

Fintech seen through a sustainability lens: Transformative potential and actual achievements

Les fintechs vues de la perspective de la soutenabilité : potentiel de transformation et réalisation effective

Las Fintech vistas desde el prisma de la sostenibilidad: potencial transformador y logros reales

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Article abstract

This paper expands traditional approaches on the impact of Fintech in the financial landscape. Beyond the perspective of technological and market-driven innovations, our study explores the role of Fintech companies in the domain of sustainability. The empirical analysis is based on a sample composed of traditional banks, so-called ethical banks, and various types of Fintech in Switzerland. The results show that, in the domain of sustainability, Fintech companies are far less game-changing than commonly thought.

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ABSTRACT

This paper expands traditional approaches on the impact of Fintech in the financial landscape. Beyond the perspective of technological and market-driven innovations, our study explores the role of Fintech companies in the domain of sustainability. The empirical analysis is based on a sample composed of traditional banks, so-called ethical banks, and various types of Fintech in Switzerland. The results show that, in the domain of sustainability, Fintech companies are far less game-changing than commonly thought.

Keywords: Business Model Innovation, Fintech Companies, Sustainability, Conventional Banks, Ethical Banks, Switzerland

Résumé

Cet article prolonge les approches traditionnelles sur l'impact des Fintech dans le paysage financier. Au-delà des perspectives d'innovation technologique et de marché, notre étude explore le rôle des Fintech dans le domaine de la soutenabilité. L'analyse empirique s'appuie sur un échantillon composé de banques traditionnelles, de banques éthiques, et de différents types de Fintech Suisses. Les résultats montrent que, en matière de soutenabilité, les Fintech changent beaucoup moins la donne qu'on ne pourrait le penser.

Mots-Clés : Innovation des business models, Fintechs, Soutenabilité, Banques Conventionnelles, Banques Éthiques, Suisse

Resumen

Este artículo amplía los enfoques tradicionales sobre el impacto de las Fintech en el panorama financiero. Más allá de la perspectiva basada en innovaciones tecnológicas y de mercado, nuestro estudio explora el papel de las Fintech en el ámbito de la sustentabilidad. El análisis empírico se basa en una muestra compuesta de bancos tradicionales, los llamados bancos éticos y varios tipos de Fintechs en Suiza. Los resultados muestran que, en dominio de la sustentabilidad, las empresas Fintech son mucho menos innovadoras de lo que comúnmente se piensa.

Palabras Clave: Innovación de business models; Fintech; Sustentabilidad; Bancos convencionales; Bancos éticas; Suiza



Technological innovation and sustainability are two major drivers in today's business world. When applied to the provision of financial services, it is widely acknowledged that the so-called Fintech companies foster technical innovation. However, little attention has been paid to the role of Fintech in the promotion of sustainable development. To the best of our knowledge, there are very few studies specifically devoted to this issue and even fewer that address the problem from an empirical perspective (Al Hammandi, and Nobanee, 2019).

Most of this scant literature conveys the idea that Fintech startups have great potential for advancing the cause of sustainability (Deng *et al.*, 2019; Arner *et al.*, 2020; Macchiavello and Siri, 2020; Moro-Visconte *et al.* 2020; Zhang-Zhang *et al.*, 2020; Chueca and Ferruz, 2021). In fact, it is not very difficult to find examples that point in this direction. Fintech startups such as Stripe and Aspiration apply different incentives to finance the planting of trees in various parts of the world. Other companies, such as Atmos and Trine, propose innovative technologies that facilitate investment in projects specifically designed to accelerate the transition towards a low-carbon economy. Blueyellow and Vandebon are examples of platforms designed for the exchange and promotion of renewable energy, etc.

The list of examples goes on. While this illustrates the growing interest of Fintech companies in creating a positive impact as regards sustainability, more systematic and empirical studies are needed before we can conclude that the trend is indeed widespread. Yet this is precisely what is most lacking in the existing literature on Fintech and sustainability. Despite the interest of individual case studies, more comprehensive research and quantitative data are needed to ascertain Fintech's precise relationship with sustainable development when analyzed within the entire financial ecosystem of a given region.

Addressing this research gap is the main goal of this paper. We propose to compare the behavior of Fintech as regards sustainability with two other types of financial institutions: conventional banks and so-called ethical banks. This latter kind of financial institution is not a simple subsection of traditional banks based on subjective perception, but a specific segment of the banking industry with a distinct business model. By way of example, ethical banks refuse to participate in speculative operations on the financial market, even though it is well known that this is one of the biggest sources of income in modern banking (Paulet and Relano, 2012). They do so as a matter of principle and in accordance with a number of values. Further knowledge of this rather unknown banking family can be attained by inspecting those members of the FEBEA (European Federation of Ethical and Alternative Banks and Financiers) that have a banking license.

We in fact chose ethical banks for this study because they also have a distinct approach as regards sustainable development (Paulet *et al.* 2015). Consequently, the research question could be set down in the following terms: is the way that Fintech companies integrate sustainability into their *modus operandi* closer to that of traditional banks or ethical banks? Alternatively, can it be said that Fintechs apprehend sustainable

development by means of a distinct business model that is at variance with both traditional and ethical banks? If so, would this innovative business model be more liable to foster sustainability than the other two financial institutions?

For reasons explained in more detail in the methodological section of this paper, Switzerland will be used as a testing ground in our attempt to answer these questions. The remainder of the paper is thus structured as follows. Section 2 reexamines the research question in the light of various theoretical backgrounds. Section 3 describes the sample and the methodology used. Section 4 presents the empirical results followed by a discussion of the key findings in section 5. Finally, section 6 explores the managerial implications and concludes.

Theoretical background

Since evaluating corporate sustainability is the main goal of this paper, we start by framing Fintechs' contribution to this issue using the stakeholder theory (Freeman, 2010). This perspective allows us to transcend the traditional focus on the core business of firms to integrate an interconnected network of external actors. Thus, rather than focusing attention on the owners' prospects, stakeholder theory stands at the crossroads of business and society (Barney and Harrison, 2020). This means that a firm cannot simply be conceived as part of a marketplace. Besides, such a firm is placed in a given society, with its specific culture and rules. Accordingly, it is generally understood that a firm has two main types of responsibility: towards so-called internal stakeholders (owners, employees, etc.) and towards external ones (suppliers, clients, regulators, lobbyists, etc.). This study will deal with both aspects, since they are ultimately interrelated; however, in line with the aforementioned research question, our focus will be on the external dimension.

Within the stakeholder framework, the purpose of the firm is no longer seen through the narrow prism of short-term profit maximization, but rather expanded to take in the creation and distribution of other forms of value. The integration of environmental and social added values, in conjunction with economic value, is particularly emphasized. This results in what has come to be called "blended value" (Emerson, 2003) or "shared value" (Porter and Kramer, 2011). Stakeholder theory is thus connected with the stream of literature devoted to sustainability-driven business model innovation (Stubbs and Cocklin, 2008; Bocken *et al.*, 2014; Uward and Jones, 2016; Schltegger *et al.* 2016; Lüdeke-Freund and Dembek, 2017). Likewise, the purpose of the inquiry becomes not only to determine for *whom* value is created but also, and above all, *how* it is created (Freudenreich *et al.*, 2020).

Specifically, a firm is said to be sustainability-driven when structural changes in its business model allow it to address social and/or environmental goals without neglecting traditional financial indicators. This type of firm is thus placed at the intersection of

for-profit and nonprofit rationales, and guided by both mission- and market-oriented practices. Accordingly, there is a continuous interaction between the constituent elements of the well-known Profit-People-Planet triptych (Fisk, 2010). Therefore, sustainability-oriented firms do not attempt to maximize their profits, since these are somehow subordinated to non-financial goals. Rather, what they actually do is to optimize three-sided benefits.

Striking a balance between a mission approach and a commercial approach is not an easy task. Quite often, the purely economic dimension conflicts with the other two (Smith *et al.* 2013). This is particularly the case when the three pillars of sustainability are kept separate in isolated repositories. Overcoming these tensions requires anticipating competing demands from the outset, i.e. when designing the business model of the company. Ideally, potential trade-offs within the triptych will thus be transformed into synergies and positive impact results as a logical outcome of the commercial activity. Ultimately, this will give sustainability-driven firms a comparative advantage.

Though not yet very common, this kind of initiative is no longer an exception (Haigh or Hoffman, 2014). There are indeed numerous examples of firms devoted to this pluralist way of creating value, namely in the field of the sharing economy. As regards the financial industry, one of the most outstanding illustrations is the Kenyan Fintech, M-Pesa. Its main contribution is to use technology and business model innovation to solve a specific social problem: offering financial services to previously underserved customers.

We thus know that Fintech companies have the potential for “doing well by doing good” provided that their business model has been accordingly designed. It would be hasty, however, to make broader inferences from a small number of cases. Even the idea that Fintechs are more liable than banks to implement sustainability-driven business models deserves further inquiry. For instance, recall that, similarly to M-Pesa, Grameen bank also put in place a business model innovation to combat financial exclusion in Bangladesh. A clearer picture may thus be gained from the empirical study carried out in this paper on the overall situation in Switzerland.

In practice, we use the Triple-Bottom-Line (TBL) analytical framework (Elkington, 1997; Varga, 2018) as a way to translate the stakeholder and business model innovation approaches into concrete measurements that demonstrate the positioning of a given firm as regards sustainability. Going even further, we have abridged the multiple variables that could potentially be associated with new business models in the twofold interplay between financial and non-financial dimensions. This set-up will certainly facilitate the legibility and interpretation of the data in a two-dimensional space, as will be explained in the methodology section.

Previous studies on Fintechs have mostly focused on financial data. However difficult and imperfect it might be to measure the social and environmental performance of firms along with their economic value creation, the above-mentioned transformation of the TBL paradigm allows us to go further and explore the possible existence of sustainability-driven business models from a dynamic and integrative perspective. We know that purely single bottom line firms do not exist. We also know that purely social/environmental companies do not exist. Both are simply ideal archetypes. What we thus want to test is to what extent the mutual interplay between these two features gives rise to distinct business models. In the event, some will certainly be more sustainability-driven than

others. Consequently, the initial research question can be reformulated as follows: is sustainability-oriented business model innovation particularly associated with Fintech companies? This is what the next sections will try to determine.

Methodology

Data collection and sampling

Given the scarcity of publicly available databases concerning Fintech companies, we decided to focus our empirical study on the Swiss financial system. Several other reasons justify this choice. First, Switzerland is a world-renowned financial center, with banking and insurance segments positioned amongst global leaders (FDF/SIF, 2020). The country has a long history and features a modern, stable and flourishing market economy. Most importantly, the Swiss financial system is mature and extremely diversified. Its banking sector, in particular, is one of the most developed in the world. At the end of 2018, Switzerland included 248 banks with different sizes, business orientations, ownership structures, and regional scope. This outstanding variety of institutions ranges from big international banks like UBS and Credit Suisse to small cantonal banks, not to mention other unique entities such as SEBA crypto bank and WIR private-currency bank. Moreover, it is worth mentioning that Switzerland has one of the highest concentrations of niche-market institutions known as ethical banks (Paulet and Relano, 2009), whose role is important for understanding the impact of Fintech on the Swiss financial system, as shown below.

Switzerland's enabling environment also conspicuously promotes Fintech firms. Zurich and Geneva are in fact two major Fintech hubs at the world level (Ankenbrand *et al.*, 2019). The country regularly ranks high in international ratings in the fields of technology, environment and innovation, such as the global innovation index, the global competitiveness index, the global green finance index, and the country environmental performance index. Switzerland's world-renowned leadership in cryptocurrency and tokenization is particularly worth stressing for its numerous potential applications in the domain of green finance. As a reminder, the canton of Zug is the cradle of the Ethereum exchange platform. In a nutshell, Switzerland stands out not only for the importance of its traditional actors in the financial system, but also for the new entrants that challenge them. This makes this country particularly appropriate for analyzing their mutual interaction in connection with sustainability.

Despite difficulties, we were able to gather a significant amount of data (see appendix 1 for descriptive statistics). For banking institutions, we used the Bloomberg database. Our sample is composed of the two big banks (UBS and Credit Suisse), the whole network of cantonal banks (24 entities), the Raiffeisen Group (246 entities), and the three existing ethical banks (Alternative Bank Switzerland, WIR bank, and Freie Gemeinschaftsbank). Together, these institutions account for over 80% of total assets in the Swiss banking industry. Note finally that, for reasons of graphic visibility, Raiffeisen and cantonal banks are represented here in an aggregate form as a single dot each.

For Fintech firms, we were obliged to create our own database manually taking as a starting point the 2019 Fintech directory produced by the Institute of Financial Services Zug IFZ, Lucerne University (Ankenbrand *et al.*, 2019). For each factsheet contained therein, it was then necessary to conduct an individual survey to obtain, by multiple means, the financial and sustainable development information for each entity. At the

end of this laborious work, we were able to constitute a significant sample that covers all Fintech segments and accounts for over 75% of the total assets of Swiss Fintech firms. For the same visibility reasons as banks, the graphic representation of some Fintech groups was made in an aggregate form. This is namely the case for Crealogix (grouping 100 firms), insurance Fintechs (20 firms), crowdfunding platforms (45), SIX (6) and Aduno (2) groups.

We took 2018 as a reference year for comparison because Fintech is a fast-changing industry. After a rapid growth phase, most start-ups need some time to stabilize and build up a significant record of their activities. In any case, the data collected for both banks and Fintech largely exceed the requirements of the statistical processing detailed below.

Research design and econometric layout

Under the assumption that all banks are not the same and that a distinct business model is a key element for evaluating innovation change, we propose to explore Fintech's impact on existing institutions using Multiple Correspondence Analysis (MCA) as the main analytical tool. The results of this approach will be then supplemented by cluster analysis.

MCA is a technique that allows us to represent multivariate data in a simplified form in order to capture underlying trends. Thus, rather than considering the financial system as formed by a series of predetermined institutions (banks, Fintech, etc.), we will define an appropriate plane of the multidimensional space where each individual entity will be graphically visualized according to its own operating characteristics in practice (rather than its theoretical membership of traditional groups). This will allow us to determine whether Fintech firms and banks are indeed two separate homogeneous groups that oppose each other. Alternatively, it may result that only a few Fintech firms stand out as having a distinct business model when compared to banks. It may even occur that certain Fintech firms appear to be closer to certain banks. Whatever the combination, MCA allows us to appreciate which individual entities work according to a similar pattern and to what extent the underlying business model of the group is really different from others.

In order to start running MCA, it is first necessary to select a number of variables that are representative of the business model practice. In this regard, scholars working on banking efficiency have traditionally focused on how financial institutions maximize profits, and selected their variables accordingly. More recently, in the digital context, emphasis has increasingly shifted to cost reduction. Our work has selected variables from both perspectives. On the one hand, operating income, net income and return on assets come into the former group. On the other, operating profit per employee and operating expense come into the latter. By combining both groups, these variables should shape the financial part of the TBL-based business model configuration.

Additionally, we introduce a non-financial insight with two dummy variables related to sustainable development, i.e. transparency and ESG criteria (environment, social and governance). A consistent rating scale ranging from 1 (low passive commitment) to 3 (strong proactive commitment) allows us to integrate the extent to which banks and Fintech firms are engaged in these issues. Row data is first traced in sustainability reports specifically dealing with Swiss financial institutions, such as those prepared by the United Nations (Bayat-Renoux *et al.* 2018) and the WWF (Schwegler and Amstutz, 2018). The results are then completed and cross-checked with information contained in annual reports and the websites of each of the institutions concerned.

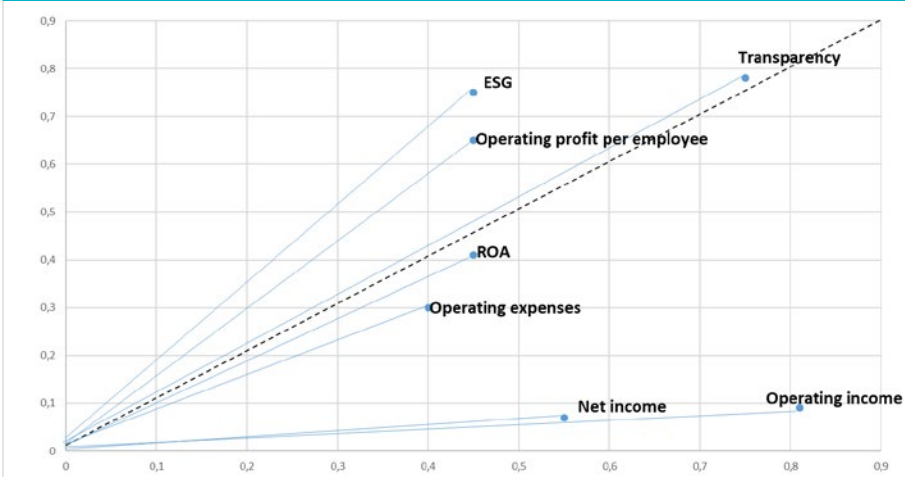
Note, therefore, that we are simultaneously dealing with continuous and categorical variables. In such circumstances, MCA is the most appropriate tool to carry out an exploratory data analysis. Moreover, MCA allows us to present the results in visual terms. Once the original data is reduced to a low-dimensional space, distinct patterns might appear as "clouds" of points when all of the analysis units are plotted in a graph. Interpreting the visualization of summarized data will thus be the most important task in this first part of our research strategy.

The second part involves supplementing the MCA with a cluster analysis. This is also an unsupervised learning technique to find latent groups; but rather than doing so by means of variables reduction, this time groups are directly made from observations. Cluster analysis is thus an excellent complementary method for discerning the existence of distinct groups with the same underlying business model irrespectively of *a priori* categories (i.e., pre-determined type of institution). It may possibly be the case, for instance, that certain Fintech firms behave in practice similarly to banks. Such an event would compromise their alleged innovation potential. In the next section, we therefore determine whether this type of situation is verified in reality.

Empirical results

Figure 1 shows the graph of variables selected in the previous section. To begin with, it is worth noting that the whole dataset has been previously standardized. Since Swiss financial institutions are very different in size, it is important to put all variables on a proportional scale to facilitate comparisons. Consequently, variables appear on the graph with their z-score value.

FIGURE 1
MCA plot of variables



Variables are then plotted on a two-dimensional space. The coordinate axis system, named dimensions 1 and 2 on the graph, comprises the two MCA components that best summarize the data variability. They account, respectively, for 55.1% and 44.9% of the inertia. For clarity of representation, we have drawn a dotted bisector line from the origin that divides this Cartesian space into two parts. This allows us to identify the variables that fall under the area of influence of dimension 1, and others that come under dimension 2. Accordingly, two types of variable can be distinguished: those that are most correlated with dimension 1 are located below the bisector, and those most correlated with dimension 2 are placed above that line. Specifically, we can see net income and operating income strongly associated with dimension 1 on the one hand and, on the other, ESG and transparency related to dimension 2. More generally, variables with similar profiles that contribute similar information are grouped together.

In terms of our business model specification, this means that variables below the bisector contribute to the financial-based dimension of banks and Fintech (pillar one of the TBL framework), whereas variables above it represent the extra-financial insight of these institutions (pillars two and three of the TBL framework). An apparent exception is operating income per employee. Its rather intermediate positioning may however be explained by the fact that this variable is equally involved in the prospect of maximizing profits (dimension 1) and that of reducing costs through efforts towards digital sustainability (dimension 2).

We can therefore rename dimensions 1 and 2 as making reference, respectively, to the financial and sustainable development components. This will make clearer the interpretation of the graph representing the individuals. Indeed, figure 2 shows the Swiss financial institutions of our sample plotted in a graph where each point is determined by the same axis system. When entities appear close to each other, they share similar characteristics. Keeping this in mind, the most noteworthy feature in the graph is the three ethical banks grouped together in a well-defined “cloud”, which is set apart from the rest in the lower right-hand corner. Since we know that these are precisely the institutions with the highest ESG and transparency scores, we can infer that the vertical axis puts the institutions most firmly committed to sustainable development in the lower part of the graph (inverse y-axis sorting).

It is hardly surprising that ethical banks emerge as the most sustainability-shaped institutions, since this is in some ways their main *raison d'être* (Paulet and Relano, 2012). If we continue reading the graph upwards in the vertical sense of dimension 2, we can see traditional banks occupying intermediate positions. This means that despite their efforts in the domain of sustainability, mainstream banks still sometimes implement greenwashing attitudes (Relano and Paulet, 2014). Finally, most Fintech firms are plotted in the upper part of the graph. This indicates that sustainable development is not a primary concern for them. One can easily imagine that for nascent start-ups that are still struggling to survive, the focus is on finding new costumers and skilled staff. Financial sustainability (first pillar of the TBL framework) is therefore a more pressing challenge than social or environmental sustainability (second and third pillars of the TBL framework).

If we now turn to a horizontal reading of the graph (dimension 1), the most noteworthy feature is that the Fintech firms in the upper-right corner largely surpass the financial efficiency of traditional banks. It is equally worth noting, perhaps because it is rather unexpected, that ethical banks also perform very well in this domain. Like a mirror

FIGURE 2
MCA plot of financial institutions

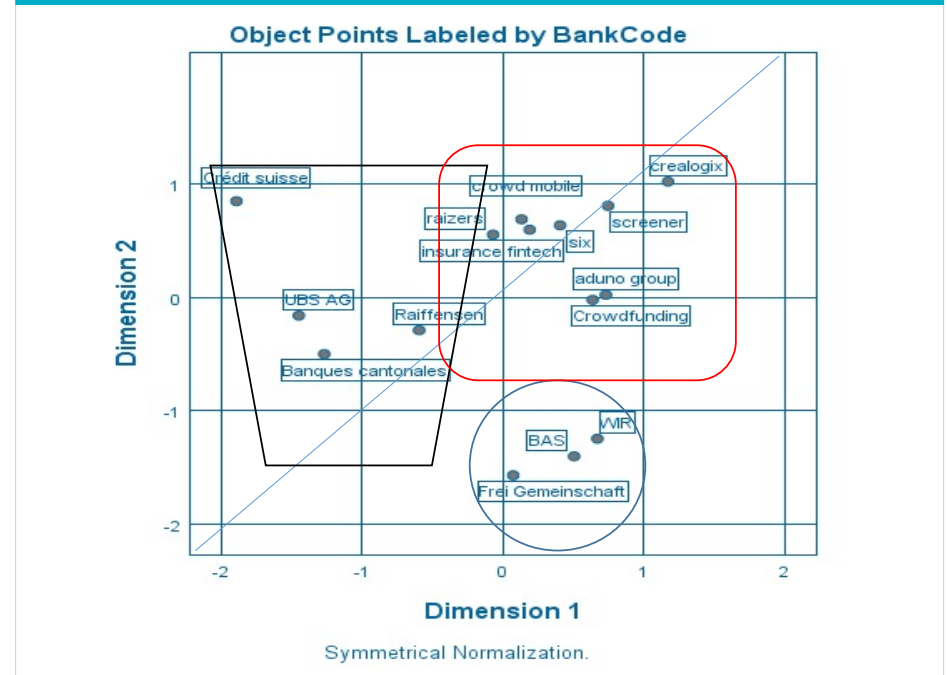


image of Fintech, they are all located to the right along the x-axis. This indicates that ethical banks are high-performing institutions, not only in terms of sustainability, but also as regards traditional financial indicators. Unlike mortar banking, their secret lies in their ability to rapidly employ advanced digitalization to push the cost-reduction rationale to the extreme. In turn, ethical banks differ from Fintech firms because they do not take this path as a means for profit-maximization *per se*. The underlying idea is rather to optimize profits in order to maximize social and environmental added value in the projects they finance. Hence their combination of financial and sustainable innovations, the results of which are ultimately reflected in the graph.

Table 1 confirms these general trends while introducing some nuances at the individual level. Specifically, the third- and second-to-last columns on the right show the contribution of each financial institution to dimensions 1 and 2 respectively. As exhibited in the graph above, we can see here that ethical banks are indeed the biggest contributors to dimension 2 (sustainability) whereas traditional banks mostly determine dimension 1 (financial). The role of Fintech firms is not homogeneous, but they tend to be aligned with traditional banks. Additionally, the two subsequent columns on the left show the role played by the two dimensions in each institution. They thus allow us to introduce specific remarks at the individual level. For example, we can see that some Fintech firms, like Crowd Mobile and Screener, are “greener” than average. Overall, the main conclusion from table 1 is that ethical banks once again stand out as the most distinct group of institutions (with high values towards/from dimension 2) and that, conversely, Fintech firms are somewhat ill-defined.

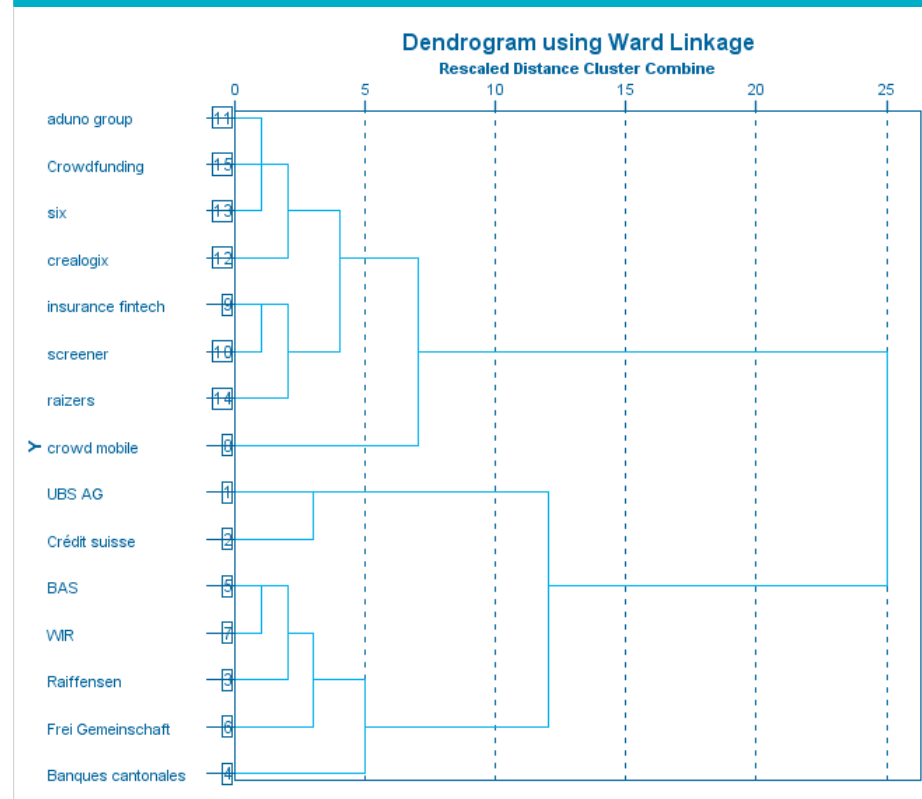
TABLE 1
Contributions to inertia of each MCA component

BankCode	Mass	Inertia	Contribution				
			Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		Total
			1	2	1	2	
UBS AG	0,067	0,320	0,183	0,002	0,332	0,004	0,336
Crédit suisse	0,067	0,382	0,312	0,070	0,474	0,087	0,561
Raiffensen	0,067	0,150	0,031	0,008	0,119	0,025	0,144
Banques cantonales	0,067	0,295	0,140	0,024	0,276	0,039	0,315
BAS	0,067	0,145	0,022	0,191	0,090	0,621	0,711
Frei Gemeinschaft	0,067	0,183	0,000	0,239	0,002	0,619	0,620
WIR	0,067	0,183	0,039	0,151	0,125	0,390	0,515
crowd mobile	0,067	0,241	0,002	0,046	0,004	0,091	0,094
insurance fintech	0,067	0,120	0,003	0,035	0,015	0,136	0,152
screener	0,067	0,186	0,049	0,064	0,152	0,161	0,314
aduno group	0,067	0,093	0,047	0,000	0,291	0,000	0,291
crealogix	0,067	0,293	0,120	0,101	0,238	0,163	0,402
Six	0,067	0,155	0,014	0,039	0,054	0,120	0,174
Raizers	0,067	0,110	0,000	0,030	0,002	0,129	0,131
Crowdfunding	0,067	0,143	0,036	0,000	0,144	0,000	0,144
Active Total	1,000	3,000	1,000	1,000			

This seeming lack of determination of Fintech firms may perhaps become more precise through a complementary approach based on cluster analysis. From this perspective, figure 3 shows a dendrogram sorting the Swiss financial institutions into different groups according to their structural similarities. The first thing that stands out from the graph is the big divide between Fintechs and banks, the former being grouped in the upper part, and the latter below. This emphasizes the idea that both types of financial institution indeed have distinct business models. Going into further detail, we can observe the existence of numerous subgroups. Within the Fintech family, for instance, we identify a cluster formed by the Fintech insurance groups, Screener and Raizers. What these institutions have in common is a higher commitment to sustainable development than their peers. Not surprisingly, this places them closer to banks, which have more experience and reputation in this domain.

The banking entities grouped in the lower half of the graph are particularly interesting. Two main subgroups can be distinguished. One of these is the cluster of big international banks (UBS and Credit Suisse). Their business model is strongly influenced by the profit-maximizing principle and their shareholder structure. Both are openly committed to CSR and sustainability, but in a rather superficial manner and often as a pure marketing device. The second sub-group, visible below, comprises three interrelated clusters of banks that have two things in common: firstly, they are small entities largely committed to local development; secondly, they are all governed by cooperative principles, even if some do not formally have this legal status. As already pointed out (Relano and Pualet, 2014), they also share more sincere involvement in transparency, ethics and sustainable development.

FIGURE 3
Dendrogram showing the clustering of Swiss financial institutions



Discussion

We initially wondered whether Fintech firms were more efficient than banks as regards traditional indicators of financial performance. Figure 2 and table 1 confirm that this is indeed the case: most Fintech companies are placed on the right of the MCA x-axis in the graph and show higher values as regards component 1 in the table. Although so-called ethical banks also appear to be quite efficient in this area, the average for the banking sector as a whole is certainly lower than that of Fintech firms.

Quite the reverse, when it comes to sustainability-based indicators, it is the banking sector that appears to be positioned best, both in figure 2 and table 1. Our cluster analysis shows that some Fintech firms are “greener” than others, and thus closer to the banks’ performance in this regard, but as a whole, banking institutions appear to be more firmly engaged with sustainability.

As regards transparency, we observe in table 1 that only the small group of ethical banks has significant values in this dimension. Most other banks and Fintech firms seem to be rather irrelevant in this regard. Although some Fintech firms show slightly higher

values than traditional banks, both are far from the values of ethical banks. This may seem a bit surprising at first glance, because in the eyes of many observers Fintechs appear to be transparent almost by design. However, consumers' growing trust in technology-led payment solutions and the increasing disintermediation of Fintechs as regards transaction processes should not be confused with transparency in their value creation (Jünger and Mietzner, 2020). With respect to this latter aspect, Fintech companies communicate very few details. It is also worth noting that transparency is the furthest plot in figure 1. This indicates that transparency is the most influential variable in determining dimension 2. Hence the consistency of the results obtained in relation to Fintechs.

Finally, as regards the local dimension, the dendrogram exhibited in figure 3 suggests, without surprise, that banks indeed have a comparative advantage in this domain. More interesting is to observe that banks are not a homogeneous group. While the cluster formed by UBS and Credit Suisse clearly denotes an international orientation, it is worth noting that Raiffisen and cantonal banks correspond with ethical banks in their strong local anchoring.

Bringing these elements together, we can infer that the achievements of Fintech companies in the domain of sustainability are rather limited. They have certainly changed the way that certain products/services are conceived and delivered. In this sense, it is fair to talk about the Fintech "revolution" (Gomber *et al.* 2018). However, this is just one aspect of the overall change explored in this paper. Through the conceptual lens of sustainability-driven business model innovation, systemic changes in the non-financial domain are equally important. With some exceptions, the general impact of Fintechs in this area has gone largely unnoticed. They are actually lagging behind the banking industry. Overall, it can simply be said that Fintech companies have not carried out a business model change as regards the multiple dimensions of sustainability.

Instead, Fintechs seem inclined to privilege purely economic value to ensure their financial survival. In terms of the stakeholder theory, this means that Fintech companies are focused on for-profit activities aimed at their customers in exchange for economic value for owners and investors. Other stakes beyond this narrow perimeter, such as societal needs or natural environment challenges, are scarcely considered. This is something of a paradox because, in addition to efficiency and individual customer-centered experience, the environmental dimension is a priority for an increasing number of people. Some examples show that Fintechs are able to bring both together simultaneously when their business model is designed accordingly. By changing the way people make their payments and investments, or by offering alternative credit models, Fintechs could indeed promote sustainability beyond the limits of focal stakeholders. To that end, higher efficiency needs to be balanced with enhanced environmental resilience, increased decentralization with more inclusive prosperity, and boosted connectivity with augmented intergenerational solidarity. Fintechs are fully capable of all this, but this is not reflected in the results of our study.

This does not mean that Fintechs will not achieve these aims in the future. It is worth recalling that sustainable-driven business model innovation can be regarded as long-term process with different developmental stages (Landrum, 2018), while the analysis carried out in this paper simply represents a snapshot. Besides, it is also worth stressing that economic sustainability is the primary, most basic pillar of sustainable development.

Consequently, it is perhaps too early to expect to see the other two pillars stand out more conspicuously in Fintech companies. Conversely, they might also never flourish. In any case, what we ascertain in the current state of research is that Fintech companies have not yet generally developed a distinct business model approach as regards sustainability. Future research will refine our conclusions in different geographical and temporal contexts. When more granular data become available, they should also allow for an analysis that distinguishes Fintech companies at a more disaggregate level.

We are also aware that the use of the TBL analytical framework, even in its present modified version, is another limitation of our study. The reason is that this theoretical scheme tends to be embedded within a "weak" conception of sustainability. In line with certain critical insights (Henriques, 2004; Norman and McDonald, 2011; Milne and Gray, 2013), we fully acknowledge that the evaluations of the economic/financial performance on the one hand, and the social/environmental on the other, are not alike. The problem is that the available alternative schemes that try to capture business model innovation within "strong" sustainability do not provide clear indicators for empirical research (Hahn *et al.*, 2015; Landrum, 2018). Besides, obtaining ready-made standardized data for Fintechs is not an easy task in the present state of research.

Given these constraints, the aim of this study was not to propose new theoretical frameworks for the study of corporate sustainability, but to adapt current schemes to the study of Fintech companies from an unprecedented angle. In this regard, we believe that this paper offers a new interesting insight. It is left to future empirical research to go even further and integrate business model innovation into a framework with a "stronger", more integrative conception of sustainability.

Conclusions

The main goal of this paper was to explore the innovation potential of Fintech companies in the domain of sustainability. We wondered in particular if, unlike mainstream banking, these new financial institutions propose a new business model that integrates non-financial aspects in the way they create value. The results of this research show that this is not really the case.

From the standpoint of business model innovation, the positioning of Fintech companies is somewhat ill-defined. Sometimes their behavior is closer to that of conventional banks; on other occasions, they clearly differ. It cannot thus be said that the impact of Fintech firms on sustainability-related issues is groundbreaking. The only group that really stands apart as a distinct business model in this regard is the group of ethical banks. This fact has already been noted when the latter were compared with mainstream banking (Paulet *et al.*, 2015). The contribution of the present study is that ethical banks' difference as regards sustainability also extends to Fintech companies.

For managers and practitioners, the interest of this study is to highlight that the new financial landscape involves important challenges but also brings valuable opportunities. Since the invariable objective is to achieve customer satisfaction, it is worth noting that the demand for financial services is now characterized by two major trends: first, it is increasingly customer-centric, with millennials seeking greater adaptability, reactive agility, and lower costs; second, environmental and social sustainability has now become a generalized concern of society. Within this framework, Fintech companies driven by

technology clearly seem to be one step ahead in terms of satisfying the former, but traditional banks still perform better as regards the latter.

This imbalanced situation opens the door to new managerial opportunities. Fintech managers have a promising future if they decide to increase the role of sustainability in the business models of their financial institutions. Besides, the experience gained by banks in this domain paves the way for future cooperation schemes between these two types of financial entity. In fact, various forms of such partnership arrangements and strategic alliances are already in place, although in Western countries, achievements are mostly confined to the single bottom-line level (Mohan, 2020). The value created in these ventures is still strongly firm-centered and primarily addressed to focal-business stakeholders. In contrast, there is a considerable record of successful collaborations between Fintechs and banks to address bottom-of-the-pyramid problems in developing countries (Gupta and Kanungo, 2022).

Learning from these cross-cultural experiences may possibly redirect current pathways to sustainability and spur a paradigm shift that has not been observed so far. Otherwise, the “big disconnect” (Dyllick and Muff, 2016) will endure between a growing number of firms boasting about their sustainability achievements while the natural environment simultaneously deteriorates.

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APPENDIX 1
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Operating Income	15	1157	3,735,000	760144,67	1327082,468
Operating Profit Per Employee	15	47.34	622.85	173.86	150.48
Number Of Employees	15	7	68000	9662.67	20186,832
Net Income	15	178	4,231,000	422757,27	1174691,567
ROA	15	0.001	0.130	0.04867	0.041668
operating expenses	15	52.00%	93.00%	68.1533%	11.61187%
Transparency	15	1	3	1.73	0.799
ESG et governance	15	1	3	1.87	0.915
N	15				