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"You should do what India does": FinTech ecosystems in India reshaping the geography of finance

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ABSTRACT

This paper explores the potential of FinTech to change the geography of finance and financial centres through a longitudinal and multiscalar analysis of FinTech in India. Using a financial ecology approach, we combine quantitative data on firm creation and funding with insights from corporate interviews to unpack and examine the key elements of the Indian FinTech ecosystem. At the national scale, our results highlight how the export-oriented ICT sector, the implantation of large-scale, open digital infrastructures and enabling regulatory frameworks have enabled and shaped the growth of FinTech as a state-supported, tech-driven "Tech-Fin-State" ecosystem. At a city scale, the paper demonstrates how FinTech transforms India's financial geography in two directions. First, locational patterns and investment networks have established New Delhi and Bangalore as international FinTech hubs, ahead of Mumbai. Second, the re-intermediation of finance by FinTech firms should be understood as the connection between the two distinct yet complementary ecosystems of Bangalore, India's FinTech capital, and Mumbai, the incumbent financial capital, while advancing regional integration beyond India.

Introduction

"India's payment system is sort of leap-frogging the world (…) So Google wrote a letter to the Federal Reserve saying that, you know, 'you should do what India does'" (IP10)

A success story of the FinTech industry, India is frequently portrayed as a global pioneer for technological innovations in finance (IMF, 2022), with results deemed "relevant and applicable for all economies, irrespective of their stage of development" (BIS, 2019). Seeking to strengthen its share in digital payments and encountering opposition from the incumbent US banking sector, Google presented India' s Unified Payment Interface (UPI), a shared public platform implemented with the support of the Reserve Bank of India to enable real-time payments , as a model in terms of digital infrastructures and policy making (Isakowitz, 2019). Along these celebrations of ground-breaking achievements, current discourses surrounding FinTech in India prominently deploy a narrative of formidable growth on financial steroids: as "a flood of foreign money is washing into India's startup scene" (The Economist, 2021), industry reports echo the sheer size of industry, with more than 2000 firms founded since 2015 (MEDICI, 2020). In parallel, major Indian cities shine in the global rankings that measure creation rate, investments and valuation. In the latest *Global city rankings* compiled by Findexable (2021), New Delhi (13th) and Bangalore (20th) ranked ahead of Mumbai (23rd). In the 2018 *Global FinTech Hub report,* dominated by Chinese and US cities, Bangalore (25th) featured prominently, just ahead of Mumbai (26th) (CCAF, 2018). These upward trajectories seem to confirm that "for aspiring financial centres, tomorrow's geography of FinTech opens up new windows of locational opportunity" (Hendrikse et al., 2020, p. 1517).

The portrait of India as an inspirational model by one of the iconic Big Tech giants lobbying for regulatory changes within the heart of global western capitalism, conjugated with the spectacular rise and position of Indian cities in FinTech rankings, raise empirical and theoretical questions for economic geographers. First, beyond the narratives of unicorns, disruption and aggregated ranking indices, the geography of FinTech in India remains largely off the map, leaving unaccounted for the networks of actors and cities that structure the spatial organization of a pioneering industry. This research gap is twofold, as the impact of FinTech on the role and evolution of financial centres in an emerging economy remains also poorly understood. In the context of a global

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FinTech boom, the growth of FinTech in India therefore questions two central features of India's financial geography: the historical position of Mumbai as financial capital on a domestic level (Grant and Nijman, 2002); and the enduring peripheral position of Indian cities in global financial networks (Haberly and Wójcik, 2022).

Second, India' status at the forefront of financial technologies interrogates our understanding of FinTech markets and policies framed by the conventional boundaries that underpin the discipline and production of economic geography. The useful and repeated, yet problematic distinction between "banking the unbanked" or "financial inclusion" for the developing markets, and "transforming banking" in the Global North (Langley and Leyshon, 2020) runs the risk of reproducing a developmentalist approach wherein the economic trajectory of Southern economies remains best understood as a catching up game. Additionally, few studies examine how the re-intermediation of finance affects the role and position of financial centres outside of western economies (Lai, 2020). Yet, as shown by the success of digital payments crafted in Kenya or India (Jacopin, 2021), corporate practises and technological innovations brought by FinTech are transforming banking and financial transactions across advanced and developing economies. As a telling example, the US Federal Reserve eventually announced in August 2022 the roll-out for mid-2023 of "FedNow", a "flexible, neutral platform" designed to promote inter-bank instant payments (Federal Reserve System, 2022), accomplishing "Washington's first foray into fintech" (Forbes, 2022).

Using a financial ecology approach, this paper adopts the concept of ecosystem to examine the examine the network of actors and regulatory changes that turned India into one of the largest FinTech industry and established Indian cities as upcoming financial hubs. To that end, we develop the first country-wide, multi-scalar and longitudinal analysis of the FinTech industry through a mixed-method framework combining statistical analysis, network visualization, and expert interviews. We first conducted interviews in Mumbai and Bangalore to gain insight into the geographical dynamics of FinTech, the relationships among FinTech firms, incumbent actors, and state entities, while enquiring about the domestic, regional, and global connections shaping the financial industry. Then, sourcing data from Crunchbase, we built a geolocated dataset containing 1248 FinTech firms and 905 investors to chart the evolution of the FinTech's ecosystem in space and time, trace the locational patterns of the industry, as well as identify the domestic and foreign networks of investments that sustain the Indian FinTech ecosystem. In doing so, we seek to further promote financial and economic geographies of non-western economies (Pollard et al., 2009).

The remainder of the paper is organized as follows. In the first section, we highlight the need of a financial ecology approach and introduce the concept of ecosystem as a relevant analytical tool to explore the structure of the FinTech industry, the related changing roles of financial centres in India, and the patterns of organizational change and inter-firm connections from a multiscalar perspective that takes into account both national and city dynamics. The following section explains data and methodology. The third analyses the locational, investment and sectoral patterns that constitute a tech-driven, metropolitan FinTech ecosystem concentrated in New Delhi, Mumbai and Bangalore and championed by the subsectors of digital payments and lending. The fourth demonstrates the central role of the state in providing the digital infrastructures and regulatory frameworks, shaping a state-supported ecosystem. The following two sections examine FinTech ecosystems at a city scale, first analysing how labour market and corporate networks rooted in skills and capital of the export-oriented ICT industry have turned Bangalore into India's leading FinTech centre. The sixth section demonstrates how financial geography in India is transformed by firms' interconnections that re-intermediate finance through the connection of Bangalore and Mumbai as two distinct yet complementary ecosystems, while advancing regional integration within and beyond India. In the last section, we reflect on the implications of the Indian case study for the study of finance and financial centres, conceptualising India as a "Tech-Fin-State" ecosystem, and raising future questions on the geography of FinTech consumption and the role of central states in orchestrating the development of FinTech.

1. The geography of FinTech in India: A financial ecology approach

FinTech can be defined as "a set of innovations and an economic sector that focus on the application of recently developed technologies to financial services" (Wójcik, 2021, p. 568). Fintech firms provide new financial products and services by leveraging modern technologies such as artificial intelligence, cloud computing, P2P technologies, and big data analytics, seeking to automate and facilitate financial services such as payment, financing, and investments. As such, the "re-intermediation of finance" designates how platform technologies reshape financial intermediation such as transaction costs and creation of liquidity (see Lai, 2020; Langley and Leyshon, 2020). In the process, FinTech is creating new financial centres alongside the dominant hubs forged by the networking and agglomeration of Advanced Producer Services that coordinate global financial networks (Bassens and van Meeteren, 2015; Cassis and Wójcik, 2018). The concept of ecosystem, popular in economic geography (Leyshon, 2020), has been successfully taken upon by financial geographers to understand both the institutional anatomy, entrepreneurial networks and inter-sectoral dynamics shaping the FinTech sector, and assess its impact on financial institutions and financial centres.

An ecosystem can be defined as "as a dynamically stable network of interconnected firms and institutions within bounded geographical space" (Auerswald and Dani, 2018). Researchers often divide the FinTech ecosystem into building blocks of key actors in order to examine organisational change and inter-firms relationships, yet the pertinent scale of analysis through which to understand and investigate the FinTech ecosystem remains contested. Most approaches navigate between an understanding of ecosystem at a national or at a city level, particularly the latter in the case of incumbent financial centres (Harris, 2021). On a rather national scale, Lee and Shin (2018) list five building blocks: FinTech startups, technology developers, government (for regulation); customers and end-users; and traditional financial institutions (banks, insurance companies, venture capital *etc*). Advocating for a financial ecology approach, Lai & Samers identify five groups of actors composing the FinTech ecosystem: banks; non-banking financial institutions; big tech companies; start-ups; state entities and regulators (2021). Regardless of the scale, existing typologies invite to scrutinise interconnections, especially the nature of relationships between FinTech and incumbent firms, in order to question if the common prophecy of disruption of financial services (often spread by the FinTech firms themselves) contrasts with the reality of FinTech whereby incumbent institutions cooperate with, invest in or acquire FinTech startups (Langley and Leyshon, 2020; Zook and Grote, 2022). Central to nascent FinTech ecosystem is the implementation and regulation of digital infrastructures such as APIs that provide the "infrastructural plumbing" (Hendrikse et al., 2020) – an element for which India became a reference point for industry experts (Financial Times, 2022). Among the elements that compose the ecosystem, researchers also highlight the key role of regulatory institutions in providing an enabling environment or lagging behind in terms of effective oversight (Wójcik, 2021).

While FinTech precipitates infrastructural and regulatory changes on a national scale, case studies at the city level remain the most common approach to analyse the reshaping of financial services by FinTech. As incumbent financial firms also embrace platform technologies (Hendrikse et al., 2018), FinTech questions how the digitalization of finance, manifesting itself through new demand in skills and technologies, challenges or confirms the role of leading financial centres such as New York and London, while simultaneously allowing the emergence of new nodes (Wójcik, 2021)). To analyse how FinTech affects the status and organizational structure of London, Sohns and Wójcik (2020) select four

domains of the ecosystem and investigate their interconnections: human capital and pool of labour; access to finance and investors; market demand and consumers; policy and support from government institutions and other businesses and infrastructures. They highlight the "strong pool of labour" both for financial and technology skills (2020, p. 1547) as a distinctive feature of the European FinTech capital, along with one of the largest venture capital markets in the world, and a highly supportive government. In the context of Brexit, they also underline the "relational dependency" of the FinTech startups on financial incumbents, particularly for accessing banking licences and infrastructure in order to build their "market legitimacy" (2020, p. 1552). Zooming on Brussels, Hendrikse and van Meeteren develop the notion of "Fin-Tech-State triangle" to categorize a "incumbent-dominated ecosystem strategically enclosing Fintech startups" (Hendrikse et al., 2020, p. 1534). Government institutions, at the initiative of entrepreneurial political elites, implemented policy regulations and working groups while supporting local incubators so that incumbent financial institutions could "develop capabilities to retain pole position in the digital age" (Hendrikse et al., 2020, p. 1532) by sourcing technological solutions from startups and bringing in venture capital. This "strategic coupling" (Coe et al., 2004) aimed to strengthen Brussels' position among European financial centres. All these authors acknowledge the need of further comparative research to assess how FinTech ecosystems reinforce or disrupt existing hierarchies within financial firms and among financial centres.

What appears particularly timely to advance an economic geography of FinTech is to reconcile global, national and city approaches that would capture organizational change across scale, from macro evolutions in terms of policies and key infrastructures to local entrepreneurial networks of knowledge and clusters of innovation between firms and investors (Lai and Samers, 2021, p. 734). Such an approach is necessary to analyse how the cluster dynamics, labour markets, regulatory frameworks and locational patterns that shape the spatial organization of FinTech translate into a changing geography of financial centres. Yet research assessing how FinTech firms and technology effectively "change existing clusters and network patterns" (Lai, 2020, p. 460) remains limited in scope and geographical diversity (Wójcik, 2021). While Mumbai, Bangalore, and New Delhi remain classified as second-tier financial centres in the financialized global economy (Derudder and Taylor, 2018), they surge to higher ranks from a FinTech perspective. With a well charted financial geography structured around the primacy of Mumbai as an incumbent centre (Grant and Nijman, 2002; Lambregts et al., 2018) and an export-oriented Information and Communications Technology (ICT) sector that bears witness to long-standing collaborations with financial institutions and to the presence of tech skills, India represents an ideal case study to examine the networks of actors driving the rise of FinTech and transforming India's financial geography.

2. Data and methods

We combine quantitative and qualitative methods to analyse the interconnections between firms, investors and regulatory institutions that structure the FinTech ecosystem in India on a multiscalar and longitudinal basis. We first conducted face-to-face, semi-structured interviews in Mumbai and Bangalore with high-profile professionals from finance and FinTech, during January and February 2020 (see Appendix). The choice of cities was informed by existing scholarly and industry reports. Mumbai, the undisputed financial capital with an ecosystem characterized by the historical agglomeration of traditional financial actors such banks, insurance companies, and key institutions such as the National Stock Exchange or the Reserve Bank of India (Grant and Nijman, 2002), embodies an incumbent financial centre. Ranked as the 6th global FinTech hub in 2020, Bangalore, also labelled as the "Silicon Valley of Asia", epitomizes a tech cluster assembled by the outsourcing and offshoring sectors accustomed to work with financial firms since the early 1990s (Grote and Täube, 2006; Massini and Miozzo, 2012). The interviewees were contacted via e-mail, often using corporate websites and LinkedIn to identify executives in leading companies, as well as a snowball method. Interviews enquired about the origins of firms, their locational strategy, their connections with the broader financial sector, and their wider perception of the financial geography of India. A total of 20 interviews were recoded and transcribed. We applied thematic content analysis using the open-source software Taguette (Rampin and Rampin, 2021).

The creation of a georeferenced dataset to analyse the networks of FinTech firms and investors was conducted after and informed by fieldwork. We first extracted data from Crunchbase, a widely used source of information for economic geographers. While industry reports typically mention more than 2000 firms (BCG, 2021), only 767 firms headquartered in India included the word "FinTech" in the "Industry Groups", a list of keywords supplied by Crunchbase to describe a firm's industrial specialization. This surprising and problematic gap further confirms that relying only on the industrial categories available on Crunchbase might lead to a significant under-estimation of the true size of the FinTech sector (Laidroo and Avarmaa, 2020), whose hybrid nature challenges existing economic classifications. To address this issue, we first extracted data on all firms headquartered in India and categorized as "Financial Services" in the Crunchbase-defined Industry Groups, obtaining a sample of 4,079 firms. Second, to identify within this large sample the firms directly associated with FinTech products, services and technologies, we replicated the methodology of Laidroo and Avarmaa. We used the list of keywords available in their online supplementary file to apply content analysis on two columns: the "Industries" and the firm's "Description". This reduced the sample down to 3175 firms.

Second, we built upon Lai & Samers classification of FinTech firms (2021) that separates financing, investment, digital money, payments, insurance, and financial advice. We assessed the column "Description" to manually classify each firm into the following categories: financing, payments, digital money, financial advice, investments, InsurTech, RegTech, PropTech, neobanks, and Analytics & software. During this manual process, we removed purely-tech focused firms, venture capital, e-commerce platforms, accounting firms, outsourcing businesses and incumbent financial institutions (brokerage business, banks, insurance companies, microcredit institutions *etc.)*. The final sample contains 1248 FinTech firms.

To examine their connections with investors, we first sourced data from Crunchbase on all funding rounds ($n = 1294$) that have involved these firms up until October 2021, identifying a total of 1,394 investors. Second, we used Crunchbase to source the location of these investors at the city level. After removing private individuals for whom location is not available and cannot be inferred with sufficient certainty through online searches, we were able to locate 905 institutional investors. Locations of FinTech firms and investors were aggregated at the metropolitan area level. For India, we used the latest spatial data on built-up areas compiled by the Geopolis research program (Denis and Marius-Gnanou, 2010). Consequently, companies headquartered in Gurugram or Noida would be located in "New Delhi", using the boundaries of the National Capital Territory of Delhi. Similarly, a firm located in Palo Alto or San Jose would fall within the San Francisco combined statistical area. Our dataset therefore allows to trace sectoral dynamics and geography of investments either at the firm, city or national level. Yet, to preserve the anonymity of our respondents, we decided not to include visualisations at the firm level. The sequential nature of our mixed-method methods for this paper meant that we were not able to select our sample of interviewees and tailor the list of questions based on quantitative findings. Despite this pitfall, we believe our paper demonstrates the potential of Crunchbase data to inform and enrich qualitative fieldwork in future research designs.

3. The rise of a tech-driven and metropolitan ecosystem

In line with global trends, FinTech in India is a recent phenomenon: 75 % of firms were created after 2013 (Fig. 1). Yet our analysis

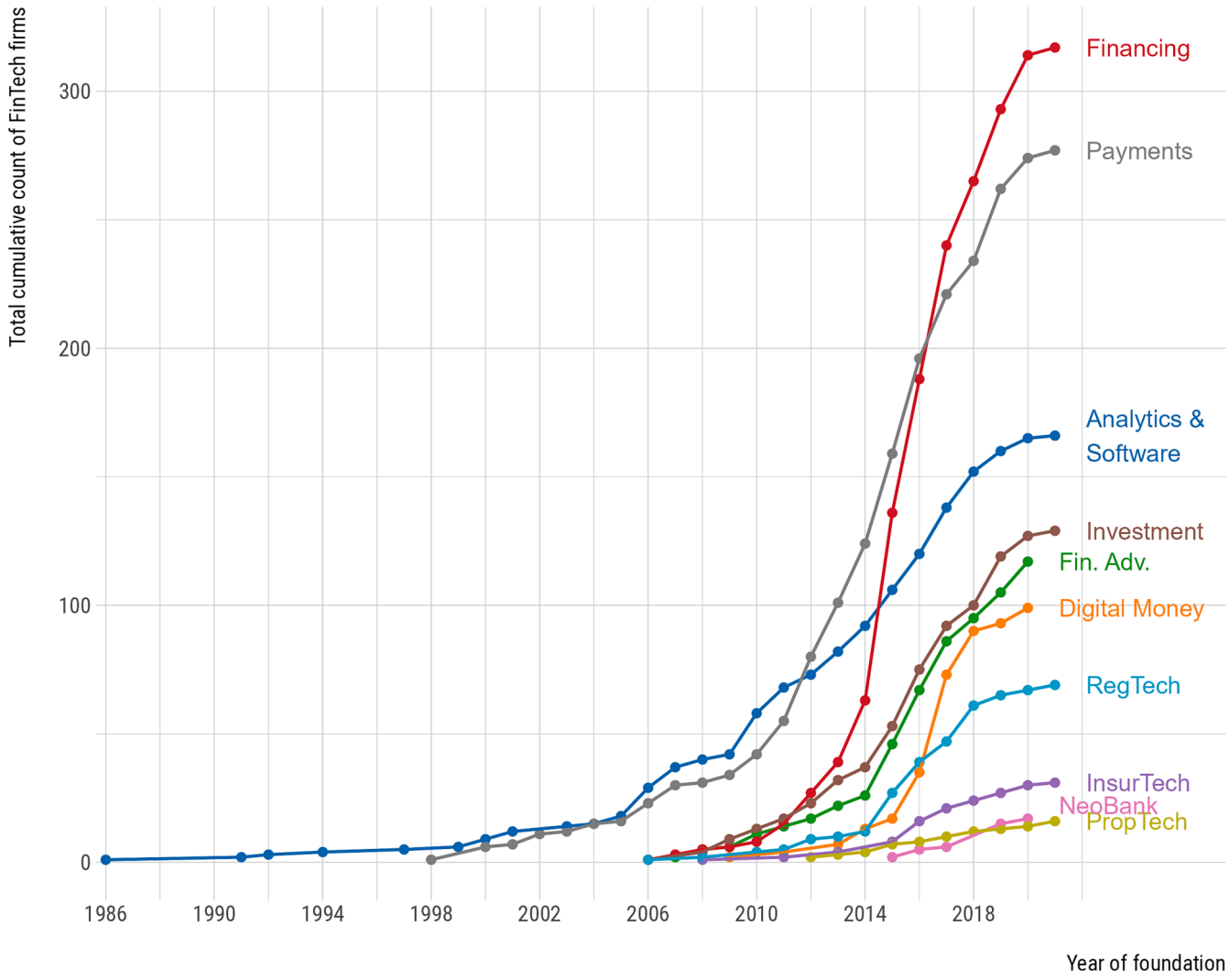


Fig. 1. The growth of FinTech sectors in India.

highlights the singularity of the Indian ecosystem, with the ICT sector shaping its uneven sectoral growth. The earlier founding dates in the sectors of analytics and software, as well as payments, emphasize the mutation of ICT firms into FinTech. The sector of analytics and software includes companies that started providing digital technologies for the finance and banking industry in the early 1990′s, years before the introduction of machine learning, cloud computing or big data analytics. In that regard, these FinTech firms such as Billdesk (2000) or Pine Labs (1998) are the last 'avatar' of the country's software industry which developed an early expertise for transaction technologies. This path-dependency nature of FinTech is similarly found in digital payments, deeply correlated to rising smartphone penetration. Telecommunication firms paved the way for this sector. For instance, the company One97 (founded in 2000) ventured into digital payments through its subsidiary Paytm created in 2010. The rise of digital payments on the top of a publicly-owned infrastructure, which we discuss in the next section, challenges the position of powerful corporations such MasterCard or Visa, establishing India as a pioneering country for the future of payments, described as "way ahead of traditional markets" (IP2). More recent sectors such as PropTech, InsurTech or neobanks record a slower growth. The spectacular increase in the sector of financing results from the multiplication of platforms offering business loans to small and medium enterprises, education, and personal loans, leveraging P2P technologies and crowdfunding.

"*It has really exploded in the last three years I would say. When we started, it was early days, there were quite a few FinTechs approaching the SME [small and medium enterprises] lending space but not the consumer space and then in the last three years, that has dramatically changed.*" (IP2)

The sector of financing also reflects path-dependency effects rooted in the country's economic trends when microfinance and non-banking financial institutions (NBFC) mushroomed in India during the 2000–2010 decade.

"*It felt like if you could build a microfinance business doing those kind of small ticket loans, empowering you know rural women, but if you could do that with technology then you could just scale these businesses so much bigger and faster*" (IP2).

The geography of FinTech production is deeply polarized by three cities (Fig. 2). Locational patterns of firm creation underline that Bangalore, Mumbai, and New Delhi increasingly concentrated the industry in similar proportions: in 2021, New Delhi counts 330 firms, Bangalore 316 and Mumbai 315, with a clear gap between this trio and the other metropolitan areas (Fig. 2). From 2006 to 2018, Mumbai was the leading city in terms of firm creation, until New Delhi and Bangalore overtook it following faster growth. India confirms that the presence of a strong technology sector is necessary to allow the formation of FinTech centres (Cojoianu et al., 2020), as evidenced on the one hand by the rise of Bangalore, crowned as the offshoring and outsourcing capital, and New

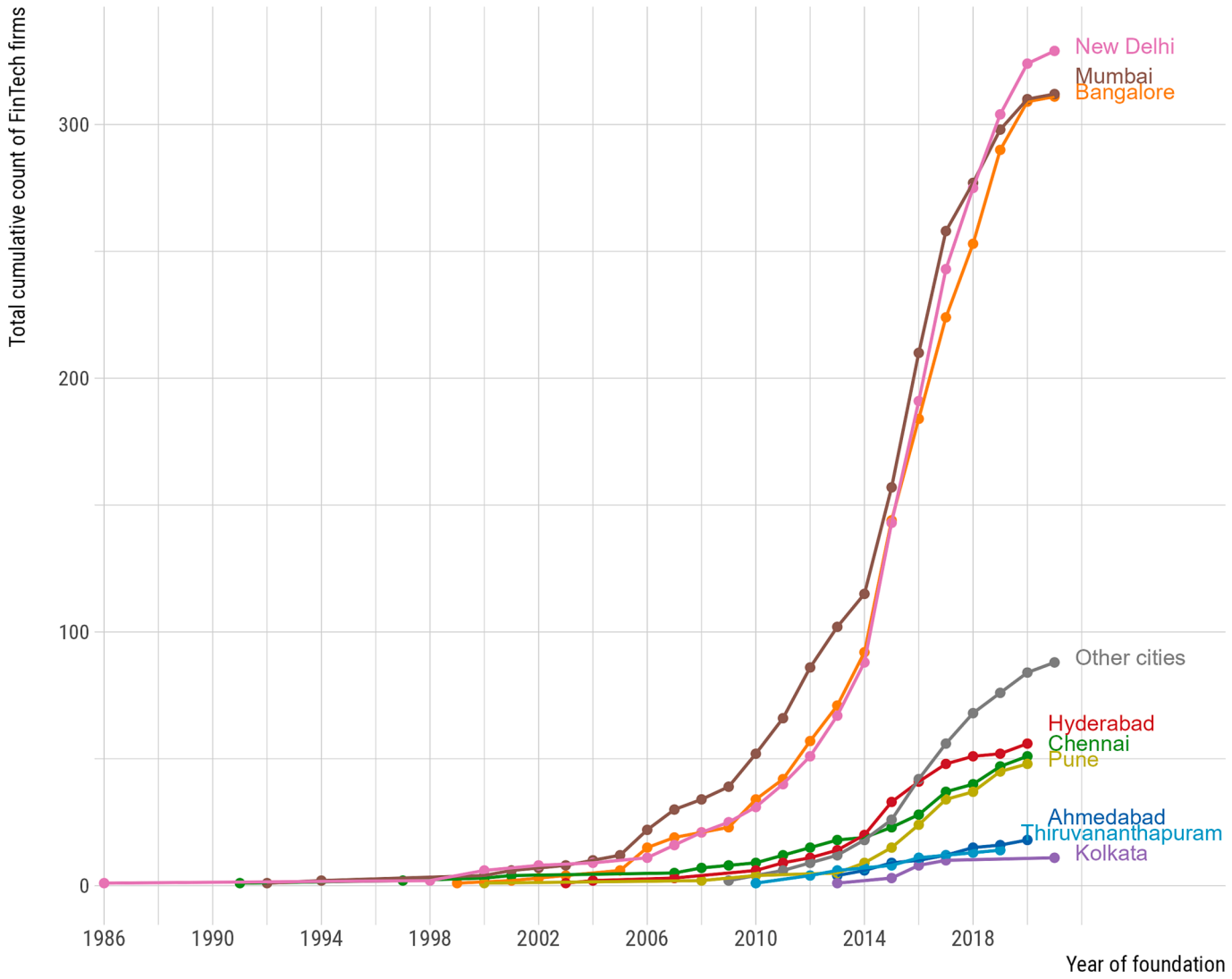


Fig. 2. Locational patterns of FinTech firms.

Delhi, home to the telecommunications industry, and on the other by the stagnation of Kolkata. Yet, other factors to support FinTech start-up emergence are necessary: despite the presence of ICT firms and talent, Chennai, Pune or Hyderabad clearly lag behind. The three main India Fintech centres display no strong evidence of sectoral specialization, though Bangalore leads in analytics (56 firms), investment (37), financial advice (37), and New Delhi in financing (92), payments (87) and RegTech (29).

Funding patterns reveal substantial unevenness between firms and sectors in terms of growth (Fig. 3). To facilitate the readability of the plot and the comparison of trajectories between high and small values, we use here a logarithmic scale. Only 3 sectors passed the US$1bn threshold: payments (US$9.7bn), financing (US$2.8bn) and InsurTech (US$1.5bn), leading in both domestic and foreign investments. Foreign investments exceed domestic inflows in every sector (except for PropTech), accounting for 84 % of capital raised for payments and 67 % for financing and InsurTech. Payments attracted 62 % of total investments in FinTech, and financing 18 %. With 65 % of firms receiving investments, InsurTech records the highest funding rate, followed by neobanks (59 %), financing (50 %) and payments (45 %). Yet, the median amount of capital raised is highest for neobanks, at US$7m, compared to US$5m and US$3m in payments and financing respectively. Domestic and international investors are selective: only one firm out of four was involved in funding rounds, which restricts the capacity of startups to scale up:

> "*There's a lot of noise, there's a lot of companies starting up, raising small amounts of money, building products but very few have kind of got to that break out stage where I'd say that they have more than a few thousand customers.*" (IP2)

These unequal funding patterns, with a few companies attracting the lion's share of invested capital, might indicate that the FinTech industry is entering a phase of consolidation, as 34 firms have been acquired since 2015. In the payments sector, such trends are clearly visible: the payment giant Paytm has acquired 12 startups and invested in 5 others since 2016. Another sign of maturity for the FinTech sector is the willingness of FinTech firms to get publicly listed. In November 2021, Paytm attracted worldwide attention, achieving India's largest IPO with $US 2,44 billion raised with the support of banks such as Morgan Stanley and JP Morgan, and investors including BlackRock, and the Canada Pension Plan Investment Board. Another giant in the payment sector, Pine Labs, was until recently planning an IPO on the NASDAQ stock exchange.

The results so far emphasise the key role of the export-oriented ICT industry in shaping the growth of the FinTech ecosystem in India. Also critical to the success of the ICT industry was the support of the central government, which similarly constitutes a key feature of the Indian FinTech ecosystem.

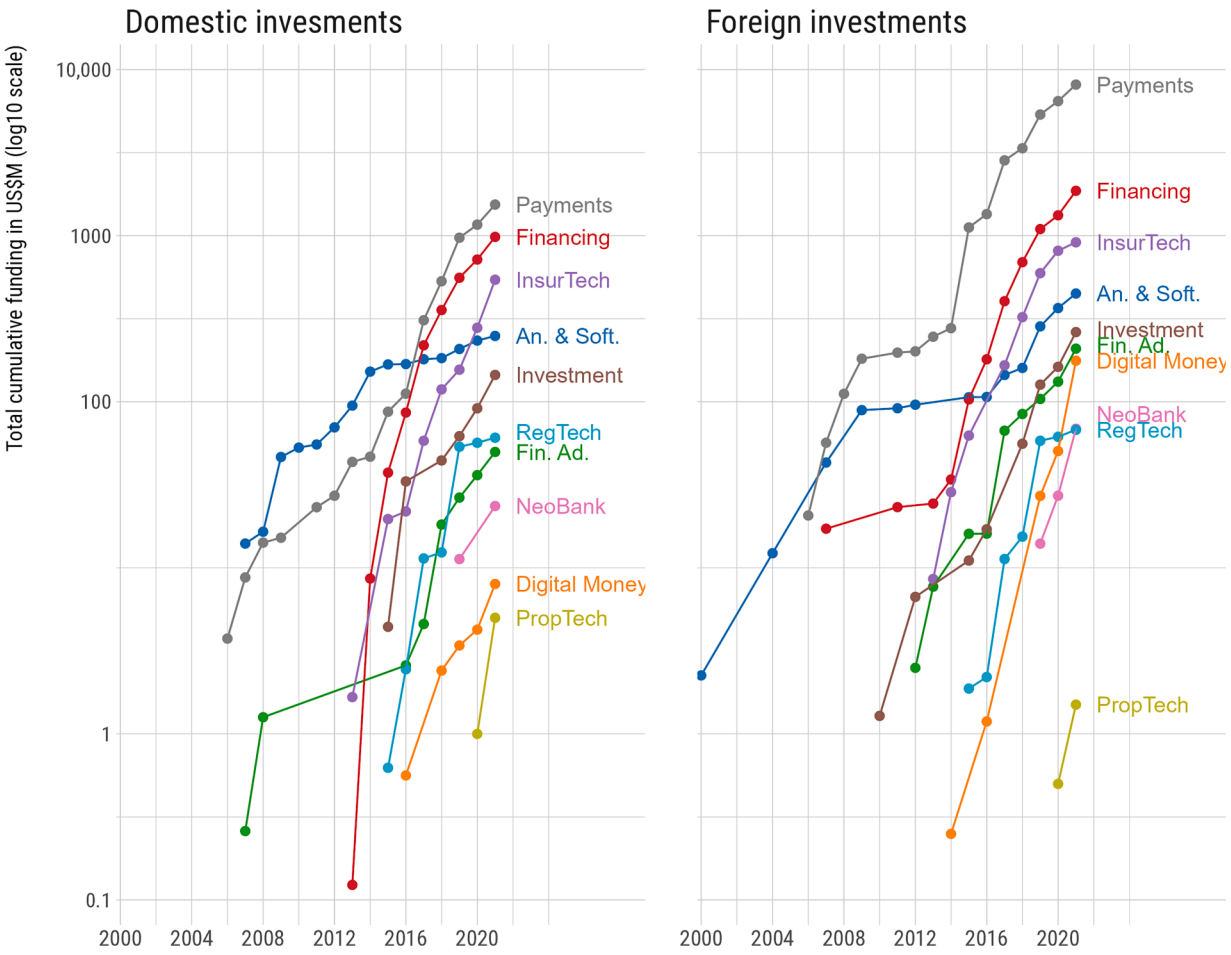


Fig. 3. Domestic and foreign investments across the FinTech sectors.

4. Infrastructural plumbing: A state-supported ecosystem

Policy support from government institutions and infrastructures are critical components of financial ecosystems. In India, an "extensive and hyperactive" state (Sarkar and Thapa, 2021) has been particularly instrumental in driving the digitalization of banking under the banner of promoting financial inclusion. The making of the "India Stack" (Carriere-Swallow et al., 2021), a state-supported, cloud-based set of infrastructures has enabled the growth of the most active FinTech sectors, namely payments and financing. Digital transactions, either for channelling money or underwriting loans, require i) a system to identify and evaluate the parties involved and ii) appropriate computing infrastructures. Both have been supported by the national government over the past decade through a range of programs and infrastructures that facilitated - or rather enforced - the transition to a cashless society (Jain and Gabor, 2020) and the rise of FinTech: "this government strongly believes that domestic demand will drive growth and, for the last five years, they've been putting the plumbing in place" (IP4).

First, FinTech firms benefited from the implementation of the Aadhaar project for biometric identification, originally launched in 2006 (Rao and Nair, 2019) and now a central layer of the India Stack through which firms can connect to Aadhaar's database in order to facilitate digital transactions (Dattani, 2020). Financial providers use a twelve-digit number to identify customers across this national ID platform. As Jain and Gabor recall, "1.2 billion bank accounts with 900 million mobile phone accounts and 1 billion Aadhaar numbers" were linked in 2016 (2020, p. 6). In 2017, the state also implemented a new Goods and Services Tax (GST) legislation that harmonized tax regimes across the country and enforced the monthly filing of financial data for businesses. This plumbing of data and identification systems knitted the "information dragnet" (Fourcade and Healy, 2017) that FinTech firms can plug into for identification purposes, especially in the sectors of payments, financing or neobanks.

Second, the National Payments Corporation of India (NPCI), an institution supervised by the Reserve Bank of India (RBI), created two key infrastructures: RuPay, a card payment system launched in 2012 to facilitate electronic transactions, and most importantly, the Unified Payments Interface (UPI), a powerful "mobile-based platform for transferring funds between banks that is open to all service providers" (Jain and Gabor, 2020, p. 10). A key component of the India Stack celebrated by Google, UPI has quickly evolved into a vital artery for the FinTech ecosystem, providing a "public utility layer" allowing "private innovation" and competition between digital payment providers (IP10). In October 2021, no less than 4.2 billion transactions worth over 7.7 trillion rupees were recorded through the UPI, with PhonePe (46 %), Google Pay (34 %) and Paytm (15 %) taking the largest share of the volume. FinTech firms use the UPI to process payments free of cost, bypassing the incumbent players such as Visa or Mastercard, creating a potential to deeply re-intermediate financial services industry:

> "*We genuinely think credit cards will die out in this market or will just become a very niche product that only exists for people that come in internationally, which is not many people and the rest of the country will go straight to completely digital payments.*" (IP2)

FinTech players benefited from the roll out of the India Stack implemented in the name of improving welfare delivery (Dattani, 2020) and financial inclusion, and also from the related massive and much criticized demonetization program. In November 2016, the central

government removed 86 % of currency notes from circulation, further encouraging the adoption of digital payments: "the only players to have apparently benefited from demonetization are the banks, with recorded increases in their returns on assets, and fintech companies" (Fouillet et al., 2021, p. 3). The government also relaxed some banking regulation, granting new licences to telecom companies such Reliance, Airtel and Vodafone-Idea to evolve into a "new category of banks which are not allowed to make loans and are expected to leverage technology to provide low-cost payment services to unbanked Indians" (Jain and Gabor, 2020, p. 8). Consequently, the percentage of population with a banking account dramatically increased from 53 % in 2014 to 80 % in 2017.

Lastly, the FinTech industry also benefits from tax incentives. The 2020 Union Budget granted tax rebates for merchants, with no charge on payments made through the domestic RuPay and UPI, while FinTech startups can claim an 80 % rebate on patent costs while being eligible for income tax exemption for the first three years of operation. These changes are seen as beneficial for firms operating in RegTech or financial advice, two sectors that experienced a later growth than payments and financing (see Fig. 3). This Bengalore-based digital risk advisor emphasized the foundational steps taken by the central government:

> "*They've set up policies, they've set up the India Stack for technology, there've been tax reforms, there've been financial reforms. (…) It's fascinating how the policy moved step-by-step. And now, later, in retrospect, I can connect the dots.*" (IP4)

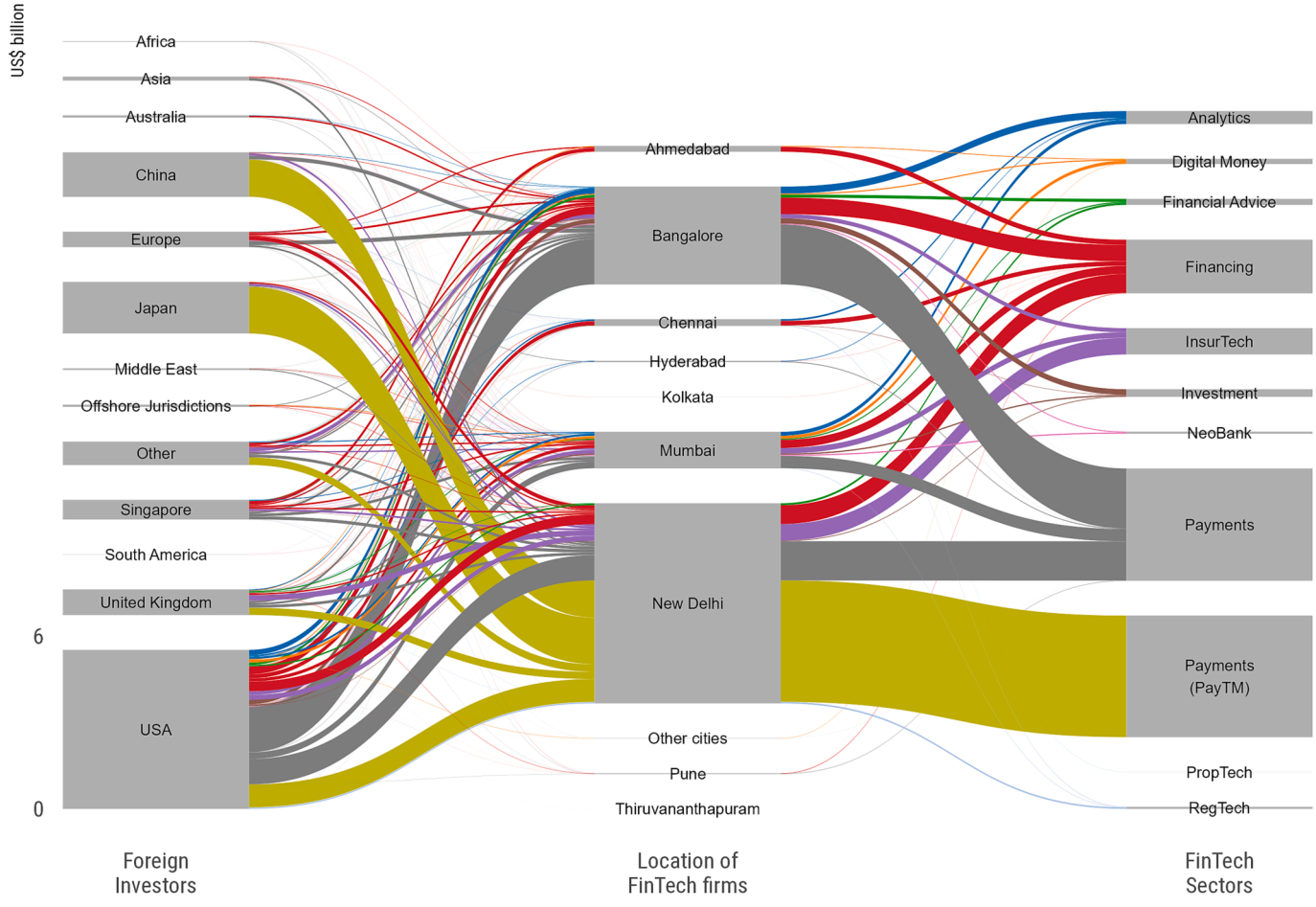
The Indian state is advancing this tech-driven political agenda. In June 2020, the RBI announced the creation of a Payment Infrastructure Development Fund (PIDF) to encourage and enable electronic and digital payments in India's small towns and remote areas. Further regulatory changes are expected to benefit other sectors such as investments or RegTech. In 2016, the RBI created at an inter-regulatory working group to report on FinTech and "appropriately reorient the regulatory framework" (Reserve Bank of India, 2016). Sandbox initiatives have also been undertaken by the Securities and Exchange Board of India (Iyer, 2020).

After charting the key elements of the Indian FinTech ecosystem on a national scale, we now turn to delving into the funding networks, locational patterns and labour dynamics that place Bangalore and New Delhi as the centre of the FinTech ecosystem, confirming these cities as emerging international financial centres.

5. Looking for India's FinTech capital: Bangalore or New Delhi?

5.1. New Delhi and Bangalore as central nodes of investment networks

Building upon our expert interviews and the analysis of the domestic and transnational networks through which Fintech firms source external



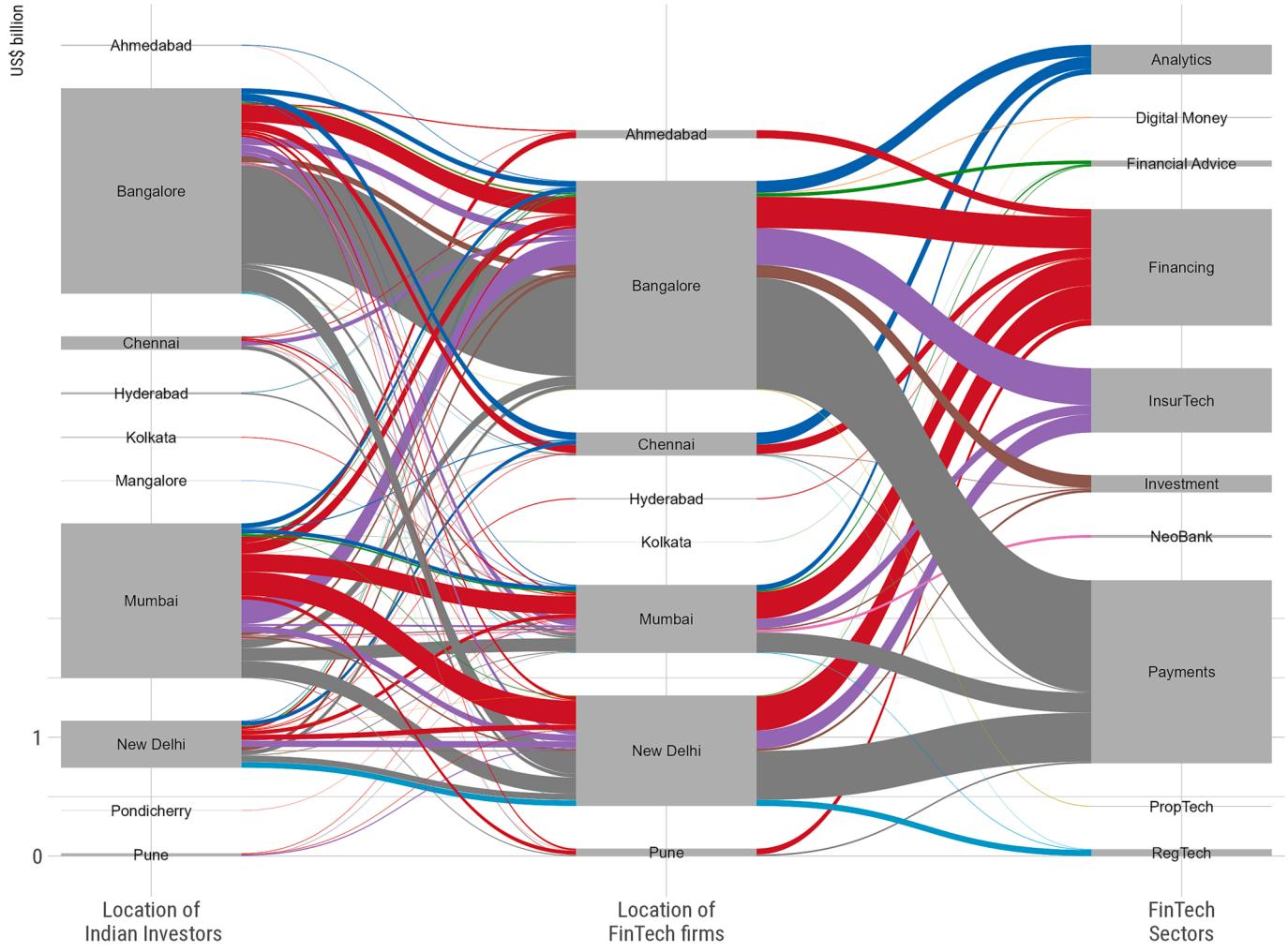
Notes: Color indicates the targeted FinTech subsector. Inward investments total 12.1$USbn.
Middle East: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UEA. Africa: Kenya, South Africa. South America: Brazil, Chile.
Asia: Indonesia, Philippines, Republic of Korea, Taiwan. Offshohre Jurisdictions: Cayman Islands, Mauritius, Seychelles.
Europe: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Ireland, Liechtenstein, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland.
Other: Australia, Canada, Israel, Turkey, Russia.

Fig. 4. Network of foreign investments in the Indian FinTech ecosystem.

capital, we argue that key domains such as human capital, pool of talent, real estate dynamics, and access to finance through transnational networks and cross-sector fertilization establish Bangalore as India's FinTech capital. Our quantitative results highlight the spectacular rise of New Delhi, especially on the recipient side for foreign investors, and the unique centrality of Bangalore in clustering firms with domestic investors. Both cities overtook Mumbai, the capital of India's finance since the early 20th century. The network of investments that structure and sustain the Indian FinTech ecosystem underline Bangalore's competitive advantages, building on the historical legacy of the offshoring and outsourcing industries, and animated by the entrepreneurial and migratory trajectories connecting the city to the US and the Bay Area (Saxenian, 2005).

In terms of access to finance, network visualizations highlight the centrality of Bangalore and New Delhi in FinTech's transnational networks (Fig. 4). Attracting 57 % of the total value of foreign investments ($US 12,1 billion), New Delhi emerges as India's main gateway for foreign investors (Fig. 4), Bangalore coming second with 28 %, well ahead of Mumbai (11 %). The rank of New Delhi is mainly attributable to one single firm: without Paytm's investments, Bangalore would account for 43 % of foreign investments, ahead of New Delhi (34 %). Chennai comes fourth in both domestic and foreign investments. In terms of firm-investor connections, the year 2015 was a turning point for the FinTech ecosystem which started attracting unprecedented amounts of money. The impact was twofold on metropolitan hierarchies: if New Delhi, Bangalore and Mumbai increasingly concentrated investments, other cities such as Pune, Ahmedabad and Hyderabad received their first significant waves of investments.

These transnational networks reveal how the Indian FinTech ecosystem, from Bangalore and New Delhi, contributes to regional integration in Asia-Pacific, through investments from China (Alibaba) and Japan (Softbank) in particular, echoing the rise of Asian investment banks (Wójcik et al., 2018). The investments received by Paytm have oriented the now publicly-listed firm's geographical expansion towards Canada, Japan, USA, and Singapore. These financial flows are strengthened by recent collaborations. In September 2021, Delhi-based Paytm Payment Banks announced a partnership with San Francisco-based Ria Money Transfer, a subsidiary of Nasdaq-listed Euronet Worldwide. In 2019, Paytm also partnered with Citi to create a credit card, after the bank acted earlier in 2016 as an advisor to Alibaba's investments into Paytm. Singapore functions as key financial centre of the Indian FinTech ecosystem, connecting firms to global investors (Lai, 2018). In terms of locational strategies, companies such as Milaap or Appknox, while created and operationally based in Bangalore, are headquartered in Singapore. In terms of regulatory entities, the Reserve Bank of India finalized in 2021 a partnership with PayNow, a platform designed by the Association of Banks in Singapore, allowing access to the UPI in order to enable cross-border payments and facilitate



Notes: Color indicates the FinTech sub-sector. Domestic investments total US$3.6 billion.

Fig. 5. Network of domestic investments in the Indian FinTech ecosystem.

the circulation of remittances. The FinTech industry also bears witness to outward financial activity by Indian firms, with Razorpay, headquartered in Bangalore and designing payment apps, recently buying a majority stake in the FinTech firm Curlec, based in Kuala Lumpur.

Most domestic investments concentrate within Bangalore's metropolitan area (Fig. 5), which underlines the unique strength of Bangalore's ecosystem in terms of proximity to investor, echoing similar patterns found in the Silicon Valley (Zook, 2002). Bangalore stands out as the main site of articulation between domestic investors and FinTech firms: Bangalore-based investors account for 48 % of the total US$3.6 billion raised by FinTech firms on the domestic side. The city also received 49 % of total domestic investments, well ahead of New Delhi (26 %) and Mumbai (16 %). Bangalore hosts 10 of the top 20 firms in terms of capital raised: PhonePe, CRED, Razorpay and Obopay (payments); Digit Insurance (InsurTech); KreditBee, Capital Float and Rupeek (financing); Groww (investment); Khatabook (analytics). New Delhi counts 6 firms (Paytm, Pine Labs, PolicyBazaar, BharatPE, OfBusiness, Aye Finance), and Mumbai 3 (Billdesk, Acko and Small Business Fincredit). Based in Ahmedabad, Lendingkart is the only firm located outside the three main cities in this top 20, which together represent 73 % of the total value invested in FinTech. The second position of Mumbai (36 %), largely ahead of New Delhi (11 %), bears testament to the appetite of incumbent financial institutions for FinTech, with key Mumbai-based players in VC and PE (including Matrix Partners India, Faering Capital, IIFL Asset Management, A91 Partners). Mumbai-based banks have also have invested in FinTech through subsidiaries, such as Kotak Investment Advisors or ICICI Venture. Results highlight yet the lower attractiveness of FinTech firms based in the financial capital (16 % of total domestic investments) compared to New Delhi and Bangalore.

5.2. *"Phenomenal ingredients for combustion": Bangalore's unique ecosystem*

These quantitative insights confirm the uniqueness of Bangalore's ecosystem, which we further examine here. First, locational strategies of FinTech firms are informed by the availability of cheaper real estate, a key criterion for startups that seek to lower the "cost of opening" (IP3), where "Bangalore is winning out over Bombay or other places" (IP10). Most importantly, FinTech firms also find in Bangalore a particularly favourable labour market, especially for talent in programming and understanding of finance. In terms of human capital, Bangalore overcomes its counterparts both in terms of supply and skills level: for this Mumbai-based FinTech executive, Bangalore stands out as "probably the only city in the world where you can hire 1,000 programmers in a week" (IP9). For instance, while mutual funds, for the most part based in Mumbai, have their own technology teams, the level of technical capabilities to build or "scale a product" is "not in Mumbai" (IP1), but in Bangalore. This comparative advantage is rooted in Bangalore's economic trajectory as the first global leading offshoring hub, further echoing path-dependent nature of the FinTech ecosystem:

> "*Bangalore has been always the first city that people will say I want to offshore to India (…) the offshore drove a huge upgrade of human capital, right? IT services gave us a bunch of professionals who have done project management in a global context, who have travelled overseas*" (IP7)
> "*It was just a tech city all the way along, so I think it was natural that some of the stuff start blossoming here.*" (IP8)

In this tech-driven ecosystem, the provision of talent is linked to the long-term presence of the "most advanced government technology institutes" (IP4) and other prestigious universities, which have strategically adapted their curriculum to provide the new type of skills in "data science, big data, machine learning, artificial intelligence" (IP11). Bangalore is therefore uniquely placed to match the new demands from the financial industry and innovates on the technological front, as shared by this FinTech executive with past experiences in London and investment banking:

> "*India is not just a sort of services hub for the world, it's now even a very highly skilled talent hub. Like if you're Uber and you need the top 10 Python engineers in the world, five of them will be in Bangalore actually, that's just where they are*" (IP2)

These long-standing interactions between global bank, "outsourcing or offshoring companies, whatever you call it" (IP6), and higher education institutions feed the local FinTech ecosystem with ideas and people trained at and accustomed to working at the intersection of tech and finance. This interviewee with 20 years of experience in one of India's leading outsourcing firms describe Bangalore's growth and ecosystem as a:

> "*a dance between captives and third parties, between tech and non-tech and between finance and sort of other resources that has produced more engineers than any other state in India.*" (IP10)

In terms of access to capital, Bangalore functions as the main cluster of startups and investors, a feature that that our interviewees emphasized repeatedly. If Mumbai hosts the largest number of FinTech investors (94) identified on Crunchbase, Bangalore also hosts numerous PE and VC firms particularly active in the FinTech sector, such as Sequoia Capital India, the second largest and most active FinTech investor in India (58 participations, 14 % of total domestic investments), Premji Invest, Chiratae Ventures, Kalaari Capital or Prime Venture. On the recipient side, Bangalore-based firms display the highest ratio for sourcing external capital: 52 % of the 316 firms were involved in at least one funding round, ahead of Mumbai (44 %) or New Delhi (35 %). With an extensive experience in banking, this executive of a US-headquartered asset management firm categorizes Bangalore as "the start-up hub. It is the place for venture capital firms." (IP8). While the presence of PE and VC firms is not exclusive to Bangalore, this key component of a FinTech ecosystem proves to be more dynamic compared to other Indian cities:

> "*For venture capital, I'd say that it is really an important part of the ecosystem and may even be the centre of gravity, right? Even if you have venture capital in other places, it's alumni of Bangalore who have graduated there and also just, it's probably you know more important than Bangalore venture capital, is just the entrepreneurial ecosystem.*" (IP10)

These entrepreneurial networks work "really well in Bangalore, maybe better than even in Mumbai or Delhi" (IP2), supported by the provincial government of Karnataka through incubation programs and large-scale industry events such as "Elevate" (IP3). In other words, the local FinTech ecosystem is characterized by comparative advantages for cross-industry innovations in financial technologies, where Bangalore is "streets ahead" (IP5):

> "*Your VCs, your start-up hubs, educational institutions, ideas, experience, IIM [Indian Institute of Management] Bangalore, IISC [Indian Institute of Science]; those are phenomenal ingredients for combustion (…) You could have a payment system versus a security layer, that could by synergised. So, that kind of synergy happens very often when you have a large ecosystem.*" (IP5)

Entrepreneurial networks endorse Bangalore's ecosystem with a distinctive, long standing and privileged link to the US and the Silicon Valley (Chacko, 2007). Returning entrepreneurs and Bangalore alumni sustain and leverage these transnational social networks, facilitating access to external capital. Fig. 4 highlights the importance of links with US investors, who account for 45 % of all foreign investments in FinTech, ahead of Japan (15 %), China (13 %) and the UK (7 %). San Francisco-based investors account for the second largest share (14 %) of foreign investments for a total of 223 funding rounds, behind Tokyo (15 %, 22 rounds) and ahead of New York (12 %, 82 rounds). Bangalore is the main recipient of capital flows from the Silicon Valley, with 100 funding rounds for a total of US$ 778 million. The geographical

footprint of these investments confirm that the social and financial networks forged by the Indian diaspora (Ghani et al., 2014; Saxenian, 2005) constitute a distinctive feature of the FinTech ecosystem.

A critical aspect of the Bangalore ecosystem are the cross-industry transfers of financial and human capital. While "the same IT companies now are providing the human capital for FinTech start-ups" (IP4), IT firms also recycle the capital accumulated into the FinTech sector. PremjiInvest, for example, was created by the founder of Wipro, the outsourcing giant headquartered in Bangalore. Similarly, Navi, a Fintech group based in Bangalore was funded in 2018 by Sachin Bansal, a former Amazon employee and founder of the e-commerce platform Flipkart, created in 2007 and acquired by Walmart in 2016 for 16 $US billion.

> "*So, he [Sachin Bansal] has just applied for India's first digital bank. What Flipkart did for organised retail, he wants to do that for financial services*." (IP10)

The Fintech ecosystem is therefore nurtured by the profits and know-how developed in other digitally-driven industries, such as e-commerce.

The unparalleled clustering of firms and investors, the transnational natures of their links, the cross-sectoral fertilization dynamics in terms of access to finance, recycling talent and capital, and the uneven anchoring of investments across Indian cities explain Bangalore's status as a leading FinTech centre in India. The unprecedented rise of Bangalore and New Delhi in the FinTech era questions the role and position of Mumbai as India's incumbent financial capital.

6. "I prefer the Indian model": Mumbai and Bangalore as complementary ecosystems

Analysed from the perspective of Bangalore's ecosystem, the FinTech industry, rather than a dethroning of Mumbai, needs to be understood as a re-intermediation of finance through the connection of two distinct yet complimentary ecosystems, which contribute to national and global processes of economic integration within and beyond India.

6.1. FinTech firms: connecting Bangalore with Mumbai and beyond

To assess how the interaction between new firms and incumbent financial actors translate into organizational change and geographical reconfigurations between cities, we focus here on two FinTech firms from our interview sample and compare their products, locational strategies, and inter-firms relationships. Firm 1 (IP1) operates in the sector of investments; Firm 2 (IP2) in consumer financing.

Since both companies develop digital platforms to connect users with investment products or loans, they flourished on the defining features of the Indian ecosystem at the national level presented in the first section: a rising smartphone penetration rate, the implementation of open digital infrastructures, and the rolling out of a favourable legislation. First, they successfully obtained the green light from regulating authorities. Firm 1 was granted a licence in 2018 from the Securities and Exchange Board of India (SEBI), while Firm 2 obtained a Non-Banking Financial Company licence from the RBI. The demonetization program and the related push for digitalization of money also benefited these companies. The nation-wide implementation of the Aadhaar project was a critical step for their respective growth, facilitating automated identification procedures. Plugging into the UPI facilitated payment transfers and execute identification procedures:

> "*Today if you want to invest, you can just open our app and you can start and you can probably get ready, in fact we have people who get ready in two to five minutes, do the full investment and eKYC, everything is done, bank verified, everything is done. This process exactly 10 years back when I started my first investment used to take about four to five days.*" (IP1)
> "*This was at the time when India developed its unique identity system and then everything around that which is now called India Stack and I guess that made me even more excited because suddenly it felt like we had digital KYC [Know Your Customer] (…) anyone that's in the lending business will tell you, being able to robustly authenticate and identify people is the most important thing, step one, in a digital lending business.*" (IP2)

Both companies chose to base their operational headquarters in Bangalore to capitalize on the strengths of the local tech-driven ecosystem. Firm 1 was founded in Bangalore to source the relevant skills and marketing talent. Originally based in Mumbai "to be close to the financial institutions (…) the regulator, the lawyers, the consultant" (IP2) to obtain a licence, Firm 2 then moved to Bangalore attracted by lower real estate costs and larger availability of talent for scaling up, reflecting a larger trend within the FinTech industry:

> "*I chose Bangalore because obviously I wanted to be an organisation which is very, very tech focused. (…) obviously you can't build a product just because you have engineers, you need to have an ecosystem of good product designers, you need to have a system of people who understand data, people who can look at data and interpret that because, who can manage the product, so product design, product management, growth or business analyst.*" (IP1)
> "*I started you know asking around other companies that were trying to build in Bombay and realised that people would have like a small head office in Bombay but all their tech and engineering would be in Bangalore or Hyderabad or Pune." (…) So, I think it was a combination of we just won't be able to get the tech talent as deeply and easily and we would be able to get you know cheap, affordable office space for our team.*" (IP2)

Moving to Bangalore was a key strategy to benefit from the networking opportunities offered by Bangalore's ecosystem for accessing finance and creating connections:

> "*Almost every day there's some event I'm invited to, some kind of meet-up or panel or hackathon or whatever and whilst a lot of it's a waste of time, I imagine for an early-stage company starting out, these events are really useful for finding partners, providers, vendors, investors, team mates, co-founders*" (IP2)

Both companies maintain a close connection to corporate partners based in Mumbai, as their platforms essentially provide consumers with an instant access to services traditionally rendered by incumbent financial institutions. Instead of retailing its own funds, Firm 1 features on its investment platform the products manufactured by Mumbai-based asset management companies and mutual funds: "obviously all our partners, all the AMC investment companies that visit, they are operating out of Bombay (…) all the manufacturers are based in Bombay" (IP2). Similarly, Firm 2 does not lend to consumers in its own capacity, but rather connects borrowers to traditional lenders through its platform: "we now have to work with NBFCs and banks, they provide the capital, we use their balance sheet" (IP1). This re-intermediation of financial services also sustained by regular face-to-face meetings between Bangalore and Mumbai, which remain essential in the industry to forge partnerships and create trust.

> "*Our team members would discuss with AMCs, and these folks would come the next day in the morning. So, I think the way it works is, while it's different geography but I think it's not that far as well, so people are connected.*" (IP1)
> "*I personally spend probably-two days a week in Bombay, in the offices of banks and NBFCs (…) You know banks are never going to sanction a credit line to a startup without a lot of physical face-to-face visits. So, we've now started to build a team in Bombay.*" (IP2)

These regular interactions between FinTech and incumbent firms echo how Bangalore's geographical location constitutes a comparative advantage:

> "*The other strength of Bangalore is the location; bang in the centre of South India. No centre is too far. Mumbai is one hour; Hyderabad is one hour; Chennai, less than an hour; Kochi, everything is close by*". (IP10)

In terms of access to finance and proximity to investors, both firms raised capital mostly from foreign investors, participating in the integration of Indian cities within global financial networks. To source capital and expertise, Firm 2 leveraged their personal networks to raise funds in the Silicon Valley, securing an investment from a leading venture capital firm in the global FinTech Sector. This process of integration from and beyond Bangalore across the Asia-Pacific region is also exemplified by Firm 2′s strategy to relocate its legal headquarters to Singapore, as "a lot of foreign investors have issues investing in Indian companies" (IP2), especially US investors who were enquiring about the potentiality of setting up a holding company in Singapore. Relocating legal headquarters to a major financial centre in Asia moved the company closer to potential investors and provided a sounder legal environment for the registration and protection of intellectual property, software, and other technology patents.

The use of Singapore as an anchorage point for Indian firms and as a gateway for external investors, and the relevance of Mumbai for sourcing partners and receiving legal advice suggest that the organization change triggered by FinTech, rather than fundamentally disrupting existing corporate practises and metropolitan hierarchies, rather confirm the position and role of established financial centres, while supporting structural changes for India's financial geography.

6.2. Two ecosystems working in tandem

As FinTech re-intermediates financial services in India, particularly in the field of digital transactions for payments or financing, the inter-firm connections, types of products, and network of investments suggest that India's financial geography is structured around Mumbai and Bangalore, which operate as two distinct yet complimentary financial centres, with New Delhi as a key and rising third, which own ecosystem and its connections to Mumbai deserve further exploration beyond the scope of this paper. While Bangalore rose as the current FinTech capital, Mumbai is not dethroned as the main financial centre, but rather repositioned as a distinctive ecosystem characterized by the historical concentration of the "banking industry", the "insurance industry", the "mutual funds", the "regulators" (IP5), and other Advanced Producer Services. When asked to assess the potential of Bangalore's upward trajectory in challenging Mumbai's position, the majority of our respondents emphasized Mumbai's sticky power, resulting from the presence of incumbent finance, distinct from the digital newcomers headquartered in Bangalore:

> "*When it comes to financial ecosystem, I think Bombay will remain the hub of that but I think what Bangalore will differentiate […] I think that hub for tech driven businesses will be Bangalore but the hub for financial services is still going to be Bombay*." (IP1)
>
> "*Because the exchange is here, because the regulator is here, because the central bank is here, I believe Mumbai will stay like at a higher pace than the rest of the cities.*" (IP6)

Rather than a rivalry between an established and an upcoming financial centre, industry experts highlighted how the-reintermediation of finance leads to a model wherein financial products manufactured in Mumbai are commercialized through digital technologies developed in Bangalore. The digitalization of payments, in particular, underlines that the channelling of transactions through Bangalore-based platforms does not equal a transfer of power from Mumbai to Bangalore:

> "*All of it is going through on platforms that have been developed in Bangalore, but that financial transaction volume is not associated with being out of Bangalore (…) The large number of decision makers(…) they're all based out of Mumbai. So as long as the domain or the area where decisions are taken doesn't move, it's unlikely that the financial capital itself will move*." (IP5)

In other words, FinTech unfolds as a re-intermediation of finance by plugging the Mumbai-based incumbent institutions to consumers through the more innovative, app-friendly and tech-driven Bangalore ecosystem, echoing how the Indian model is characterized by a collaborative rather than a confrontational interconnectedness:

> "*In London, the sort of mantra was the fintechs will kill all the banks (…) And, honestly that didn't really play out over the last decade and so I kind of prefer the India model which is the fintechs or the tech companies will touch the customer but there will always be a bank behind the scenes, you know securing the capital and stuff like that. And those kinds of partnerships seem to be I think working a lot better here than they did in other parts of the world.*" (IP2)

The partnerships evoked here between Mumbai and Bangalore actually reflects the "enrolment of FinTech products and services into existing bank offerings" (Lai, 2020). If our results indicate that the financial capital of India is lagging behind in terms of firm creation and investments, confirming the views expressed by this experienced Mumbai-based executive passed by US and Indian investments banks that "Mumbai has given technology largely speaking a pass" (IP3), incumbent financial firms are nonetheless actively shaping the FinTech ecosystem, either by concluding "fintech partnerships [which have] grown out the pool of targeted customers" (IP5), investing in or acquiring FinTech firms. For instance, FreeCharge, a buy now-pay later app, was acquired by Mumbai-based Axis Bank in 2020, while incumbent firms such as such as HDFC or Kotak Mahindra (banking), Tata or Reliance (financial conglomerates) or Max Life (Insurance) have created FinTech incubators in Mumbai. The rise of mobile payments, automated loans, InsurTech or neobanks does not threaten but rather bolsters the position of incumbent actors. India's financial geography as reshaped by FinTech is now structured around the complementarity between the incumbent financial centre (Mumbai) and the new technical capabilities and networks of investments found in rising financial centres as finance becomes increasingly digitalized (Bangalore and New Delhi).

7. Conclusions and implications

Using a financial ecology approach, this paper unpacked the pioneering FinTech industry in India through a longitudinal and multiscalar analysis to reveal a "Tech-Fin-State" ecosystem, confirming the transformative effect of the FinTech industry on the geography of finance and financial centres within and beyond India. In doing so, this paper lays out primary contributions to the study of FinTech and financial geography, pointing out to future lines of enquiry for economic geographers.

From the vantage point of India, the role of FinTech on the upward trajectory of Indian cities underlines how the ICT sector is becoming an integral component of the APS complex that participates to the uneven integration of cities within global financial networks in the era of platform capitalism (Bassens et al., 2020). The rise of New Delhi and Bangalore as International Financial Centres connected to investors worldwide underline the path-dependency dynamics shaping the FinTech ecosystem in India. For Bangalore, the path-dependency effects of the export-oriented IT industry are particularly visible in nurturing the pool of talent and turning the city into a innovation cluster, while the capital originally accumulated in the IT sector is recycled towards FinTech through a dynamic VC scene – another evidence of the cross-sectoral fertilization that animates the Indian FinTech ecosystem. New Delhi emphasizes the similar foundational function of the telecom industry in paving the way for digital payments where FinTech firms bank on the mass penetration of smartphones and builds upon public infrastructures such as the UPI. Overall, our analysis of FinTech confirms the transformative nature of FinTech and put New Delhi on the map as a rising International Financial Centre, emphasizing the need to extend the economic geography of Indian cities beyond existing contributions mostly focused on Mumbai and Bangalore. While our paper focused on the relationships between Bangalore and Mumbai, future research needs to extend the study of cross-sectoral and inter-firm relationships that animate the FinTech industry across other Indian cities such as New

Delhi, Chennai, Pune or Hyderabad. Given that the Indian FinTech ecosystem seems to enter a stage of consolidation, the gap between Bangalore, New Delhi, Mumbai and the other cities is indeed likely to deepen, further challenging the already uneven spatial economy of the country. In that regard, India points out to an urgent need to develop a geography of FinTech consumption from both quantitative and qualitative perspectives. Such research questions remain largely unexplored in the current literature (Bhagat and Roderick, 2020). Beyond the steady increase of UPI-enabled transactions, is the growth and maturing of the FinTech ecosystem promoting financial inclusion in India by reaching out to unbanked and underserved customers across the country? Or is this new industry powered by the India Stack rather enabling a new and selective growth regime around platform technologies in tier one cities, further deepening regional inequalities? While these central questions on the social structures of FinTech *consumption* are beyond the scope of this paper, our analysis of the geography of FinTech *production* suggests that FinTech might increase regional inequalities.

Captured from the Indian ecosystem, the re-intermediation of finance underlines how FinTech firms transform the geography of financial centres through collaborations rather than competition with incumbent finance, confirming previous research. India's financial geography is structured around two ecosystems working in tandem: a tech-driven, dynamic, and globally connected ecosystem in Bangalore, India's FinTech capital, and a finance-dominated ecosystem in Mumbai. On the one hand, Mumbai as the traditional financial centre clearly remains an obligatory passage point for FinTech entrepreneurs to interact with regulators, conclude partnerships with incumbent financial institutions, or venture into stock markets, as exemplified by Paytm's IPO on the Bombay Stock Exchange. On the other hand, Bangalore emerged as the main cluster for investors and firms seeking to upscale their products, also attracting foreign FinTech firms seeking to gain market share on the domestic market, as exemplified by Revolut's recent arrival in Bangalore. Back in 2004, it was suggested that Bangalore' position as a service hub restricted to back-office functions of foreign firm turned the city into "Silicon Valley's India" rather than "India's Silicon Valley" (Parthasarathy, 2004, p. 266). Yet over the last decade, Bangalore emerged as a unique innovation hub, boosted by the concentration of venture capital and FinTech firms. In that regard, the trajectory of Bangalore calls for further and renewed comparison with the Bay Area, which despite the relatively weaker presence of incumbent finance compared to world cities such as London or New York (Taylor et al., 2021), became a global financial centre through the clustering of technology firms, talent, and private capital (CCAF, 2018; (Cassis and Wójcik, 2018). The strength and features of Bangalore's ecosystem further calls for comparative studies in order to center the Global South in understanding the transformations of financial geography.

Finally, one of our primary contributions in this paper is to underline the prominent and proactive role of the central state in supporting FinTech. Comparing with the "Fin-Tech-State triangle" cultivated in Brussels (Hendrikse et al., 2020), FinTech in India should rather be conceptualized as a "Tech-Fin-State" ecosystem, as it stems from the historical prominence, networks and comparative advantages of the export-oriented ICT sector, rather than finance itself, and from the remarkable involvement of the central government to support and orientate the implementation of a pioneering infrastructural plumbing. Through new legislation and large-scale digital infrastructures, the central government has been instrumental in shaping the FinTech ecosystem, advancing in the process its political agenda at the national and global scale (Sukumar, 2019). While FinTech firms advance the demonetization of the country and turns into a vehicle of regional integration with investors from Asia, the state leverages the UPI and the India Stack for institutional collaborations with Singapore, involving central institutions such as the Reserve Bank of India. Overall, these trends question the potential of FinTech for fast internationalisation and state relations, with India contrasting with the limited cross-border integration that characterizes the FinTech industry across South America (Ioannou and Wojcik, 2022).

Globally framed as a model, could the Indian FinTech ecosystem turn into a soft diplomatic power for a country historically placed in a subordinate position in global financial networks? Announcing the worldwide opening of the India Stack's repository as a "global public good", Prime Minister Modi's prided himself on India "guiding the world in the fourth industrial revolution" (ANI, 2022). The position of India and its use of FinTech infrastructures contrast here with the – debated – neocolonial nature of FinTech development in other emerging economies such as South Africa (Langley and Leyshon, 2022; Pollio and Cirolia, 2022) or Kenya (Bernards, 2022). This paper calls for further exploration on the political economy of FinTech, especially how state entities shape and orientate FinTech development with regards to issues of state power and state making (Gruin, 2019). In that regard, the expected development of a Central Bank Digital Currency (CBDC) by the Reserve Bank of India might inform the other CBDC projects that multiply on a global scale. From the vantage point of India, a central question for economic geographers will revolve around how financial technologies and policies crafted in the Global South circulate in the forms of South-North and South-South relations, shaping FinTech ecosystems and changing the geography of finance.

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CRediT authorship contribution statement

Julien Migozzi: Conceptualization, Methodology, Formal analysis, Data curation, Visualization, Writing - original draft, Writing - review & editing. **Michael Urban:** Conceptualization, Investigation. **Dariusz Wójcik:** Conceptualization, Supervision, Project administration, Funding acquisition, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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Appendix

List of interviews.

Interview Code	City	Sector
IP1	Bangalore	FinTech – Investments
IP2	Bangalore	FinTech – Financing
IP3	Mumbai	Investment Banking
IP4	Mumbai	Management Consulting
IP5	Bangalore	Industry Association
IP6	Mumbai	Wealth Management
IP7	Bangalore	Management Consulting
IP8	Bangalore	Asset Management
IP9	Mumbai	FinTech – Wealth Management
IP10	Bangalore	Human Resources
IP11	Mumbai	Consulting
IP12	Mumbai	Insurance
IP13	Mumbai	Stock Exchange

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