How to Respond to Artificial Intelligence in FinTech

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Artificial Intelligence (AI), machine learning and deep learning are doing something that once seemed unthinkable. They are transforming heavily regulated industries, such as the financial services and trading industry, or the healthcare and life sciences industry. What is interesting, however, is that "insiders" in these industries seem to react in very different ways to the arrival of these new and disruptive technologies.

Take healthcare and life sciences. AI takes the role of an experienced clinical assistant who helps doctors make faster and more reliable diagnoses. We already see AI applications in the areas of imaging and diagnostics, and oncology. Machine learning has the potential to improve remote patient monitoring. AI algorithms are able to take information from electronic health records, prescriptions, insurance records and even wearable sensor devices to design a personalized treatment plan for patients.

These AI-related technologies accelerate the discovery and creation of new drugs. There is a broad consensus amongst insiders that healthcare is being transformed for the better as a result of AI. The opportunities and potential are limitless.

"Healthcare is going to be one of those industries that is elevated and made better by machine learning and artificial intelligence." — Jennifer Bresnick in "How Healthcare Can Prep for Artificial Intelligence, Machine Learning" (https://healthitanalytics.com).

Similarly, new technology is disrupting the financial services sector. FinTech — broadly defined as the use of new technologies to make financial services, ranging from online lending to digital currencies, more efficient — can be seen across a range of financial services. For example:

- Peer-to-peer lending platforms that use algorithms and machine learning to assess the creditworthiness of borrowers.
- "Robo-advisors" that have the potential to automate personal finance and wealth management. They can help individuals manage their personal accounts, debts, assets and investments.

And yet, in contrast to the healthcare sector, most incumbents in financial services appear to take a more cautious or even skeptical view about the possibilities and prospects of this technology. While the healthcare industry is generally convinced that AI, machine learning and deep learning will improve the quality of health care and transform the industry, this view is not widely shared among traditional bankers and other finance professionals and consultants, such as accountants. This resistance to the potential benefits of new technologies occurs in spite of the fact that technology is transforming the industry.

AI in the Financial Industry

The most important reason for the "resistance" seems to be the emphasis that financial insiders place on the human or emotional aspects of their services. Financial service providers like to emphasize how finance and wealth management is a profession rooted in a personal approach to dealing with clients. An experienced and knowledgeable advisor understands the relationship with his/her client as a deep, ongoing and dynamic process. According to this view, it is important for clients to know that they have entrusted their money with a real person who understands human emotions and believes that investment and financial services are much more than just portfolio optimization.

Against this background, it is easy to deny the potential benefits of a cold and calculating machine intelligence. Machines lack the human empathy and emotional understanding that are seen by insiders as a crucial element of the service that they provide.

"Even with great attention to learning the emotional strengths and limitations of clients, we still are highly imperfect, so how likely is it that even the best AI model will achieve results that are both dependable and reliable?" — Rob Clarfeld in "Why Robo-Advisors Don't Worry Me", *Forbes*, May 5, 2017.

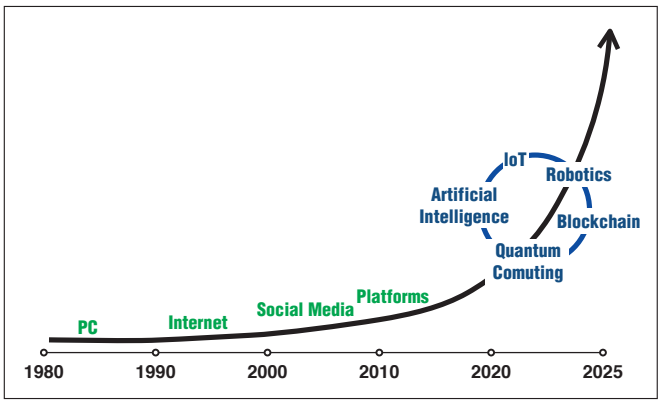
This more skeptical view of the potential of AI and automation in a financial services context does not completely deny the role of technology. Everyone accepts that computer algorithms have a place in the investment process. But this role is "limited"; technology is a supporting device in the hands of an emotionally intuitive human advisor.

"This is precisely the reason that the recent slew of interest in robo-advisors (automated investment solutions) isn't a big concern for me. At its best, technology can assist the implementation of a strategy, not its purpose or relevance." Rob Clarfeld *(idem)*.

Moreover, this more cautious view about the prospects of FinTech seems to be supported by the fate of start-up companies in the

CHART 1

Exponential growth of technology



Source: Compiled by the authors

FinTech sector. Such companies have received enormous amounts of investment, but have often had difficulties in scaling. High profile examples are the online investment companies Betterment and WealthFront.

In trying to understand why it has proven so difficult to scale AI-based FinTech start-ups, skepticism is perhaps the most important reason. Many financial professionals appear to believe that AI is science fiction that doesn't need proper attention for the next 10 years. And even then, its implementation and integration in our daily lives will be hampered by regulatory challenges, fear and costs. The emotional and human aspects of financial services are again often mentioned in this context. According to some studies, it has been suggested that people are unlikely to use a purely automated financial advising system in the foreseeable future.

There is some empirical evidence to support this claim. According to a GfK survey, only 10% of all participants said they would be likely to trust a computer algorithm more than a human to give them financial advice, while 50% of respondents disagreed with this statement. Some 45% said they would not be willing to forgo live customer service in return for paying less. Across a diverse range of financial products, consumers are least open to completely automated customer service for high impact investments and personal mortgages. This emphasis on the meaning of financial services, both for the client and the provider, should not be dismissed lightly. It clearly influences much of the thinking and discussion in the field.

No doubt there are some issues to be overcome, but here are five reasons why this skeptical view of AI-based FinTech is wrong.

(1) The exponential growth of disruptive technologies that accelerate each other

The speed of technological development means that transformative change will come much sooner than expected. Big data and the near-endless amounts of information have undoubtedly transformed AI to unprecedented levels. Blockchain technology and smart contracts will merely continue the trend.

The enormous increase in computational power, the breakthrough of Internet of Things (IoT) applications and the further development of smart machines will only accelerate AI's development and global adoption *(Chart 1)*. The increasing acceleration of innovation will add to AI's ability to adapt to new situations and solve problems that currently seem to be impossible.

(2) The need for "humanity" in financial services as self-serving deceit

Bankers, financial services providers and their consultants often use the "personal" aspects (particularly, the understanding of human emotions) as the main argument against the wide adoption of AI, machine learning and deep learning in the industry. Ironically, however, the emphasis on the meaning and the human aspects of financial services can come across as arrogant and self-serving. The characterization of finance as deceitful, infamous, and vulgar still rings true today — particularly in the wake of the 2008 financial crisis.

"Arrogant" bankers and financial professionals, engaging in a produced performance that is not authentic, make us skeptical about their dismissal of AI and smart machines. The hierarchical organization and structure of banks appears to be an important reason for the "impersonal", time-consuming and cumbersome interaction with bankers and their consultants.

(3) Funding in new technologies reaches "record" levels

The flat hierarchy and "peer-to-peer" opportunities offered by innovative start-up companies in the financial industry give them a tremendous advantage over traditional banks. Innovative AI applications (that have the potential to reduce the need for trained professionals) will only facilitate "peer-to-peer" transactions.

The fact that smart innovators continue to attract record amounts of money usually means something big is happening *(Chart 2)*. This is just another reason why we cannot ignore AI in the financial industry.

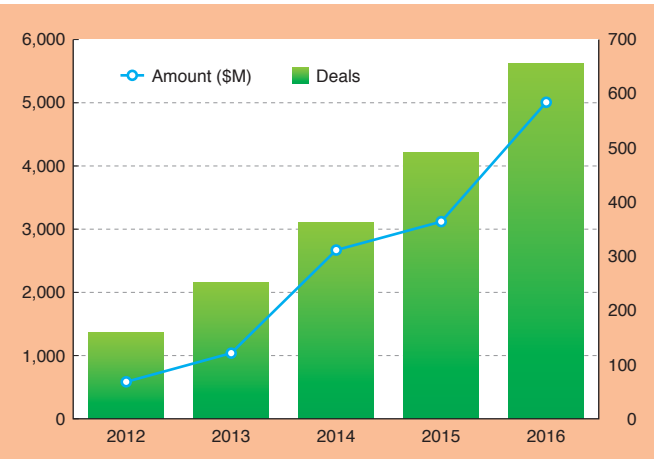
(4) AI and algorithms are hot

Companies that are algorithmically based and embrace AI are the darlings of consumers and popular culture. Siri (Apple), Google Assistant (Alphabet), Cortana (Microsoft) and Alexa (Amazon) are currently ready to assist you with more and more difficult tasks. AI, machine learning, and deep learning are just the beginning of a revolution that will transform everyday life and how we interact with technology.

Investors and consumers value the companies that embrace these new technologies and gradually bring them to the market. It is thus not surprising that Apple, Alphabet, Microsoft and Amazon have

CHART 2

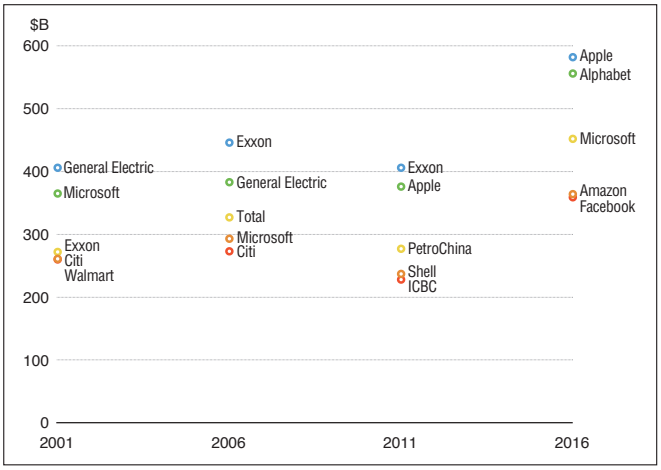
Global venture capital investments in AI



Source: CB Insights

CHART 3

Largest companies in the world
(by market capitalization)



Source: Visual Capitalist

recently replaced the traditional financial institutions (and oil businesses) as the largest companies in the world, at least according to their market capitalization *(Chart 3)*. These companies view different types of AI as the most important business opportunity for the future.

(5) Disruption doesn't need *Westworld*-type AI

In thinking about intelligent machines, it is helpful to distinguish between four types of AI:

- ***Type 1 AI*** refers to reactive machines that specialize in one area — for instance, the drafting and review of loan agreements. More "famous" examples are IBM's Deep Blue chess software or Google's AlphaGo algorithm that was too strong for the best players of the board game Go.
- ***Type 2 AI*** machines possess just enough memory or "experience" to make proper decisions and execute appropriate actions in specific situations or contexts. Self-driving cars, chat bots, or personal digital assistants are the most commonly used examples.
- ***Type 3 AI*** has the capacity to understand thoughts and emotions which affect human behavior. *Softbank Robotic*'s "Pepper" can organize large amounts of data and information to have a "human-like" conversation.
- ***Type 4 AI*** is "artificial intelligence" as it is typically portrayed in Hollywood movies or TV shows. Machines using this type of AI are self-aware, super intelligent, sentient and conscious. Think *Westworld*.

The key point here is that skeptics of FinTech in the financial services industry think that until we have Type 4 AI — AI that is more human than human — we cannot fully trust or rely on the technology. But this view is based on a misconception. There are many tasks that are central to financial services that are already performed by machines. Type 1 AI can do certain things more effectively than a human (for instance, reviewing standard form contracts). Type 4 AI is a long way off, but that doesn't mean that the financial services industry can't be radically disrupted by the other, simpler, forms of machine intelligence.

How to Respond?

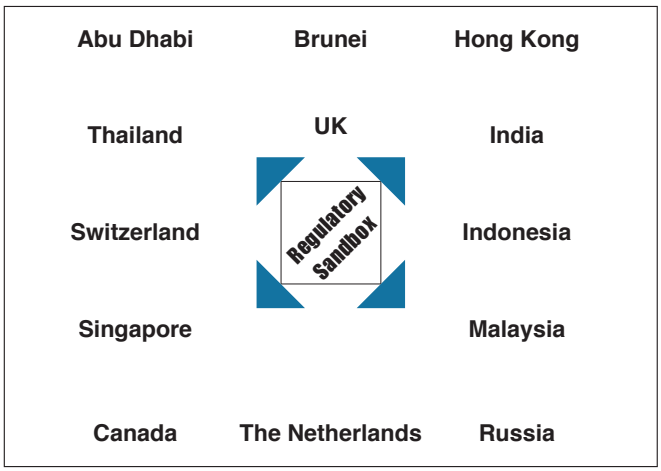
We must study AI, machine learning, and deep learning technology, as well as their applications. Yes, we are perhaps still in the development stage, but the various technological and security issues surrounding these new technologies will soon be solved. And solutions will be accelerated by the development of other related technologies. To dismiss the arrival of industry-transforming technology seems to go against everything that we know about technological change in the digital world. And the recommendation to study and understand AI is not only for technologists, mathematicians and computer scientists. Everybody should engage with these developments.

Though some have voiced concerns about AI, it's actually leading us to a very different future than what we're currently experiencing. We should not continue to rely on old ideas, principles, concepts and experiences. We must study the new world in order to remain relevant and to develop a better understanding of the new digital reality that is emerging around us.

In the financial industry, this engaged-approach with disruptive technology is best facilitated by the establishment of "regulatory sandboxes". In April 2016, the UK Financial Conduct Authority broke new ground by announcing the introduction of a "regulatory sandbox" which allows both start-up and established companies to

CHART 4

Regulatory sandboxes



Source: Compiled by the authors

experiment with and test new ideas, products and business models in the area of FinTech.

Of course, the set-up of the "regulatory laboratory" comes with restrictions in time and number of users. Still, the idea was rapidly followed by other jurisdictions that desire to promote innovation by allowing new technologies, products and services to be developed and tested in a supervised and safe environment *(Chart 4)*.

In discussions about regulatory sandboxes with other experts in banking and finance, we have heard arguments that their deployment is nothing more than a strategy of a country to signal its openness to innovation and technology. In their view, "sandboxes" aren't offering anything new. Regulators are usually able to exempt companies and technologies from complying with the applicable set of rules and regulations without referring them to a sandbox. The Australian "FinTech" exemption is an example.

Yet, these arguments seem to miss the main advantages of the "regulatory sandbox". What makes these initiatives so attractive is not the mere fact that the regulator encourages technological innovation by lowering regulatory barriers (and costs for testing disruptive new technologies). The potential of regulatory sandboxes goes much further than this. Insofar as technology has consequences that flow into everyday lives, such technology will be open to discussion and democratic supervision and control. In this way, public entitlement to participate in regulatory debates can help to create a renewed sense of legitimacy that justifies the regulation.

What is even more important is that regulatory sandboxes offer opportunities to generate information and data relevant for the regulation of the new digital world. They allow the participants in the sandbox — i.e. regulators, incumbent companies, start-ups, investors, consumers — to learn about the new technologies (such as AI). They can create the necessary dialogue that helps us understand new technologies. They allow for collaboration and joint discovery.

But perhaps most importantly, they create an opportunity to change the mindset of incumbents operating in the financial services sector and allow them to embrace the new possibilities associated with artificial intelligence, machine learning and deep learning. And that's something to be excited about. Moreover, the empirical evidence seems to prove the advantages of "regulatory sandboxes" over other regulatory approaches.

Empirical Study

Given the disruption that is already occurring — a trend that seems set to continue — regulators are obliged to respond to FinTech. So, what are the options? Broadly speaking, if we look around the world today we can distinguish between two broad categories of response — "reactive" and "proactive"— each of which has a number of sub-categories.

1. Reactive

The first group includes countries in which nothing is being done. There is "no regulatory talk or action". The second group consists of countries in which there is partial or "fragmented regulation" of FinTech. Certain institutions, such as the Consumer Financial Protection Bureau (CFPB) in the United States, may offer certain safe-harbor provisions for certain types of FinTech companies. Yet there appears little willingness to genuinely embrace the technology and its regulatory implications, nor is there any comprehensive plan as to how FinTech can or should be regulated.

2. Proactive

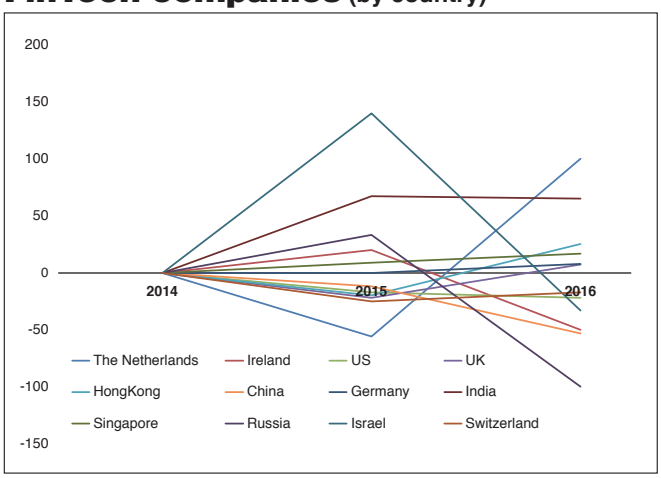
On the other hand are those countries that take a more a proactive approach. In this group, we find those countries that make FinTech a "priority". In such countries there is a lot of regulatory attention paid to FinTech. Such "attention" can take the form of consultation papers, White Papers, or conferences. But action is limited and there is a risk that "prioritizing" FinTech can slide into an empty "lip service" aimed at projecting an image of regulatory action when, in reality, action is limited.

A second group of countries engage in what we might characterize as "regulatory guidance". Regulators issue guidelines or provide advice to FinTech start-ups and incumbents in order to help navigate them through the regulatory system. This does not necessarily entail changes in regulatory structure, but it does support innovation. The initiative to issue a national charter for the supervision of FinTech companies by the US Office of the Controller of the Currency (OCC) is a recent example.

A final group of countries have embraced the possibilities of FinTech by creating regulatory sandboxes, as described above. We characterize this as "regulatory experimentation". Regulators create

CHART 5

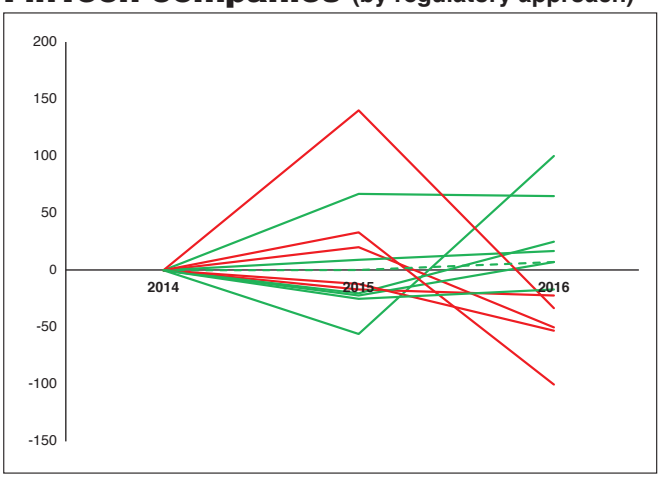
Year-on-year percentage growth of first-time venture capital-backed FinTech companies (by country)



Source: Compiled by the authors

CHART 6

Year-on-year percentage growth of first-time venture capital-backed FinTech companies (by regulatory approach)



Source: Compiled by the authors

a regulatory sandbox in which they facilitate and encourage a space to experiment. This allows the testing of new technology-driven services, under the supervision of regulators. This ensures that meaningful data can be gathered for the evaluation of risk in a safe environment. Such data can then facilitate "evidence-based regulatory reform".

A key point about this last approach is that it is collaborative and dialogical, in the sense that regulators, incumbents and new service providers are engaged in an on-going dialogue about the most effective means to gather relevant information and to identify the most appropriate regulatory model.

In order to better understand the effects, risks and opportunities associated with these regulatory choices, we conducted an empirical study of regulatory responses to FinTech in 12 jurisdictions. In particular, we looked at first time "venture capital" investments in FinTech companies. The intention was to see whether there was a meaningful connection between levels of investment and regulatory choice.

Chart 5 shows the results of year-on-year percentage growth of first time "venture capital" backed companies. In many cases, this data confirms anecdotal evidence of a slowdown of interest in FinTech. But interestingly, in six of the 12 jurisdictions there was an increase in investment activity in 2016. The question this data raises is whether there are any signals as to a correlation between regulatory initiative and increased activity in the FinTech sector?

Chart 6 gives the answer. In those countries in which the response was reactive (red line), there seems to be clear evidence of a slowdown. In contrast, in those countries with a more proactive response — particularly involving regulatory guidance (green "dashed" line) or regulatory experimentation (green line) — there is evidence that this proactive approach makes the jurisdiction more attractive as a potential location for starting FinTech operations.

This suggests that the regulatory environment does affect the degree of investment and — perhaps as importantly — affects the willingness of companies to start operations in one jurisdiction, rather than another.

Regulation matters, but we have to realize that there are other components that make up an attractive ecosystem for FinTech. Consider Israel: a market known for its venture capital industry, a strong R&D focus and large multinationals that are open to FinTech. These ingredients play a crucial role in making Israel an attractive site for investing.

The Future?

The evidence does suggest that regulatory sandboxes that facilitate experimentation are key. For now, policy experimentation seems to be the way to go for regulators. It is, therefore, crucial that we track the effectiveness of regulatory sandboxes in 2017. After all, they are relatively new and we need to build a better understanding of their effectiveness in order to improve their design. JS

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