

Special Report

# Analysis of Banking Patent Filing Strategy

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Why are banks filing patents aggressively?

## Introduction

- **Struggle for existence and survival of the fittest**, two of Darwin's theories form the foundation of all markets. It is a well-known fact that the best products that fulfill customer demand wins; consequently, there is constant competition to emerge as the top contender. Disruptive technologies, such as fintech, are transforming the banking sector and changing the rules of the game.
- US-based banks conventionally mortgaged patents; however, in the past decade, banks across the world have jumped on the bandwagon. Between 2010 and 2020, the top 20 **global banks filed around 50 patents each year (4 patents per month) on average**. The focus of these banks has been on the fintech domain in order to improve banking infrastructure, data processing, checks and verifications, and AI and ML technologies for providing better customer experience, among others.
- In 2020, patent filing activity by the top 20 banks decreased 34% YoY owing to pandemic-induced disruptions. **On the contrary, in the same year, the Industrial and Commercial Bank of China (ICBC) recorded a 73% jump in patent filing activity.**
- Through this study, we have tried to find possible answers for the following questions:
  - *Which banks are filing patents aggressively?*
  - *Why and what are they doing with their patents?*
  - *What banks would be doing with their patents, going forward?*

During the 2020 pandemic, patent filing activity of all major banks reduced **34% YoY**.

Conversely, the Industrial and Commercial Bank of China recorded a **73% jump** in patent filing activity during this period.

# Key Observations

## Q1: Which banks are filing patents aggressively?

- The average patent filing per year of **ICBC and Capital One increased tenfold** in the last four years.
- Top 10 major patent filers since 2009:
  - **Seven US-based banks** – Bank of America, JP Morgan, Wells Fargo, Capital One, Citibank, Morgan Stanley, and Goldman Sachs
  - Three non-US-based banks – ICBC (China), Deutsche Bank (Germany), and Mitsubishi UFJ (Japan) at third, eight, and ninth position, respectively

## Q2: Why and what are they doing with their patents?

- Almost 85% of patents filed by banks are live, of which 60% are granted. This **indicates that banks not only file their IP but also retain them by paying maintenance fees.**
- No major case on licensing, infringement, or litigation is identified from publicly available information. This shows that banks are neither out-licensing their technologies nor actively preventing others from using them.
- The main objective of banks seems to be the launch of new technologies, helping them secure a strong technological position in the market. Other objectives include motivating and rewarding the innovativeness of their human resources.

## Q3: What could be expected in the future?

- The Great Recession of 2008 has led to major US-based banks (Bank of America, JP Morgan, Morgan Stanley, etc.) turning their focus from mortgaging patents to owning them through internal innovation. French banks BNP Paribas and Credit Agricole have almost exited the patent filing scene.
- It would be interesting to observe the impact of the 2020 pandemic and economic slowdown on banks' patent filing strategy.
- Owing to a favorable patenting system, **60.7% of the patents have been filed in the US jurisdiction.** Apart from the US, China holds 12% of the patents, mostly filed by ICBC. The remaining 27.3% is divided between 55 jurisdictions, with no one jurisdiction having a major share.
- Chinese banks are expected to continue filing patents aggressively. It would be interesting to see if patent filing would be restricted to their region or if they will file patents in other major economies as well.
- So far, banks have been filing patents to secure their technologies. In future, it would be worth noting if banks will use their patents as a new revenue stream by receiving royalties from licensed patents or through infringement litigations.

### Contents

Research Methodology .....	>>
Detailed Analysis .....	>>
Where do leaders stand?.....	>>
Key Takeaways for Planning an IP Filing Strategy for Your Bank .....	>>

# Research Methodology

- **R**esearch methodology used for the project:



## Developing search criteria

- In this study, the top 20 global banks were selected based on their market capitalization, financial status, and performance.

<b>US</b>	<ul style="list-style-type: none"> <li>▪ Bank of America (<b>BOA</b>), Capital One (<b>CO</b>), JP Morgan (<b>JPM</b>), Wells Fargo (<b>WF</b>), Barclays (<b>BARC</b>), Morgan Stanley (<b>MS</b>), Citi Bank (<b>CITI</b>), Goldman Sachs (<b>GS</b>), Truist Bank (<b>TB</b>), US Bancorp (<b>USB</b>)</li> </ul>
<b>Europe</b>	<ul style="list-style-type: none"> <li>▪ <b>HSBC</b> (UK), BNP Paribas (<b>BNP</b> - France), Credit Agricole (<b>CA</b> - France), Deutsche Bank (<b>DTCH</b> - Germany)</li> </ul>
<b>APAC</b>	<ul style="list-style-type: none"> <li>▪ Commonwealth Bank (<b>CWB</b> - Australia), <b>ICBC</b> (China), Mitsubishi UFJ (<b>MUJF</b> - Japan), Japan Post Bank (<b>JPB</b> - Japan), DBS Bank (<b>DBS</b> - Singapore), State Bank of India (<b>SBI</b> - India)</li> </ul>

- Various search strings were developed to identify patents assigned or reassigned to these banks in the past 10 years (based on the earlier priority date).

## Searching patents on database

- Using search strings on Orbit Intelligence, **26,719 patents** were identified from the Questel Orbit Intelligence database.
- These patents were validated through other databases such as Espacenet and Google Patents.

## Downloading patent dataset

- IP data was exported to measure various parameters such as the type of patent, current and past assignees, inventors, legal status, IPC/CPC classes, and geography. This formed the basis of follow-on research and analysis.

## Sanitizing the dataset

- Data was cleaned and refined to eliminate redundancies, and junk patents captured by the database.

## Categorizing

- A patent may be assigned to a bank under the following four scenarios:
  - **Self-owned patents:** These patents are expected to be filed by bank employees and are assigned to the bank.
  - **In-licensed patents:** These patents are in-licensed by the bank from a company, startup, university, research institution, or an individual to develop or implement a technology.

- **Mortgaged patents:** These patents may be mortgaged by companies, startups, or individuals to the bank against a credit.
- **Invested patents:** Some banks (such as JP Morgan), through their investment arms, are actively investing in companies and startups; hence, patents filed by companies include banks as their assignees.
- However, due to limited availability of details, categorizing a patent under all the four scenarios was not possible. Therefore, to assess the patent owning strategy of a bank, patents are categorized into:
  - **Self-owned/In-licensed**
  - **Mortgaged/Invested**
- Categorization is done based on the assignee history, inventor address, and licensing details available on the database.
- Considering the nature of the business, banks are expected to file patents under certain technical areas. In cases where complete details are not available, it is assumed that patents disclosing the following broader domains are self-owned or licensed by the banks:
  - A. **Financial:** Credit estimation, etc.
  - B. **Technological:** Network security, transaction security, risk management, fraud detection, imaging, etc.
  - C. **Banking Accessories:** Display, light fixture, wardrobe management, etc.
- Patents that do not fall under the technologies mentioned above are considered to be mortgaged or invested by the bank.

## Analyzing

- The categorized patent data was analyzed to answer the following questions:
  - Who are the top patent assignees? What is their patent owning strategy?
  - Which banks are filling patents aggressively? Who have exited the IP space?
  - Is there any shift in the patent owning strategy after the 2008 financial crisis or due to the boom in fintech?
  - Are there any changes in the relative ranks of banks owing to the shift in their patent owning strategy?
  - What are the activities undertaken by banks after filing a patent?
  - Where do the leaders stand?

## Who are the top patent assignees? What is their patent owning strategy?

- Among the selected 20 banks, more than 1,000 patents were assigned to each of the following six banks:



Total Assigned Patents	Self-owned patents over 3x higher compared to mortgaged patents	Equal number of self-owned and mortgaged patents	Mortgaged patents over 3x higher compared to self-owned patents
>1,000	<ul style="list-style-type: none"> <li>ICBC</li> <li>Capital One</li> </ul>	<ul style="list-style-type: none"> <li>Bank of America</li> </ul>	<ul style="list-style-type: none"> <li>JP Morgan</li> <li>Wells Fargo</li> <li>Citi Bank</li> </ul>
400–1,000	<ul style="list-style-type: none"> <li>Mitsubishi UFJ</li> </ul>	<ul style="list-style-type: none"> <li>Goldman Sachs</li> <li>Barclays Bank</li> </ul>	<ul style="list-style-type: none"> <li>Morgan Stanley</li> <li>Deutsche Bank</li> </ul>
<400	<ul style="list-style-type: none"> <li>Japan Post Bank</li> <li>Commonwealth Bank</li> <li>Truist Bank</li> <li>State Bank of India</li> <li>HSBC</li> <li>DBS</li> </ul>	<ul style="list-style-type: none"> <li>US Bancorp</li> </ul>	<ul style="list-style-type: none"> <li>BNP Paribas</li> <li>Credit Agricole</li> </ul>

### Observations

- About 16 out of 20 banks had an unbalanced ratio of self-owned and mortgaged patents.** This indicates banks either preferred to invest in internal R&D or lend against IP.
- Non-US banks also preferred to invest in internal R&D.** This can be seen from the fact that banks such as ICBC, Capital One, and Mitsubishi UFJ had more self-owned patents than mortgaged ones.

## Which banks are filling patents aggressively? Who have exited the IP space?

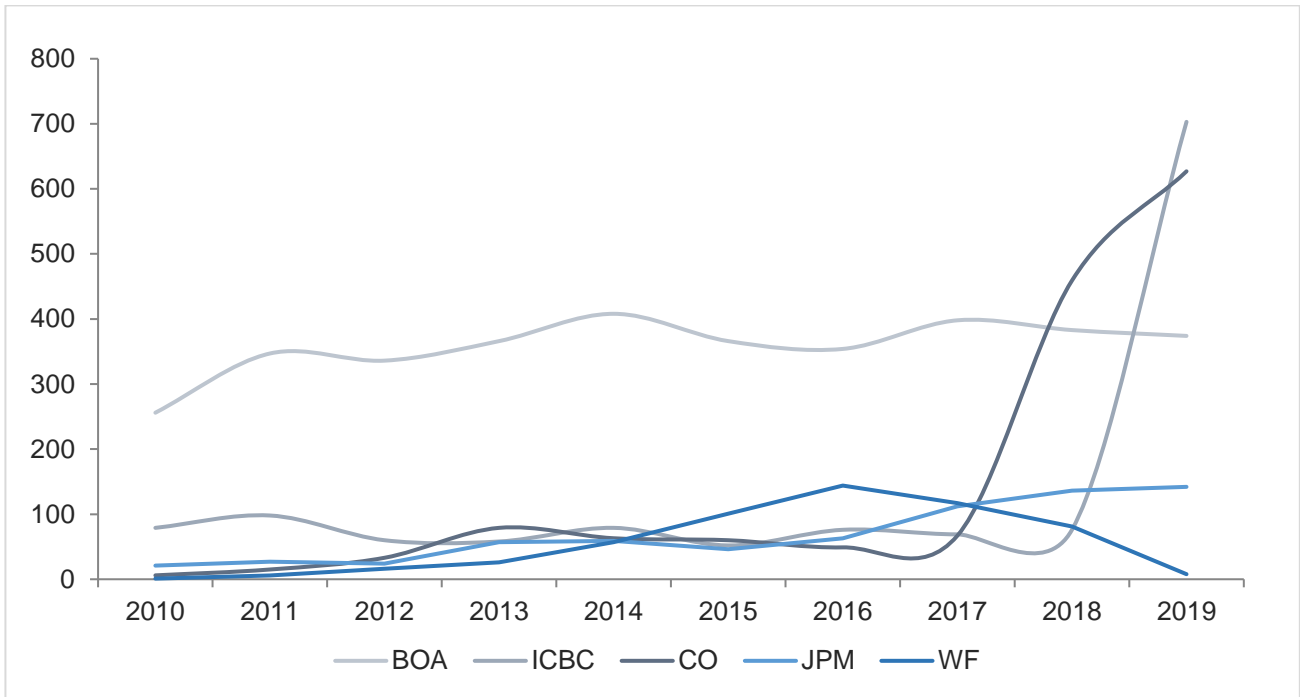


Chart depicting self-owned patent filing trend by top five banks over past 10 years

Self-owned patent in past 10 years	Rapidly increased in past five years	Consistently increasing	Constant	Inconsistent	Reducing	No patent in last 5 years
1,000–4,000	<ul style="list-style-type: none"> <li>ICBC</li> <li>CO</li> </ul>		<ul style="list-style-type: none"> <li>BOA</li> </ul>			
500–1,000		<ul style="list-style-type: none"> <li>JPM</li> </ul>		<ul style="list-style-type: none"> <li>WF</li> </ul>		
100–500		<ul style="list-style-type: none"> <li>MUJF</li> </ul>			<ul style="list-style-type: none"> <li>BARC</li> </ul>	
50–100		<ul style="list-style-type: none"> <li>MS</li> </ul>	<ul style="list-style-type: none"> <li>CITI</li> <li>GS</li> <li>JPB</li> </ul>			
<50				<ul style="list-style-type: none"> <li>DTCH</li> <li>USB</li> <li>CWB</li> <li>TB</li> <li>BNP</li> <li>SBI</li> </ul>		<ul style="list-style-type: none"> <li>CA</li> <li>HSBC</li> <li>DBS</li> </ul>

## Observations

- **ICBC filed patents aggressively during the pandemic.** Until 2018, the bank used to file approximately 71 patents per year. However, it filed 793 patents in 2019 and 1,215 patents in 2020. These patents are mostly related to data security, authentication, encryption, blockchain, AI, credit rating, and transaction fault detection.
- **Capital One increased its patent filing activity by tenfold between 2017 and 2019.** However, it filed only 59 patents during the pandemic and lockdown.
- The filing trend of **banks with more than 100 patents** in the last 10 years **was either constant or increasing.**
- As expected, **banks with less than 100 patents** (US Bancorp, Commonwealth Bank, Truist Bank, State Bank of India, DBS Singapore, etc.) **showed inconsistent patent filing over the years**, indicating low interest in R&D and mortgaging.
- From 2010 to 2016, Wells Fargo constantly doubled its patent filing every year and filed maximum 144 patents in 2016. **However, after 2017, a sudden dip was observed for no specific reason.**
- **Non-US-based banks such as Credit Agricole, DBS, and HSBC have not filed any patent in the last five years.**



## Is there any shift in the patent owning strategy after the 2008 financial crisis or due to the boom in fintech?

Period	Primarily focusing on owning patent	Equal focus on owning and mortgaging	Focusing only on mortgaging	Additional remarks
<b>Pre-Recession Period</b> <i>(Until 2009)</i>	<ul style="list-style-type: none"> <li>▪ ICBC</li> <li>▪ Capital One</li> <li>▪ MUJF</li> <li>▪ CWB</li> <li>▪ SBI</li> <li>▪ HSBC</li> </ul>	<ul style="list-style-type: none"> <li>▪ GS</li> <li>▪ Barclays</li> <li>▪ US Bancorp</li> </ul>	<ul style="list-style-type: none"> <li>▪ BOA</li> <li>▪ JPM</li> <li>▪ WF</li> <li>▪ Citibank</li> <li>▪ Morgan Stanley</li> <li>▪ Deutsche Bank</li> <li>▪ BNP Paribas</li> <li>▪ Credit Agricole</li> </ul>	<ul style="list-style-type: none"> <li>▪ JPB, Truist, and DBS neither owned nor mortgaged any patent until 2009.</li> </ul>
<b>Post-Recession Period</b> <i>(In last 10 years)</i>	<ul style="list-style-type: none"> <li>▪ BOA</li> <li>▪ JPM</li> <li>▪ ICBC</li> <li>▪ Capital One</li> <li>▪ MS</li> <li>▪ MUJF</li> <li>▪ Barclays</li> <li>▪ JPB</li> <li>▪ US Bancorp</li> <li>▪ CWB</li> <li>▪ Truist Bank</li> <li>▪ SBI</li> <li>▪ HSBC</li> <li>▪ DBS</li> </ul>	<ul style="list-style-type: none"> <li>▪ WF</li> <li>▪ GS</li> <li>▪ Credit Agricole</li> </ul>	<ul style="list-style-type: none"> <li>▪ Citibank</li> <li>▪ Deutsche</li> <li>▪ BNP Paribas</li> </ul>	
<b>Fintech Mainstreaming Period</b> <i>(In last 5 years)</i>	<ul style="list-style-type: none"> <li>▪ BOA</li> <li>▪ JPM</li> <li>▪ ICBC</li> <li>▪ WF</li> <li>▪ Capital One</li> <li>▪ MS</li> <li>▪ MUJF</li> <li>▪ Barclays</li> <li>▪ BNP</li> <li>▪ JPB</li> <li>▪ US Bancorp</li> <li>▪ CWB</li> <li>▪ Truist Bank</li> <li>▪ SBI</li> </ul>	<ul style="list-style-type: none"> <li>▪ Credit Agricole</li> </ul>	<ul style="list-style-type: none"> <li>▪ Citibank</li> <li>▪ Deutsche</li> <li>▪ GS</li> </ul>	<ul style="list-style-type: none"> <li>▪ HSBC and DBS neither owned nor mortgaged any patent until 2009.</li> </ul>

## Observations

The study shows that banks followed these five strategies:

- **Primary focus on internal innovations:**
  - Banks (such as **ICBC, Capital One, Mitsubishi UJF, Commonwealth Bank, State Bank of India, and HSBC**) mainly focused on internal innovations and have not changed their strategy over the years.
- **New entrants**
  - **Japan Post Bank, Truist Bank, and DBS Bank** built their portfolio in the past 10 years only through internal innovations.
  - DBS has not filed any patent after 2013.
- **Shift from mortgaging to self-owning**
  - Following the 2007–08 great recession, all major US-based banks (including **Bank of America, JP Morgan, Morgan Stanley, Barclays, US Bancorp, and Wells Fargo**) shifted their focus from mortgaging patents to owning them through internal innovation.
- **Balanced portfolio**
  - **Goldman Sachs** maintained a balance between self-owned and mortgaged patents.
- **Focus only on mortgaging**
  - **Citibank** and **Deutsche Bank** retained their focus on mortgaging and investment.
- **Almost exited from patent filing**
  - Until 2009, **BNP Paribas** had 131 mortgaged and 5 self-owned patents. However, after 2009, it had only 4 mortgaged and 3 self-owned patents.
  - Until 2009, **Credit Agricole** had 59 mortgaged and 16 self-owned patents. However, in the last 10 years, it had only 1 mortgaged patent and 1 self-owned patent.

## Are there any changes in the relative ranks of banks due to the shift in their patent owning strategy?

Ranking of banks based on self-owned patents				Ranking of banks based on mortgaged patents			
Bank	Rank until 2009	Last 10 years	Last 5 years	Bank	Rank until 2009	Last 10 years	Last 5 years
BOA (US)	1	1	2	JPM (US)	1	3	7
MUJF (Japan)	2	6	6	BOA (US)	2	4	5
JPM (US)	3	4	4	WF (US)	3	1	1
CO (US)	4	3	3	DTCH (Germany)	4	9	8
CITI (US)	5	10	11	MS (US)	5	8	9
GS (US)	6	11	10	CITI (US)	6	2	2
ICBC (China)	7	2	1	GS (US)	7	7	4
BARC (US)	8	7	9	BARC (US)	8	10	10
MS (US)	9	9	8	BNP (France)	9	11	11
WF (US)	10	5	5	CA (France)	10	14	12
USB (US)	11	14	13	CO (US)	11	6	6
DTCH (Germany)	12	15	14	USB (US)	12	15	15
CA (France)	13	20	18	MUJF (Japan)	13	12	13
CWB (Australia)	14	13	16	ICBC (China)	14	5	3
BNP (France)	15	16	15	JPB (Japan)	15	13	14
SBI (India)	16	17	17	TB (US)	16	16	16
HSBC (UK)	17	19	20	CWB (Australia)	17	17	17
JPB (Japan)	18	8	7	SBI (India)	18	18	18
TB (US)	19	12	12	DBS (Singapore)	19	19	19
DBS (Singapore)	20	18	19	HSBC (UK)	20	20	20
Upward shift of more than 3 positions				Downward shift of more than 3 positions			

## Observations

- Before 2009, Bank of America, Mitsubishi UJF, JP Morgan, Capital One, and Citibank had the highest self-owned patent filings.
- In the last five years:
  - **US-based banks – Bank of America, JP Morgan, and Capital One – retained their position.**
  - **MUJF slipped to the sixth position and Citibank to the 11<sup>th</sup> position.**
  - **ICBC's ranking went up from the 7<sup>th</sup> to the 1<sup>st</sup> first position and Wells Fargo climbed up from the 10<sup>th</sup> to the 5<sup>th</sup> position.**
- In last five years:
  - **Wells Fargo and Citibank** became the top mortgagees in the US.
  - **JP Morgan and Bank of America were top mortgages till 2009, are now down to the 7<sup>th</sup> and 5<sup>th</sup> positions, respectively.**
  - **ICBC advanced from the 14<sup>th</sup> to the 3<sup>rd</sup> position** and Goldman Sachs from the 7<sup>th</sup> to the 4<sup>th</sup> position.

## What are the activities undertaken by banks after filing a patent?

Banks	Total self-owned patents filed after 2009	Alive		Dead			% Alive patents
		Granted	Pending	Expired	Lapsed	Revoked	
BOA (US)	3599	1916	546		1137		68.4%
ICBC (China)	2568	465	1939	52	16	96	93.6%
CO (US)	1518	1132	299		87		94.3%
JPM (US)	687	320	318		49		92.9%
WF (US)	558	448	51	3	56		89.4%
MUJF (Japan)	276	127	70		43	36	71.4%
BARC (US)	109	46	21		39	3	61.5%
JPB (Japan)	90	39	31		2	18	77.8%
MS (US)	64	32	22		10		84.4%
CITI (US)	53	33	12		5	3	84.9%
GS (US)	50	27	13		9	1	80.0%
TB (US)	18	12	6				100.0%
CWB (Australia)	12	7	1		4		66.7%
USB (US)	11	6	3		2		81.8%
DTCH (Germany)	10	6	1		2	1	70.0%
BNP (France)	3	2			1		66.7%
DBS (Singapore)	3	1	1		1		66.7%
SBI (India)	3						100.0%
HSBC (UK)	2						100.0%
CA (France)	1						100.0%

### Observations

- **Most of the banks are attempting to get their patents granted**, as evident from the following observations:
  - **Four of the top five banks have more than 85% alive patents**, indicating their interest in retaining the patents filed by them.
  - **Except JP Morgan, all US-based banks have over 60% granted patents**, suggesting they prefer to protect patents.
  - Since ICBC and JP Morgan increased the number of filings after 2017, their patents would be in the prosecution stage. The **status of their patents could be ascertained in the next 2–3 years**.

## Where do the leaders stand?



**BANK OF AMERICA**

### Bank of America

- **In terms of asset, Bank of America is the second largest bank in the US** and has the **largest IP portfolio** with a total of 4,181 self-owned and 2,731 mortgaged patents.
- **After the 2008 financial crisis, the bank changed its strategy.** In the last 10 years, Bank of America has filed 6x more patents than that filed until 2009. Total patents mortgaged by the bank over the decade were 13x less than the patents filed until 2009.
- Citation analysis of the bank's portfolio suggest **each patent was cited by more than five patents that were filed by other assignees.**
- **Since 2009, Bank of America has constantly filed on average 358 patents per year.**

### The future

- **Bank of America's closest competitors are ICBC and Capital One.** Due to ICBC's increased self-owned patent filing activity, Bank of America has slipped to the second position. It **is recommended that the bank keep an eye on competitive filings.** If ICBC and Capital One continue to file at a similar rate, Bank of America may lose its position further.
- Of the 3,599 patents filed by Bank of America in the last 10 years, 1,137 (31.6%) lapsed. However, a similar pattern is not seen for the other banks, as 15 out of 20 banks have less than 20% lapsed patents. **Bank of America could aim to file patents after better due diligence to avoid IP expenditure on patents that lapse at later stages.**

## J.P.Morgan

### JP Morgan

- **JP Morgan** is the largest bank in the US and **has the second highest total assigned patents.**
- Similar to Bank of America, **JP Morgan's mortgaging activity reduced significantly.** Until 2009, it was the biggest mortgagee in the US and had the highest number of mortgaged patents at 5,302. However, between 2009 and 2015, it mortgaged only 203 patents and just 7 patents after 2016.
- Over the last few years, **JP Morgan constantly pushed its self-owned patenting activity.** During 2017–19, JP Morgan filed at a rate of around 130 patents per year; however, between 2013 and 2016, this figure decreased to around 56 patents per year.
- In terms of total self-owned patents, JP Morgan filed 686 patents and Wells Fargo 558 in the last 10 years. **Though Wells Fargo follows close behind, JP Morgan may not face competition from the latter** because Wells Fargo's primary focus is still on mortgaging and its self-owned patenting pattern has shown a downtrend in the past three years.

### The future

- Of the total 638 self-owned active patents **JP Morgan held in the past, approximately 50% are pending; it could focus on getting them granted.** Since the bank is actively engaged in mortgaging, it may **leverage its client network to monetize through these patents.**



## ICBC

- **ICBC has emerged as an outlier patent filer** in the last two years.
- Almost **100% of its patents are filed in China**, which are in the pending stage.
- The bank mostly files patents in the domain of fintech and transaction security. No significant mortgaging activity is observed.

### The future

- Though its patenting activity is limited to the Chinese jurisdiction, **it would be interesting and important for the other global banks to monitor ICBC's filing pattern and technological advancements.**



## Wells Fargo

- Wells Fargo is the third largest bank in the US and the fourth biggest patent assignee.
- **About 96% of its patents are filed in the US and Canada.**
- **While other US-based banks have reduced mortgaging activity, Wells Fargo is actively mortgaging** and is currently the **largest IP lender or mortgagee in the US.**
- **Wells Fargo's filing trend of self-owned patents saw a major dip after 2017** for no specific reason.

### The future

- Wells Fargo may continue its mortgaging strategy and not focus on growing its IP portfolio organically. Nevertheless, **it would be worth keeping an eye on its filing pattern, which could set a new trend for both US-based and global banks.**

## Key Takeaways for Planning an IP Filing Strategy for Your Bank

- **Focus on self-owning:** Various studies suggest banks are not able to monetize the mortgaged IP. Learning from historical experience and looking at innovative technologies developed by non-banking entities and individuals, it is advisable for banks to secure patents, either organically or inorganically.
- **Consistency is the key:** Given the pace of technological changes, consistently increasing R&D and innovation activity could help banks stay focused in the market.
- **Volume does not matter, but quality does:** Banks such as Barclays, Citibank, Goldman Sachs, and HSBC have less than 100 patents. However, each patent is cited by more than 8 patents, which are filed by other banks, fintech companies, universities, and individuals. Banks could focus on generating high quality IP and keeping it alive, which could pave the way for further innovation in the Fintech domain.
- **How Aranca can help:**
  - *This report is just a sample of the analysis that can be conducted on this topic. We can customize this to delve deeper or look at other banks based on the client's specific requirement.*
  - *Aranca can assist banks to:*
    - Track technological developments and IP activities of global banks, fintech companies, and startups.
    - Benchmark your patent portfolio vis-à-vis of your competitors and recommend ways to optimize the portfolio.
    - Conduct due diligence of the patent draft to minimize chances of rejection during patent prosecution.
    - Identify the right set of patents for the purpose of investment or acquisition; and
    - Conduct valuation of mortgaged and licensed patents and identify strategies and targets to monetize them.





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