

WIPO Committee on Development and Intellectual Property

Intellectual Property in Mobile Applications Overview and key issues

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Intellectual Property in Mobile Applications

Overview and key issues

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Part I - The mobile apps ecosystem

Introduction

Mobile applications have become an integral part of our lives, they influence the way we interact, communicate, work, access information and relax. The mobile app economy has become an essential contributor to global GDP. The global mobile app market is expected to reach over \$935 billion in 2023, with a compound annual growth rate of 19.5% between 2018 and 2023¹. This growth rate is expected to continue growing at the rate of 13.8% from 2023 to 2030. The annual increase of downloaded apps is on average 20% and consumers are downloading more than 435,000 apps per minute. The Apple App Store has 1.96 million while Google Play Store has 2.87 million apps available for download. Against this background it is critical to understand the app ecosystem, how it functions and how intellectual property supports and interacts with that ecosystem.

Mobile apps are actively used in various industries to streamline processes, improve efficiency, and provide value to customers. From retail to gaming, mobile health and fitness, music and entertainment, social networking, retail and e-commerce and finance mobile apps play an increasingly important role in business and social life.

The apps embody a dramatical improvement of mobile devices by software applications and have transformed profoundly the economy and people's life, enabling disintermediation between buyers and developers, facilitating actions that were difficult or setting up completely new industries. With the merger between app stores, mobile, and cloud apps they have changed the way we use phones, devices, and services.

Mobile apps drive the adoption of new technologies and innovative smart solutions. They depend, on the one hand, on the availability of the right combination of multidisciplinary skills and, on the other hand, on the technological infrastructure which enables the delivery of improved services using mobile technologies.

The mobile apps market is characterized by relatively low barriers to entry and many SMEs, start-ups and individuals develop and supply new apps. In comparison with the capital-intensive subsectors, the mobile apps sector has a strong potential for growth in terms of jobs and revenues and can be sustainable with relatively low investments which makes it particularly relevant as a component of national growth strategies.

The success of the app economy is sustainable because developers continue to create new products, services, and markets that did not exist before - the multiple new services which are developed support its growth. The app economy provides huge business potential for small, independent companies and individual developers to engage with customers on a global scale and bring their transformative products to all industry sectors. The app economy is very well interconnected with the rest of the economy as it is present in the majority of its branches. Turbulent economic and social processes impose the need to find new innovative solutions for work and for dealing with challenges in healthcare, education, cloud services, tourism and commerce and apps are providing numerous solutions and facilitate the process of mastering these challenges.

This tool developed by the World Intellectual Property Organization (WIPO) seeks to provide the reader with basic knowledge on the intellectual property aspects relating to mobile applications. This overview of the mobile app economy with a focus on intellectual property is

intended to offer a perspective for strategic policy decisions which need to be taken to secure a successful business with apps. The tool uses and builds on the information resources that WIPO has developed on the various aspects of the topic¹ⁱⁱ. The material is designed to serve the needs of policymakers, but it offers also relevant content for anyone who wants to understand why intellectual property matters in apps and how it adds a competitive edge and income streams to app rights owners. The tool will help its users to understand the business and legal issues related to the development, distribution and use of mobile apps.

This tool is not intended to replace the expertise of lawyers and other key stakeholders in the mobile apps industry in negotiating deals. It offers high-level explanations as to the role of IP in developing and commercializing apps.

1.1. An overview of the app economy

The mobile app sector has a complex structure and includes a spectrum of key parties ranging from individual entrepreneurs and developers to technological leaders. This diversity within the sector contributes to constant innovation and the uninterrupted introduction of novel apps.

Market concentration

The level of market concentration within the mobile app sector varies with the different stages of the mobile app life cycle. During the conception and development stages, a higher degree of fragmentation prevails. This period witnesses a dispersion of entities, including independent developers, development agencies, and other stakeholders, as ideas for apps originate from universities, startups, SMEs, artists and other creatives, as well as established businesses.

In the distribution stage, a notable concentration emerges. Prominent App Stores such as Apple's App Store and Google Play exert significant influence in terms of both app downloads and revenue generation. This concentration leads to more attention to their practices, prompting anti-trust complaints and regulatory scrutiny, aimed at ensuring equitable competition and averting anti-competitive conduct.

As for the associated technological services, such as mobile app hosting, payment gateways and mobile payment services and advertising services, there is a considerable degree of fragmentation and we note a diverse landscape of market players.

Finally, as regards to mobile operators, the degree of market concentration and dominance of significant actors tends to differ according to the level of development of the country. In some countries with less developed market for mobile operators these operators get more involved in the app market. In developed markets, the higher degree of competition among mobile operators and broadband providers ensures that their intervention is limited mainly to being data carriers.

Investment

Investment in this sector has surged in recent years, specially over 2020 and 2021 with peaks related to pandemic which made anything mobile and virtual an attractive target for investors. High potential returns due to diverse monetization strategies, like in app purchases and advertisement, has attracted significant interest from investors.

Venture capital firms actively support start-ups. Despite a decrease over 2021-2022, the general trend demonstrates constant growth, making it an attractive choice for investors seeking both innovation and profitability.

Policy attention

Policymakers have acknowledged the significance of overseeing the mobile app industry to promote fair competition, safeguard consumers and ensure the protection of personal data, among other objectives. Efforts such as the European Digital Markets Act (DMA) and Digital Services Act (DSA) and the General Data Protection Regulation (GDPR) are aimed at tackling issues linked to the dominance of app marketplaces and higher risks in terms of privacy within Europe. This is not limited to the EU: regulations like the Singapore Personal Data Protection Act, Australian Privacy Principles share the common goal of establishing clear guidelines and responsibilities for App Stores but also the whole mobile app sector while upholding the rights of End Users.

1.1.1. Key sectors

There are apps for virtually every sector of the economy. Certain sectors within the app environment have experienced exponential growth, the three dominant ones being games, business and education.

Gaming apps have transformed entertainment and have a dedicated and expanding user base. From casual games like Candy Crush to immersive multiplayer experiences, mobile gaming continues to captivate audiences worldwide. As of 2023, almost 700,000 games are available in the mobile app stores. Revenues in Mobile Games market are projected to reach 173.60 billion USD in 2023.

Entertainment apps have become integral to everyone's daily lives, regardless of the age. Streaming platforms like Netflix, Disney+, and Spotify have redefined how people consume content and media, offering a vast library of content at our fingertips. Personalized recommendations and on-demand access make entertainment apps a must for users seeking quality content. In 2022, the leading entertainment and streaming app worldwide by number of downloads was TikTok, with over 670 million downloads, followed by Netflix, with 165 million downloads, YouTube, with 154 million, Disney+, Amazon Prime Video, YouTube Kids and HBO Max.

Education has gone mobile, with **mobile learning** apps catering to learners of all ages. These apps offer courses, tutorials, and resources on a wide range of subjects, empowering users to expand their knowledge and skills anytime, anywhere. Mobile learning is particularly valuable in a world where lifelong learning is essential for personal and professional growth.

E-commerce apps have transformed the way we shop, providing a convenient and secure platform for online purchases. Giants like Amazon and Alibaba have paved the way for smaller retailers and entrepreneurs to reach clients worldwide, fostering a competitive and

dynamic marketplace. Analysts expect 3.5 trillion USD of mobile e-commerce sales by 2027.

Mobile banking and payment apps have become indispensable for managing finances and making transactions. They offer features like mobile check deposits, budgeting tools, and peer-to-peer payment options, simplifying financial tasks and promoting cashless transactions. Estimates are that around 2.8 billion mobile wallets are in use worldwide.

With the rise of the on-demand economy, **food delivery and grocery apps** have witnessed unprecedented growth, especially after the Covid-19 pandemic's lockdown. Convenience and accessibility have become paramount, with users enjoying the ability to order meals and groceries with a few taps on their smartphones. In 2022 the user base of online food delivery apps and platform reached 3 billion consumers, and grocery delivery has a projected market value of 0.63 trillion USD in 2023.

Well-being and Fitness. The health and well-being sector has seen a surge in mobile apps, catering to fitness enthusiasts, mental health advocates, and individuals seeking healthier lifestyles. These apps offer features such as workout tracking, meditation guidance, and nutrition planning, empowering users to take control of their well-being. The revenue in this market sector is projected to reach 28.93 billion USD in 2023, and it is expected to show an annual growth rate of 13,32 percent.

The rise of **cryptocurrencies** has triggered a new wave of apps for buying, selling, and managing digital assets. These apps offer real-time market data, wallet services, and secure trading platforms, catering to both novice and experienced crypto fans.

1.1.2. Key technologies

Some technologies have been widely used in mobile applications and improved user experience or apps functionality and are particularly relevant for intellectual property (IP) protection and management.

Artificial Intelligence (AI) and Machine Learning (ML) have become an integral part of app development. AI-powered algorithms analyze user data to provide personalized experiences, recommend content, and optimize user interfaces. ML models enhance app functionality by enabling predictive analytics, automating tasks, and improving user engagement. From virtual personal assistants to chatbots, AI and ML are shaping the future of app interactions and are used for different purposes.

Augmented Reality and Virtual Reality are revolutionizing the way users interact with apps and the real world. AR overlays digital information onto the physical world, while VR immerses users in entirely digital environments. From gaming and education to healthcare and retail, these technologies offer limitless possibilities for creating engaging and immersive experiences.

Peer-to-Peer (P2P) technologies are becoming more popular in the app sector as they enable user-to-user communication. Without the need of middlemen, these apps allow for file sharing, communications, and even money transactions. P2P apps, which provide efficiency and convenience, are revolutionizing how people connect and conduct business. Leading technologies like WhatsApp and PayPal have become extremely popular.

Security technologies are widely used with the growth of the app ecosystem and the accompanying security threats. App developers are prioritizing security by implementing robust encryption, biometric authentication, and secure Application Programming Interfaces (APIs). Continuous monitoring and updates are essential to safeguard user data and maintain trust.

5G allows real-time experiences, from high-quality video streaming to augmented reality applications, thanks to its breakneck speeds and low latency. It serves as the foundation for IoT, connected devices, live streaming, and real-time gaming applications.

Voice Technology has revolutionized how we use apps. Voice-activated assistants have gained widespread recognition, including Siri and Alexa. To increase accessibility and user engagement, app creators are using voice recognition and synthesis.

Natural Language Processing (NLP) empowers apps to understand and respond to human language. Chatbots and virtual assistants use NLP to engage users in natural conversations, making information retrieval and customer support more efficient.

1.1.3. Key types of mobile applications

There are four main types of apps.

- a) **Super Apps**, which are multi-purpose applications that offer a wide array of services and functionalities within a single platform (WeChat, Gojek, Rappi and Alipay). Super apps aim to be a one-stop solution for users, eliminating the need to download multiple specialized apps. As these super apps are particularly sophisticated and complex, they require a greater need for understanding and managing the IP related issues. The global super apps market size was valued at USD 61.30 billion in 2022 and is expected to expand at a compound annual growth rate of 27.8 percent from 2023 to 2030.
- b) **Native Apps** are developed for a particular operating system using platform-specific programming languages. Native apps are optimized for the respective platforms, resulting in a superior user experience and performance. Furthermore, they have a seamless integration with the device's hardware and software features that means better performance and functionality. Some popular native apps include Instagram, WhatsApp, Spotify, Uber and Netflix.
- c) **Web Apps** represent a versatile and cross-platform solution: they run within a web browser and do not require installation from an app store. Users can access them simply by navigating to a website, making them platform-agnostic. Web apps are an excellent choice for businesses looking to reach a broad audience without the constraints of app store policies but can also be transformed fairly easily into independent apps for different target markets and experiences. They are cost-effective to develop and maintain because they share a common codebase across various platforms.
- d) **SDK (Software Development Kit)** are crucial tools that offer developers with the resources and libraries they need to create and improve their apps. Pre-built code, APIs and documentation are frequently included in these resources. SDKs are essential for extending the functionality of mobile apps. The Google Maps SDK, for example, allows developers to smoothly incorporate mapping and location services

into their apps, whilst the Facebook SDK allows for easy integration of social media capabilities.

1.1.4. Key trends

The success of the app industry depends on finding the balance between the right product to the right user at the right time and at the right stage of their app experience. People increasingly rely on devices as a source of information and entertainment, as well as utility or inspiration. This provides a huge opportunity to **increased app monetization**, which, on its turn, will further boost the app economy. Consumers are finding new ways to monetize their app-based activities. This process is fueled by the active social networking, which provides additional incentives for gamers, content creators and app users to find new ways to monetize their activities. With the rise of digital marketing there are more e-commerce or peer-to-peer sales being rolled into social media apps - people may buy more clothing, artwork and other goods and services outside of established ecommerce platforms, which were specifically set up with buying and selling in mind.

Another important trend is the **integration of users in the mobile development process**. App companies are becoming increasingly focused on growing communities as they realize that a more diverse range of voices is essential for feedback and product adjustment. User-driven innovation has endless potential for optimizing market performance. More users and customers are being brought in at the early stages of the app development process, resulting in products that are increasingly made by the people and for the people. Developers and companies will continue to focus on the value of user-driven innovation. This involves essential feedback which facilitates product and service optimization.

A major infrastructure trend is the **improved capacity of broadband** as a key prerequisite for market expansion. The growing use of apps is impossible without broadband access and the relationship between the two is very direct. Today nearly 90% of mobile usage is spent on apps. This requires companies to make their website accessible to mobile users by creating highly responsive mobile applications. The lack of access to broadband connections will deprive the population where this infrastructure is not developed in disadvantageous position in relation to apps usage.

The increased internet penetration and gaming technology have continued to improve, resulting in more accessibility to mobile games. Games such as Pokémon Go use sensors such as motion sensors, gyroscopes, and accelerometers in tablets and smartphones to ensure the capability of AR and VR on the mobile phone through various apps. Moreover, primarily there are three revenue models, comprising in-game purchases, paid game applications, and in-app advertisements that games and application developers follow.

As 5G networks become more widely available, mobile app developers will be able to take advantage of faster download and upload speeds, as well as lower latency, to create more advanced and responsive apps. With the implementation of 5G at full-scale, **data will ultimately be delivered faster than previous years**, efficiently supporting more users, devices and services. For mobile developers, 5G means being able to deliver high-quality video streaming, lower latencies and new functionalities powered by augmented and virtual realities.

The issues of **security and privacy** have been of growing concern and a top priority in the app industry. Software security becomes a key requirement in developing each feature and

functionality of mobile apps. Developers must ensure their mobile applications are properly secured from potential cyber threats, such as data breaches and malware.

The **expansion of the usage of mobile apps in on-demand services** has become predominant. The popularity of on-demand services, such as for example ridesharing and food delivery has quickly established itself as a prime service. It opens possibilities for more companies entering the market and offering their own mobile apps. The continuing rise of the on-demand mobile service application market is expected to reach \$335 billion by 2025. These types of apps include delivery services, healthcare consultations, transport and logistics, as well as platforms that provide clients with a wide range of services offered by freelancers.

Perfectioning of the app performance

Apps are **expanding into new areas**. Increasing number of services are relying on apps and making them an inherent and inseparable part of the service. A typical example are health services, which through apps can monitor health condition of vulnerable people, provide data to experts to make informed decisions and interventions, communicate messages relating to prevention, warnings or diagnostics.

The world of mobile applications is extremely dynamic and demands not only keeping a careful eye on emerging trends, but also understanding how apps and the related intellectual property rights (IPR) may be secured and effectively used. IP is critical in this process as it serves as the foundation for safeguarding and commercializing these digital assets.

1.2. Major players

Throughout the entire life cycle of a mobile app, from conception to distribution, there is a vast array of stakeholders considered key to the success and sustainability of the ecosystem. Each of these key parties contributes value and generates synergies necessary for an ever-growing industry. The key stakeholders include:

- The App Owner
- The App Developer
- The Platforms
- The App Stores
- Service providers
- B2b Clients
- End Users

These actors intervene at different stages of the lifecycle of an app, from conception to commercialization, and in the creation of new versions in a cyclical manner. This is illustrated by the circle below.

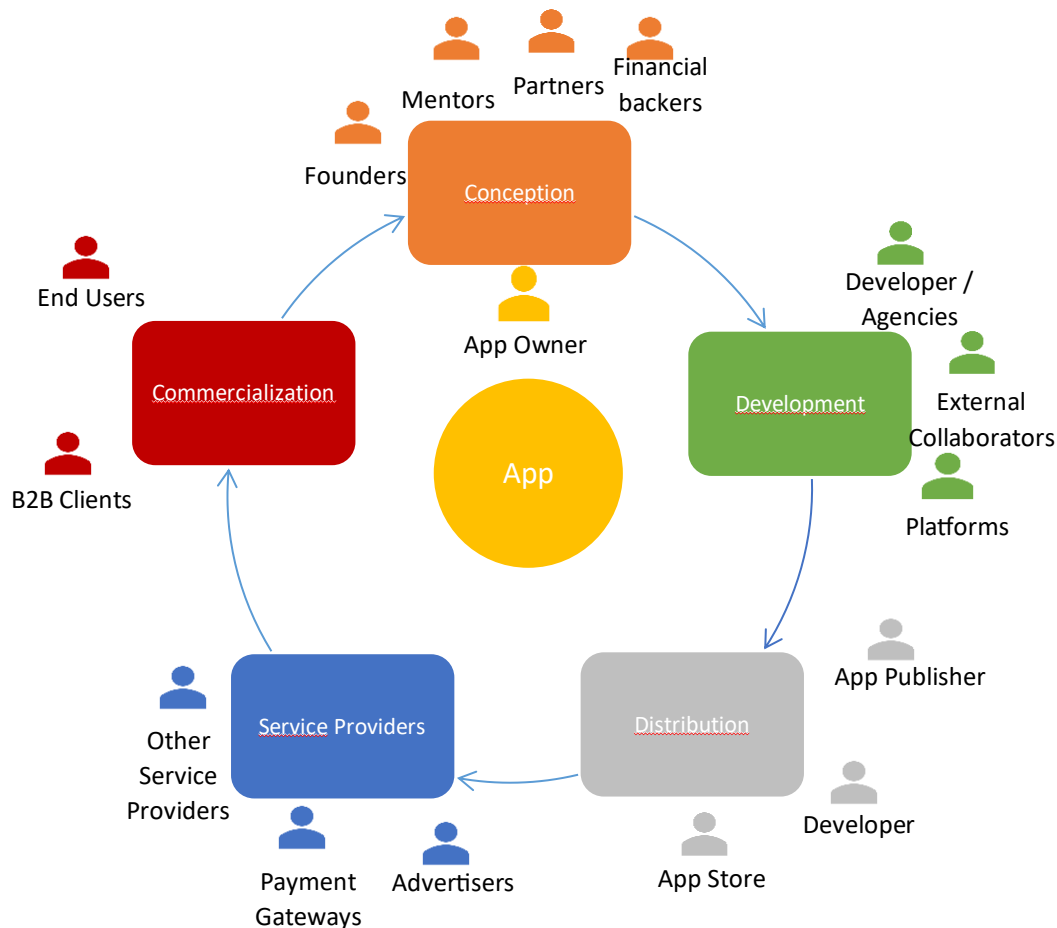


Figure 1 – The mobile app ecosystemⁱⁱⁱ

1.2.1. The App Owner

The App Owner is usually the company or individual that conceptualizes the mobile app. In the conception phase they predefine the ideas aiming to satisfy detected needs. The App Owner is involved in all phases in the mobile app lifecycle and is often the one who commissions the work on the development of the app.

App Owners play different roles and assume several responsibilities to obtain a result that integrates the various specialties within the industry. They perform the following functions:

- **Conceptualization** - identifying the needs or problems the mobile app aims to solve, searching for relevant features and establishing mid- and long-term goals.
- **Financing** - allocating the necessary budget and resources for different phases of the mobile app lifecycle.
- **Control** - hiring developers or outsourcing the development work to agencies, project supervision.
- **Strategizing** - providing the strategic direction of the mobile application project and deciding on necessary deviations from initial ideas.
- **Legal and contractual matters** - addressing legal and compliance issues, incl. data privacy regulations, copyright and intellectual property concerns.

- **Monetization** - defining the monetization plan, incl. market expansion, etc.

The App Owner interacts at all stages, playing an essential role.

1.2.2. App Developers

The App Developer is responsible for designing, creating, and maintaining the app. The developer uses various programming languages and tools to develop the app. Developers need to understand End User requirements in order to design the mobile app's user interface, implement functionality, test the mobile app in different environments, and deploy it to app stores or distribution platforms.

Developers may be internal ("inhouse development") or be hired as external developers, either as a freelance contractor or as a development company (often called "Agency") to build the mobile app.

The development process requires specific skills and involves such experts as:

- **Mobile app developer** - responsible for programming and building the app.
- **UX/UI Designer** - responsible for user experience ("UX") and user interface ("UI") design, ensuring that the app is intuitive and visually appealing.
- **Software architect** - designs the overall structure of the application and decides on the most appropriate technologies and tools for development.
- **Business analyst** – defines the requirements and ensures that the application meets business or market needs.
- **Tester or QA (Quality Assurance)**: In charge of testing the application at different stages to ensure its quality and find bugs.

Other important skills bring the manager of the development project, security specialists, database specialists and others.

1.2.3. Platforms

Platforms are the software architecture that serves as a foundation for other programs or apps to run on. It usually includes security features and procedural and software rules that apps must comply with to use the Platform. When a Developer is deciding to design an app, the Platforms are the basis on which the app will run, so it is at the Conception and Development stages where this technology must be defined. Apps exist within a Platform and there are several popular Platforms supporting apps on mobile and portable devices.

Currently, the Android and iOS Platforms significantly occupy the mobile operating system market, jointly accounting for an estimated 99 percent of the total market share.

The primary objective of Platform operators is to augment their user base, which includes both individual users and App Developers, and, under certain circumstances, encompasses mobile handset manufacturers as well. App Developers invariably gravitate towards Platforms that have the most End Users, while End Users seek Platforms endowed with a rich array of apps complemented by compelling hardware features.

Platforms provide an indispensable legal and regulatory infrastructure in such aspects as:

- **Standardization** - they facilitate a coherent and unified development framework, enabling the interaction of apps with various hardware under standard protocols.
- **Security and privacy** - they establish security protocols, guaranteeing the protection of end-user data and the integrity of the app.
- **Market accessibility** - Platforms are matched by the corresponding App Store, and through their app stores they act as intermediaries between developers and users, ensuring that applications comply with specific legal and technical guidelines.
- **Compatibility and adaptability** - they allow applications to adapt to various devices and hardware solutions, providing a uniform experience to the end user. Users are comfortable with a standard operating system where user experience is harmonized.
- **Updates and support** - they provide regular updates to address emerging challenges, both security and functionality, ensuring the adaptability and longevity of apps. in the ecosystem.

1.2.4. Publishers and App Stores

The App Publisher is responsible for bringing the mobile app to the market, handling its distribution, and often overseeing marketing and monetization strategies. The App Owner often performs the role of the App Publisher, especially in smaller development teams or startups where a single entity manages the entire app lifecycle. App Publishers assume several responsibilities to obtain a result that integrates the various specialties within the industry. Among them are:

- submitting the app to the app store and handling the relationship with them;
- marketing and promotion of the app to reach a wider audience;
- collecting user feedback, reviews, and ratings to address user issues and improve the app;
- coordinating the release of updates and communicating with users about new features;
- being aware of app store guidelines and policies updates to prevent app removal or suspension;
- collaborating on the long-term strategy for the app, including potential expansions, new versions, or spin-off apps.

The App Stores are online marketplaces where End Users can review and download apps to their devices. App Stores have emerged in any market segment where software can be delivered online. They may be tied to a desktop operating system (e.g., Google Play Store, Apple App Store), a mobile platform (Google Play, iTunes, BlackBerry World, Windows Store), a browser (Firefox Marketplace, Chrome web store), a television platform (e.g., Samsung Apps, Iliad's Freebox), social networks (Facebook) or other platforms. Hereinafter will be referred as App Stores.

The value of an App Store for the App Owner depends on such factors as submission process, the levels of certification/quality control it enforces over published apps, flexibility in pricing mechanisms and promotion and revenue-generating capacity.

App stores' terms for end users generally define such issues in the clauses as End User Conduct, payments, privacy, User-Generated content and liabilities.

1.2.5. Other stakeholders

Mobile apps are complex technologies and offer a wide variety of features and services. In many instances, these features are provided not directly by the App Owner, but incorporated into the apps (and their back-end servers) from third parties providing these services to the App Owner.

Among these stakeholders should be noted the hosting services, payment gateways, advertising services (incl. In-App Advertising, Mobile Ad Networks, App Store Optimization, Social Media Advertising, Location-Based Marketing, User Data Privacy Compliance, Performance Analytics), mobile operators and end users. They are in constant interaction and ensure the smooth operation of the app on the market.

The mobile app ecosystem has a sophisticated and complex structure. While some sectors show a higher level of atomization with many actors and types of relationships (especially in relation to Service Providers and App Developers/Owners), others are more concentrated (such as App Stores distribution). Each participant in this ecosystem increases its overall vitality.

A key issue with each stakeholder is the relationship with the intellectual property. IP management is fundamental as creativity is the source of innovation and IP is the basis for safeguarding rights in that innovation, facilitating the licensing of such rights and eventually their subsequent transfer. A thorough understanding of these aspects is indispensable for good IP management.

1.3. Mobile apps and economic development

Mobile apps have multiple impacts on the economic, social and cultural development.

Apps support directly economic development through the generation of employment and value, which is increasing at an unprecedented rate. This is often underestimated because apps tend to be embedded in other products and their impact and contribution is not always properly valued. Apart from the direct contribution to employment and value generation apps support indirectly the development of technologies and content, which are supporting apps or represent an inherent part of the app itself. The interaction between apps and artificial intelligence, blockchain, augmented and virtual realities, 5G and other technologies confirm that apps are closely associated with the progress in technology development and deployment. Finally, the economic impact of apps is linked to creating demand for multiple products and services throughout the economy.

In terms of social development apps are directly supporting interaction between people in different social groups, they create communities, develop tastes and can even dictate choices. In that sense apps can be considered as engines of social innovation, performing

both direct contribution in their own space and delivering indirect functions by providing supporting infrastructure for examples through social networks.

As to cultural development apps support the creation of more creative content, which enriches our cultural life and increases the supply of creative goods and products. They often perform the role of catalysts for cultural consumption and offer new, innovative models for cultural consumption and experience. The increased use of apps in cultural and entertainment activities makes them more accessible, enhances the experience and the user participation.

Part II. Mobile apps and Intellectual Property

2.1. Structure of the app

- The mobile app **is usually** defined as a complex multimedia product consisting of a combination of different elements of software code, text, images, and sounds. The app is a key ingredient of the startup economy, and it can be instrumental for any sector of the economy. It acquires a meaning in its interaction with various types of content while enhancing its feature or resulting in a qualitatively new product or service. Understanding the different components of an app is essential. These components include the software code, the graphical user interface (GUI), the creative content of the app, databases, APIs, functionalities and background infrastructure.
- **The computer code** covers both source code and object code. The most fundamental part of the app is the source code, which is made up of sequences of words with functions, descriptions, calls, definitions, methods, and other operational semantics, in a human-readable form, that, once compiled into object code, can be executed on a computer;
- **The Graphical User Interface (GUI)** is a visual interface that allows users to interact with electronic devices, software, or computer systems through graphical elements such as icons, buttons, menus, and windows, as opposed to using only text-based commands;
- **The creative content** encompasses all works that have been used in the app such as images, text, audiovisual products, music or other type of protected content;
- **The logo or name** of the app which distinguishes a company's products or services from the products or services offered by other companies in the market;
- **Databases** in the sense of a structured set of data of any kind held in an information system representing collections of independent works, data, or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means;
- **Application Programming Interface (API)** includes a set of rules and protocols that allows different software applications to communicate and interact with each other;
- **Functionalities** may include for example functions for security and authentication, data processing, encryption, mobile transmissions, etc. In mobile apps functionality covers both the functionalities that a given mobile app delivers and the form in which it is delivered;
- **Background infrastructure** refers to the underlying technological components and services that operate behind the scenes to support an app's functionality.

These components can be protected by different intellectual property rights (IPR). IPRs are the critical framework for safeguarding creativity, innovation, and the fruits of human intellect, as well as a way to monetize it.

The life cycle of a mobile app covers three phases — a conception phase, a development phase and a commercialization phase. During each phase there are different IPRs which are generated or used, and which require different types of actions. The following IPRs are most relevant in the area of mobile apps: copyright, patents, trademarks, trade secrets, designs and data bases *sui generis* rights. They provide different level of protection and can be used both separately or in combination.

One could probably best understand the interaction between IP protection and the various components of the app by looking at the protectable structural elements of the app by the different IP instruments.

2.2. IP rights in the app

2.2.1. Copyright

Copyright protects productions in the literary, scientific and artistic domain, whatever the mode or form of expression, provided they are original creations of the author. Beside literary works, musical works, and artistic works, among others, copyright protects computer programs, as well.

The author of a copyrighted work is the individual (or group of individuals) who creates the work. The author is automatically granted the exploitation and moral rights in the work, from the moment of its creation.

On the other hand, the copyright “rightsowner” (or “rightsholder”) is the entity that legally owns the copyright to a work and may or may not be the same as the author. The rightsholder and the author are not the same when the rights over the work are assigned from the author to the rightsholder, either through a contractual assignment or a legal assignment.

The owner of copyrights in a protected work has certain exclusive rights categorized as “economic rights” and “moral rights”. In certain circumstances, the economic rights of the author or copyright holder can be limited, meaning that the protected work can be used without their authorization or payment of compensation. Those exceptions and limitations are country specific, but some of them are common ones, such as the exceptions for educational and research activities, and for museums and libraries.

Copyright protection is granted from the moment of creation of the work, without any formalities. Today copyright protection is in force from the moment of creation in all 181 countries party to the Berne Convention for the Protection of Literary and Artistic Works (practically worldwide). Copyright can be either licensed or assigned (i.e., complete transfer of the ownership of the exploitation rights on a work to another party).

In general, the duration of copyright protection is 70 years after the death of the author.

Which elements of the app can be protected by copyright?

a) Code

The fundamental component of all software is a computer code, and copyright law protects both source code and object code (or binary code).

Which are the implications of copyright protection of software code?

- Other entities cannot use your code without your permission, that is, a license.
- You cannot use software code written by other persons or entities without their permission (a license), or without them assigning the right over the code to you.

b) Graphical User Interfaces (aesthetic)

Copyright can protect GUIs' code, as well. Nonetheless, GUIs' peculiarity is not in its code, rather in its appearance and the look and feel that its components generate. This protection would only apply to the esthetic elements of GUIs, and not to their functionality. Some legal systems indeed extend copyright safeguards to GUIs that demonstrate originality and being non-commonplace.

What's the implication of a GUI being protected by copyright?

- the copyright owner has the exclusive right to copy, modify, and distribute a work, unless an exception applies. Other entities need a license to perform these activities on his/her GUI.
- App developers need to pay attention to avoid copying third-party GUI elements such as images, icons or animations that display distinctive creativity without authorization.

2.1.1. Patents

Patents protect inventions, which often are referred to as "*new solutions to a technical problem*". Inventions can be either products or processes. The inventor is the individual, or individuals, that contributed to the creation of the invention. The applicant or the inventor is granted the patent rights, from the moment of the patent grant. Once the patent is granted the applicant becomes the patent rightsholder who is the entity that legally owns the patent rights to an invention and may or not be the same as the inventor. In particular, the inventor and the applicant (the rightsholder) are not the same when the former assigns the rights to the latter, through a contractual agreement or legal assignment. The duration of patent rights is limited to 20 years and patents are valid only within the jurisdiction of the country having granted the patent.

Patent protection is subject to an application filed with the patent office and containing a description and claims of the invention. The patent office will examine the application as to novelty, non-obviousness and industrial applicability and once satisfied, a patent will be granted.

Which elements of the app can be protected by patents?

a) GUI (functional elements)

GUIs functional aspects may qualify for protection under patent law, though in practice this happens rarely. In order to be patentable, GUIs must have a technical character consisting of an improvement of the internal working of a device, or a physiological impact on how the mobile app user interacts with the mobile app.

b) Mobile app functionalities

Patent law can be a viable option for protecting specific ways of implementing a mobile app feature, e.g., functions for security and authentication, data processing, encryption, or mobile transmissions, etc. Often features that are hardware implemented inventions may obtain patent protection, while this protection is more difficult to obtain for software implemented functionalities, which are the majority in the mobile app space.

As regards the protection process, in certain jurisdictions it is mandatory to describe the code or algorithm underlying and allowing the execution of a feature, while in other jurisdictions it is not. In such cases, it is necessary to disclose the steps to follow for implementing the specific features. As a consequence, competitors may be able to implement similar functionalities without infringing any rights, following a different process or using different algorithms or code.

c) Code

Patent can be used for protecting software code, however the length of the patent grant process is incompatible with the ephemeral nature of software code, that is frequently amended and improved. Some countries explicitly exclude computer programs as such from patent protection.

d) Software architecture

In order to obtain patent protection for any invention, it must meet all requirements set out by patent law, including novelty. With regard to software architecture, it means that this must be computationally more efficient than other similar applications in that, for instance, it requires less time and fewer internal resources.

2.2.2. Trademarks

A trademark may consist of words, images, designs, symbols, letters, numbers, colors, 3D features such as shape or packaging of goods, or even sounds, provided that they are capable of distinguishing the goods or services of one enterprise from those of another one. The trademark owner is the individual or the entity that applies for registering a trademark.

The registration of a trademark confers on the proprietor exclusive rights to use the mark in commerce. The protection granted is limited to the territory and for the products and/or services for which the mark is registered. The registration is in force for 10 years and can be renewed many times.

Which are the apps' elements protected by trademarks?

a) The app logo or name

Trademarks distinguish a company's products or services from the products or services offered by other companies. In the mobile app environment trademarks have great value, given that users recognize specific mobile apps in the plethora of mobile applications published in the App Stores from their name and/or logo.

In the mobile app's intangible and dynamic market, it is important to be recognized by users that, ultimately, are the mobile app's customers. Applying for a trademark is a smart and relatively cheap move, as the protection is granted for 10 years and prevents competitors from using an identical or similar mark for their mobile app.

b) Color combinations used in the mobile app

Colors and color combinations used in the mobile app can be protected as trademarks, in particular when they are a distinctive item. This means that the color(s) can be registered only if customers identify the mobile app by the color only.

c) Aesthetic elements of GUI

In order for GUIs (or its components) to be registered, they must be capable of being perceived by the public as an indication of origin, without any reference to other signs such as a logo or brand name (provided that the logo or brand name are not included in the user interface). This is particularly difficult to prove prior to the mobile app's launch. It is important to bear in mind that only aesthetic elements of GUIs can be registered as trademark, given that all functional or technical elements are excluded from this type of protection. In order to be protected as trademarks, GUIs must not be similar or identical with earlier marks.

2.2.4. Trade secrets

Special attention should be given to trade secrets (know-how, proprietary information) developed and acquired in relation to the development of the app. Unlike other industrial property rights (such as patents, marks, designs) protection of trade secrets (undisclosed information) are not subject to administrative or registration procedure and is not limited in time.

Trade secrets or proprietary information are valuable business information that derives its value from not being generally known and that are subject to reasonable efforts to maintain its secrecy. Trade secrets owners are protected against acquisition, use or disclosure of such proprietary information by or from third parties without the owner's consent. The specific protection of trade secrets depends on the country, and usually prohibit these practices as unfair competition or as a violation of trade secret rights.

It is important that the App Owner or the company adopts and applies procedures for marking, documenting and keeping confidential such undisclosed information. The confidentiality will apply not only to external persons, but also to all employees of the developer.

The start-up scene is often characterized by a culture of openness and sharing. However, it is crucial at this stage, especially with regard to a micro business whose real value lies in its intellectual assets, to adopt a clear and comprehensive trade secrecy policy.

Trade secrecy protects the information included in the documentation, as well as any information that was disclosed among the development team during their work on developing the app.

Confidential information is protected as trade secret when all the requirements for being considered a "trade secret" are met. Therefore, it is pivotal to have evidence that the information is a trade secret to be able to enjoy the protection granted by the law. Furthermore, trade secret protection last as long as the information meet the requirements indicated before.

Trade secrets may need to be shared with someone for specific purposes. For instance, a secret algorithm will be shared with employees or external consultants who need to work with it. Trade secrets may also need to be shared with collaborating companies. It is fundamental that everyone, internal or external to the company, is bound by confidentiality agreement before accessing the trade secrets and accept to comply with it.

Which are the app's elements protected by trade secrets?

a) Code and architecture and data

Trade secrets protection is particularly important in the initial phases of the conception, design and creation of a mobile app, when information is not made available to the public yet, however

it is also important in later stages of development. Elements that can be considered and protected as trade secrets are software code and architecture of the mobile app, when not made publicly available. It can be the case of cloud-based apps, or code that is not made available (for instance, code of new features, code of new apps, etc.)

b) Functional aspects of GUIs

GUI and its elements can be treated and protected as trade secrets only prior to their launch together with the mobile app, or with subsequent versions or updates. The source code of GUIs can be protected as trade secret, as this is not usually distributed with the mobile app. Nonetheless, trade secret might not be the best form of protection for GUIs. Indeed, a developer could reproduce the same GUI functionalities without having access to the source code and, therefore, without infringing any trade secret right.

c) Underlying idea, features, preliminary design documents

Trade secret protection can be used for protecting elements of the mobile app that either (a) cannot be protected by other intellectual property rights, or (b) can be protected in a later phase. For the above, underlying ideas, preliminary documents (such as drafts, meeting minutes, sensitive emails, etc.) are likely to be one of the most relevant assets of a mobile app and of any business, as well its features before the mobile app is commercialized. For this reason, keeping them secret, marking them as “confidential” and protecting them in an appropriate manner is a good move, to ensure they are considered and protected as trade secrets.

2.2.5. Design Rights

Design rights protect the appearance of the whole or a part of a product, such as its shape, contours, colors, texture, materials or its ornamentation. In some countries, certain designs might not be eligible for registration and thus protection. Design rights require registration. The registration of a design confers on the proprietor exclusive rights on it, in the territory of registration, for a defined period of 5 years, renewable for further periods of 5 years. The duration of protection depends on national legislation (for example in the EU the maximal length of protection is 25 years). In particular, the proprietor of a design has the right to prevent other from making, selling, importing products bearing a design that is a copy or substantial copy of his/her design, if these acts are performed with commercial purposes.

Designs are protected from the moment of their registration with a national or regional intellectual property office. Entities that do not own a design need the owner’s consent to licitly using it. This consent takes the form of a license, where the owner specifies the activities that the licensee can carry out and any limitation. In case a design owner wants to “sell” the ownership of the rights over the design, he/she has to assign it to the new owner, as well as change the information in the relevant intellectual property office.

User interfaces and its graphical components (such as icons, graphics, etc.) could be protected as designs, if they are new and distinctive. In order to receive this kind of protection, the design must not be solely driven by functional reasons, rather it has to be ornamental and driven by aesthetic reasons also. The protection of GUIs as design is not harmonized and varies across countries.

2.2.6. Database rights

The EU protects databases, defined as a collection of independent works, data, or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means. The protection is triggered when the creator made substantial investments for in obtaining, verifying, and presenting the database's contents. The database sui generis right protection grants the right holder the right to prevent others to extract content of the database and re-utilizing it without the rights holder's consent. It lasts 15 years from the creation of the database and does not require registration.

This overview of the relevant protection through different IP rights suggests that there are multiple options to be explored by the right owner of the app. Therefore, it is important to distinguish the different aspects that may potentially be protected and to decide on the most appropriate form of IP protection.

2.3. IP based income streams in mobile apps

2.3.1. App Business Models

The App Owner can generate different income streams from the app. This is crystalized in the selected business model. Each of the actors in the app market has its own business model, based on both technical and commercial factors. The main business models for the App Owner are:

- a) **Paid apps** - when the mobile app is sold instantly for a price. Effectively, this represents an IP license to enable the user to download and use the mobile app, and in return the App Owner will obtain revenues from such license to use the app.
- b) **Freemium model** – when a version of the mobile app is available for free. Mobile apps with more sophisticated functionality (or less obligatory advertising) are usually available for a price.
- c) **Additional in-app services** – when the business model is based on generating revenue through other means: this can be in-app purchases, where the App Owner gains income from selling items, subscriptions, upgrades, etc., through the mobile app; in-app advertising and affiliate linking and referrals where revenue comes from a third party.
- d) **Product and Service sales** – when the revenue comes from the sale of own- or third-party physical goods or services from the mobile app. For example, free banking apps enable income from the offer and execution of financial services through the mobile app. For product sales, the most famous of these would be the online marketplaces (Amazon, AliExpress, MercadoLibre) and many “online” stores, but there are many mobile app-based marketplaces.
- e) **Subscriptions** - when the App Owner offers mobile app-based services on a recurring monthly or annual basis, which generate “recurring revenue”. This is a key factor for success and obtaining finance.
- f) **Advertising** – advertising commissions are a very significant proportion of the mobile app income and advertising revenue supports many free apps that would otherwise be for payment.
- g) **Licensing** – when apps or app technologies are aggregated or embedded with other technologies to create a more sophisticated service for End Users: often, these are “background” technology apps, such as visual or sound recognition, keyboards, security or other technologies that can be licensed.
- h) **Other sources** – such as the collection and sale of data generated by mobile app usage, sponsorships, etc.

These models are not mutually exclusive, and App Owners often combine models to maximize revenue. App Developers are generally more focused on monetizing their IP through licensing or assigning the IP rights in their mobile app related technologies and the code apps that they develop for the App Owners, and also offering essential maintenance and support services as well as sometimes managing the whole technical publication and operation of the mobile app on behalf of the Owner.

2.3.2. IP related income streams

One of the main principles of IP is to provide exclusive rights over creations and innovations in order to enable creators and owners of the IP to commercialize those creations and obtain income. This mechanism is highly relevant to obtaining income from IP in mobile apps. To leverage this, an App Owner or other actors in the sector should identify what are the IP assets that are generated around their mobile app or platform and how these can be used as a basis for commercial income.

What are the **key relevant IP assets**? These are:

- a) **Inventions** embodied in app technologies. These may be protected by patents or trade secrets, and inventors can monetize these patents through licensing or assignment of the IP to third parties interested in using the invention for their purposes.
- b) **Software code** as the main technology of a mobile app and the back-end platform which is mainly protected by copyrights (and trade secrets). Rights owners can license the software to third parties or assign it.
- c) **Content** - music, videos, images, icons, emojis, graphic designs. Mobile apps are a key channel for commercializing the IP in this content through licensing or assignment.
- d) **Designs** - mobile apps include graphic designs, mainly in the User Interface, and these can also be protected and licensed or assigned to an App Owner to use in their mobile app.
- e) **Data** - mobile apps generate a significant amount of data from personal data of the person using the app, scientific, technical, or commercial data regarding sales or relationships generated by the mobile app, and metadata about mobile app usage as a whole. This data can be extracted, analyzed, and licensed or “sold” to third parties interested in having this data for their own business purposes.
- f) **Brands** - once a brand has significant value, licensing that brand’s trademark rights to third parties may be an important revenue stream:

In order to generate income from these IP assets one needs to identify the value that these assets have for the business owner and for third parties and bringing and offering that value to the market.

IP-related income generating models

The table below summarizes how income may be obtained, through different commercialization channels or models, for the different IP.

Table. Income generating models for apps

IP Asset	Protection	Value	Commercialization	Income stream
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Technical invention	Patent or utility model	Technical innovation providing a solution and competitive advantage	Assignment or licensing	One-shot payment or with deferred revenue Licensing: one-shot or recurring royalties
Software code	Copyright, trade secrets	Functionality of the mobile app, performance, security, etc.	Assignment Licensing for reproduction, distribution, transformation indirect licensing to other App Owners	One-shot payment or with deferred revenue Licensing: one-shot or recurring royalties indirect licensing: revenue share or royalties
Content: music, videos, designs, images, icons, avatars,	Copyright	Unique creation, recognition (music, images)	Assignment Licensing for reproduction, distribution, or communication within the mobile app	Royalties or fees per use of the content subscription fees
Data	Database rights, contractual protection or trade secrets	Business intelligence, user profiling, trends, etc.	Sale or licensing access to database	One-shot or recurring subscription revenue
Brand	Trademark, logo, sound signal	Distinction in the market	Licensing trademark for use in commerce	Usage fees

Other income streams for app owners

Licensing or assignment of IP is not the only income stream for apps and other players in the app space. As there are a significant variety of business models in the sector, each based on one or other aspect of the app model.

The key income streams, which are not directly linked to IP are:

- a) Advertising – when the app provides adverts directly or offers space for third party adverts provided by Ad networks.
- b) Payment to remove advertising – when a premium subscription is offered to remove ads from the accessed content.
- c) Pay for premium - when premium services or content are offered for a monthly subscription (over freemium) – e.g., Spotify
- d) In-app purchases - when different digital goods and services are purchased when advertised in the app (e.g., games), including automatic subscriptions.
- e) Freemium - there is a positive relationship between App trialability and purchasing intentions.

- f) Electronic word of mouth – when the app promotes better placing in rankings, through reviews, ratings or recommendations.

Income streams for third parties

Apps provide opportunities to generate income for third parties that are fundamental to the operation of mobile apps. These are some of the most important ones:

- **App Stores** – earn fees through commissions on mobile app sales and in-app sales.
- **Platform providers** - earn income from providing the infrastructure services and added value services such as security, traceability, billing, and accounting, etc.
- **Service Providers as wallets, payment gateways, logistics, security** are essential for the mobile app industry, as they support both financially and logistically the operations.
- **Advertising networks** - these are intermediaries in between advertisers and the spaces where adverts are placed, they centralize ad content and content provision, and provide added value services such as targeting, analytics, etc. Income is usually derived from commission on ads, clicks and sales promoted by the ads that have been served by the networks.
- **Mobile network operators** – they supply and run the communications networks to support mobile apps and the back-end services. Depending on the territory their role can be in providing access to internet and data carriers (charging users for connection fees, through flat or variable fee or broadband), or be gatekeepers for mobile apps on the network and may charge mobile apps for transactions carried by the network.

Some mobile app related technology or content providers sell their services or IP results to clients for one-off fees, obtaining ongoing or recurring revenue through repeat engagements or a variety of sources.

In summary, IP relevance is of growing importance and suggests multiple income streams both for the App Owners and for other stakeholders in the industry. Models range from a continuous stream of licenses, assignment of the IP, creating partnerships or joint ventures. Each model depends on the needs and resources of the App Owner. What is clear is that most mobile apps have some IP attached to them and it can be turned into an income stream.

Part III – The operation of the app economy

3.1 Commercializing IP in apps

Intellectual Property Rights (IPRs) are an important component enhancing the financial and commercial value of a mobile app. There are two major goals that you can achieve with your IPRs in the app – to use it for financing and to derive commercial value from it. A successful commercialization takes place when there is a clear strategy on the use of the IPRs.

3.1.1. Mobile app financing through IPR

IPRs can be a valuable asset for securing financing and is worth considering in the financing strategy of the company. The intangible assets in the mobile app may be more valuable, in financial terms, than the app itself. Funding is always important and necessary to launch the mobile app and commercialize it and securing IP protection is an important tool in this regard.

To secure funding through IPRs the App Owners should identify the IPRs that may emerge at throughout the lifecycle of the mobile app. Identifying potential IPRs and deciding on their protection and use needs to be done at all stages of the app cycle.

During the ideation phase, entrepreneurs brainstorm and conceive novel ideas that could revolutionize the mobile app market. These ideas, which serve as the basis of any successful mobile app, are intangible assets that can be easily replicated or imitated if not guarded. It is imperative, therefore, that businesses recognize the value of these innovative concepts from the outset and apply measures to protect them. At this stage trade secrets are of key importance, but if there are potential IPRs to be created during the development of the app, decisions need to be taken to secure protection through appropriate forms of IP.

In the development phase the role of an IP strategy becomes even more crucial. This is the stage where the abstract concepts begin to take shape, and technologies, codes, and unique user interfaces are developed. Without a comprehensive IP strategy, there's a high risk of these innovations being disclosed and copied or modified by competitors, leading to potential revenue loss and dilution of market positioning. Safeguarding the proprietary features and functionalities of the mobile app through IP titles (patents, copyrights, designs, or trademarks) during this phase ensures that the App Owner's work and investment will not be undermined.

IP protection and commercialization go hand in hand. Once the IPRs are secured, the App Owner can confidently explore various avenues to monetize the assets. This could range from licensing the technology and IPRs to third parties, establishing partnerships or directly generating revenue through user subscriptions or in-app purchases. Moreover, a robust IPR portfolio serves as an attractive asset in mergers and acquisitions or when seeking investments. In essence, an effective IP strategy not only aims legal protection but more importantly opens up channels of revenue generation, making it indispensable in the competitive landscape of the mobile app sector.

There are key IP issues to consider at the different stages of the app lifecycle. Among those can be mentioned:

- Understanding the basics of IP
- Diligent documentation in the development process
- Due Diligence in Relation to Pre-Existing Intellectual Property Rights (IPRs) in earlier products, services or processes (third party rights)
- Registration of the IPRs, where applicable
- Implementing trade secrets protocols

- Adopting a licensing strategy
- Use Non-Disclosure Agreements (NDAs)
- Develop a Business Plan with IP components
- Regular IPR Audits and Updates
- Keep in mind that IPRs can provide value beyond protecting the app and have a life of their own, offering new revenue streams.

Key steps for securing financing

a) IP Audit

Undertaking an IP audit allows to discover the true value of the mobile app, often revealing it's worth more than initially perceived. After an initial audit, regular check-ins on the IP become more straightforward, empowering to plan and strategize future mobile app features and updates more effectively.

An IP Audit is a thorough examination of all intellectual assets in an App, including both registered and unregistered rights. Unlike tangible assets, these are outcomes of innovation and creativity, such as business names, trademarks, inventions, product designs, written documents, client lists, trade secrets and other proprietary information. The source of these rights might be internal or acquired through contractual agreements with original creators.

Conducting an IP Audit offers numerous benefits such as the recognition of all non-tangible assets, the estimation of the App Owner's business overall worth, the identification of business risks, adoption of corrective measures and policy development, it enhances IP asset management and revenue generation and ensures protection and enforcement of intellectual property rights.

IP audit usually involves the following steps:

- Assessing all business dimensions for IP relevance.
- Identifying, verifying, and documenting all potential and existing IP rights.
- Ensuring rightful ownership and usage permissions.
- Evaluating potential IP rights violations.
- Reviewing digital assets.
- Strategically aligning IP rights with business objectives.
- Preparing for future technologies.

b) IP Valuation

Companies in the mobile app industry base their operations on intangible assets and innovation, and therefore may be more likely to thrive if the IP is correctly identified and valued. Intellectual property valuation can help you determine the true value of a business and leverage assets that may currently be unaccounted for or underutilized, in order to maximize their profitability.

Determining the value of patents, trademarks, designs, copyright, trade secrets and other proprietary information simplifies the process of licensing or transferring such assets, enabling

to set suitable usage fees when others wish to utilize them. Moreover, an IP Valuation can enhance the App Owner's financial standing, paving the way for better funding opportunities.

The general principle governing the valuation of IP is the degree of competitive advantage that the App Owner's intellectual property provides relative to other companies in the industry – in this case, the IP relating to the mobile app.

c) Market Analysis

The comprehensive market analysis includes understanding both the geographical region and the specific product market. Important elements of this analysis include IP rights valuation, market size, customer demand, purchasing power, competitors' presence and capacity, potential business partners, logistical considerations, and the relevant legal framework. SMEs benefit from such an analysis as it provides clarity about their competitive position, potential threats, and opportunities, as well as insights into industry scenarios.

Some of the effective tools for market analysis that can be used are **SWOT Analysis, PESTL Analysis, and the Competitive Forces Model**. Each of these provides unique insights into an App Owner's standing, external factors influencing its business and the competitive landscape.

3.1.2. IP commercialization

Commercialization of the mobile app itself is the key objective for generating revenue. In the IP context, commercialization implies bringing IP to the market to generate a profit.

There are four main models for commercializing IP:

- a) **Commercialization by the IP owner:** direct exploitation of the mobile app (and the IP in the mobile app) to customers. Commercializing includes manufacturing fees, marketing and selling subscriptions or copies of the mobile app that embeds the technology to end-customers.
- b) **Assignment:** the App Developer assigns the rights in the IP asset to a new owner, for example an agency assigning all rights in a mobile app to its client, or creatives assigning rights in customized or bespoke content to the App Owner.
- c) **Licensing:** the mobile app technology or the mobile app as a whole is licensed to a third party that wishes to use or commercialize the mobile app for itself as App Owner, in exchange for royalties or licensing fees.
- d) **Joint ventures or partnerships:** the App Owner will partner up with a larger company or investor to enable it to bring the technology to market and find clients. The results are often jointly owned (or owned by a joint venture vehicle) and the income from commercialization is split.

Independent commercialization

When App Owners decide to commercialize their mobile apps independently, they take the reins of the entire process - from ideation and development to marketing and distribution. There are numerous reasons why an App Owner might opt for this route:

- Possessing an existing robust marketing strategy and capability.
- Lacking the bandwidth to form or nurture partnerships.

- Reluctance in sharing proprietary mobile app information with external parties.
- Desire to avoid potential competition or the time and investment required to establish partnerships.

Choosing this path allows App Owners to retain total control over their mobile apps and the corresponding IP. This not only means that they have the power to make all decisions, but they also do not have to share the profits with anyone else. However, doing everything by yourself might not always result in a competitive edge.

Licensing

The outbound licensing model involves granting permission to third-party entities to utilize one's IP in exchange for compensation, typically in the form of licensing fees or royalties. It essentially represents the act of allowing another party to leverage your intellectual property for their endeavors. Instead of internally commercializing an IP, rights holders can license it out, thereby potentially generating continuous streams of revenue. This is especially prevalent in the mobile app sector, where technologies, brand names, and datasets can be licensed to other App Owners seeking to build upon existing innovations.

For mobile App Owners, the outbound licensing model offers a multifaceted approach to leveraging their intellectual property:

- Firstly, it presents an avenue for sustainable monetization. Developers can seamlessly earn royalties from their IP, eliminating the need to divert additional resources for product or service deployment. This not only offers a financial advantage but also ensures continued innovation without capital constraints.
- Secondly, this model implies risk sharing. Licensing out one's IPRs means that the complexities and challenges of commercialization are borne by the licensee. This is especially beneficial for App Owners who may not possess the requisite infrastructure or resources to roll out the IP on a grand scale, neither would they have the skills and capacity to identify illegal use of IPRs and fight counterfeiters.
- Lastly, it fosters collaboration. Licensing can act as a bridge, connecting two entities with shared or complementary visions. This often culminates in synergetic partnerships where the combined skills and assets of both parties lead to the creation of a product or solution that is far more competitive than if developed in isolation.

Assignment

When the App Developer or App Owner transfers all rights, titles, and interest in their mobile app to another party the recipient has full ownership and control over the app's future direction, monetization strategies, and any derivative works.

Through this model App Owners can get immediate financial returns, mitigate future liabilities related to the mobile app and avoid the complexities of long-term mobile app management or marketing. Additionally, for App Owners lacking the resources or know-how to bring a mobile app to its full market potential, IP assignment can present a favourable way to ensure their creation reaches a broad audience. However, the model is not without its drawbacks. Apart from the difficulty of performing the IP Valuation process, App Owners relinquish all future profit potentials from the mobile app, lose any say in its future development, and, if the mobile app becomes wildly successful, may feel they sold their IP rights too cheaply.

Partnerships or Joint ventures

A partnership or joint venture serves as a prominent commercialization model for mobile App Owners seeking to combine resources, expertise, and market reach. Partnerships require comprehensive coordination and clear communication to avoid misunderstandings. The division of profits might be a point of contention, and the pace of decision-making can be slower due to the need for consensus. While partnerships and joint ventures in the mobile app sector offer combine strength and shared risks, they necessitate clear agreements and understanding among all parties involved.

3.2. Dealing with IP infringements in apps

To secure successful exploitation of the rights in the app it is crucial to monitor the use of the apps and the related IPRs. This is responsibility of the rights owner, and no one will do it for you. The law provides protection of IPRs, however cases of infringement or illegal/non authorized use have to be identified by the owner. The rights owner should initiate any action aimed at eliminating cases of unauthorized use of rights.

When IPRs are infringed (used without authorization) you have two options:

- You do nothing, in which case the infringer can continue using your IPRs for free and you are giving up on potential benefits from your IP and App,
- You decide to stop the illegal use of your IPRs by the infringer and you seek agreement with the infringer on the damages and the conditions under which your IPRs can be used further.

Once you have identified your proprietary information and IPRs and know in which elements of your app they appear you need to start monitoring the marketplace.

Monitoring the marketplace

Monitoring the marketplace will enable you to identify who is using the rights without permission.

Depending on the IPRs you possess monitoring can be done in various ways:

- online searches
 - AppStore searches
 - monitoring competitors
 - search engine alerts
 - IP offices notification
 - Marking your IPR
 - Professional monitoring services
- **Online searches using IPR related keywords** are useful to identify certain rights (copyright, trademarks, designs), but are not effective for identifying illegal use of patent rights, or software, or program codes.

- **AppStore searches:** Periodically check mobile application stores to identify any apps that may be similar or infringing your IPRs rights – e.g., name and logo of the app (trademark), GUI registered as design, certain unique and protected functionalities.
- **Monitoring competitors:** Regularly monitor competitors' apps to determine if they have copied and used any of your protected features and/or IPRs.
- **Search engine alerts:** specifically for texts or trademarks, alerts can be set up through search engines based on specific keywords.
- **IP offices notification:** Certain IP offices will send notifications when someone is applying to register similar marks. The EUIPO will inform a right holder when someone has applied for a similar or identical trademark. This allows the right owner to oppose the registration.
- **Marking your IPRs:** copyrights, audio-video works, pictures, graphics, etc. can contain special marks (e.g., watermark) which facilitate identification of unauthorized copies and use.
- **Professional monitoring services:** there are companies offering IPRs monitoring services. Such services are fee based and allow to detect infringement of various IPRs.

Possible Actions against Illegal Use

The legal practice requires different actions to be initiated by the right owner to be sure, that his/her actions will have chances of success.

- **Informal contact** - The first step aims at a friendly approach and solution -- reaching out to the infringer and informing that they have no rights to use your IPRs, and that their use constitutes an infringement of your IPRs, which is illegal. This approach is often effective with entities who did not infringe your rights intentionally and are willing to remove your content or stop using your IPRs or proprietary information, for example your registered GUI elements, or music (sound sequence), photograph (picture) or other copyrighted content. In case the 3rd party is interesting in using the IPRs lawfully, you can offer a license agreement (see below).
- **Cease and Desist Letter** from a lawyer: next action in case the informal contact was without success (the 3rd party does not stop using your IPRs nor are they ready to enter a license agreement to use the IPRs lawfully subject to payment of a fee) or if you prefer not to have initial informal contact – your IP lawyer must send a formal “*cease and desist*” letter – requesting the infringer to halt the illegal use of your IPRs. In certain jurisdictions, sending a “*cease and desist*” letter is mandatory before filing a lawsuit.
- **Negotiate a license:** In case the infringer recognizes your ownership of the IPRs and is interested to use them, an option would be to negotiate a license agreement, that would enable the infringing party to use your IPRs with your consent (lawfully) against payment of a license fee (royalty) and other agreed obligations.
- **Agree on a dispute resolution mechanism:** The possible resolution of the dispute could be submitted to an ADR (Alternative Dispute Resolution) process, which may be a less onerous and more agile mechanism, than a formal lawsuit, with confidential and enforceable results (for a settlement).
- **Initiate legal action:** In case the infringer persists in the illegal action after having received the “*cease and desist*” letter, you may initiate legal proceedings. Such action – a formal lawsuit - should be entrusted to a lawyer practicing in the country where the infringement occurs.

- **Actions through AppStores: When** the infringement is through another app, the IPR owner may request the AppStores to take down or at least suspend the allegedly infringing app. Most AppStores have specific provisions and procedures as well as an online channel for such cases and usually their response is very quick (otherwise they may be liable for contributory infringement, depending on the applicable jurisdiction). In most cases this is a very effective and dissuasive measure, however the claimant must be sure of his claims, because such procedure could backfire if the alleged infringer is not infringing and launches a counterclaim for commercial damages.

Handling trade secrets

Trade secrets have their specifics, which may require adjustments in the approach. Generally, three steps are recommended:

Identification

- Spot information that must be kept confidential
- Spot information that can qualify as trade secret

Protection

Adopt policies

Implement measures (physical, organizational, technical)

Employees training and awareness

Prepare and use NDAs

Other contractual provisions

Enforcement

Precautionary measures

Seek for damages

Other local legal remedies (consult a lawyer)

Once the pieces of information and IPRs that give a competitive advantage over competitors or represent a commercial value there are different actions that can be taken in order to make the rights over proprietary information (trade secrets) effective and to enforce them in case of infringement:

- a) Create and adopt a Confidentiality or Trade Secret Policy.

Adopting a policy is the first step to ensure a uniform approach among everyone in your company, thereby safeguarding confidential information in a consistent manner. The policy should outline, at a minimum, how to identify confidential information, methods to protect it, applicable measures, access, circumstances, under which sharing information with other developers is allowed, etc.

- b) Educate your employees

To maximize the policy's effectiveness, employees should be constantly informed and educated on the confidentiality policy. Just having all staff members sign the policy is not enough, since only a few will read it.

- c) Protect confidential information and trade secrets against employees.

Employees pose a potential risk of unauthorized use and disclosure of a company's trade secrets and confidential information, for example employees leaving the company could use sensitive and valuable information to create a competing app or business or sell such information to competitors. To safeguard your products and business, include specific provisions concerning confidentiality obligations in employment contracts, along with a reference to the company's confidentiality policy that every employee must sign. The same should also apply also to consultants' contracts.

- d) Prepare a template of NDA, adapted to specific cases.

A standard NDA should be used when sharing information with 3rd parties. Seek legal advice for the preparation of the NDA template.

In the following cases sharing confidential information might be necessary:

- (i) disclosing marketing plans or app details in partnerships or collaborations,
 - (ii) working with external developers needing access to existing source code or preliminary documents,
 - (iii) potential investors reviewing business and financial plans,
- or other similar situations.

Legal enforcement of your rights in case of infringement

Depending on the country where you operate or where the infringement occurs, legal action should be initiated in response to illegal use of your confidential information or trade secrets. You should consult a local lawyer to understand and decide on the possible actions.

In certain countries unauthorized access and/or use of third parties' confidential information and trade secrets are considered criminal offense.

The following checklist may help in managing the protection of IPRs and proprietary information:

- Identify valuable proprietary information and products/works (texts, codes, software, GUS, logos, marks, (including sound marks), technical solutions) that can be protected as IPRs;
- Register those rights that require registration and consider registering copyrights for easier enforcement; Adopt and apply a confidentiality policy;
- Apply confidentiality marks (including watermarks or other technical identifiers) to your proprietary information (texts, code, software, logos, GUS, etc.);
- Contractually protect your rights including specific wording in your app's terms;
- Enter into NDAs and confidentiality agreements with employees and external entities;
- Educate and train employees on confidentiality procedures and practice;
- Periodically monitor unauthorized use of your IPRs and confidential information;
- In case of detection of infringement exercise/enforce your rights by initiating action
 - Informal contact

- Cease and desist letter
- Negotiate a license agreement, (if infringer interested to legalize use)
- Propose using an ADR mechanism
- File a lawsuit.

Registering IPRs and proper handling of confidential information and regular monitoring of any unauthorized use or infringement of IP assets are important for enforcement of rights.

It is equally important to ensure that a new app does not infringe any 3rd party IPRs, as the consequences can be not only changing the app's name, visualization or operations, but also could result in very high costs or legal fees.

3.3. Resolving IP disputes in mobile apps^{iv}

As the Mobile Apps sector continues to grow, it is likely that disputes in the sector will increase as well. For example, patent and trademark protection are increasingly being sought in multiple countries. For those owners whose apps are distributed in many countries, this means that related Intellectual Property (IP) disputes may no longer be confined to a single jurisdiction. The adoption of Alternative Dispute Resolution (ADR) process can be a more cost-effective means to resolve such “multi-theater” IP disputes and provides both rightsholders and users of IP more options to resolve their disputes effectively and efficiently.

The **WIPO Arbitration and Mediation Center (WIPO AMC)** provides ADR options to assist parties in the mobile app industry in resolving their disputes. These options present a practical and cost-effective alternative to court litigation and allow parties to choose specialized neutrals with knowledge of the industry.

Mediation, arbitration, expedited arbitration and **expert determination** allow parties to adopt practical and satisfactory solutions, while limiting disruptions in long-standing business relationships. ADR fosters an environment conducive to preserving business relationships between the parties. For example, mediation encourages open and non-adversarial discussions, leading to collaborative solutions and can prevent escalation of the dispute. Preserving business relationships is especially significant in this industry, where cross-border collaboration is becoming increasingly commonplace.

Flexibility is a key advantage of ADR procedures, as they work in a more informal and expeditious manner, tailored to suit the unique needs of the disputing parties. This includes the ability to choose the language, applicable law, and place of the procedure, as well as opting for expedited procedures when time is important. By streamlining the process, ADR can also reduce the time needed for dispute resolution and lead to cost savings compared to traditional judicial channels.

Confidentiality is an equally important element of ADR. Parties may agree to keep all or specific elements of the dispute confidential, offering protection for sensitive issues such as trade secrets or a firm's market reputation.

Given the complexity and the **technical and specialized** nature of mobile application disputes, ADR mechanisms **allow parties to choose experts**, such as mediators or arbitrators, knowledgeable in the field.

ADR allows to create a one-stop-shop, where parties can merge multiple cross-jurisdictional disputes in a **single procedure**. Since apps tend to be distributed on international platforms,

ADR is an attractive solution to allow disputing parties to resolve their disputes globally via the ADR process. Such procedure can consider the parties' business and other strategic goals. ADR provides independence from national legal systems, procuring to ensure fairness and impartiality in the resolution process. The involvement of foreign judges and language barriers in national courts is also mitigated through ADR.

ADR procedures culminate in settlement agreements or arbitral awards, which are **final and binding**. These awards can be enforced internationally, making ADR a practical choice for international parties seeking efficient cross-border dispute resolution.

One of the key advantages of the WIPO AMC is its **neutrality**. As a specialized agency of the United Nations, the WIPO AMC ensures a level playing field for all parties, which fosters fair and equitable outcomes.

WIPO ADR proceedings can be conducted **fully online**, from the filing of the Request for WIPO ADR to the sessions and hearings and the conclusion of the proceedings with a final settlement or award.

The **WIPO List of Neutrals** includes independent experts in all areas of IP (e.g., copyright, designs, patents, and trademarks), but also technology, and dispute resolution, including experts specializing in mobile applications. Of course, the parties are always free to select a neutral from outside the list, if they consider it appropriate.

The WIPO AMC offers support for customizing ADR proceedings, accommodating internal systems or procedures, and enhancing parties' confidence in the process.

By utilizing the WIPO Mediation, Arbitration, Expedited Arbitration, and Expert Determination Rules, or a combination of these options, stakeholders in the app industry can benefit from a well-established framework that combines the advantages of ADR mechanisms with the industry-specific expertise of the WIPO AMC.

Routes to WIPO ADR for Mobile Application Disputes

Opting for ADR for the resolution of mobile app disputes is voluntary. It can be agreed in existing contracts or after the dispute has arisen through a submission agreement, during or after contract negotiations, or even after court litigation has begun. Some jurisdictions may support, suggest, or require ADR, with mediation showing promise for effective resolution.

Depending on the specific needs of the dispute, different ADR options offer different advantages that can lead to considerable time and cost savings, making them accessible and affordable for resolving mobile App disputes.

WIPO Mediation

In a mediation procedure, a neutral person (the mediator) assists the parties in reaching a mutually satisfactory settlement of their dispute. Under the WIPO Mediation Rules, mediation is an informal and flexible process, which is in the hands of the parties and the mediator. Parties can terminate the procedure at any moment.

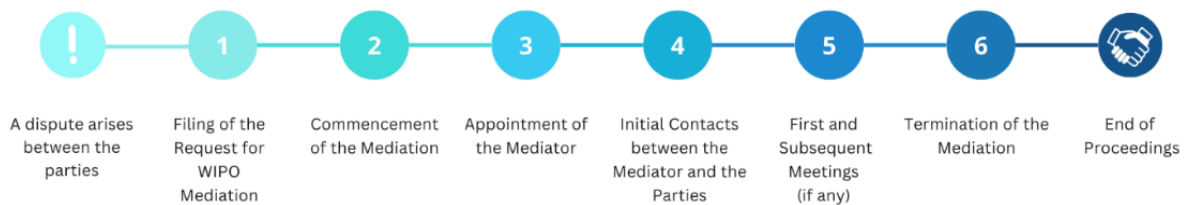
Some key characteristics of WIPO Mediation are:

- **Non-binding:** Unlike a judge or an arbitrator, a mediator cannot impose a decision. The settlement agreement has the force of a contract, and the parties may still seek remedies before state courts or arbitral tribunals. Even when the parties have agreed

to submit a dispute to mediation, they are free to abandon the process at any time if they find that its continuation does not meet their interests.

- **Tailor-made and flexible:** The parties and the mediator are free to decide on how the mediation process should be conducted.
- **Confidential:** The existence and the outcome of WIPO Mediation, as well as any information disclosed during the proceedings, are confidential.
- **Interest-based:** The settlement agreement can be determined by the business interests of the parties.

A WIPO Mediation can be tailored to meet the interests of the parties. Usually, a procedure will involve the following steps:



The WIPO AMC makes available [recommended contract clauses and submission agreements](#) that parties can use to submit their disputes to WIPO Mediation.

In the absence of a mediation agreement, parties may still seek the aid of the WIPO AMC, by submitting a [Unilateral Request for WIPO Mediation. The WIPO AMC may then assist the parties in considering accepting this invitation to WIPO Mediation.](#) Indeed, parties in several cases have successfully used this invitation to mediate of the WIPO AMC to submit disputes to mediation.

As mentioned earlier WIPO AMC offers Expert Determination under WIPO rules, Arbitration, incl. Expedited Arbitration and

also makes available recommended contract clauses and submission agreements that parties can use to submit their disputes to WIPO Arbitration and WIPO Expedited Arbitration.

IV. Conclusions

Given the importance of mobile apps they require a strategic approach on several levels. First and foremost, governments should make sure that the regulatory framework does not impose any unreasonable restriction on the operation of apps in various field of the economy, social and cultural life. The existence of intellectual property laws and regulations, competition laws and other public policies are important conditions for the seamless functioning of the mobile apps economy and for securing IP rights for the rights holders. The government has also important responsibilities in terms of ensuring technical infrastructure which supports the mobile app economy – connectivity, broadband penetration and connections to global networks.

Secondly, the industry – be it large corporations or micro, small and medium sized companies should have a clear strategy on how to maximize the use of their IPRs in the apps which they develop, own or exploit. This strategy concerns the use of the various forms of IP protection at the different stages of the app life cycle and needs to be adapted to each cycle phase. Understanding the terms of protection with regard to different forms of IPRs, the mechanisms for protection, the potential for deriving income form IP, IP financing and commercialization are key for not missing on opportunities.

Thirdly, the use of IPRs in apps needs to be based on a broad understanding in society on the nature of IP, its relevance in today's world, the role of creativity and innovation and the need to respect the creative efforts and property of others. This awareness-building aspect is essential not only for the app economy, but also for other areas of the national economy and culture, where IP is an important factor. Therefore, there are natural synergies with government policies and industry efforts to increase respect for IP and support the application of the law.

Policy makers and governments could perhaps achieve better results through facilitation rather than regulation. A constructive dialogue with the professionals and business managers of the app ecosystem will permit to identify actions and interventions at the policy and legislative levels.

Apart from strategies one needs to consider the fact that the apps economy involves individuals who are not always in possession of the mix of skills and understanding of how to build an efficient business model. Business models are unique for each company and depend on multiple factors – demand for the product, competition in the sector, value of the asset and many more. In this regard the app economy can only benefit from support to this sector by providing skills development opportunities, sharing best practices and perhaps joint actions by the industry, where appropriate, to achieve shared goals.

There are several IP rights that can protect the different elements of mobile application technologies. IP protection is not an aim in itself – it is a business tool to safeguard the creative efforts of app developers from unfair and malicious free-riders, to secure the rights of the App Owners, but also a means to share knowledge and successful solutions.

IP relevance is of growing importance for the app industry. A continuous stream of IPRs licenses will secure income for the App Owner. Other monetization strategies involving IPRs include an outright sale of the IP, creating partnerships or joint ventures, or commercialization of the IP by the App Owner on their own. Each model depends on the needs and resources of the App Owner. What is clear is that most mobile apps have elements, that can enjoy IP

protection and the related IPRs it can result in benefits and revenues streams, if identified and well managed.

In the rapidly evolving landscape of the mobile app industry, the value of a mobile app goes beyond just its code and design. The intrinsic intellectual property (IP) encapsulated within an app holds tremendous potential for financing, monetization, and strategic leverage. For App Developers and Owners, recognizing and maximizing this potential is a vital necessity.

We live in the knowledge economy and a key prerequisite for using IP to support economic development is spreading knowledge on the options which exist. The only way of ensuring compliance with the law is sharing knowledge and information and working hand in hand with the industry to inculcate IP knowledge.

Acknowledgment

This tool is derived and based on the WIPO materials prepared on the topic, namely:

1. *WIPO Handbook on Intellectual Property in Mobile Applications*, prepared by Across Legal, 2023 (forthcoming)
2. WIPO, *The Role of Intellectual Property Rights in the Development and Commercialization of Mobile applications* www.wipo.int/export/sites/www/ip-development/en/agenda/docs/wipo_iprs_mobile_apps.pdf
3. *WIPO 2021. Protecting your Mobile App: Intellectual Property Solutions:* https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1071.pdf
4. *WIPO Intellectual Property Toolbox for Mobile App Developers, 2021* https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo_ip_toolbox_mobile_apps.pdf
5. *WIPO Handbook on Key Contracts for Mobile Apps – developers’ perspective, 2020* https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo_handbook_key_contracts_mobile_apps.pdf
6. *WIPO Tool on IP Financing for Mobile Apps, 2021* <https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo-tool-financing-mobile-apps.pdf>
7. *Open Source for Mobile Apps, 2021* <https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo-tool-open-source.pdf>
8. *WIPO Guide on ADR for Mobile App Disputes, 2020* https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo_disputes_guide_mobile_apps.pdf
9. *A Guide to Data Protection in Mobile Applications, WIPO 2021* <https://www.wipo.int/export/sites/www/mobile-apps/en/docs/wipo-guide-data-protection-mobile-apps.pdf>

ⁱ See <https://www.businessofapps.com/data/app-revenues/>

ⁱⁱ See website <https://www.wipo.int/mobile-apps/en/>

ⁱⁱⁱ Figure reproduced from « Handbook on IP and Mobile Application », developed for WIPO by Across Legal.

^{iv} For more information, see Chung Nian Lam, “WIPO Guide on Alternative Dispute Resolution for Mobile Application Disputes” (WIPO Guide on ADR for MA Disputes) (May 2020), available at https://www.wipo.int/export/sites/www/ip-development/en/agenda/docs/wipo_mobile_apps_disputes_guide.pdf.