Hard Coding Ethics into Fintech

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* The views expressed herein are those of the author and do not necessarily reflect those of the Organization he is affiliated to.

Fintech[1] fuses digital technology with traditional finance. The field of digital finance that results is often claimed to be a disruptive hybrid that will displace 'old' finance. However, a significant amount of fintech innovation can best be understood as the automation of traditional finance, or the automation of its user-experience layer. Many fintech start-ups build platforms that either replace financial professionals with algorithms – for example, an automated 'robo-advisor' wealth manager[2] – or that replace front-office customer service staff with self-service interfaces, as in the case of artificial intelligence 'chatbots'[3].

These innovations increase the speed and lower the costs of providing financial services, and may enable services to reach a wider range of people. That said, they do not necessarily challenge the underlying principles of the existing financial system. Indeed, fintech mostly aims to make the existing system faster, more convenient and cheaper for people to interact with. We should thus ask whether the digital format challenges or reinforces established systems of financial ethics. Furthermore, we should consider whether it introduces new ethical issues previously not as prominent within finance, such as data ethics.

This essay aims to lay out a programme for the ethical study of fintech. Since the financial crisis, much attention has been given to the ethics of 'high finance', the world of

1 Financial technology
2 See, for example, Wealthfront (https://www.wealthfront.com/) and Betterment (https://www.betterment.com/)
3 See, for example, Kasisto (http://kasisto.com/) and Cleo (https://meetcleo.com/)

Fintech fait fusionner la technologie numérique avec la finance traditionnelle, et peut être le mieux appréhendé comme l'automatisation de la finance traditionnelle. Les start-ups de fintech cherchent à remplacer les professionnels de la finance par des algorithmes, et à remplacer le personnel au service du client par des interfaces numériques. Il se peut que cela rende l'interaction avec le système financier plus facile pour les gens, mais il faut nous demander quel est son impact sur l'éthique en finance.

Cet essai énonce un programme pour l'étude éthique de la fintech en quatre parties. La première partie décrit la différence de puissance entre l'industrie financière qui crée des contrats financiers et les clients de détail qui accepte ces contrats.
La deuxième partie montre comment le Fintech est en train d'automatiser la création de ces contrats.
La troisième partie

investment banks and trading. The everyday finance of retail banks and pension funds, despite scandals such as PPI, has often escaped attention. Furthermore, the fintech companies building services on top of these institutions have been viewed largely as positive innovators who will only benefit customers. A more balanced and critical view needs to be developed. We cannot allow ethical considerations to be *post hoc* 'add-ons' to technological innovation. They must be considered prior to us building dependence upon digital finance.

This essay will proceed in four parts:

1. I start by describing finance as a realm of monetary contracts, but draw a distinction between the professional financial industry that creates these contracts and the retail customers who accept them.

2. I then argue that the fintech industry is attempting to automate the creation of these contracts, and our interaction with them.

3. In order to assess how this process impacts ethics, I then establish a baseline snapshot of the ethical dimensions of existing retail finance.

4. This makes it possible to consider how the digital format might impact those existing ethics.

It is impossible to comprehensively assess every ethical issue raised by fintech within a single essay. It is possible, however, to identify what we should be looking at and watching out for. Part four of this essay thus sets out five discreet research programmes that are required if we are to understand the ethics of fintech.

The power dynamics of monetary contracts

Basic finance – debt or equity – involves the creation of contracts that give one party rights to future money in exchange for granting rights to present money to another party. The latter party may use the money to mobilise labour, resources and technology to produce goods and services, which in turn are exchanged in markets for money, which creates the flow of future money promised in the contract.

In an idealised sense, a contract implies a certain equality between signatories to the contract. In reality, though, when it comes to *retail finance* many people experience financial contracts as a one-way 'service' offered to them – or perhaps forced by circumstance upon them – by a large financial institution.

In the best case this can be a mutually beneficial contract. In the worst case it can involve 'asking permission to be exploited'. A power differential exists between individuals and institutions. For example, a person 'applies' for a mortgage from banks who advertise their willingness to entertain such contracts, but the legal, informational and political resources of the banks are often much greater than that of the customer. Likewise, a retail

établit un instantané de l'éthique de la finance de détail. La quatrième partie propose cinq programmes de recherche pour examiner comment le nouveau format numérique peut impacter cette éthique.

La finance implique la création de contrats monétaires, mais beaucoup de gens appréhendent les contrats proposés par la finance de détail comme une proposition à sens unique, émanant d'une grande institution financière aux pouvoirs légaux et politiques bien plus importants qu'eux. La finance de détail consiste soit en de grandes institutions qui offrent de petits contrats standards à un grand nombre de personnes, soit en de grandes institutions qui agrègent l'argent de petits investisseurs afin de leur permettre d'offrir collectivement des contrats à plus grande échelle à d'autres grandes institutions. Le client de détail moyen est se sent écrasé par les grandes institutions financières qu'il utilise. Elles sont souvent si grandes qu'elles ne sont pas

investor trying to invest for future returns often operates via a large intermediary like a mutual fund. Retail finance thus either involves large institutions offering small-scale contracts to large numbers of people, or it involves large institutions pooling the money of small-scale investors to enable them to collectively offer large-scale contracts to other large institutions.

The automation of financial contracting

We can thus distinguish between two camps. On the one hand we have the *financial sector*, consisting of large, well organised financial institutions that specialise in offering financial contracts, or in investing in those on other's behalf. Then we have the general public, the dispersed, uncoordinated retail customers who often feel like passive *receivers* of 'financial services'. We may distinguish between members of the general public who are subject to obligations to financial institutions – like someone who must pay their mortgage – and those who feel the institution is obligated to them, like a pensioner or a bank depositor, but the common factor is their feeling of being on the 'receiving end' of a contract.

The disparity of scale is crucial. The retail customer may feel dwarfed by the financial institutions they use, and those institutions are often so large as to be unable or unwilling to engage with the particular circumstances of each customer. The impulse of financial companies is to present retail customers with standardised menus, interfaces and rule-sets for interaction: *If you want this mortgage, fill out this form and prove X, Y and Z*. The scale necessitates bureaucratic rule systems, brings a tendency to rely upon statistics and modelling rather than personal interaction, and creates pressure to automate processes to lower the costs of interacting with so many small players.

Following the distinction established above, we can see two broad components of financial services that can be automated. The first is the internal activities of financial professionals within financial institutions. The second is the institution's points of interaction with customers who approach to make requests.

Automating financial professionals: machines to robots to AI

In principle, financial contracts require little more than a written document with a legal system to enforce it. Indeed, an ancient financier may have used manual *tools* such as a quill pen and paper, along with an abacus and calculation methodologies to work out a contract. Modern financial institutions, however, use more advanced technologies to speed up the process for deciding who gets to enter contracts, for calculating contract terms, for executing the contracts, for valuing the contracts once created, and for transferring them.

capables de prendre en considération les caractéristiques particulières de chaque client. La grande taille est à l'orgine d'une pression pour automatiser les processus afin de baisser les coûts d'interaction avec autant de petits acteurs.

Des pans entiers des services financiers peuvent être automatisées. En premier, les activités des professionnels financiers à l'intérieur des institutions financières. En second, l'interaction de l'institution avec les clients extérieurs.

Les institutions financières modernes utilisent des technologies pour accélérer le processus de création, de valorisation et de transfert des contrats financiers. Un exemple de machine financière est le système de notation de crédit automatisé. Les robots financiers sont des machines qui sont capables d'intégrer des intrants variables et d'exécuter des décisions définies d'avance, tel qu'un système pour approuver automati-

Manual tools have been surpassed by *financial machines*. For example, an Excel spreadsheet partly automates and greatly speeds up the process of storing and analysing large amounts of data. Likewise, an automated credit-scoring system may take in data inputs about a person – such as their spending behaviour, location and age – and output a score for them.

Increasingly, though, we are seeing the rise of *financial robots*, machines endowed with the ability to take in variable inputs and execute pre-set decisions based upon that data. Automated trading algorithms are perhaps the most well-known of these, but a 'robot' might also include, for example, a system that automatically approves a loan to a person who scores above a certain threshold on a credit-scoring model.

At the frontiers we have *financial artificial intelligence*, financial robots with variable parameters that can shift depending on the data presented to them, allowing them to make more advanced decisions or predictions. A traditional credit-scoring model operates with a pre-set methodology implemented as a step-by-step algorithm that takes data inputs and converts them deterministically into data outputs. A *machine-learning* system, though, can calibrate its operations in response to past data, 'learning from past experience' rather than merely 'following orders'.

These technologies are being used to remove human calculation and decision-making processes within financial institutions. While they may not immediately threaten professionals who work in corporate finance – such as experienced bankers financing a major infrastructure project – they are proliferating within retail finance, where large numbers of smaller decisions have to be made.

Automating the user-experience layer: from service to self-service

Financial institutions are increasingly automating the process via which customers interact with financial professionals. This is made possible by technologies like home computers and smartphones that allow people to communicate their intentions to institutions via an Internet connection. Interaction options can be presented to customers via smartphone apps and internet banking portals. This also necessitates the development of ways for people to prove who they are when communicating, such as smartphone biometric finger-print readers. To make these self-service experiences feel more 'human', institutions are experimenting with 'chat-bots', digital interfaces presented as living beings with personality, equipped with natural language processing (NLP) capabilities that allow them to interpret human speech or writing. Institutions are also developing new ways to automate customer support.

quement des prêts à des gens qui obtiennent un bon score de crédit.

L'intelligence artificielle appliquée à la finance, implique des robots qui peuvent prendre des décisions plus avancées, telles que le système d'apprentissage automatique qui peut calibrer ses opérations en réponse aux données passées, « en apprenant de l'expérience passée » plutôt qu'en « suivants des ordres ».

Les institutions financières sont en train d'automatiser le processus par lequel les clients interagissent avec les professionnels financiers. Les options d'interaction peuvent être présentées via des applications de smartphone, qui nécessitent de nouveaux moyens pour que les clients s'identifient, tels que des lecteurs d'empreintes numériques sur smartphone.

Le vieux modèle selon lequel un client rentre dans une succursale pour consulter le mana-

The digital institution

These innovations give rise to visions of completely digital financial institutions that integrate an automated customer interaction process with an automated decision-making process. Thus, the 'old' model in which a customer walks into a branch to consult with a manager – who looks over their business plan and makes a loan decision – may be replaced with a customer inputting data via a smartphone interface into a machine-learning model that has been granted power to approve or reject the application. At the frontiers are systems that do not even require the customer to input data, but that extract data about them from external sensors, such as the location data on their phone[4].

The digitisation process can be applied on both sides of banks' balance sheets, with automated interfaces presented to both depositors and borrowers. In the case of fund management and financial advisory, points of interaction with retail investors are being automated. These different strands of automation are also enabling the rise of umbrella platforms that mediate between a single customer and multiple underlying institutions via APIs[5]. A person might interact with a bank, FX company, wealth manager and short-term loan company via a single smartphone app[6].

Towards an ethical assessment of fintech

The replacement of financial professionals with algorithms, and the replacement of customer service staff with self-service interfaces may cut costs and allow financial institutions to deal with a greater volume of customers, but what are the ethical implications? To grapple with this, we must first sketch out a baseline model of retail finance ethics, against which we can assess fintech.

Retail finance ethics are complicated by the power differential between the large-scale financial institutions and the small-scale customers. The greater level of power, expertise, information, and co-ordination possessed by large institutions suggests that they should be subject to greater ethical scrutiny and responsibility than the individual customer. Using this lens, we can see three broad fields of potential ethical concern:

1. How retail borrowers are treated
2. How retail depositors and investors are treated
3. The ethics of what gets financed by large institutions that take money from retail customers

4 See, for example, Costa et al. https://www.omidyar.com/insights/big-data-small-credit

5 Application Programming Interfaces. This is a theme of the EU PSD2 directive. For a summary, see https://www.evry.com/en/news/articles/psd2-the-directive-that-will-change-banking-as-we-know-it/

6 See, for example, the services offered by Fidor (https://www.fidorbank.uk/) and solarisBank (https://www.solarisbank.de/)

ger qui prend une décision de prêt peut être remplacé par le client qui rentre des données à travers l'interface du smartphone dans un modèle d'apprentissage automatique qui a le pouvoir de valider l'application. Il existe déjà des systèmes qui n'ont même pas besoin que le client rentre des données, mais qui extraient des données sur celui-ci à partir de censeurs externes, tels que des données de localisation du téléphone. Le processus de digitalisation peut être appliqué des deux côtés des bilans de banque, avec les interfaces automatisées présentées aussi bien aux déposants qu'aux emprunteurs.

Pour pouvoir analyser les implications éthiques du Fintech nous devons d'abord ébaucher un modèle de base de l'éthique dans le contexte de la finance de détail.
Il y a trois larges champs de préoccupation éthique potentielle. Premièrement, comment les emprunteurs de détail sont traités. Deuxièmement, comment les déposants et les investisseurs de

We see historical examples of abuses in all these fields. The predatory issuance of punitive loans to vulnerable borrowers might be an example within the first category. Scandals around banks' mis-selling insurance products to small businesses, or funds charging excessive fees may fall into the second. This essay, however, will focus on the third category.

The ethics of financing

An institutional equity investor helps to finance a property company developing an office block. In such a process, things are created – a building – and things are destroyed – forests used for timber. The workers who built it could be treated fairly or unfairly, and the tenants who move in might be subject to dangerous conditions or safe ones. The financier thus becomes implicated in webs of ambiguous ethics. Their money is used to mobilise energy towards ends that impact both ecosystems and other people, and they receive monetary benefit from that.

Property development is – comparatively speaking – an uncontroversial industry, but whole industries like weapons, tobacco and fossil fuels are viewed by many as being fundamentally problematic. Within the financial sector this is sometimes resolved by making a distinction between 'normal finance' and 'ethical finance'. The former is presented as a default realm of rational and amoral economic principles, a world of mathematical projections and equations. The latter is presented as fuzzy and emotional, a discretionary realm where you can bring in your personal values.

This distinction is false on two grounds. Firstly, within 'normal finance' there are embedded ethical principles that are so taken-for-granted that they are almost invisible. For example, it is taken for granted that it is unacceptable to knowingly finance a company that uses slave labour. 'Rational' 18th century financiers financed slave plantations, but once slavery was rejected as a norm, an anti-slavery principle was incorporated as a baseline principle into ordinary finance. Thus, what ends up being called 'ethical finance' really only concerns those issues that are still morally debated, such as whether undermining ecological systems is acceptable. Mainstream financiers continue to finance ecologically destructive projects, while the 'ethical finance' sector may self-consciously choose not to.

This relates to a second point, which is that the term 'ethical' is often used shallowly to refer to being self-consciously 'good'. This is in contrast to a more holistic notion of ethics as any principles people use to guide their interactions with others. Ethical finance is presented as the realm where you go to overtly *act with ethics*, implying that normal finance is somehow outside the realm of ethics, an amoral zone where you focus on 'being rational'. This narrowly defined 'rationality', however, *is* an ethical

détail sont traités. Troisièmement, la place de l'éthique dans ce qui est financé par de grandes institutions qui utilisent l'argent des clients de détail. Cet essai va se concentrer sur la troisième catégorie.

Les financiers sont impliqués dans un tissu de relations ou prévaut une éthique ambiguë. Leur argent est utilisé pour des investissements qui ont un impact sur les écosystèmes ainsi que sur les autres gens. À l'intérieur du secteur financier, ceci est parfois reconnu du bout des lèvres par la distinction entre « la finance normale » et « la finance éthique ». La finance normale est une zone dans laquelle les acteurs sont des « êtres rationnels ». Cette « rationalité » étroitement définie est, cependant, une position éthique. Spécifiquement, il s'agit d'une forme de conséquentialisme que nous pouvons appeler égoïsme monétaire, une version de l'égoïsme éthique qui énonce qu'un investissement est « bon » s'il permet des gains financiers personnels.

position. Specifically, it is a form of consequentialism[7] we might call *monetary egoism*. This is a modified version of *ethical egoism*[8], and states that an investment is 'right' if it leads to personal monetary gains.

This is given formal expression in the mathematical risk-reward calculations of investment: '*How much future money will I get, relative to how much money I have to put in now, relative to how much risk I must take in the process?*' These calculations are nested within a substrate of norms seen to be outside the realm of egoist calculations, like slave labour.

Ethical neutralisation techniques

If we believe in concepts like 'the public interest', it is necessary to instil deeper ethical reflection beyond monetary egoism among financial professionals. This faces hurdles. When confronted with ethical criticism, financial professionals have a range of neutralisation techniques, all of which need to be subject to ongoing challenge. These include:

1. Arguing that a controversial investment or behaviour is not bad (morally neutral), or that it is in fact good.

2. Arguing that the moral character is undetectable, multi-faceted, ambiguous or unknowable in advance. This was used in the wake of the financial crisis, where 'we didn't know that would happen' was a common refrain.

3. Arguing that, even if it is bad, the financier is not ethically responsible, or is subject to a higher-order duty or good that overrides the bad.

This latter category of *justification strategies* is aided by the scale and hierarchal management structure of financial corporations. Large projects may be fragmented into smaller sections, such that nobody feels responsible for the whole. Such settings also allow individuals to assign blame to an 'irresponsible' junior or a dominant senior. Additionally, the sheer scale and geographic dispersion of financing activities can add layers of abstracted distance. A controversial coal mining project in Colombia, for example, is reduced to numeric models on a screen in London. *Indirectness* abounds, such that few feel directly responsible, or even *perceive* distant injustices.

Even when direct responsibility can be ascertained, financiers can justify actions by asserting a higher moral priority (*I had a good reason for it*). A common version is to simply invoke monetary egoism. When a fraudster defends themselves by saying 'I needed money to feed my kids', they appeal to their children's wellbeing as a justification. A

7 An ethical school that considers the outcomes of an action to determine the moral character of that action

8 Ethical egoism asserts that a moral action is one that maximises an individual's self-interest. This weighing of personal costs vs. benefits is unlike consequentialist utilitarianism that weights up costs and benefits to a collective. For a short summary, see Shaver https://plato.stanford.edu/entries/egoism/#2

Il est nécessaire d'insuffler une réflexion éthique plus profonde au-delà de l'égoïsme monétaire parmi les professionnels financiers. Cela fait face à des obstacles, car les professionnels ont une série de techniques de neutralisation pour contrer la critique éthique. Celles-ci incluent soir le fait de nier qu'un investissement controversé est mauvais, soit d'argumenter que même si l'investissement n'est pas éthique, le financier n'est pas éthiquement responsable, car il est assujetti à un ordre supérieur bon qui prime sur le mauvais. Les stratégies de justification incluent l'égoïsme monétaire, en affirmant que la poursuite privée d'intérêt personnel monétaire est vertueuse et qu'elle prime sur les conséquences publiques qui peuvent découler de l'activité financière. D'autres stratégies de justification comprennent le fait de nier l'autonomie de l'action personnelle (« je n'avais pas le choix, je fais simplement mon travail »), assumant le rôle d'un loyal serviteur (« j'ai une responsabilité envers mes clients »),

monetary egoist might leave off the 'feed my kids' part. Financiers may not be engaged in anything illegal, but within the sector it remains comparatively common to assert that there is some inherent rightness to the private pursuit of monetary self-interest that overrides whatever public consequences might stem from a financing activity[9]. Monetary egoism is the counterpart to the concept of 'negative externalities', social losses incurred as a result of economic agents' private pursuit of individual gain.

To illustrate other justification strategies, let us take a hypothetical example of a paper company engaged in irresponsible rainforest destruction, financed in part by a large diversified fund manager. When challenged, the portfolio manager might:

1. Deny personal agency (*I had no choice*): Subsets of this might include presenting themselves as a 'jobsworth' ('*I'm just doing my job. I take orders from senior management*'), or presenting themselves as an embattled follower of the 'invisible hand' ('*we just respond to what the market demands. We'd go out of business if we didn't*').
2. Assume the role of a loyal servant, as in '*I have a responsibility to my clients. Speak to them if you have a problem*'.
3. Deny direct causal responsibility: The fund's scale and diversification add moral dispersion and responsibility dilution, allowing statements like '*we invest in many companies and cannot follow them all, or be held directly responsible for their actions*', or '*we are but one investor among many*'.
4. Appeal to collectives: The presence of a competitive market with other investors allows moral escape hatches like '*many others are doing it*'.
5. Assert inevitability: This includes statements like '*If I didn't do it, somebody else would*', the implied argument being '*It will happen anyway, therefore I'm not really responsible*'.
6. Add diversionary moral indignation: '*It is irresponsible for us to not to. Without these forestry companies you wouldn't have paper*'. This ignores that paper can be produced more sustainably.
7. Finally, they can resort to, '*If you don't like this, we also offer an ethical fund*'.

The financial ethics of the public

One fall-back position of institutional investors is to assert that they are only responsible for the financial interests of their clients, and that it is up to those clients to specify acceptable investments. There is some merit in this argument[10], but

9 This inspires ethical finance practitioners to try win support in mainstream finance by arguing that you can 'make money by being good', an attempt to align monetary egoism with broader ethics

10 There are debates on the nature of the fiduciary duty institutional investors owe to their clients, relative to environmental and social responsibilities. See for example, the 2014 UK Law Commission report on the topic http://www.lawcom.gov.uk/app/uploads/2015/03/lc350_fiduciary_duties.pdf

refusant la responsabilité causale directe (« nous investissons dans de nombreuses compagnies et nous ne pouvons pas être tenus directement responsables de leurs actions »), faisant appel à des comportements de groupes (« beaucoup d'autres le font »), faisant valoir la fatalité (« si je ne l'avais pas fait, d'autres l'auraient fait »), et l'indignation morale de diversion (« ce serait irresponsable de notre part de ne pas le faire »).

Les investisseurs institutionnels affirment souvent qu'ils sont seulement responsables des intérêts financiers de leurs clients, et qu'il revient à ces derniers de préciser ce que sont pour eux les investissements acceptables. Ceci ne tient pas compte de la grande différence de pouvoir entre les clients de détail et les institutions. Les connaissances en matière financière dans le secteur public demeurent faibles et les normes éthiques des établissements financiers spécialisés sont acceptées comme « du bon sens financier ».

it glosses over the large difference in information and power between retail customers and institutions.

While there are campaigns – such as divestment campaigns[11] – that try to mobilise retail investors into demanding higher ethical standards from institutions, public levels of financial literacy remain low, and ordinary customers may be authentically perplexed about finance beyond a shallow surface understanding.

In such a context, it is easy for the ethical norms of expert financial institutions to be accepted by the broader public as 'financial common sense'. These ethical standpoints are embedded within the marketing language of financial products, and many customers do not have enough time or energy to deconstruct this. Indeed, financial products are often marketed to people in narrow *functional* terms that focus on 'what this product will do for you individually', rather than broader *structural* descriptions of 'how it will do that and who else it impacts in the process.'

Combatting ethical indifference

One need not agree with every element of the assessment of financial ethics above to agree that – in general – it would be a positive step to challenge any process that allows both financial professionals and the general public to ignore the ethical consequences of financial decisions.

We can thus argue that a more ethical financial system would actively:

1. Encourage greater ethical reflection from financial professionals prior to their decisions.
2. Connect them more closely to the ethical outcomes of their decisions.
3. Encourage customers to take a more active and demanding stance on ethics.
4. Encourage customers to understand what is happening behind the scenes with their money.

We might generalise these by saying the financial system should aim to create opportunities for moments of *ethical pause*, reflection on the implications of investments beyond monetary returns. This is different to asserting that people should be 'good'. Rather, it is to say they should understand and take responsibility for investments they are implicated in, rather than denying responsibility.

Assessing the ethical implications of digital finance: a proposal

In the context of the ethical angles sketched above, the process of automating finance raises two broad sets of questions. Firstly, does the process of automating various elements of the jobs of financial professionals alter the ethics of their decision-making or lead to new ethical justification strategies?

11 See, for example, the GoFossilFree movement https://gofossilfree.org/

Un système financier plus éthique devrait encourager les professionnels financiers à mener une réflexion éthique plus ample avant de prendre leurs décisions, à les associer plus étroitement aux résultats étiques de leurs décisions, et à encourager les clients à prendre une position plus active et exigeante envers l'éthique.

Le processus d'automatisation de la finance soulève deux séries de questions. En premier, le processus d'automatisation de différents éléments du travail des professionnels financiers altère-t-il l'éthique de leur prise de décision ? En second, l'automatisation affecte-t-elle la prise de conscience du client des problèmes éthiques, et de ses droits ?

Comme les processus de prise de décision sont de plus en plus automatisés, les professionnels financiers individuels peuvent se sentir de moins en

Secondly, does the automation of the customer experience affect customer awareness of ethical issues, and customer rights?

It is beyond the scope of this essay to comprehensively answer this. The aim rather is to propose the outlines of a comprehensive research agenda that we urgently need to undertake if we are to evaluate the ethical impacts of fintech. What follows are short summaries of five areas of concern that need to be tackled by dedicated research programmes.

Research programme 1: Does automation reduce the ethical awareness and responsibility of financial professionals?

A cynic might flippantly argue that ethical awareness among financial professionals is already low, but it seems unlikely that automation would *increase* ethical awareness. It is plausible that as decision-making processes are increasingly automated, individual financial professionals will feel increasingly less responsible for the decisions, or perhaps will not even be *aware* of the decisions.

Once set up, automated financial systems can take on the superficial appearance of being external to, and autonomous of, the individuals that manage them. This may allow financial professionals to use them to further deny moral agency and responsibility. The process of deferring to a non-human third party that apparently makes decisions is common in society: we see it in simple examples like an indifferent waiter shaking his head and pointing to a menu when a customer makes a request for something that is not on it. The menu has no agency, and yet becomes an objectified 'actor' in the situation. With advanced financial machines, robots and AI, this process of pointing to a third-party 'actor' may increase. Furthermore, as financial robots *execute* decisions themselves, professionals may increasingly feel 'it wasn't me'.

Research programme 2: Does automation reduce customer awareness of ethics?

Fintech companies put a positive spin on the speed, ease and *frictionless* nature of digital finance, but does frictionless finance increasingly detach the customer from deeper awareness of what lies behind financial instruments? 'Friction' can be a negative way of framing 'contact', 'engagement' or 'texture'. Much like shopping online can feel 'less real' than testing products in a shop, so interacting via a smartphone interface with financial contracts is a more detached psychological experience. The frictionless interface may further reduce scope for moments of ethical pause. Indeed, robo-advisor services and startups like Nutmeg[12] actively tell people that they need not think about what to invest in, marketing the

12 See https://www.nutmeg.com/

moins responsable des décisions. Les systèmes financiers automatisés peuvent sembler superficiellement être indépendants des individus qui les gèrent, ce qui permet aux professionnels financiers de nier toute nature morale de l'action et la responsabilité.

L'incapacité d'avoir accès au crédit peut mettre en péril le bien-être économique d'une personne, et les établissements devraient rendre compte de leur action quand ils le refusent. À l'inverse des modèles financiers courants où la cause du refus peut être communiquée à un client, les managers des systèmes d'apprentissage automatique II ne peuvent pas nécessairement dire pourquoi un client a été exclu de ces services.

La numérisation signifie que les gens remettent des quantités toujours plus grandes de données plus complètes. Les gens ne sont souvent pas conscients que de telles données sont collectées, et puisque la technologie

ability to obtain a diversified portfolio at the click of a button. Could this create a sense of investment as a 'magical process', that 'just happens', rather than a deep process with real moral implications?

Research programme 3: Does automation reduce accountability to retail borrowers?

The inability to access credit can be damaging to a person's economic wellbeing, adding credence to the idea that institutions should offer accountability when rejecting them. The indifference displayed by ordinary automated systems is famously encapsulated in the phrase 'Computer Says No', but this could become acute as we move into the realm of machine learning.

Unlike ordinary deterministic models where the cause of rejection can be identified and communicated to a customer, machine learning designers cannot necessarily account for why a customer gets placed in a certain bracket. In a traditional algorithm, the designers take past human learning and encapsulate it within an '*if-then*' algorithmic form (for example, *if person has less the X income, then not desirable)*, but in the case of machine learning, the automated system is designed to make inferences itself, which may remain unknown to the creators of the system.

Research programme 4: Does automation lead to financial surveillance?

Digitisation increases personal data trails. As non-digital interaction options are removed, people are handing over ever greater amounts of richer data, such as the exact *time* at which they paid for something and their smartphone *location* when they did it. People are often unaware that such data is being collected, and fail to understand where it is taken from and what it is used for.

They may be pushed into giving consent for its usage as a condition for accessing basic services. In innovation areas like 'insurtech' (insurance technology) smartphones and wearable devices like Fitbits can be used by large institutions to monitor behaviour to determine a person's risk profile[13]. These systems are currently optional, but as the technology becomes ubiquitous it could become mandatory for individuals to grant access to this data, or else face exclusion and punitive costs.

Many people feel intuitively concerned about questions of privacy – like '*Am I being spied on?*' – but a potentially deeper concern is the use of peoples' data to steer their behaviour. Financial data reveals very deep insights into how people act in the world, and – when combined with other data sets – potentially allows institutions to 'know you better than

13 See, for example, Fitsense (http://fitsense.io/) and WeSavvy (http://wesavvy.com/)

devient omniprésente, il pourrait devenir obligatoire pour des individus d'accorder l'accès à ces données, sous peine d'être exclu et d'être exposé à des coûts punitifs. Ceci soulève des problèmes en matière de protection de la vie privée. Les données financières révèlent aussi des informations très précises sur la façon dont les gens agissent dans le monde. Ainsi, les établissements peuvent non seulement prédire potentiellement votre comportement, mais aussi le manipuler avec une exactitude de plus en plus grande.

La finance numérique est souvent présentée comme permettant au consommateur d'augmenter ses choix, mais ce qui débute comme un choix peut s'avérer être obligatoire plus tard. Les établissements financiers présentent actuellement de nouvelles options numériques, qu'elles utilisent ensuite pour justifier le retrait des options non numériques qui sont plus coûteuses pour elle. Le self-service numérique implique que les clients

you know yourself'. We already sense this trend in online recommendation engines that use your past interaction data to suggest future paths of behaviour. These fall within the broader field of *predictive analytics*, which not only allow institutions to potentially predict your behaviour, but also to potentially manipulate it with ever-increasing accuracy. While this may be narrowly useful, it can also feel disconcerting, and reduce peoples' sense of autonomous agency.

A related long-term question concerns the psychological impacts that occur when people learn they are being monitored. Are we seeing the incremental growth of a financial 'panopticon' that might cause people to censor and regulate their own behaviour out of fear that their every private move may be subject to monitoring?

This question complements Research Programme 3. The fields of *big data* and *machine learning* are linked, in that machine learning models are trained using large amounts of data collected from multiple sources. Advanced artificial intelligence systems may use such data to come to a deep understanding of your character, but what if – on the other hand – the systems are incompetent and make arbitrary, unaccountable, *Kafkaesque* decisions? The rejected borrower seeking accountability might face a dead-end, trying to guess what element of their behaviour has caused the rejection.

Research programme 5: Does automation reduce customer autonomy?

Digital finance is often presented as increasing consumer choice, but what starts as a choice can later become mandatory. *Email*, for example, started as an exciting new communications option but quickly became *required*, resulting in economic exclusion for those who did not use it. Likewise, automated self-checkout counters at supermarkets might initially be pitched as an *option*, but simultaneously provide supermarkets with a justification for reducing the number of checkout clerks, which in turn may reduce the convenience of using the clerks. Institutions seeking to cut costs through automation gradually make it harder and harder to use non-automated options, 'inspiring' people to 'choose' self-service.

We are currently in the stage where financial institutions are competing to showcase new digital options, but we are likely to see them converge on a common set, which they will then gradually use as a justification to remove non-digital options that are costlier for them to maintain. At that point, we may get locked into dependence upon digital finance.

This raises perhaps the most philosophical concern. Let's return to the waiter analogy used in Section 4.1. An empathetic, innovative waiter can rise above a menu, showing flexibility towards customers. The

interagissent avec des managers cachés à travers un menu établi par ses managersL'élargissement des choix peut être une illusion.

Alors qu'il y a de grandes opportunités d'utiliser fintech pour promouvoir le bien social et environnemental, il est crucial de rechercher les potentiels éthiquement négatifs de nos innovations. Sinon nous risquons d'être des somnambules dans un système financier de plus en plus handicapé éthiquement.

self-service world, however, only has customers interacting with hidden managers via a menu set by those managers, with no 'waiter' figure to mediate between them. Menus both define available choices – by highlighting acceptable options – and limit them, by rendering invisible options that are not tolerated. Digital interfaces and apps might come in many colours and designs, but if financial institutions begin to converge on a common set of options, the sense of wide choice may be an illusion. Without an intermediary connection to company management via flexible or empathetic frontline customer service staff, users may find themselves feeling even more like passive acceptors of services from distant, unfathomable financial gods.

In closing

Above, I have speculated on some potentially negative ethical implications of fintech. These need not transpire and, indeed, there are great opportunities to use fintech for promoting social and environmental good[14]. That said, unless we actively start to research these questions and embed awareness of them into our innovations, we may sleepwalk into an increasingly ethically-disabled financial system.

14 See UNEP 2016

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