional guiding principle for ethical design is transparency. Because algorithms are decision-making tools, often in fact extremely complex computer programs, simple explanations may not be sufficient to demystify the decision-making process. Creating a basic user-facing description or definition of the functions that the algorithm performs may be sufficient for some products, but it may be necessary to create a human-facilitated understanding of how it works internally. This would include something like models created using methods that make algorithm outputs more accessible to users by generating explanations for individual data points. Giving users the ability to read and understand the models on which decisions are based, especially when they are central to the fintech services provided, is likely to increase their understanding of what they can claim as legal rights and use for litigation should something go awry. In other words, assisting users' ability to interpret the algorithms should be a design goal of fintech companies, particularly when the algorithm cannot be further elucidated in simple ways.

The connection between accountability and ethical design is similar. Fintech algorithms perform the unique function of servicing the entire financial needs of a user by analyzing and making determinations about behaviors within the entire app ecosystem of a user. Therefore, when something goes wrong, it is vital that the user is able to answer two fundamental questions: Who is making these financial decisions on my behalf? Why? Thus, design choices should address accountability in any way they can. For example, transparency for consumers also means being able to read the algorithms in other, behavioral ways as well. Are algorithms treating consumers differently than a human would in the same situation? Could a human treatment decision be easily defended legally, or are decisions purely based on mathematical modeling?

11.4. Algorithmic Governance

Due to the specificities of FinTech products, we analyze the algorithmic governance with greater depth in this section. Algorithmic governance represents a new experimental and empirical phase that enables us to discuss how distributed ledger technologies, computational algorithms, and smart contracts encode rules and govern behavior. As it is aimed at promoting a self-regulation of financial markets and decreasing the risks of information asymmetry, the use of algorithmic governance is especially suited for the FinTech sector because the existing regulatory framework, not adapted to the challenges posed by this emergent economic sector, faces collective action and coordination problems. Such characteristics make the sector prone to misconduct, malfeasance, and fraudulent behavior, which lead to risks to financial integrity.

However, the finance sector is not entirely outside the traditional realm of state-enforced regulation. The regulation of banks, lenders, money transmitters, insurance companies, and securities companies is an activity that states worldwide exercise, in one form or another, through administrative rules, supervisory agencies, and special enforcement instruments. Some of these companies are among the most important institutions in the world, touching the lives of trillions of dollars of wealth across millions of businesses and individuals. For some types of companies engaging in a new form of non-bank banking, the activity is particularly intuitive, since they issue or exchange assets that are regulated in the traditional economy, such as currency, securities, or equivalently regarded financial instruments like commodities.

11.4.1. Definition and Importance

In the last decade, we have witnessed amazing technological innovations, particularly in the fields of artificial intelligence and the machine learning subdomain. The Fintech sector has been one of the prime domains that have undergone unprecedented transformation due to those developments. From online trading platforms to digital banking, and from payday loan services to robo-advisors, algorithms have started governing decisions around which services to render and the extent to which to trust their users. However, what makes the design and implementation of algorithms in the Fintech sector even more worrying from a regulation and governance perspective is the lack of appropriate Algorithmic Governance frameworks. The existing laws explicitly forbidding the discriminatory treatment of citizens in the realm of finance are written in a human context; they do not extend to artificial agents, and lack the judicial precedence to convict a product for not being 'fair' to those it commoditized. Algorithmic Governance is of great importance for fintech companies because of the nature and usage of algorithms in the services provided by such companies. For example, there are discrepancies in the regulation of assets that exist as syntactic code and syntactic code

that map to other assets in the traditional financial realm as standalone products. Furthermore, the interpretation and enforcement of Intellectual Property Rights vary across territories. Therefore, the creation and implementation of Algorithmic Governance for Fintech has become increasingly important to eliminate unequal and asymmetric treatment of varying Fintech regulations across territories.

11.4.2. Regulatory Frameworks

The development and implementation of algorithmic governance, or the use of algorithms to influence or manage society, relies heavily on the social, legal, and institutional infrastructure designed to regulate its creation and use. However, due to rapid advancements in software development, algorithmic decisioning, and fintech ecosystems it is often too containable that these systems are something we should not regulate, as they are just tools to help us better market goods and better credit markets. Because of this, we have what some regard as a truly Wild West state of affairs; regulation is often out of date, the technology, controlled by small groups of powerful agents, works in the shadows, bias and discrimination can be introduced at scale, the consequences of policy or governance levers are heavily modified, policy interference is infeasible or even crazy, measurement is very coarse, the science itself is madness, and who owns or has access to the data that drives algorithmic rulings is a hard question to answer. Ignoring such forces seems at best irresponsible.

The kernel of truth is that algorithms perform better if the designer has done their job right, and this is now perhaps the most influential industrial, bank supervisory, and global coordination principle. In the absence of formal safety and security requirements, the fairness of AI algorithms comes down to information policy: the regulation of data and information, what data should AI algorithms use, what added guarantees should be enforced on the construction and development of AI systems, how or should the data, algorithms, and algorithms' decisions/results be audited and by whom. Algorithmic governance implementation in this aspect of information policy would need to be highly adaptive and context specific.

11.5. Challenges in Ethical Design

Ethical design is imperfect and there are clear challenges that will require ongoing discussions and iterations and rethinking in the product, if there is the commitment to do so. Two key challenges to practical ethical design in fintech tools are bias in originating data, and our approach to privacy. These challenges are addressed below, and several concrete examples of conflicting approaches are provided to aid in debates for design challenges in the implementation of fintech systems.

Bias and Fairness

Algorithmic systems can magnify and entrench established social biases and inequities. Human beings are exposed to bias in data implicitly through representation, or explicitly through decisions around labeling. When bias is not the primary task of an algorithmic decision, it can result in failures — such as auto-tagging a picture of a dark-skinned person with an inappropriate label. Yet, when data bias is recognized to be a critical decision focus, apparent successes can still have widely diverging consequences — such as a racial and gender-blind data synthesis system that masks the very social disparities it was meant to ameliorate, by employing a smoothing function of mixed coherence-based classification.

Algorithm designers and coders are responsible for both types of bias. When the component-based design is being performed, the modeler makes assumptions about which features to include and which training/testing data to use. These decisions can encode the modeler's biases in the model, and their choice of chosen domain may reflect some degree of bias in the choice of what score or similar data to expect the model to predict. Undebatable aspects of systems that predict customer preferences depend on the data available. However, it is the coder, implementing the model, who must address the inherent bias present in these algorithms.

11.5.1. Bias and Fairness

The presence of bias—whether in the data used to inform the development of a product or within the algorithm that generates an output—represents a considerable concern within creative assurance and algorithmic governance in fintech. The highly politicized context of financial services suggests that developer intent with relation to a product's fairness may not be fully achievable—yet any tools deployed to operationalize developer intent may fail without guidance on what constitutes an ethical conception of fairness. Existing proposed frameworks for algorithmic fairness concern themselves with protecting historically marginalized groups from harm but do not speak directly to the need to achieve beneficial outcomes. Some definitions of fairness approach the subject general evaluation criteria to be audited. The sociotechnical lens through which the AI ethical community approaches algorithmic accountability tends to treat fairness as speaking to the purity of algorithm internals instead of explored outcomes. No proposed approach addresses the full holistic envelope of ethical implications to be considered, let alone prioritized. Yet for specific financial products, priorities can be set; users and user groups to focus upon can be chosen. Doing this highly politicized the use of any of the proposed fairness metrics—some people will certainly benefit relative to others, meaning that it will be impossible to avoid bias regardless.

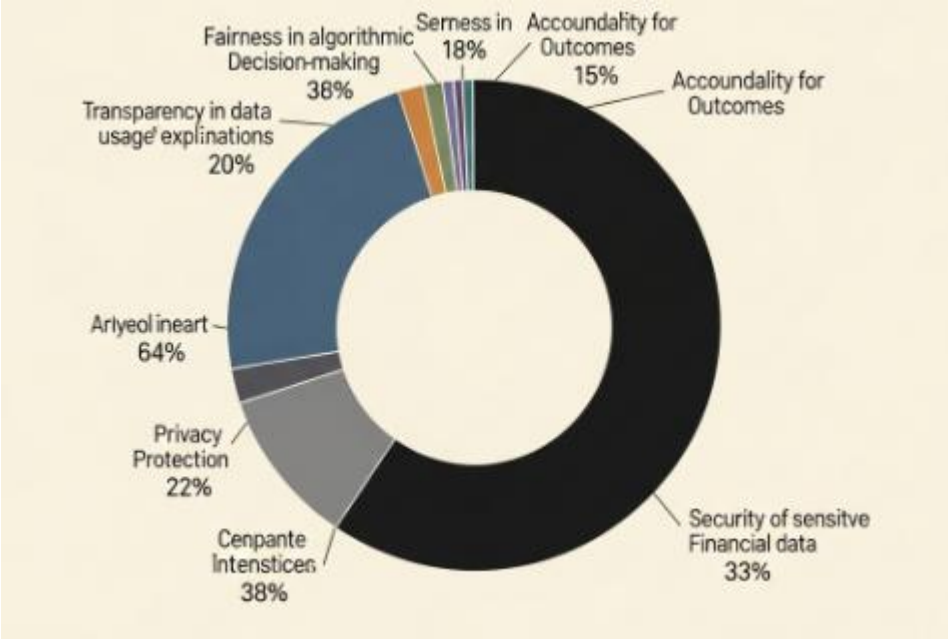

Fig : Algorithmic Governance in Fintech Product Development

The technofix proposed has thus far been auditing. The promise of auditing tools is transparency; their primary aim is to identify "bad" algorithms. To date, we have no experience creating specialized auditing tools for financial services or openly using generic ones and no understanding what to look for. No firms, especially not those building high-stakes algorithms, have any experience with complex guidelines around using "proxy" attributes for demographic-based auditing.

11.5.2. Data Privacy Concerns

An often overlooked issue in fintech product development is that of privacy, particularly in relation to creating services and products that require a high consent threshold, for example, the use of financial data to build out a user's credit score or credit risk profile. The importance of strong consumer privacy protections is critical in fintech, for a number of reasons including the unique data that these services often rely upon as well as the unique licensing laws that many of these industries are subject to. However, technical approaches to fintech innovation often ignore consent models with unique user value trade-offs. For example, credit service fintech solutions often rely on sensitive consumer credit activity data to produce scores.

However, privacy is worth exploring in the realm of ethical design. One area of increasing concern is embedded finance, where companies are attaching financial

services offerings to adjacent products such as shopping or travel, while arguably ignoring fundamental aspects of financial responsibility, like risk. For example, there are well-established risks associated with certain systems where consumers, especially young consumers, are frankly ignored during the service design process. Data privacy has been a fundamental concern in virtually every digital experience from the beginning of the Internet. But with fintech, these privacy – and often consent – concerns are heightened.

11.6. Conclusion

This chapter contributes to advancing our understanding of the implications of ethical design and algorithmic governance in fintech product development, through a research purpose that reflects an increased pressure on product designers to take into consideration consequential impacts of technological developments. It responds to calls for more exploratory empirical work investigating the entanglement of design and ethics in relation to platform technologies – including a recognition of how that relationship is increasingly affirmed by financial technologies – and research seeking to further illuminate the dynamics of political, ethical, and regulatory concerns cut across the activities of designers and technologists. Collectively, the presented cases illustrate not only how ethical considerations in product design are being absorbed by product developers across a range of roles and artistic tools but also how competing motivations and socio-political dynamics shape how and why ethical concerns emerge.

How ethical considerations are being structured, diffused, and semi-certified at the level of everyday designing is an urgent issue for many areas within digital product development. We envision two future avenues of exploration. First, more closely mapping the links to emerging ethical guidelines and industry standards would establish helpful connections between expertise elaborated in our cases and the infrastructures surrounding tech design and development. Second, the increasingly permissive regulatory attention to the specifics of UX design.

11.6.1. Future Trends

Several notable trends are already emerging that may lead to a new, more sophisticated, and more inclusive way of navigating towards lasting, ethical financial and business ecosystems. Some will likely complement each other, while others may compete for attention. But until regulatory and ethical design frameworks gain practical relevance in fintech product development, tokenized financial assets, more impactful fintech cooperatives and collaborative finance experiments, and open-market, platform co-op aggregators will enact some of the trends identified in previous sections.

The recent boom of decentralized finance and the effort to tokenize more financial instruments are only the most recent endeavors in exploring alternative market logics based on blockchain technology, liquidity mining, and decentralized autonomous organizations. Tokenizing a financial product or service with a token enables customers to actively engage with it, increasing its value and payout potential, so they have a much better vested interest in its lasting success than an anonymous investor would behind the closed doors of a traditional financial backer – an approach particularly appealing to collaborative, not-exclusively-for-a-profit business models.

Fintech cooperatives and other collaborative, social-impact-oriented startups are slowly beginning to offer attractive peer-supported solutions that do not put social network members at risk of being expropriated or exploited by an anonymous capitalist investor. Small yet significant innovations like this help gradually reshape the current economic order, steering it away from its destructive economic and social impact and moving towards a more stable, sustainable financial and business ecosystem. The potential of these entities, however, is generally not yet fully realized. Platform cooperative aggregators have begun to digitally aggregate the various offerings to make local and small-scale transparent, comprehensible, and more attractive for a wider audience.

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