

**MICROECONOMICS OF COMPETITIVENESS, SPRING 2016
HARVARD BUSINESS SCHOOL**

Professor Laura Alfaro

THE UK'S FINTECH CLUSTER

**LEVERAGING THE UK'S STRENGTHS
IN FINANCIAL SERVICES, TECHNOLOGY,
AND ENTREPRENEURSHIP**

Authors:

Jared Davis, Laura Grimmelmann, Brayden McCarthy,
Sofia Pietrella, Grant Whiting

May 6, 2016

Required Disclosures:

1. Jared Davis: Worked in the London financial services sector (banking, private equity, and hedge fund) for 4+ years and visited London four times during the semester for reasons unrelated to the project.
2. Laura Grimmelmann: Worked in the London financial and professional services sector (consulting and private equity) for 5+ years and visited London six times during the semester for reasons unrelated to the project.
3. Brayden McCarthy: VP of Strategy at Fundera, a leading fintech loan marketplace based in New York, and co-author with former SBA Administrator Karen Mills and current Harvard Senior Fellow on a white paper on the state of small business lending in the U.S. and how fintech may change the game.
4. Sofia Pietrella: Worked in London in the financial services sector (investment banking) for one year and in the media sector (advertising) for three. Visited London once during the semester for reasons unrelated to the project.
5. Grant Whiting: Received a Masters of Philosophy from Cambridge University in 2008

TABLE OF CONTENTS

[Executive Summary](#)

[Regional context: the United Kingdom](#)

[Endowments and Location](#)

[Human Development & Political Institutions](#)

[Monetary and Fiscal Policy](#)

[Economic Performance](#)

[State of Cluster Development](#)

[National Business Environment](#)

[Cluster focus: London's FinTech](#)

[Introduction to the cluster](#)

[Mapping the Cluster](#)

[Historical Development of the FinTech Cluster](#)

[Cluster Performance](#)

[Comparative snapshot of global FinTech clusters](#)

[Cluster analysis](#)

[Recommendations for the UK's FinTech cluster](#)

[Bibliography](#)

Executive Summary

In this paper, we introduce the United Kingdom and the factors that have been at the basis of the flourishing of a FinTech cluster. We first describe the elements that have contributed to its current business environment (endowments, location, human development, monetary and fiscal policies). We then proceed to characterise its economic performance, with a focus on the current state of the economy - describing its main clusters. We qualify its business environment through the lenses of factor conditions, context for firm strategy and rivalry, related and supporting industries, and demand conditions (diamond analysis).

We proceed to take a deeper look at the FinTech cluster itself. We qualify the ‘emergent’ FinTech cluster (as opposed to the ‘traditional’ one) and describe its four main sub-clusters: payments and remittances, lending and banking, investment and insurance, and software and data. We draw a map of the cluster, presenting its supporting infrastructure, talent pool, related industries, and then progress into describing its historical origins through the history of London, of the financial services industry, and of the local tech concentration. We then compare it against other FinTech clusters in the world and assess its performance through another ‘diamond analysis’ as we did earlier for the UK as a whole.

We conclude our paper with recommendations for the UK to set the stage for the FinTech cluster to continue to thrive in the future, applying a similar framework used for the ‘diamond analysis’.

Regional context: the United Kingdom

The United Kingdom (UK) is a former global empire, current hub for international finance, and a leading service economy. Ranking 10th in global competitiveness according to the World Economic Forum’s 2016 report, it outperforms the average of advanced economies across all pillars save one (WEF, 2016). A parliamentary democracy, it boasts

some of the world's best legal and political institutions, and ranks 14th globally for Human Development (UNDP, 2015).

Endowments and Location

The UK has a GDP of approximately \$2.66 trillion, and a population of approximately 65M people, making it the third largest country by both size of the economy and population in the European Union, behind Germany and France (EIU, 2016). Ranked as an OECD high income country, it has a GDP per capita of \$46,297, ranking 19th globally according the World Bank (World Bank, 2016).

The UK was historically endowed with robust agricultural land, natural resources crucial for industrial production, and harbors and waterways that promoted trade, exploration and transportation. England was historically endowed with rich coal and iron reserves, which provided crucial energy for early industry, as well as the primary material from which early industrial machinery was constructed. The UK coal industry has been steadily declining for more than 100 years, since its peak in 1913, however the discovery of oil and gas in the 1960s helped replenish the UK's energy supplies (Woolf, 2007). The UK ranks first in oil production and second in natural gas production in the European Union, however the production is declining over time (USEIA, 2016). The UK's irregular coastline provides numerous natural harbors suitable for supporting large merchant fleets, including eighty commercial ports. Moreover, the numerous internal rivers and waterways provided efficient early commercial transportation as well as hydroelectric power (Woolf, 2016). Finally, a large percentage of the overall land is arable, with 71% of total land capable of supporting agriculture, whether arable or pasture land. This much higher than, for example, the United States' 44.5% of agricultural land.

As an island nation, the UK benefitted early on from industrial growth largely uninhibited by European wars despite its participation throughout the 18th and 19th centuries. More recently, the UK has benefitted greatly from its proximity to European markets, particularly after their accession to the EU in 1973, providing access to \$17 trillion market, and access to high-skilled labor for its large services sector. A recently politically and economically stable neighborhood has helped the UK economy. However, the threat of an exit from the EU (or *Brexit*), which will be decided in June of 2016 via popular referendum, could undermine future access to this market, hindering the UK's future potential. The EU is currently the UK's largest trading partner, making up 44% of exports and 53% of imports of goods and services in 2015, with over three million jobs linked, directly or indirectly, to EU exports. The EU is also a significant source of inward FDI into the UK, accounting for 48% of the total stock (Webb 2016).

Human Development & Political Institutions

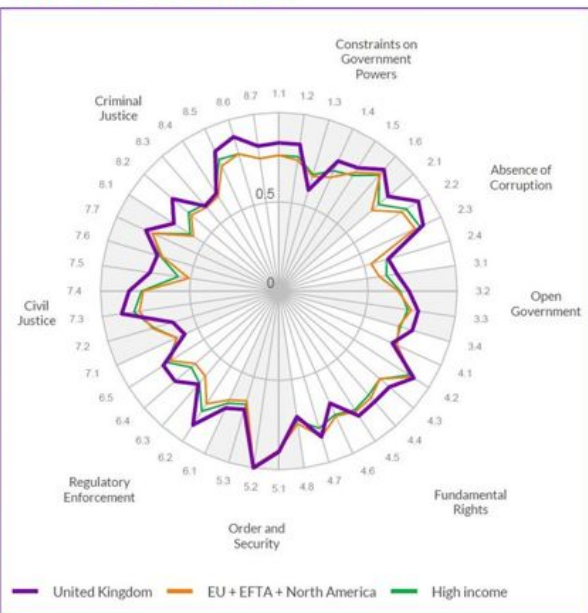
A robust parliamentary democracy, the UK has strong political and legal institutions, ranking high globally across numerous metrics and indexes, meeting and often outperforming high income and developed peers. According to the *WJP Rule of Law* index, the UK ranks 8th in Open Government, 11th in Constraints of Government Power and Criminal Justice, and 15th in Absence of Corruption, out of 102 countries surveyed (WJP, 2015). According to the *Global Competitiveness Index*, the UK ranks 3rd for Property Rights, 6th for Efficiency of Settling Legal Disputes, 7th for Intellectual Property Protection, 10th for Judicial Independence, and 13th in Transparency of government decision-making, out of 140 countries (WEF, 2016).

Exhibit 1 (WEF, 2016; WJP, 2015)

The Global Competitiveness Index

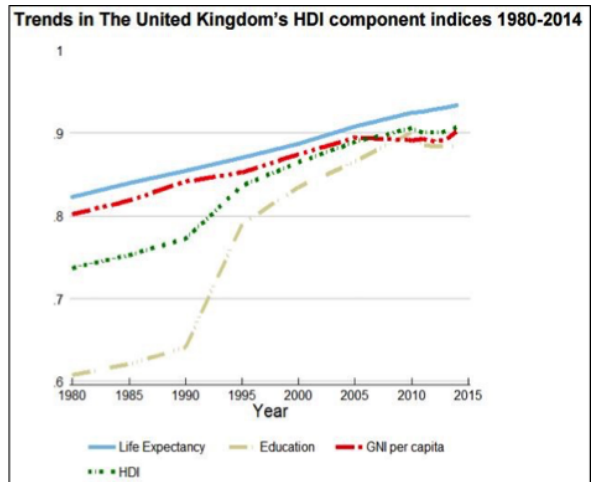
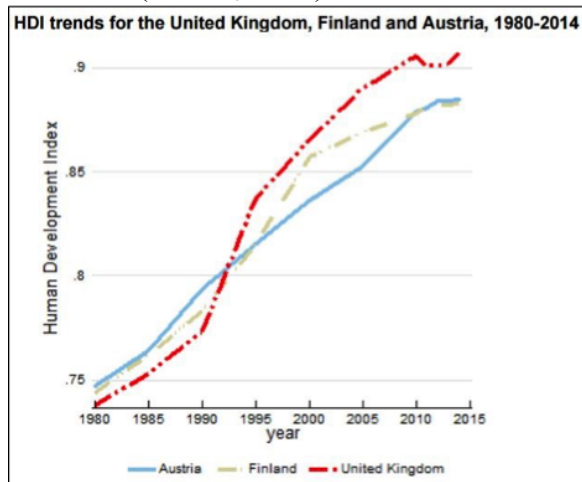
INDICATOR	VALUE	RANK/140
1st pillar: Institutions		
1.01 Property rights	6.3	3
1.02 Intellectual property protection	6.0	7
1.03 Diversion of public funds	5.6	15
1.04 Public trust in politicians	4.5	22
1.05 Irregular payments and bribes	6.0	15
1.06 Judicial independence	6.2	10
1.07 Favoritism in decisions of government officials	4.5	18
1.08 Wastefulness of government spending	3.8	34
1.09 Burden of government regulation	3.9	33
1.10 Efficiency of legal framework in settling disputes	5.7	6
1.11 Efficiency of legal framework in challenging regs	5.3	9
1.12 Transparency of government policymaking	5.5	13
1.13 Business costs of terrorism	5.1	83
1.14 Business costs of crime and violence	5.2	44
1.15 Organized crime	5.7	33
1.16 Reliability of police services	5.6	25
1.17 Ethical behavior of firms	5.5	20
1.18 Strength of auditing and reporting standards	5.9	15
1.19 Efficacy of corporate boards	5.7	16
1.20 Protection of minority shareholders' interests	5.4	10
1.21 Strength of investor protection, 0-10 (best)*	7.8	4

WJP Rule of Law Index



According to the most recent Human Development Report, the UK ranked in the “very high human development category”, ranking 14 out of 188 countries and territories. In addition, the UK’s human development ratings have increased 22.9% since the 1980s, similar to Sweden’s overall growth. During this time period, the UK’s life expectancy at birth grew by over 7 years, the average years of schooling increased 5.6 years and expected years of schooling increased by 3.3 years. Finally, the GNI per capita grew by about 92.7 percent between 1980 and 2014 (UNDP, 2015).

Exhibit 2 (UNDP, 2015)



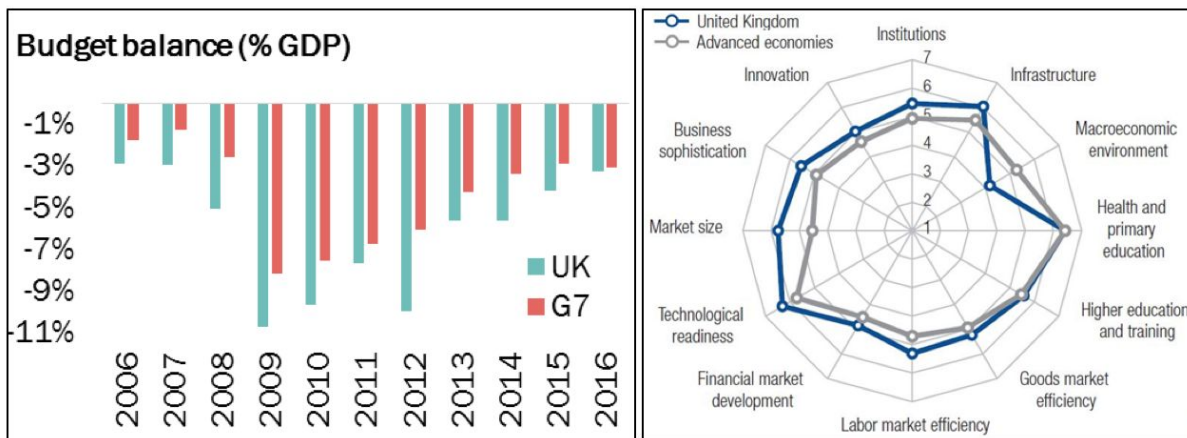
Overall, the UK has performed very well across both political and social metrics, and although some sub-sections of these categories, such as skills development for basic and vocational education, and business costs from terrorism remain outstanding issues for overall competitiveness (address below), they remain one of the highest performers globally.

Monetary and Fiscal Policy

The Great Recession had a particularly pronounced effect on the UK economy, given the significance of the financial sector to the overall economy. High consumer debt accompanied by plummeting home prices, and overall global economic stagnation led to a recession in the British economy. The Labor government responded by enacting stimulus programs to raise aggregate demand and stabilize the financial markets. This fiscal policy led to a record deficit for the UK. The conservative government, which came to power in 2010, has since implemented austerity programs in an effort to reduce British budget deficits. However, as of 2015, the UK deficit remains one of the highest in the G7 at 5.1% of GDP, down from a peak of 10.8% in 2009 (CIA Factbook, 2016). Total public debt amounted to 88.2% of GDP in 2014, with an expectation of reaching 90% in 2017, and then gradually declining (EIU, 2016). Cuts in fiscal spending are aimed at public spending and welfare benefits. Although the UK ranked very high on almost all pillars of competitiveness according to global rankings, deficits have reduced their rating for macroeconomic policy.

The Bank of England (BOE) has not raised interest rates since 2009, as inflation has remained low, and there is little sign of inflationary pressure on the economy. Fears of inhibiting the economic recovery through monetary contraction has stayed the BoE's hand thus far (EIU, 2016).

Exhibit 3 (World Bank; UNDP, 2016)



Economic Performance

During the post-war period the UK’s economic advantage declined as other industrialized nations, most notably the United States, rose, converging the UK. During this time period the UK began a gradual shift toward a more services based economy. However, until the early 1980s the British government failed to ensure economic competitiveness, as rampant nationalization undermined productivity, and crucial supply-side reforms, particular in industrial labor relation, never materialized, primarily due pressure from powerful interest groups (Crafts, 2002).

In the early 1980s, the Thatcher administration began a process of intensive privatization and deregulation, reforming industrial relations, reducing government spending, restructuring the tax system, and expanding higher education. These reforms, which were generally accepted by the New Labor government of the 1990s, helped improve the incentive structures facing firms and workers (Crafts, 2002). The Big Bang, as the 1986 Thatcherite reforms of UK financial services is often referred, allowed banks to capitalize on new opportunities through globalization and financial innovation. This expansion created a banking system with large balance sheets, significant functional and geographical diversity

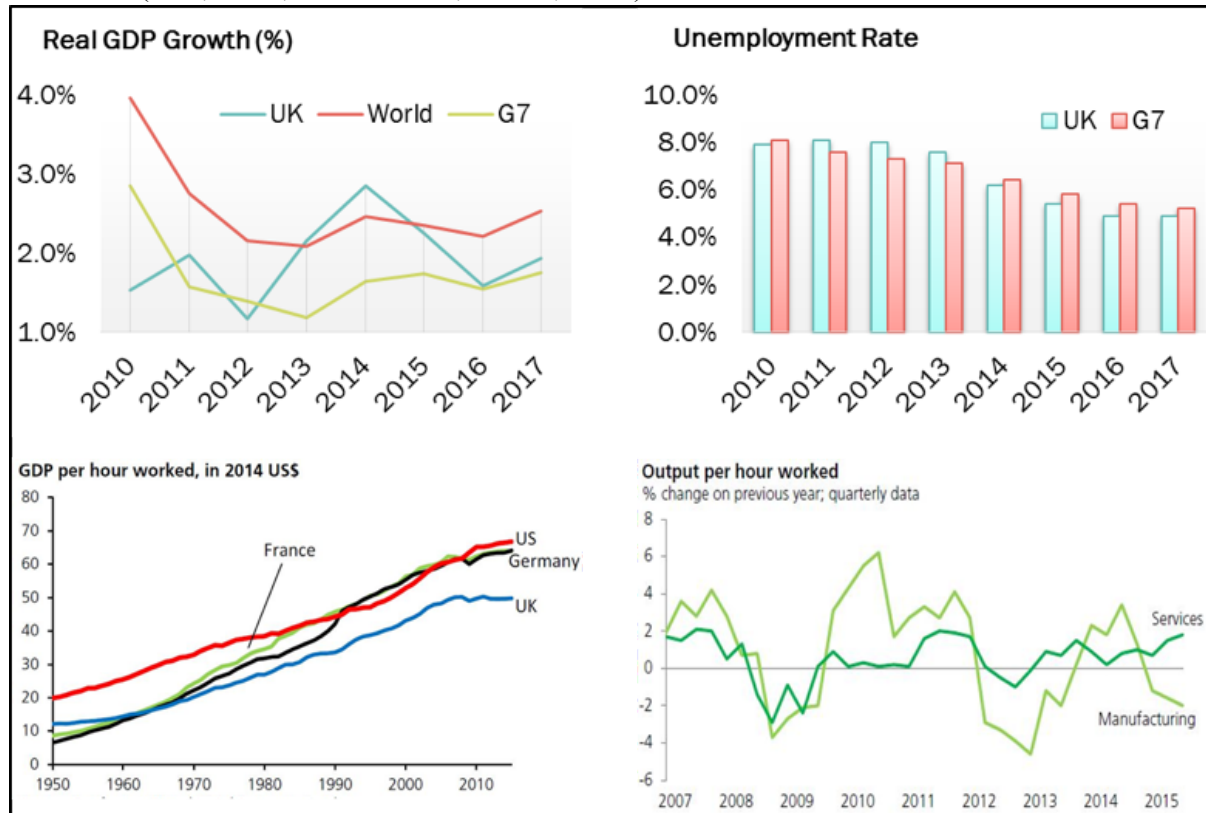
and complexity, a high level of leverage, and extensive network interconnectivity, solidifying the UK's position as a global financial hub (Davies, 2010).

The UK has since experienced dramatic economic growth up until the great recession. Although the UK experienced GDP growth of 2.9% in 2014, up from an average of 1.5% between 2010-2013, the average annual growth slowed to 2.2% in 2015. The Economist Intelligence Unit anticipates continued loss of economic momentum in 2016, to average annual real GDP growth of 1.7%. The annual pace of growth will remain relatively subdued thereafter, at 1.9% per year in 2017-20 (EIU, 2016). Although growth has recently slowed, unemployment has consistently improved, down to 5.4% in 2015 from a high of 8.1% in 2011, falling below the G7 average. Services are fueling the bulk of growth, while manufacturing and construction have lagged. Services account for more than 75% of overall GDP, and has actually surpassed its pre-recession peak, unlike the rest of the UK economy¹.

Productivity, however, remains a significant problem for the UK economy. Historically, UK labor productivity grew by approximately 2% per year. However, since the 2008 recession it has stagnated. In the third quarter of 2015 productivity was just 0.7% above the level of over seven years earlier (the pre-recession peak level). The Office for National Statistics has called this lengthy period of stagnation in productivity “unprecedented in the post-war period”. London has the highest levels of productivity, by some margin, of any region or country in the UK, while Northern Ireland has the lowest. Internationally, the UK is ranked 6th among the G7 countries, with Germany top and Japan bottom. In 2014, UK productivity was 18% below the rest of the G7 average, the widest productivity gap since at least 1991 (when the data series began) (Harari, 2016).

¹ Financial Times research. Accessed April 18, 2016 from <https://ig.ft.com/sites/numbers/economies/uk>

Exhibit 4 (EIU, 2016; World Bank; Harari, 2016)



State of Cluster Development

Cluster development in the UK has been a crucial aspect of its overall success, ranking 8th globally according to the Global Competitiveness Index. The 31 largest clusters in the UK generate 20% of the UK's output while accounting for only 8% of its overall businesses, employing 4 million people, or 15% of the total working population, and offer average salaries significantly higher than those in the surrounding regions. The UK boasts fast growing and globally significant clusters, such as Financial Services, Business Services, Information Technology, and High Tech clusters (McKinsey, 2014). Given that over 73% of the UK economy comes from the services sector, it is not surprising that majority of growing clusters are in the services sector. Although only 10 of the top 31 clusters are services oriented, they provide 70% of the total gross value added. The 17 most

economically important clusters are not just nationally powerful, but are global leaders (McKinsey, 2014).

Moreover, many of these large services clusters are reinforcing. For example, according to a recent report by McKinsey, the UK's Financial Services cluster leads globally, encompassing "all aspects of banking and financial services concentrated in the City of London and the Canary Wharf areas of London", while the Business Services cluster is "inter-related with the financial services sector and includes law, accountancy and consultancy firms across the London area and parts of the South East". Finally, Digital Services in London encompasses "software consulting and supply, computer services, technology entrepreneurship, data processing and telecoms services and which has TechCity as its nexus, but stretches across the London area". It is worth noting that more than 60% of top non-European Tech companies that have a European headquarter have chosen London as their base as of 2014, driven by the language, business infrastructure and high quality of life (Techworld 2015). These geographical and subject matter expertise overlaps are difficult to replicate and provide innovation and competitive growth (McKinsey, 2014). These cluster are particularly important when considering the development of the FinTech cluster in the UK. They provide access to world-class human capital and infrastructure.

Although the clusters in general are geographically widespread, services clusters are concentrated in the London area, whereas Production-led clusters such as Aerospace, Industrial Manufacturing, Electronics, and Automotive are scattered throughout the country. Service clusters therefore benefit greatly from geographical concentration. Services clusters located in London and the South East account for approximately 67% of the total GVA from the UK's largest clusters.

National Business Environment

The UK national diamond is highly competitive, performing well globally across all metrics. However, relative to developed peers, there remain areas of concern. Basic skills development, specifically in primary education and STEM are lagging, while infrastructure investments remain insufficient. Clusters for non-services industries are declining and productivity lags peers. Finally, the Brexit remains a considerable concern for demand conditions, as uncertainty and regulatory arbitrage could undermine the UK's access to a \$17 trillion market.

Factor Conditions: The UK boasts world class universities, providing a stock of human capital eminently capable of supporting the large services industry, particularly the financial services and tech community. However, labor force skills in the UK are highly polarized. In 2011, UK ranked 19th for low skills, 24th for intermediate skills, and 11th for high skills – behind the US, Canada, Japan, South Korea, Finland and Norway, of 33 OECD countries. It has one of the fastest shrinking shares of people completing education below GCSE, however has also experienced a notable increase in the share of people completing degree level (UKCES, 2014).

In addition, some of the clusters benefit from top notch physical infrastructure, most notably those located in London and the South East, accessing international connections via Heathrow Airport, creating an important draw for multinational companies. For our concerns, the IT and digital infrastructure has become a priority for the UK government as of late, as they invest in developing the fiber optic and digital foundations necessary bolster a growing tech and financial services cluster. (McKinsey 2014).

Related and Supporting Industries: The UK financial markets are the deepest outside of the US and some of the world's most developed, capable of providing venture capital and

equity financing to start-ups and entrepreneurs (WEF, 2016). Services clusters tend to be geographically concentrated, primarily in London, providing for significant overlap between financing, accounting, law, information technology, and business services. This is particularly significant for our project, given that the financial and tech clusters provide expertise, human capital, and related industries for FinTech entrepreneurs. This is less the case for production and extraction led clusters, which are scattered throughout the country and do not immediately benefit from such industry support. There are examples, however, such as the “Motorsport Valley”, wherein “eight of the eleven Formula 1 teams are based, within 80 minutes’ driving time of the Silverstone racetrack, and with them a supply chain of tens of thousands of high-performance engineering businesses” (McKinsey 2014).

Context for Strategy and Rivalry: As mentioned previously, the UK has outstanding public and private institutions (14th), strong property protection rights (5th), and an efficient judicial system, according to competitiveness rankings. In addition the UK rates very high on the World Bank’s Ease of Doing business index, coming in 6th overall globally, above both the United States and the OECD average. Finally, the UK has implemented aggressive immigration programs to access Tier 1 talent from across the globe, ranking 4th globally for attracting foreign talent (WEF, 2016). Finally, the UK financial regulators operate on a principles based approach, moving away from a reliance on detailed, prescriptive rules and setting policies based on broadly stated standards and objectives. As the FinTech cluster develops, as well as many other entrepreneurial and technology clusters, this principles based regulatory framework allows for greater flexibility and ease of doing business (Black, 2007).

Demand conditions: The UK boasts high demand sophistication and access to large markets, with impressive levels of technological adoption (9th) and ICT penetration (2nd), which is particularly significant relative to the FinTech cluster. This mobile services

adoption will be crucial for development and implementation of a robust FinTech sector. The primary demand concern is a looming Brexit that could potentially restrict UK access to European markets. Given the significance of the EU for UK demand, this is a major risk. However, even without the Brexit, evolving EU regulation could limit the UK market access, particularly for such emerging industries as FinTech, around which a collective set of regulatory norms has yet to function. This regulatory gap between the UK and the rest of the EU provides a threat to rapid scaling across the continent.

Cluster focus: London's FinTech

London FinTech cluster emerged at the intersection of three established concentrations present in London for decades, namely an entrepreneurial talent pool, a strong technology cluster and the most competitive financial center in the world.

Introduction to the cluster

Financial Technology (“FinTech” in 21st century parlance) companies are not a new phenomena. Indeed, financial services firms have sought to lower their costs, improve decision-making, and reach new customers by embracing incremental technologies for decades. Providers of such services, “Traditional” FinTech firms, still exist today and facilitate incumbent financial institutions’ operations. Well-known examples include FIS, which supplies data and software to banks and insurance companies, and FirstData, a provider of back office services to banks and brokerage firms. These companies utilize existing infrastructure to deliver their services and derive profit through established revenue models, such as cost per transaction, fees as a percentage of assets served, and license fees (Ernst & Young, 2014). In many ways, Traditional FinTech’s bear more resemblance to outsourced service providers or business services companies than to technology or financial services firms.

In this paper, we focus instead on “Emergent” FinTech firms. These companies differ from the Traditional players in that, rather than being technology vendors to existing financial services firms, they are seeking to replace Traditional FinTech’s and/or, in many cases, to deliver services and products directly to the customers, thus disintermediating incumbent financial services firms. For Emergent FinTech companies, disruption and innovation are crucial for success (Ernst & Young, 2014). Whether it be cross-border currency transactions or peer-to-peer lending, Emergent FinTech firms are leveraging new technology, especially the Internet and growing connectedness of consumers, to make existing markets more efficient and to open up new categories altogether. Innovation is not unique to the services themselves: the very way in which the companies charge for these services is changing too. While many Emergent players will continue to use established revenue models, newer avenues to generate turnover, such as site advertising and data monetization, are becoming popular (Ernst & Young, 2014). Within the Emergent landscape, four sub-clusters have developed: Payments and Remittances, Lending and Banking, Investments and Insurance, and Software and Data. Below, we briefly describe the services offered, value propositions, customer profiles, and example companies for each sub-cluster.

Payments and Remittances. Emergent FinTech firms are growing rapidly in the international transfers and payment processing markets. The large fees charged by traditional players have lured new entrants equipped with new business models backed by new technology. Incumbent High Street bank Barclays charges £25-40 per international wire transfer and keeps the bid-ask spread.² On the other hand, UK FinTech firm Transferwise charges 0.5% of the currency changed and completes the transfer at the mid-market rate by matching customers on each end of the trade, e.g. a customer transferring USD to GBP might

² Barclays Bank plc. Accessed April 18, 2016 from <http://www.barclays.co.uk/Helpsupport/Internationalpayments/P1242593395280>

match with customers wanting to exchange GBP for USD. Transferwise estimates a customer transferring GBP1,000 to USD would save \$63.37 by using their service instead of the average Big 4 UK bank.³ On the back of such compelling savings, Transferwise has raised \$90 million from high profile venture capital firms such as Andreessen Horowitz and Index Ventures and private investors like Richard Branson and is now valued at over \$1 billion. Other startups active in the international transfers market in the UK include Revolut, Azimo, and CurrencyFair. In the payments space, start-ups such as GoCardless and Curve are attempting to streamline the payments process and make it cheaper for businesses and consumers. For example, GoCardless enables small and medium-sized businesses to use direct debit technology to ensure their customers pay on time and in an easy-to-use manner instead of requiring checks or incurring credit card transaction fees. Curve enables consumers to combine all of their credit and debit cards into a single card.

Lending and Banking. New online banks and lenders are disrupting the High Street banks through cheaper and increased access to services. Online banking firms such as Mondo, Atom, and Tandem are targeting individuals and SMEs through increased ease of use and lower costs due to the reduced overhead from the lack of a brick and mortar presence. Tandem, for example, enables depositors to proactively budget and save by divvying up monthly income into sub-accounts and providing customers with enhanced data visualization tools to monitor their spending. In online lending, UK startups are creating peer-to-peer networks that connect capital-hungry individuals and small businesses, that have struggled to access credit from incumbent banks, with both small and large investors. The UK's leader in the small-business segment of this market is Funding Circle, which has now raised \$273 million and is valued at more than \$1 billion. The company has expanded beyond the UK

³ Transferwise. Accessed April 11, 2016 from <https://transferwise.com/us/>

and is now active in five countries. Demonstrating the competitiveness of UK companies, the United States is now Funding Circle's most profitable geography, and the London-based lender is a market leader there.

Investments and Insurance. Similar to the lending and banking sub-cluster, the value propositions for FinTech firms in the investments and insurance space are the increased access to services and lower costs. However, most activity has been consumer-focused with little attention paid to SMEs to date. Nutmeg is a London-based pension-provider founded by a Stanford MBA that provides a low-fee pension tailored to each customer's investment preferences. The company does this by creating portfolios of exchange-traded funds ("ETFs") to match a customer's desired risk/return profile and time horizon. The UK FinTech insurance market is still in its early stages, but startups have begun emerging, such as RightIndem, which processes insurance claims online for incumbent insurance companies such as Allianz.

Software and Data. Companies active in this sub-cluster are focused on providing software and financial analytics services to increase efficiency and enable better decision-making for individuals, SMEs, and large corporations. For example, DueDil is a London-based B2B lead generation and risk management startup whose cloud-based service enables its corporate customers (both small and large businesses alike) to find information on private companies, track firms of interest to them, and manage financial risk arising from their supply chain or customer base. It has raised \$22 million to date and has now expanded to Ireland.

Mapping the Cluster

In the following paragraphs we describe the sectors' various actors and their inter-relatedness.

Infrastructure: London as a global capital has world-class infrastructure, in particular access to several international airports and high speed train links, telephone and fiber networks and other business services. The quality of life in London is very high despite high cost levels thanks to an attractive housing stock and efficient public transportation system.

Talent: The UK is home to world class universities such as Oxford, Cambridge, Imperial, and the London School of Economics that draw an international student body and are world-leading in sciences as well as finance and economics. Many private institutions also offer programming and coding courses to individuals and corporate clients (e.g. Decoded or General Assembly), supplying the tech sector with specialised talent.

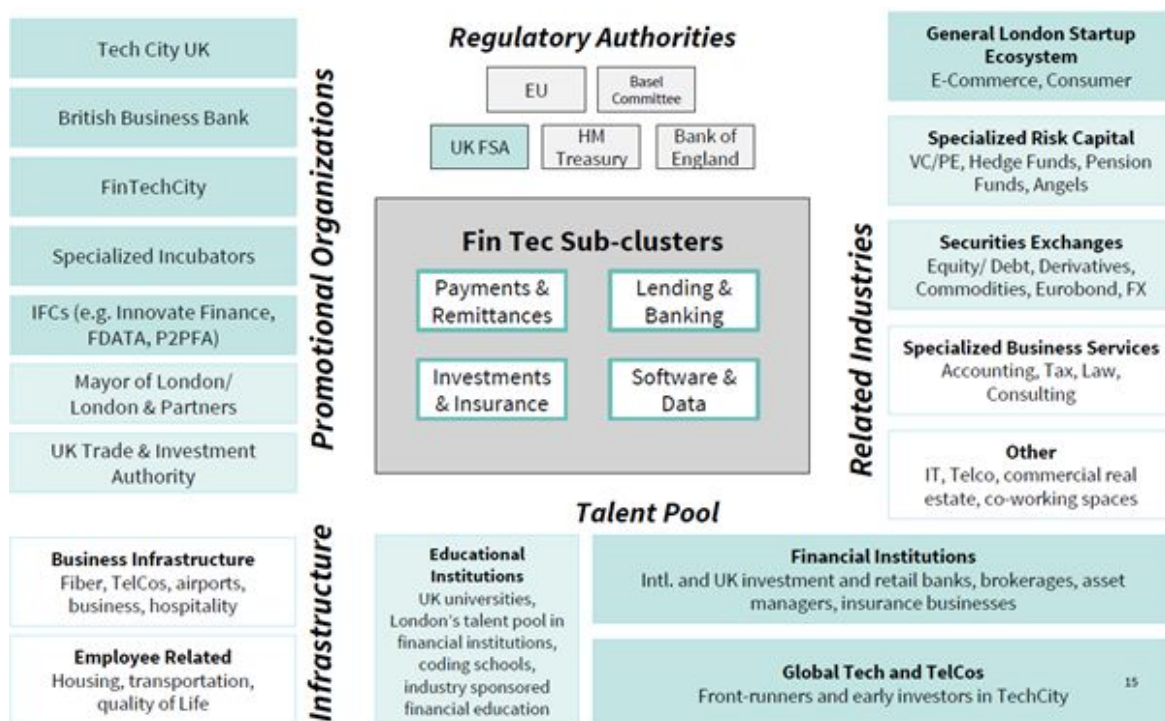
Related Industries: The presence of global financial institutions and tech companies really drove the development of the cluster by being the source of entrepreneurial and technical talent. Incumbent financial institutions such as banks, asset managers and insurances also are potential customers for FinTech solutions, and have been acting as sources of funding for FinTech startups through their incubator and specialized VC arms (e.g. Santander, Barclays). London's tech startup community emerged in the early 2000s around the Silicon Roundabout in Shoreditch, in the beginning primarily focused on consumer services and e-commerce (e.g. Asos, JustEat, Global Fashion Group, Farfetch, Zoopla, Shazam, Lyst, Rightmove). This cluster is closely located to the financial services cluster in the City of London, and within it the FinTech cluster emerged as the strongest sub-cluster by 2016. The providers of specialised risk capital (e.g. venture and private equity) and London's securities exchanges (e.g. the London Stock Exchanges, the AIM) are key sources of capital for founders of FinTech startups.

Promotional Organizations: The UK government has taken a particular strong pro-Tech stance and, through the establishment of various task forces such as Tech City UK

and the British Business Bank, supported the development of the emergent FinTech sector. Non-governmental institutions for Collaborations such as FinTechCity, specialist incubators, and formal sub-cluster IFCs, such as the Financial Data and Technology Association (FDATA) and the Peer-to-Peer Finance Association (P2PFA), have furthermore bundled bargaining and lobby power of companies, affecting legislative changes at the government and regulator level.

Regulation: The cluster is regulated at city, national, and EU level. In particular, the UK Financial Services Authority had the most specific impact on the emergence of the sector due to its pragmatic approach to regulation and proactive collaboration with the emergent FinTech sector’s companies’ demands. This collaboration has been prompted in particular by the UK government’s pro-sector initiatives described below.

Exhibit 5: London FinTech Cluster Map (Team analysis)



Historical Development of the FinTech Cluster

London's FinTech cluster is best understood as the synthesis of the Financial Services and Technology clusters, which has created a disruptive new cluster that cannot be properly defined as a sub-cluster of either. To understand the development of the FinTech cluster, a closer look at the history of the more established Financial Services and Technology clusters is required.

Financial Services. London, situated near the mouth of the River Thames, has been a trading hub since its founding by the Romans in 43 CE. Over the next 1,500 years, London solidified its place as the preeminent city in the British Isles, and, as the Elizabethan period brought about an increase in seaborne trade with the European continent and beyond, the City of London, the original neighborhood between St. Paul's Cathedral and the Tower of London in which financial services firms clustered (and still do in the 21st century), became a hub for merchants and brokers. In 1570, the Royal Exchange was founded to facilitate the trade of goods. By the late eighteenth century, London had developed money and bond markets to finance rapidly expanding international trade with the Americas and Asia and to fund British government debt (through the Bank of England). Despite the rapid growth of London as a trading hub, Amsterdam was the world's leading center of trade in the XVII and XVIII centuries. Commodities were imported to the Dutch port city from far-flung parts of the world and re-exported to other European markets. London's rise to dominance came with the onset of the French Revolution and Napoleonic Wars (1792-1815), during which Amsterdam was occupied and international capital and residents fled, often to London (Jones, 2014).

Coinciding with the growth of Britain's empire (that would ultimately cover roughly a quarter of the world's surface area and inhabitants), the City of London experienced a boom from 1870-1914 that has been called the city's "golden years," making it "the most powerful

financial and commercial center that the world has ever seen” (Kynaston, 1995). Markets and institutions developed to facilitate short term trade finance (e.g. merchant banks and discount houses), commodities trading (e.g. the Baltic Exchange for grain and shipping and the London Metal Exchange), insurance (e.g. Lloyd’s), and long term capital (e.g. the London Stock Exchange). To put London’s pre-eminence during this period in context, the London Stock Exchange was the largest market for equity issuances in the world, two-thirds of global marine insurance was underwritten in London, and 23% of the world’s manufacturing came from Britain (Jones, 2014 and 2015).

Following World War II, international flows of capital and goods declined significantly compared to pre-World War I levels. Coupled with the UK’s decline in relative power versus the United States and West Germany and the movement away from the British pound as a major reserve currency, London began to lose its dominant position in international finance. However, British banks began to develop the Eurodollar market in the 1950s to enable holders of US dollars to deposit them outside the United States. As a result, European, American, and Asian banks expanded into the UK. The number of foreign bank branches in London jumped from 80 in 1960 to 355 by 1980 (Jones, 2014).

The Conservative government of Margaret Thatcher (1979-1990) led a deregulation of the financial services sector in 1986 to boost London’s competitiveness versus New York City and Tokyo that had begun to pull ahead of London in financial innovation in a series of reforms that came to be known as the “Big Bang,” (Jones, 2014). Despite significant job losses during the 2008 financial crisis, London remains the leading financial center in the world according to the Global Financial Centres Index.⁴

⁴ Global Financial Centres Index, Z/Yen Group. Accessed April 18, 2016 from <http://www.longfinance.net/global-financial-centre-index-19/976-gfci-19-the-overall-rankings.html>.

Technology. An early-stage technology industry first developed in the UK in the 1980s as investor appetite for venture capital expanded internationally following Silicon Valley's successes. However, the lack of experienced, homegrown technology investors and the vast amount of capital chasing a small number of companies led to dismal returns following the 1987 stock market crash. According to Felda Hardymon, "Institutional investors...fled the sector; European firms closed their VC operations; and US firms closed or sharply reduced their European presence." A similar story, though to a much lesser degree, occurred again following the tech bubble bursting in 2001 (Hardymon, 2003).

While the venture industry had been wounded following the technology crash, small e-commerce and digital companies began to form in the early 2000s in an artistic and bohemian neighborhood near Old Street Roundabout in London, only 500 meters from the heart of London's financial center. By 2008, this agglomeration had grown enough to earn the nickname "Silicon Roundabout" (Ranger, 2014). By 2016, 33 accelerators and 26 incubators had been set up across the UK, with the vast majority based in London.⁵ Between 2008 and 2015, 25 venture capital funds opened offices in London⁶, and venture funding reached \$3.6 billion in 2015.⁷ Supporting this rapid development were government programs such as:

- Tech City UK (2010): Non-profit launched by the Prime Minister to support digital technology businesses and entrepreneurs through programming and policy work.
- UK British Business Bank Angel Fund (2011): £100 million angel investment fund to support early-stage businesses.

⁵ UKTI Venture Capital Unit Brochure 2016, p. 6.

⁶ *Ibid*, p. 4.

⁷ Murad Ahmed, "UK Tech Sector Raises \$3.6bn Venture Capital in 2015," *Financial Times*, January 5, 2016, accessed on April 18, 2016 from <https://next.ft.com/content/fad8a17a-b38e-11e5-b147-e5e5bba42e51>.

- UK British Business Bank Start-up Loans Program (2013): Government program to provide loans, mentorship, and advice to startups.
- Global Entrepreneur Program (2014): UK Trade & Investment initiative to help foreign entrepreneurs and startups relocate to the UK.
- HQ - UK (2015): Joint program from the UK government and Tech City UK to showcase why digital technology companies should relocate to the UK.
- Tech Nation (2015): An online report and interactive database for businesses interested in the UK tech industry, including data on clusters, factors, and endowments.

FinTech. The combination of a strong financial services sector that had been hit with job losses and structural change following the 2008 financial crisis and a digital technology ecosystem that was taking off in close physical proximity to the heart of the City of London has led to the rapid growth of the London FinTech cluster. Helping fuel this trend has been both private and public sector support.

Key private sector support includes industry groups and conferences like City Meets Tech, a regular meetup for FinTech entrepreneurs and potential sources of funding, and FinTech Week, the world's largest FinTech-focused conference now in its third year. Private market help for young startups has grown quickly. Since 2011, six incubators and four accelerators focused on FinTech have launched in London (Ernst & Young, 2016).

Government support for the FinTech cluster in Britain has been strong with its prospects prompting George Osborne, the Chancellor of the Exchequer, to cite the cluster's "huge economic potential" for the UK⁸. He continued in his remarks in 2014 at the launch of a new trade body for FinTech, Innovate Finance, "I want the UK to lead the world in

⁸ George Osborne, "Chancellor on Developing FinTech," speech given at the launch of the new FinTech trade body Innovate Finance, Level 39, Canary Wharf, London, UK, August 6, 2014.

developing FinTech... And with the right backing from government, I believe we can make London the FinTech capital of the world.”⁹

Indeed, several public policies and regulatory reforms and public/private initiatives have occurred over the last five years. The table below highlights some of these:

Initiative	Description
Financial Services Trade and Investment Board (2013)	Public/private initiative to identify and support growth opportunities in the financial sector, including an ongoing project focused on the FinTech sector
FinTech Initiatives, UK Trade & Investment (2014)	UKTI, the government’s trade ministry, performed roadshows abroad to lure foreign FinTech firms to the UK
IFISA (2015)	Legislation that makes peer-to-peer loans an eligible ISA (tax-efficient) investment
Payment Systems Regulator (2015)	Subsidiary of the Financial Conduct Authority set up to regulate the budding payments industry

Cluster Performance

London’s FinTech cluster has grown dramatically since 2008, with venture capital deal volumes and investment increasing by 74% and 51% annually, respectively.¹⁰ By 2015, venture capital investments in UK FinTech reached \$962 million in 61 companies, with the vast majority of that activity in London (\$744 million in 50 deals).¹¹ Three companies received more than \$100 million of funding to expand their businesses domestically and abroad (e.g. online small business lender Funding Circle, \$150 million; online bank Atom Bank, \$128 million; and money transfer service WorldRemit, \$100 million). The spate of progress has not gone unnoticed: In February 2016, Ernst & Young, the global accountancy

⁹ *Ibid.*

¹⁰ UKTI Venture Capital Unit Brochure 2016, p. 18.

¹¹ KPMG, “The Pulse of Fintech, 2015 in Review,” March 9, 2016, accessed on April 22, 2016 from <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/03/the-pulse-of-fintech.pdf>.

and consulting firm, called London “the global FinTech capital,” and ranked it ahead of other leading regions, such as New York, Hong Kong, and Silicon Valley (Ernst & Young, 2016).

Moreover, UK lending startups are using their strong foothold in the UK market to expand elsewhere. Funding Circle, which is an online marketplace lender focused on small businesses and the dominant player in that market in the UK, expanded to the U.S. in 2013, and Spain, Portugal and Germany in 2015 and 2016. To date, Funding Circle has decisioned over \$1 billion in loans to small businesses globally, among the largest fintech lenders globally.

Comparative snapshot of global FinTech clusters

Talent. London compares favourable to other global fintech clusters, with the world’s largest pool of financial services professionals (1.2 million vs 0.7 million in New York). This abundance of talent is due in part to the high concentration of global financial institutions discussed further above and below. However, the UK has weaker talent relative to the U.S. when it comes to home-grown coders, developers and engineers.

Market Demand and Penetration. Growth in lending to U.K. small businesses and consumers has been captured almost exclusively by emergent fintech players, with the market share of London-based fintech companies rising from 4 percent to 12 percent from 2012 to 2014, which compares quite favorably against the U.S. lending market: for example in the U.S., emergent fintech players have captured just 3 percent of market share to date according to estimates prepared by Morgan Stanley.

Capital Raised. The UK generated £520 million of VC investment in fintech in 2015, the third-largest region by capital invested, but this pales in comparison to more than £3.6

billion raised in California and the £1.4 billion raised in New York in 2015.¹² The higher level of FinTech investment in the US stems partly from the presence of a well-established VC sector, which invests in FinTechs of all sizes.

Government Oversight. Moreover, London's fintech cluster is reinforced by the strength of government support for it, which compares favorably to other clusters. In the U.S., regulation of much of the fintech sector, and particularly the non-bank fintech sector, has tended to occur at the state level, rather than the federal, with some notable exceptions (for example, financial investments and consumer banking). As a result, emergent fintech players are forced to navigate a more cumbersome patchwork of state-by-state regulation, rather than a seamless, nation-wide system in the UK.

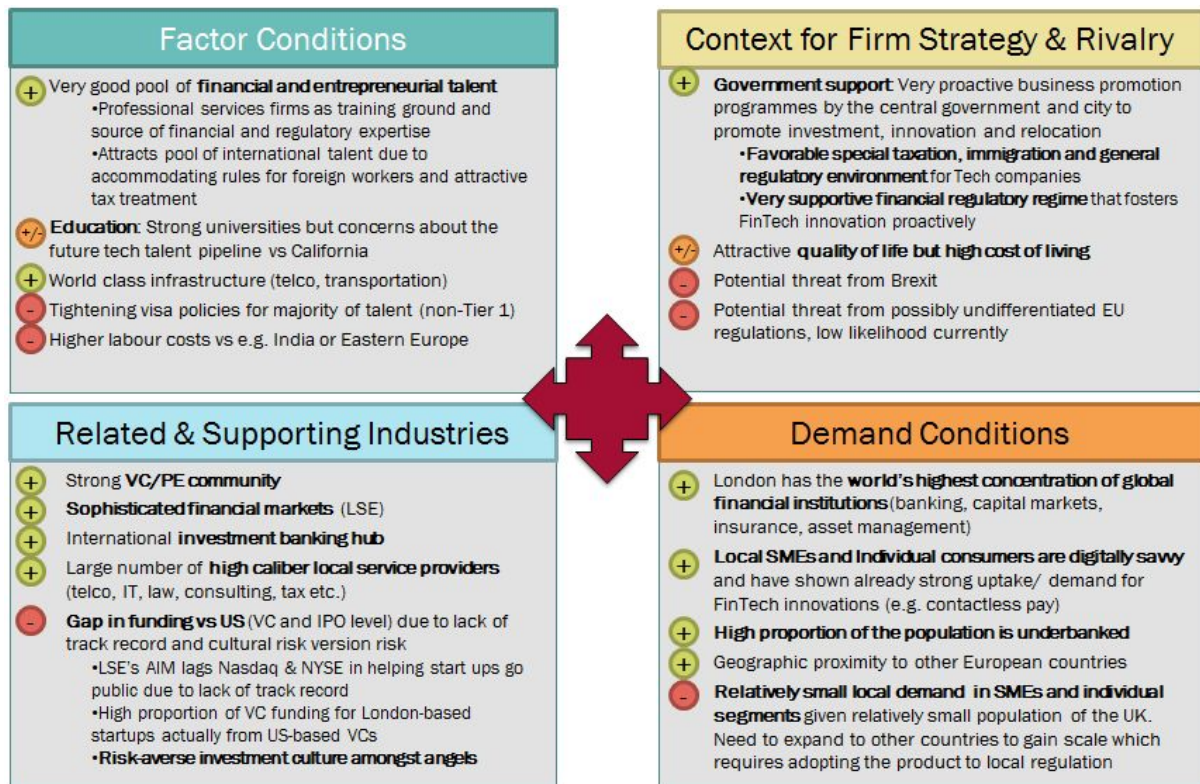
Explaining Cluster Performance: The Cluster Diamond

The competitiveness of the FinTech cluster in London can be explained by the strength of its factors, in particular talent and complementary industries, namely the financial services sector.

12

[http://www.ey.com/Publication/vwLUAssets/EY-UK-FinTech-On-the-cutting-edge/\\$FILE/EY-UK-FinTech-On-the-cutting-edge.pdf](http://www.ey.com/Publication/vwLUAssets/EY-UK-FinTech-On-the-cutting-edge/$FILE/EY-UK-FinTech-On-the-cutting-edge.pdf)

Exhibit 6: London's FinTech Diamond



Factor Conditions: In addition to the UK's generally strong academic talent, London boasts a deep pool of financial and entrepreneurial talent that is drawn by early career opportunities with professional services firms (e.g. investment banks, law firms, consultancies and accountancies). The UK's historically accommodating visa rules, attractive tax treatment of expats, high quality of life and world-class transportation system added to this attractiveness. Concerns exist around changing visa rules due to political sentiment and a potential *Brexit* that would especially affect second-tier talent (e.g. programmers and technical talent rather than entrepreneurs) and EU citizens that currently profit from unrestricted labour mobility. Also, the pipeline of local programming and engineering talent is weaker compared with California. Generally, London's cost of labour is very high, reducing competitiveness vs. e.g. India or Eastern Europe.

Related and Supporting Industries: Availability of funding is key for early stage ventures and London being the leading financial center in the world has a strong VC/PE community and intermediaries and strong financial markets like the LSE and AIM. However, a gap in funding compared with the US at VC and especially IPO level persists. Drivers are cultural in part; Europe has a more risk averse culture generally and successful entrepreneurs rather diversify into other asset classes than be angel investors. Also, there are less European VC funds as local LPs are less familiar with the asset class, and more risk averse. In fact, a high proportion of VC funding for London-based startups actually comes from US-based VCs. On the IPO side, the UK faces a chicken-and-egg dilemma – its markets lag the Nasdaq and NYSE in helping start-ups go public due to lack of historic track record.

Context for Firm Strategy & Rivalry: The UK government and City of London have been very supportive in promoting investment and innovation in tech as well as relocations of foreign tech businesses to London with tax breaks, accommodating immigration rules and supportive regulation (see “Historical Development of the FinTech Cluster” section for detail). The key issues London has been facing are the mentioned Brexit that would deteriorate the quality of business environment significantly. A lesser threat we did not find significant evidence for is possibly undifferentiated regulation of the sector at EU level.

Demand Conditions: On the B2B side, London has the world’s highest concentration of global financial institutions that are both incumbent competitors to and customers of FinTech startups. On the B2C side, individual consumers are digitally savvy and have shown already strong uptake of FinTech innovations in everyday life, e.g. of contactless pay in stores and the subway system (Ernst & Young, 2016). Moreover, a high proportion of the population is underbanked, with three quarters of overall lending to U.K. small businesses and consumers coming from just four banks, and the average turndown rates at banks hovers

at around 80 percent. Compared with the US however, the UK due to the size of its population and economy is a relatively small market and startups need to expand to other countries to gain scale. This expansion is facilitated by the UK's geographic proximity to other European countries, but nevertheless often requires adopting the product to local regulation.

Recommendations for the UK's FinTech cluster

We have organised our recommendations for London's FinTech cluster following similar framework used above in the 'diamond analysis'. The list below does not want to be a collection of a finite number of initiatives, but a starting point of the most pressing initiatives that, from our opinion, the key players in the cluster and the government.

Factor conditions: Access to talent is going to remain key for the UK to continue to fuel the growth of the FinTech cluster: currently the country is ranked only 43rd in availability of tech talent. On a similar note, visa policies are becoming more and more stringent for immigration of labour. With a small population at 65M people, making it only the 22nd most populous country in the world, the UK will have to enact policies that will ensure an adequate supply of talent to allow its FinTech cluster to thrive. Our recommendations to improve the UK's factor conditions are the following:

- Continue to invest in STEM education in order to foster the development of local talent that can then easily support the growth of the industry;
- Support coding schools and retraining programs in order to develop the much needed skills in workers that have already entered the labour force but that could be upskilled in order to create wider value for the society;
- Relax visa requirements for tech talent in order to make the UK a more competitive destination a vis to other FinTech hubs.

Context for firm strategy and rivalry: The UK government is currently running an open data initiative (data.gov.uk), but its scope is currently limited. FinTech players have been vocal about their need to have access to government-owned data in order to be able to better assess systemic trends and not take positions that are not in line with how the market is moving. We call for the expansion of the access to relevant government-collected data to lead to the development of new products and to increased competition. A sector that would disproportionately benefit for this would be insurance.

The UK government, within its 2014 budget, proposed a bill that would make mandatory the referral of declined customers from banks to FinTech providers. Unfortunately the timing of this initiative is still unclear. We urge the government to pass this bill as soon as possible because this would give FinTech players a new level of visibility to their potential customers.

The UK government remains a unique ally to the FinTech cluster, adopting a best-in-class regulatory approach, balancing consumer protection with flexibility for new players to innovate. Other important governments, namely the EU and the US, have a more restrictive regulatory approach. In order for the global FinTech sector to thrive (which will drive further innovation in the UK), we suggest that both the US and the EU align with UK's unique approach.

Related and supporting industries: The key supporting industry to the London FinTech cluster is the VC industry as it provides capital for new firms to emerge and for established ones to grow. Other important related industries are the financial services and the tech industries as they are key suppliers of talent, but we are not going to mention them further here as we talked about talent in 'factor conditions'. The main challenges the UK FinTech sector are experiencing in relation to the local VC industry is the lack of depth of the

market, with fewer players that are not as well capitalised. The general market sentiment characterizes European LP's as more risk averse than their American peers and therefore less willing to put their capital in riskier asset classes such as VC. A similar behaviour is encountered in UK serial entrepreneurs who are more likely to invest the proceeds from the sale of their businesses in a diversified fashion rather than becoming champions of their sectors, pouring investments into it. Our recommendations for these issues revolve around encouraging European capital to enter riskier asset classes and encouraging American VC's to enter the UK market. For both sources of capital, this can be achieved in several ways: from providing tax breaks, to encouraging the education of the market on the opportunity, and, specifically for VC's, by creating programs that helps them in their expansion to London.

Demand conditions: We mention earlier how the UK government ranks low in e-governance ranking of adoption of FinTech solutions for its operations. It is clear that bureaucracy hinders the adoption of new processes, but we strongly believe that if the UK government started to adopt more services offered by the FinTech cluster and was vocal about it, this would be of huge help to some of the players in the cluster. Our recommendation would be to push for upgrade programs that require short term capital investments that would though lead to long term cost savings. An example would be to change some of the obsolete processes of the HMRC.

Bibliography

- Black, J. and Hopper, M. (2007). "Making a success of Principles-based regulation". Law and Financial Markets Review, London School of Economics.
https://www.lse.ac.uk/collections/law/projects/lfm/lfmr_13_blacketal_191to206.pdf
- CIA World Factbook, (2016). "United Kingdom: Economy".
<https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html>
- Crafts, N. (2002). *Britain's Relative Economic Performance, 1870-1999*. London: Institute of Economic Affairs.
- Davies, R. (2010). "Evolution of the UK banking system". Research and analysis done by the Bank of England.
- EIU (2016). "Country Report United Kingdom: February 2016"
- Ernst & Young LLP. "Landscaping UK Fintech." August 6, 2014. Accessed April 11, 2015, from
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/341336/Landscaping_UK_Fintech.pdf.
- Ernst & Young LLP. "UK Fintech: On the Cutting Edge." February 24, 2016. Accessed April 19, 2015, from
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/502995/UK_FinTech_-_On_the_cutting_edge_-_Full_Report.pdf.
- Harari, D. (2016). "Productivity in the UK". Briefing Paper, House of Commons Library.
- Hardymon, Felda, Josh Lerner, and Ann Leamon. "Accel Partners' European Launch." HBS No. 9-803-021. Boston: Harvard Business School Publishing, 2003.
- Jones, Geoffrey and Meghan Gallagher-Kernstine. "'Walking on a Tightrope': Maintaining London as a Financial Center." HBS No. 9-804-081. Boston: Harvard Business School Publishing, 2014.
- Jones, Geoffrey, Elisabeth Koll, and Alexis Gendron. "Opium and Entrepreneurship in the Nineteenth Century." HBS No. 9-805-010. Boston: Harvard Business School Publishing, 2015.
- McKinsey & Company (2014). "Industrial Revolutions: Capturing the Growth Potential". Report conducted with the Centre for Cities.
- Kynaston, David. *The City of London: Golden Years, 1890-1914*. London: Chatto & Windus, 1995. Introduction.
- Ranger, Steve. "First Came the Artists, Then Came the Hackers: The Strange History of London's Own Silicon Valley." *TechRepublic*. January 16, 2014. Accessed on April 18,

2016.

<http://www.techrepublic.com/article/first-came-the-artists-then-came-the-hackers-the-strange-history-of-londons-own-silicon-valley/>.

UKCES (2014). “The Labour Market Story: The State of UK Skills”. Briefing Paper.

UNDP (2015). “Human Development Report”.

http://hdr.undp.org/sites/default/files/2015_human_development_report_1.pdf

UNDP (2015). “Work for human development”. Briefing note for countries on the 2015 Human Development Report.

http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/GBR.pdf

USEIA (2016). “United Kingdom”.

<http://www.eia.gov/beta/international/country.cfm?iso=GBR>

Webb, D. and Keep, M. (2016). “UK-EU economic relations”. House of Commons Briefing Paper.

WEF (2016). “Global Competitiveness Report: United Kingdom”.

<http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#economy=GBR>

WJP (2015). “Rule of Law Index 2015”. <http://data.worldjusticeproject.org/#index/GBR>.

Woolf, A. (2007). *Focus on the United Kingdom*. Milwaukee, WI: World Almanac Library.

World Bank (2016). “GDP per capita (current US\$)”.

http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?order=wbapi_data_value_2014+wbapi_data_value+wbapi_data_value-last&sort=desc