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Fintech in statistical classifications: suggestions and tentative figures in a central bank context¹

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Fintech in statistical classifications: suggestions and tentative figures in a central bank context

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Abstract

Fintech happens where innovation takes place in the financial sector and where new methods and products emerge, are tested and made ready for the market. The results are shaping the financial industry as a whole. Central banks need to identify, describe and understand fintech activities.

Considering the central banks monitoring needs and following the targeted road-map to construct Fintech statistics outlined in the central banks' international initiative under the auspices of the IFC², we i) provide an overview of fintech activities, ii) discuss on how best reflect this reality in statistical classifications based on the example of the European Classification of Economic Activities (NACE), currently under review and iii) elaborate on the Fintech landscape in France, Spain and Germany,

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² The Irving Fisher Committee on Central Bank Statistics (IFC) Working Group on Fintech data, which published a report [Towards monitoring financial innovation in central bank statistics](#), IFC Report No 12, July 2019

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1. Introduction

In the last decade, innovation activity in the financing industry has, to a large degree, been moving to entities commonly labelled Fintech amid a wider phenomenon of decentralised finance in which financial functions migrate away from the traditional core of intermediaries, infrastructures, and instruments.³

Fintech refers to solutions for innovative products, services, and processes in the financial industry that could improve, complete and/or disrupt existing financial products and services. Decentralisation of financial intermediaries is evidenced by the emergence of Fintech players from outside the traditional financial sector⁴ as well as by finance embedded in non-financial digital platforms⁵. As for the decentralisation of infrastructure, processes and the instruments, technology is enabling fundamentally different approaches to the provision of financial services⁶ and to the creation of new assets which do not follow the traditional asset-liability model⁷. Fintech also apply to incumbent financial institutions that adopt similar business models. On the other hand, *Tech facilitators* embracing new technologies and supporting financial activities in terms of necessary infrastructure have also enabled innovation in the financial industry. However, in this paper, activities of Tech facilitators are not considered as financial as they do not constitute per se the provision of financial services⁸.

There is no internationally accepted harmonised definition of Fintech for statistical or for other classification purposes. The most commonly used definition is that of the FSB defining Fintech broadly as “technologically enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services.”^{9,10} References to volatile and evolving concepts such as “innovation” and “technology” render this definition unsuitable for a statistical classification system which should be stable over time.^{11,12}

³ Menon R. (2021)

⁴ BigTech, technology firms, individuals, undefined groups of online users (“crowd”); e.g. as in the case of bitcoin, behind which there is no identifiable entity or person, or in decentralised applications (DApps) on the Ethereum blockchain.

⁵ The term TechFin is often used for embedded finance, see e.g. <https://payspacemagazine.com/fintech/the-difference-between-fintech-techfin/>

⁶ crypto network, self-executing smart contracts, non-custodian financial services where users maintain control over their assets at all times),

⁷ alternative currencies compared to those issued by central banks (non-fiat currencies by technology firms or individuals)

⁸ Nevertheless, beyond the context of NACE, Tech facilitators might be relevant in NCBs analysis as they constitute an important aspect of the value chain.

⁹ <https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/>

¹⁰ The term “Fintech” was coined from “finance” and “technology”, however defining Fintech as “financial technology” is incomplete.

¹¹ von Kalckreuth and Wilson N. (2020)

¹² Unified Theory of Acceptance and Use of Technology (UTAUT) postulated by Venkatesh et al. (2003) identifies the four main constructs “performance expectancy”, “effort expectancy”, “social influence” and “facilitating conditions” to predict the behavioural intention to use a certain technology.

This paper clarifies the scope of (current) Fintech activities to support their classification in statistical systems, thereby enabling their monitoring. Novel Fintech activities entailing financial intermediation and financial auxiliary functions should be identified and classified in an appropriate place in the statistical systems. Currently, many Fintech activities are not included in activities or product classifications entries for financial intermediation and auxiliary functions. The possibility of introducing new classification entries is discussed, taking as a point of departure the current NACE hierarchical structure K and distinguishing within the Fintech universe between the novel activities, old activities done in a new way, and activities which are not financial. The paper aims to serve as an input to any discussions on Fintech in the context of statistical classifications e.g. in the remaining stages of the current reviews of the NACE, the International Standard Industrial Classification of All Economic Activities (ISIC) and the classifications of products (CPC/PA). Importantly, this paper continues the central banks' work on statistical classification of Fintech and largely completes the outlined road-map to construct fintech statistics envisaged in the IFC Report *Towards monitoring financial innovation in central bank statistics*¹³. Finally, the topic of this paper fits well in the context of the new *Data Gap Initiative (DGI)* currently discussed with its workplan covering recommendations under four main statistical and data priorities, of which priority three focuses on Fintech and financial inclusion¹⁴.

2. Overview of Fintech activities and how to classify them

This section describes business areas with technological innovations related to financial services¹⁵. They include different types of activities, namely (i) financial activities that are totally novel (ii) financial activities that are in principle already covered in NACE but their provision is enhanced by innovation, (iii) activities of Tech Facilitators¹⁶ and (iv) borderline cases.

Crypto-asset activities

"No liability crypto-asset (NLCA)"¹⁷ such as bitcoin, a prominent type of crypto-assets, can be defined as a new type of asset recorded in digital form and enabled by the use of cryptography that is not, and does not represent, a financial claim on, or a liability of, any identifiable entity¹⁸. Such NLCA's are truly new assets and have been

¹³ IFC (2019)

¹⁴ G20 Data Gaps Initiative (DGI-2) Progress Achieved, Lessons Learned, and the Way Forward; Prepared by the IMF Staff and FSB Secretariat 9 June 2022

¹⁵ Based on various reflections on input e.g. Deutsche Bundesbank, 2022, U. Kochanska Characterisation of the euro area fintech scene, Financial Integration and Structure in the Euro Area, ECB 2020.

¹⁶ that are not financial but for which automation, new delivery platforms, DLT, AI, and others provide the infrastructural foundation for innovation in the financial sector.

¹⁷ Such assets are also often labelled as Crypto-Assets Without Liabilities (CAWL) and unbacked crypto-assets.

¹⁸ Based on ECB (2019)

enabled through the emergence of the distributed ledger technology (DLT). The technology underpins i) the peer-to-peer transactions, ii) the decentralised way of validating transactions and, iii) when applicable, of issuing this type of crypto-asset. Stablecoin - another type of crypto-assets – that uses stabilisation mechanisms which can minimise price fluctuations¹⁹ may constitute a subset of NLCA²⁰ when there is no liability attached. However, many stablecoins do have a liability attached. The crypto-assets ecosystem also encompasses Decentralised Finance (DeFi), in which financial applications are run by smart contracts and offer novel protocols, e.g. for trading, lending, and investing²¹. DeFi tokens very often do not have a liability attached either. Crypto-asset activities, especially related to NLCA, including emission, issuance, operating (validating), and services are considered novel and should warrant a dedicated entry in statistical classifications e.g. in K66 of the current NACE. Importantly, crypto-asset may be reused in other activities e.g. in payments.

In the context of crypto-assets it is worth mentioning tokenisation, which refers to the process of issuing a token on a distributed ledger (e.g. blockchain)²². Tokenisation typically covers securities or more broadly traditional financial instruments with liabilities attached, therefore this is not an entirely new activity. Nevertheless, considering the complexity of separating NLCA activities from activities related to crypto-asset with liabilities, they both could be lumped in the novel crypto-asset activities in K66 of the current NACE until the sub-segments are sufficiently big and distinguishable to treat them separately.

Fintech related to financing and services auxiliary to financing

This category covers Fintech activities supporting the access to funds, which includes crowdfunding and supply chain financing. First, **crowdfunding can be defined as the efforts by individuals or groups to fund their ventures by drawing on small contributions from a relatively large number of individuals (“crowd”) using the Internet**.²³ Crowdfunding draws inspiration from the concept of microfinance and crowdsourcing. It represents a unique form of fundraising where the demand side on the capital market (project proponents) are linked to the supply side (investors) through a crowdfunding intermediary (platform).²⁴ Two main models of crowdfunding platforms²⁵ can be distinguished (see Table 1).

¹⁹ ECB (2020) Stablecoins: Implications for monetary policy, financial stability, market infrastructure and payments, and banking supervision in the euro area, <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op247~fe3df92991.en.pdf>

²⁰ Based on their design, stablecoins can be classified into four types: (i) tokenised funds; (ii) off-chain collateralised stablecoins; (iii) on-chain collateralised stablecoins; and (iv) algorithmic stablecoins. Stablecoins with a claim or liability attached share the function and characteristics of financial instruments, therefore would fall into the tokenised financial instruments category.

²¹ BIS (2021)

²² ECB (2021), The use of DLT in post-trade processes: https://www.ecb.europa.eu/pub/pdf/other/ecb.20210412_useofdltpostradeprocesses~958e3af1c8.en.pdf

²³ Mollick (2014)

²⁴ Di Pietro F. (2019)

²⁵ There are also other ways to further subdivide crowding platforms, e.g. generalist vs. thematic platforms, or depending on the funding mechanism, e.g. all or nothing or keep it all.

Table 1. Crowdfunding models

Investment models	Non-investment models
- <i>lending-based crowdfunding</i>: funds are paid back, and funders have the right to receive a contractually agreed interest payment; includes peer-to-peer lending (P2P) and social lending (typically at local level) - <i>equity-based crowdfunding</i>: funds are provided in exchange for company's shares. - <i>other</i>: funds are provided in exchange for company's bonds e.g. mini-bonds, or in exchange of some hybrid instruments.	- <i>reward-based crowdfunding</i>: funds are provided in exchange for non-monetary benefits (e.g. a small gift (reward), a pre-order) - <i>donation-based crowdfunding</i>: funds are provided for philanthropic or sponsorship reasons with no expectation of remuneration.

Second, supply chain finance (invoice financing, reverse factoring) constitutes an arrangement between a buyer, a supplier, and a financial intermediary where the creditworthiness of a buyer is used to improve the working capital position of a supplier²⁶. Typically, such arrangements involve a large, financially strong company that is supplied by several SMEs, and a financial intermediary – often a bank. Fintechs in this domain operate as cloud-based software platforms and can enable “procure-to-pay” systems that incorporate both purchasing management and accounts payable functionalities. Fintechs may often take on some exposures to risk. In the future, some Fintechs may extend their services beyond financing the supply-chain, by offering related services such as procurement and supplier management.²⁷ Due to increasing importance both crowd-funding and new forms of supply-chain financing could be considered novel and could be classified e.g. in K66.1X and K64.9X of the current NACE respectively.

Fintech related to investment, asset management, and trade

This category encompasses various activities facilitating investment activities covering a) social trading platforms, b) robo advice, c) personal financial management and d) other. **Social trading offers investing strategies that use copy trading or mirror trading, based on following the investment behaviours of peers and expert traders.** Social trading platforms facilitate connections within an online community of investors, in which users can fully observe and automatically, simultaneously, and unconditionally replicate investment strategies of other users based on relatively low costs²⁸. **Robo advice constitutes an online automated investment platform that uses quantitative algorithms to manage investors’ portfolios.** Robo advice covers a wide range of digital (semi-)automatic investment platforms and services. Robo advice has evolved from online “manual” questionnaires and proposals to automated portfolio management using quantitative methods and algorithms to construct and rebalance portfolios. The latest robo advice systems cover the entire investment/portfolio management process, starting from the selection of the instrument universe and finishing with periodic portfolio rebalancing and appropriate performance reporting. **Personal financial management covers private financial**

²⁶ https://ec.europa.eu/growth/content/supply-chain-finance_en

²⁷ Rogers D. et al (2016)

²⁸ Reith R. et al (2020)

planning, in particular the administration and presentation of financial data (also from various accounts) using software or app-based services. To integrate the accounts of different providers into a personal financial management system the application programming interface (API) technology is frequently used²⁹. Personal financial management may overlap with some (Fintech) services in the payment and insurance service area (see below). **Other activities in this section include e.g. online asset management platforms, deposit brokers and online trading platforms.** Online based asset management platforms offer a combination of human and robo advice. Deposit brokers exploit differences in the interest rates from various countries e.g. in the EU³⁰ and offer the opening and managing of accounts on one single website in a chosen/domicile country. While deposit brokers may fit well into the investment, asset management and trade section, they may often be considered among the Fintech activities related to banking as they can offer traditional banking products such as a cash account with certain IT functionalities. **In the context of identifying novel activities the feature of robo-counterparty stands out and such activities could be classified in e.g. K66.X in the current NACE.** The other activities can be considered as existing ones done in an innovative way; hence they should be covered in K66.30 or K66.19.

Fintech related to payment services

Very often blockchain and crypto-asset solutions are mentioned also in the payment service category as crypto-assets might be reused in other activities; however, such classification – if exclusive – does not capture the full scope of crypto-assets. Furthermore, the use of crypto-assets as a means of payments is largely contained within the crypto-asset ecosystem for the moment. Therefore, it is envisaged to analyse the various Fintech-related payment activities separately. Fintech activities in the payment services segment include e.g.: mobile payments, digital wallets, Peer-to-Peer payments and others (see Table 2). **These payment activities are considered novel and could be classified in K66.1X: PayTech in the current NACE.**

Table 2. PayTech examples

Mobile payments (mobile finance)	Digital wallets (eWallets, cyberwallets)	Peer-to-Peer payments	Other such as:
various functionalities that are handled via mobile phones ³¹ , includes to make payments or bank transfers	systems in which both means of payment and payment information for various payment systems can be stored, thereby facilitating online payment. ³²	electronic transfer of money ³³	real-time payments, atomic payments, pay as you go payments, payments using QR codes or utilising Near Field Technology (NFT), payments initiation, novel cross-border remittances and transactions,

²⁹ Dorfleitner G. et al (2017)

³⁰ Dorfleitner G. et al (2017)

³¹ see Mallat N. (2007); Mallat N. et al. (2004); Merritt C. (2010)

³² Mjølunes S. F. and Rong C. (2003); Mallat N. (2007)

³³ P2P payments in the Fintech category would cover both emerging and mature markets. In this context it is worth recalling that there are three key differences on the reasoning behind P2P money transfers

			microfinance services, e-payments and loyalty cards, novel payroll services
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Digital-only banks, Quasi-banks and BankTech

Fintech activities related to banking are part of a trend towards the unbundling of financial services³⁴. Technological advances facilitated the emergence of a new type of bank that is fully digital and runs its operations online and/or through a mobile application – the *digital-only bank* (which also may be called *neobank*, *nubank*, *online bank*, *internet-only bank*, *virtual bank*, *digital bank* or *challenger bank*). Fintech banking activities might be provided also by entities without a banking licence; for the purposes of this note such entities are labelled *quasi-bank*. Finally, Fintech activities related to banking may cover embedded finance or the provision of tools for enhanced bank customer experience, fraud security, background checks or credit decisions, typically using the services of a bank or quasi-bank acting in the background. The activities of digital-only banks are considered to a large degree as existing activities done in an innovative way and existing NACE sub-sections (K64.19) already cover them in substance. On the other hand, **the activities of quasi-banks and auxiliary activities are considered novel which could be classified as new K64.9X Quasi-banks and K66.1X Bank Tech respectively.**

InsurTech and PensionTech

Fintech in this domain covers services that use, for example, big data and AI, chatbots, customisable insurance policies (e.g. pay as you go), or P2P- or crowd-surance. Fintech activities related to insurance and pension funding are considered largely existing activities done in an innovative way and could be included in NACE K66.29. Nevertheless, due to increasing importance InsurTech and PensionTech could earn a dedicated sub-entry eventually.

Tech facilitators

Tech facilitators provide infrastructure solutions, based e.g. on DLT, AI, the Internet of Things (IoT) and big data technologies³⁵. Some examples of infrastructural activities are the production of the hardware required for some Fintech activities (e.g. crypto-

when comparing emerging and mature markets: 1) cash vs. digital value stored in e.g. banks and credit cards as starting point, 2) need for a swift conversion/convertibility of stored value into physical cash and 3) lack of access to formal financial tools like banks; See Matsumoto M., Terrenghi L. (2016)

³⁴ Matousek R., Xiang D. (2021)

³⁵ Technologies that Tech facilitators leverage upon may include Cyber Security Technologies (Biometrics, cryptographic algorithms, etc.), Data Analytics Applications (based on machine learning and data science), Cloud and Software-as-a-Service (platform technology), NoSQL (Graph Databases, and other innovative ways of storing and accessing data), W3C Internet Standards, HTML, XML (XBRL), RDF, OWL, SWRL SQL Technologies, Data lakes, Hadoop; API Application Programming Interfaces, etc; see European Commission: Expert Group on Regulatory Obstacles to Financial Innovation (ROFIEG): 30 Recommendations on Regulation, Innovation and Finance, Belgium (2019). https://ec.europa.eu/info/files/191113-report-expert-group-regulatory-obstacles-financial-innovation_en

asset mining hardware) as well as software or apps. These activities that facilitate Fintech are neither strictly financial intermediation nor financial auxiliary services, as in many cases they are scalable and can be applied in non-financial sectors, therefore they should be classified in NACE outside section K.

SupTech and RegTech – borderline cases

SupTech services are dedicated to improving surveillance and analytical capabilities on the part of supervisors and regulators. SupTech encompasses technologies aimed at automating and streamlining administrative and operational procedures, digitising data and working tools, and improving data analytics. Some SupTech solutions enable regulators to prepare and transmit machine-readable and machine-executable regulatory documents to their regulated entities, which in turn could result in more automated regulatory compliance, lower costs and greater consistency in regulatory reporting. Other SupTech solutions are focused on achieving real-time risk alerts, thereby enabling supervisory teams to pivot attention towards pre-emptive rather than curative oversight, in turn possibly improving the resilience and stability of the broader financial system. **Aimed at regulated institutions, the use of RegTech improves compliance outcomes.** RegTech solutions encompass the areas of regulatory reporting, risk management, identity management & control, compliance, and transaction monitoring^{36,37}. RegTech activities cover, for example, automated data distribution and regulatory reporting through big data analytics; real-time reporting and cloud solutions; sanctions screening/watchlist filtering and regulatory reporting capabilities to comply with AML and CTF regulations; and Know Your Customer (KYC) procedures.

3. Fintech in statistical classifications from a central bank perspective: the case of NACE rev.2

This section provides a summary of the proposed classification of novel Fintech activities set out in the previous section referring to the coding framework of the current NACE.

K – Financial and insurance activities

K64 – Financial service activities, except insurance and pension funding n.e.c.

K64.1 – Monetary intermediation

K64.11 – Central banking

K64.19 – Other monetary intermediation

K64.2 – Activities of holding companies

³⁶ BIS on Suptech and RegTech: https://www.bis.org/about/bisih/topics/suptech_regtech.htm

³⁷ The Use of Supervisory and Regulatory Technology by Authorities and Regulated Institutions: Market developments and financial stability implications, FSB, 2020, <https://www.fsb.org/2020/10/the-use-of-supervisory-and-regulatory-technology-by-authorities-and-regulated-institutions-market-developments-and-financial-stability-implications/>

K64.3 – Trusts, funds and similar financial entities

K64.9 – Other financial service activities, except insurance and pension funding

K64.91 – Financial leasing

K64.92 – Other credit granting

Proposal K64.9X – New forms of supply chain financing activities

Proposal K64.9X – Quasi-banking

K64.99 – Other financial service activities except insurance and pension funding n.e.c.³⁸

K66 – Activities auxiliary to financial services and insurance activities

K66.1 – Activities auxiliary to financial services, except insurance and pension funding

K66.11 – Administration of financial markets

K66.12 – Security and commodity contracts brokerage

Proposal K66. 1X – BankTech

Proposal K66. 1X – PayTech

K66.19 – Other activities auxiliary to financial services, except insurance and pension funding

K66.2 – Activities auxiliary to insurance and pension funding

K66.21 – Risk and damage evaluation

K66.22 – Activities of insurance agents and brokers

K66.29 – Other activities auxiliary to insurance and pension funding

K66.3 – Fund management activities

Proposal K66.X Crowd-funding activities

Proposal K66.X Robo financial activities

Proposal K66.X Crypto-Assets activities n.e.c.

Some of the existing financial activities done in a novel way would not necessarily require new subitems in NACE. This applies to the Fintech activities related to security dealing platforms and asset management (in K66.30 or K66.19), digital-only banks (in K64.19), or InsurTech and PensionTech (in 66.29). For these activities, improving the explanatory notes to clarify the content of the sub-classes would facilitate the classification in cases of doubt and thereby harmonise and improve statistics. The explanatory notes should also elaborate that the borderline cases of SupTech and RegTech should ideally be considered as financial on account of supporting financial activities in K, and that the activities of Tech facilitators should be classified together with non-financial activities.

³⁸ N.e.c.: not elsewhere classified

4. Fintech Statistics at the Bank of Spain

As in other countries, Spain does not have an official register of Fintech firms, since some of their corporate purposes do not need to be registered by a supervisory authority. This, together with the ongoing innovations in this area, has hindered the preparation of an exhaustive census of Fintech firms. Therefore, Banco de España (BdE) has to draw information from various public and private sources: the Spanish National Securities Market Commission (CNMV), business associations (the Spanish Fintech & InsurTech Association and the Spanish Crowdlending Association) and private consulting firms (Finnovating).

This Fintech project, counting now around five years of existence, produces a set of information based on the sample of identified Fintech firms that should be regarded as experimental statistics. Nevertheless, this dataset is considered good enough to obtain an initial characterization of Spanish Fintech firms.

The BdE study shows that the Fintech sector is a rapidly growing market in Spain. According to the most recent available data, the sample of Spanish Fintechs has grown from 77 in 2012 to 328 in 2021, registering an annual 17.5% increase in this nine-year period³⁹. Similarly, the number of employees rose from around 600 in 2012 to almost 5,000 in 2021, with an annual growth around 26%.

To assess the relevance of these figures, it should be borne in mind that they could underestimate the true importance of the Fintech activity in Spain for three reasons. First, it does not take into account the Fintech activity developed inside the banking industry; second, the census of Fintech firms is without any doubt incomplete; and third, it does not record the activity performed by non-resident Fintech firms in the Spanish market.

In relation to this last point, numerous non-resident firms providing Fintech services in Spain have been identified by our experimental investigations, but the lack of detailed financial information prevents their inclusion in our dataset with quantitative figures. As a matter of fact, the digital provision of Fintech services (often without a permanent establishment in the country where the firms are operating) and the cross-border characteristics of the Fintech industry (specially for BigTechs) demand a supranational perspective for the data collection on Fintech activity or, at least, a quite high coordination across countries.

All in all, the growth rates of Fintech activities in Spain, as well as in most developed countries, are expected to accelerate in the forthcoming years, thus increasing the relevance of this activity in the financial sector. Having this in mind, there is an urgent need to improve our statistical approach to this sector, including the development of a homogeneous treatment which would allow for reliable comparisons across economies.

In this sense, an adequate inclusion of Fintech activities in the economic activity classification should be considered as a fundamental prerequisite to produce better

³⁹ Although not collecting information of Fintech credit activities, Banco de España has a non-exhaustive collection of Fintech firms and produces experimental statistics on them, quantifying their economic relevance and classifying in different Fintech activities. In addition, for a subset of these firms, annual detailed accounting information is available for research purposes at BELab (Banco de España's Data Laboratory). Further details are available under the link: [Banco de España - Economic analysis and research - What is BELab? - Content - Available microdata - Fintech no bancarias \(FIN\) \(bde.es\)](#).

statistics. In the case of Spain, the main segment of this sector is the activity of lending and obtaining funding on online platforms (crowdfunding) - with 132 active companies, 2.220 employees and a turnover of more than 551 million euros - , followed by the provision of technology services (see Table 3).

Table 3. Size dimensions of suggested new classes in K for Spain

New NACE Suggestion	Nº of Fintechs	Nº of Employees	Turnover (€)
K66.X: crypto-assets	10	39	59.574.836
K66.X: Crowd-funding activities	132	2.220	551.244.418
K64.9X: New forms of supply-chain-financing	23	223	199.280.806
K66.X Robo financial activities	68	1.195	93.476.836
K66.1X: PayTech	55	877	91.773.910
Neobanks/BankTech	4	43	11.259.701
InsureTech	32	398	37.611.075
Suptech/Regtech	4	129	16.223.761
Totals	328	5.124	1.060.445.343

Note: BdE provisional data.

Analysing how these Fintech firms classify themselves in the national economic activity classification shows that very often they are included outside NACE section K (Financial Activities) and, unfortunately, they are spread across more than ten different groups. This result could be related to the lack of Fintech details in the current NACE, which makes both the identification of Fintech firms and a correct assessment of their activity very difficult. A more detailed sub classification in the section K of the NACE together with clear explanatory notes could solve these identification problems, making it easier to achieve an effective and more useful classification.

5. Experimental Data at the Deutsche Bundesbank

Statistical work on Fintech is notoriously difficult, not least because their activities do not fit current classification schemes and firms are hard to identify. Furthermore, there are no comprehensive reporting obligations that could be the basis of an encompassing data base. Hence, in a model project on Fintech data, Bundesbank Department of Statistics collects what is internally available and what can be obtained freely in electronic media, enhancing it with selected commercial information. This experimental data collection, a proof of concept, is labelled *Fintech monitor*.

The Fintech monitor has two main functions. First, it is to set up as a data hub for various Bundesbank departments working on Fintech activities. Thus, the Fintech monitor provides a platform to store and retrieve the collected pieces of information across the bank. Second, it is designed to become a basis for statistical data work. Accordingly, the Fintech monitor collects Fintech IDs, references and classification data, information on business models and basic data on commercial activity, such as turnover and number of employees.

As of October 2022, the Fintech monitor collects information⁴⁰ on 1,227 companies with Fintech activities in Germany, of which 1,062 companies are active. Among the active companies, 939 ones are resident in Germany. It needs to be pointed out that important Fintech activities are carried out by BigTech companies. Typically, the commercial focus of BigTechs is outside finance, and they often offer Fintech services as a by-product or secondary activity. Furthermore, a larger part of Fintech activity is to be attributed to companies outside Germany. Thus, activities of Fintech companies in Germany will give only part of what is relevant.

The Fintech monitor allows to give a non-comprehensive and incomplete assessment⁴¹ on the number of active⁴² units located in Germany which would fall into the NACE categories suggested in this paper. Crypto-asset activities are the focus of 48 German companies. Looking at Fintech financing first, crowd-funding and new form of supply chain financing are offered by 148 and 25 companies respectively. Furthermore, the Fintech Monitor identifies 94 companies providing robo-financial activities. PayTech has expanded a lot in recent years - currently 112 companies have been identified in this segment. Finally, there are 18 BankTechs, 77 InsurTech/PensionTech companies and 24 companies that are either SupTech or RegTech (see Table 4).

Table 4. Identified active Fintech companies resident in Germany for suggested categories

New NACE Suggestion	No. of Fintechs	No. of Employees	Turnover (€)
K66.X: Crypto-assets	48	137	20.893.034
K66.1X: Crowd-funding activities	148	3159	690.196.527
K64.9X: New forms of supply-chain-financing	25	515	133.234.860
K66.X: Robo financial activities	94	2249	391.736.923
K66.1X: PayTech	112	4.240	806.180.218
K66.1X: BankTech	18	1.057	68.293.399
InsurTech/PensionTech	77	2.272	317.331.452
Suptech/Regtech	24	1.058	115.556.440
Totals	546	14.687	2.543.422.853

Note: October 2022. All numbers are preliminary. Data on number of employees and turnover are to be considered lower bounds, because these data are not available for all companies.

All numbers displayed in table 4 should be interpreted with caution and are to be considered lower bounds. Not all of the relevant companies are known, and not from all the known companies there are data on the number of employees or turnover that could be displayed. At this point, no attempt was made to estimate or impute the missing data. Furthermore, much of the important activity is carried out by firms located outside Germany and doing business with German residents. Big crypto-asset exchanges and service providers are a good example of this issue, which is important when estimating a crypto-asset market size in Germany. It is clear that cross-border

⁴⁰ Data sources used for this analysis: internal data, North Data ([North Data Smarte Recherche](#)), TheBanks.eu ([The European Banks \(thebanks.eu\)](#)) and CompanyHouse ([Handelsregister- und Wirtschaftsinformationen - CompanyHouse](#))

⁴¹ All numbers are preliminary.

⁴² We consider as active firms those that are not in liquidation, and have not exited the market or closed their business.

cooperation among authorities is very important when trying to understand and capture the Fintech phenomenon and its dimensions.

6. Fintech statistics at the Banque de France

As for other central banks, there is no mandatory data collection for statistics on Fintechs in Banque de France (BdF). In order to set up a census on French Fintechs a twofold approach was followed. First, professional associations, with valuable expertise in the field, such as *France FinTech* or *Finance Innovation* have been approached for assessing the best practices. Secondly, knowledge from internal experts and regulators in charge of issuing licences were mobilised in order to link practices to the core business of National Central Banks (NCBs).

The establishment of an NCB compatible census opens the room to a data collection (number of employees, turnover, etc.) based on internal resources provided by a BdF's department in charge of analysing enterprises data. The collaboration of the national statistical institute (INSEE) was also necessary for accessing the "SIRENE" database which is a comprehensive register for companies in France.

The characterisation of the activity of each Fintech entity was carried out by investigating their websites and by exchanging with the professional associations mentioned above. This step-by-step work has allowed an initial characterisation of French Fintechs according to the breakdown proposed to fulfil section K of the NACE (see Table 5).

Table 5. Size dimensions of suggested new classes in K for France

New NACE Suggestion	N° of Fintech	N° of Employees	Turnover (€)
K66.X: Crypto-asset activities	5	49	46 508 000
K66.X Crowd-funding activities	28	707	38 387 000
K64.9X: New forms of supply-chain-financing	12	516	5 599 000
k66.X Robo financial activities	12	232	4 647 000
K66.1X: PayTech	50	1 840	537 552 000
K66.1X: BankTech	20	652	39 892 000
InsureTech	36	732	23 039 000
SupTech/Regtech	21	601	26 372 000
Totals	184	5 329	721 996 000

It should be noted that the above figures are certainly underestimating the scale of Fintech companies in France. As a first caveat, it should be mentioned that the list of companies is not comprehensive, as it only corresponds to resident Fintechs and exclude foreign companies operating in France. In addition, a number of data points on turnover were missing. Moreover, the census of entities dates to early 2020, hence many enterprises have emerged and grown since then.

However, despite those caveats, the work done so far is an important and vital step to assess the importance of each activity segments.

Therefore, the PayTech sector appears to be the most preponderant in France with 50 active companies, 1840 employees and a turnover of more than 530 million euros. This segment of Fintech activity is also the one that attracts the most investors, with

nearly €1.7 billion of funds raised since 2010⁴³. This sector expands extensively in France particularly by enlarging its service supplies. For example, the French unicorn *Lydia* that started with providing peer-to-peer payment solutions is now offering investments in crypto-assets and stocks, savings books, consumption loans, contactless mobile payments, online payments, virtual cards, etc.

The Fintech sector is expected to continue growing in the forthcoming years, since the investors' appetite for such companies, especially in the form of foreign direct investments, remains strong. Due to their innovative services, the ease of access to their offers, their very competitive prices and with the ever-increasing digitalisation of our society, it is certain that Fintechs will take an ever more important place in the financial sector. It is therefore essential to be able to characterise the current activity of Fintechs in order to identify them more easily (hence our breakdown proposal based on the example for the sector K of NACE), as well as to collect information to monitor and analyse their activity and eventually to capture them in the NCBs statistical systems.

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Fintech in statistical classifications: suggestions and tentative figures in a central bank context

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Overview

1. Motivation
2. Statistical classification of Fintech: the case of NACE rev.2
3. Experimental Fintech data at BdE, BuBa and BdF
4. Conclusions

1. Motivation

- In the last decade, **innovation activity in the financing industry** has largely been moving to entities commonly labelled **Fintech** amid a wider phenomenon of decentralised finance
- There is **no internationally accepted harmonised definition of Fintech** for statistical or for other classification purposes
- This paper **clarifies the scope of (current) Fintech** to support their classification in statistical systems, thereby enabling their monitoring
- The possibility of introducing new classification entries is discussed, taking as a point of departure the current NACE hierarchical structure for economic activities and distinguishing within the Fintech universe between novel financial activities, old financial activities done in a new way, and activities which are not financial
- **Context** → IFC Report *Towards monitoring financial innovation in central bank statistics and the New G-20 Data Gap Initiative (DGI) in preparation*
- **Input** → to any discussions on Fintech in the context of statistical classifications e.g. NACE, ISIC and the classifications of products (CPC/PA)

2. Statistical classification of Fintech: the case of NACE rev.2

- **Crypto-asset activities**, especially related to No-Liability Crypto-Assets (NLCAs), including emission, issuance, operating (validating), and services are considered novel and should warrant a dedicated entry in statistical classifications e.g. in K66 of the current NACE. Importantly, crypto-asset may be used in other activities e.g. in payments.
- Fintech related to financing (or services auxiliary to financing) which includes **crowdfunding** and **new forms of supply chain financing**. Due to increasing importance, new entries are warranted e.g. in K66.1X and K64.9X of the current NACE respectively.
- Fintech related to investment, asset management, and trade covers: **a) social trading platforms, b) robo advice, c) personal financial management** and **d) other e.g. online asset management platforms, deposit brokers and online trading platforms**. Robo-advice stands out in terms of novelty and could be classified in e.g. K66.X of the current NACE. The other activities can be considered as existing ones done in an innovative way; hence they should be covered in K66.30 or K66.19.
- Fintech activities in the payment services segment include e.g.: **mobile payments, digital wallets, Peer-to-Peer payments and others such as real-time payment, atomic payments**. These payment activities are considered novel and could be classified in K66.1X: PayTech of the current NACE.

2. Statistical classification of Fintech: the case of NACE rev.2

- **Digital-only banks, Quasi-banks and BankTech.** The activities of digital-only banks are considered to a large degree as existing activities done in an innovative way and NACE sub-section (K64.19) already covers them in substance. The activities of quasi-banks and related auxiliary activities are considered novel and could be classified as new K66.1X Bank Tech and K64.9X Quasi-banks respectively.
- **InsurTech** and **PensionTech.** Fintech in this domain covers services that use e.g. big data and AI, chatbots, customisable insurance policies (e.g. pay as you go), or crowdsurance. Such activities are considered as existing activities done in an innovative way and could be included in NACE K66.29.
- **Tech facilitators** provide infrastructure solutions, based e.g. on DLT, AI, the Internet of Things (IoT) and big data technologies, however they are neither strictly financial intermediation nor financial auxiliary services, therefore they should be classified in NACE outside section K.
- **Borderline cases:** **SupTech** (dedicated to improve surveillance and analytical capabilities of supervisors and regulators) and **RegTech** (aimed at regulated institutions, improves compliance outcomes).

2. Statistical classification of Fintech: the case of NACE rev.2

K – Financial and insurance activities

K64 – Financial service activities, except insurance and pension funding n.e.c.

K64.1 – Monetary intermediation

K64.11 – Central banking

K64.19 – Other monetary intermediation

K64.2 – Activities of holding companies

K64.3 – Trusts, funds and similar financial entities

K64.9 – Other financial service activities, except insurance and pension funding

K64.91 – Financial leasing

K64.92 – Other credit granting

Proposal K64.9X – New forms of supply chain financing activities

Proposal K64.9X – Quasi-banking

K64.99 – Other financial service activities except insurance and pension funding n.e.c.

K66 – Activities auxiliary to financial services and insurance activities

K66.1 – Activities auxiliary to financial services, except insurance and pension funding

K66.11 – Administration of financial markets

K66.12 – Security and commodity contracts brokerage

Proposal K66. 1X – BankTech

Proposal K66. 1X – PayTech

K66.19 – Other activities auxiliary to financial services, except insurance and pension funding

K66.2 – Activities auxiliary to insurance and pension funding

K66.21 – Risk and damage evaluation

K66.22 – Activities of insurance agents and brokers

K66.29 – Other activities auxiliary to insurance and pension funding

K66.3 – Fund management activities

Proposal K66.X Crowd-funding activities

Proposal K66.X Robo financial activities

Proposal K66.X Crypto-Assets activities n.e.c.

3. Experimental Fintech data at BdE, BuBa and BdF

Statistical work on Fintech is notoriously difficult, not least because Fintech activities do not fit current classification schemes and firms are hard to identify. There are no comprehensive reporting obligations that could be the basis of an encompassing database, there are no official registers of Fintech firms.



Fintech project



Fintech monitor



Census on French Fintechs

Output:	experimental statistics for a sample of identified Fintech firms (350 firms)	IDs, references and classification data, information on business models and basic data on commercial activity, such as turnover and number of employees (1227 companies with Fintech activities in Germany of which 939 resident companies)	number of employees, turnover, etc. based on internal resources used for analysing enterprises' data; data from the so-called "SIRENE" database (a kind of comprehensive register for companies in France) thanks to the collaboration of the national statistical institute (INSEE), (184 companies)
Input:	various public and private sources: the Spanish National Securities Market Commission (CNMV), business associations (the Spanish Fintech & InsurTech Association and the Spanish Crowdfunding Association) and private consulting firms (Finnovating)	Bundesbank statistics collects what is internally available enhancing it with selected commercial information	1) professional associations, with valuable expertise in the field, such as <i>France FinTech</i> or <i>Finance Innovation</i> have been approached for assessing the best practices, 2) knowledge from internal experts and regulators in charge of issuing licences were mobilised in order to link practices to NCBs core business. 3) exploring Fintech's websites to characterise the activity of each Fintech

3. Experimental Fintech data at BdE, BuBa and BdF

	Spain			Germany			France		
New Nace Suggestion	Number of Fintechs	Number of employees	Turnover (€ million)	Number of Fintechs	Number of employees	Turnover (€ million)	Number of Fintechs	Number of employees	Turnover (€ million)
K66.X: Crypto-asset activities	10	39	60	48	137	21	5	49	47
K66.X Crowd-funding activities	132	2,220	551	148	3,159	690	28	707	38
K64.9X: New forms of supply-chain-financing	23	223	199	25	515	133	12	516	6
K66.X: Robo financial activities	68	1,195	93	94	2,249	392	12	232	5
K66.1X: PayTech	55	877	92	112	4,240	806	50	1,840	538
K66.1X: BankTech	4	43	11	18	1,057	68	20	652	40
InsurTech/PensionTech	32	398	38	77	2,272	317	36	732	23
SupTech/RegTech	4	129	16	24	1,058	116	21	601	26
Total	328	5,124	1,060	546	14,687	2,543	184	5,329	722

Notes: ES – data for 2021, figures may underestimate the true importance the Fintech activity for three reasons: i) Fintech activity is also inside the banking industry, ii) incomplete sample, iii) missing info on activity performed by non-resident Fintech firms in the Spanish market (investigated, but lack detailed information); DE – based on preliminary, non-comprehensive assessment of Fintech entities resident in Germany, important Fintech activities are due to BigTechs and quite a large part of Fintech activity is attributed to companies outside of Germany, thus not included in this analysis, data compiled in August 2022; FR – data for 2020, figures underestimate the scale of Fintech phenomenon as the census is not comprehensive (resident Fintechs only, foreign companies operating in France are excluded) and a number of data on turnover were missing.

4. Conclusions

- **Fintech activities are expected to grow significantly** in the forthcoming years, also considering the substantial attraction of investors, thus increasing the relevance of this activity in the financial sector → there is **an urgent need to improve our statistical approach** to this phenomenon, including the development of a homogeneous treatment which would allow for reliable comparisons across economies.
- Fintech firms are often classified outside NACE section K Financial Activities (spread across more than ten different NACE sections). This could be related to the lack of Fintech details in the current NACE, which makes the **identification of Fintech firms and a correct assessment of their activity very difficult** → a more detailed Fintech classification in statistical systems e.g. the sub classification in the NACE section K together with clear explanatory notes, could solve these identification problems and make it easier to achieve an effective and more useful classification.
- This paper **clarifies the scope of (current) Fintech activities** and provides examples on how they could be classified in the current NACE section K. Furthermore, it aims to support any future discussion on Fintech classification in statistical systems.