

WIPO Committee on Intellectual Property and Development

Mobile Applications and Digital Books

2023

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Introduction

The expansion of the Internet and the growing reach of mobile devices, together with the daily and increasingly widespread use of applications, have facilitated access to a large part of the world's population to a wide variety of content, at any time and place, which is driving the publishing sector to transform itself and adopt increasingly innovative solutions for the circulation of books. In order to understand the magnitude of this phenomenon, we shall consider some data from 2023 (We are social, 2023):

- Around 5.18 billion people have an Internet connection, this is equivalent to 64.6% of the world's population.
- In the last 12 months alone, 147 million new Internet users were registered.
- Almost 98% of Internet users own a smartphone.
- Each year, the gap between mobile and fixed connection speeds decreases. Mobile bandwidth has increased by a third in the last year, with the global median reaching almost 40 Mbps by February 2023.
- The average speed of mobile connections exceeds that of fixed connections in a total of 48 countries, and in six countries, cellular data is at least three times faster than fixed connections.

The consumption of digital books has revolutionized the reading experience, both in terms of access and reading mode. However, the accelerated technological development and the volume of information and data available in digital environments have increased the book industry's concern about unauthorized content access and circulation practices.

In this context, the protection of intellectual property and copyright has become a key issue for publishers, authors and other players in the publishing sector. Safeguarding copyright is key to ensuring that content creators receive fair remuneration and adequate recognition for their creative work, as well as a crucial guarantee for preserving the integrity and quality of digital content. Without effective copyright protection, creators would also be discouraged from continuing to produce original works, which would negatively affect the diversity and quality of content available to society.

It is also inevitable to consider the effects of the pandemic caused by Covid-19, which accelerated changes in people's cultural habits and behaviors globally, accentuating previous trends, resulting in massive subscription to entertainment platforms. The content offer multiplied and concentrated on dominant platforms in the market, such as Spotify, Netflix, Amazon Prime, HBOMax, Movistar, Rakuten and Disney+, among others. This phenomenon was also evident in the book industry and the consumption of digital books, which as we shall see later has grown exponentially, especially on platforms that offer a similar ecosystem for distributing and marketing books, such as Scribd, Bookmate or Perlego.

In this document we provide an overview of the digital book market in mobile applications and the technological solutions and platforms available in the sector, with a focus on the protection of intellectual property and copyright in the digital publishing environment. Our goal is to provide a comprehensive overview of the tools and strategies that publishers and other industry players may employ to ensure the protection of works, and also to account for current issues and challenges. The document seeks to provide the actors of the book ecosystem and the makers of public policies that affect the publishing sector with tools for making informed decisions tailored to their specific needs in a constantly evolving scenario.

Due to the dynamics of transformation and continuous emergence of new solutions in the platform market, this document necessarily establishes certain cuts and does not aim at having a total and exhaustive coverage on the subject.

In this sense, the document focuses on the digital book as a new book format marketed by traditional players in the industry (mainly publishers). Less reference is made to examples of digital books with features that deviate from the traditional book format (enriched functionalities and new reading experiences, for example) or ecosystems developed by companies outside this industry. Finally, this document doesn't cover the audiobook business, which has a considerably different distribution model.

The document is organized as follows:

The first section focuses on a review of the current digital book market and its connection with forms of copyright protection: it synthesizes the functioning of the digital book distribution and marketing ecosystem, the platforms, technologies and business models most adopted by the publishing sector, and the main players involved in this value chain. Special emphasis is given to mobile reading applications and their characteristics, functions and relevant aspects.

The second section offers a review of existing technologies and platforms used for the distribution of books in mobile applications. Specific examples of solutions for the commercial, school and academic sectors are provided and some cases have been selected for illustrative purposes. Some guidelines to think about the future of the digital book market in mobile applications are also presented, based on the new trends and perspectives of the sector in the medium term (such as the growing use of artificial intelligence or blockchain).

Finally, the third section synthesizes the main conclusions, summarizing the main aspects discussed throughout the document.

The appendix offers a more extensive list of available solutions, which provides a more complete view of the existing alternatives, complementary to the specific cases discussed in the document main body.

Section 1. The current digital book market and its relationship with copyright regulations

The digital book distribution and marketing ecosystem currently operates under two main logics. The first, more standardized and consolidated at the international level, is associated with the general idea of the digital book as a mere new format, one more variant of the paper edition, distributed under online stores or services that mainly promote unit sales of content. In this model, digital books closely resemble paper editions. The dominant platforms in the global market are Amazon, Google and Apple, and to a lesser extent, Kobo. The content within these stores is largely distributed by publishers, but also by authors who choose to do so directly, a phenomenon known as self-publishing.

Within this logic, there are two major differential aspects that stand out over the distribution of physical books. The first is that books can be reproduced unlimitedly. Each new book can be copied as many times as readers wish to access its content, which represents a radical change in the book economy, which until now was associated with the concept of limited copies. The second aspect is that distribution is planned in global terms, since it does not imply higher costs. Therefore, books are available (or have the potential to be available) all over the world at the same time. This is another profound change that breaks with the distribution limits of physical books.

Globally, there are 5 countries that concentrate more than 60% of the world's business within the publishing industry: United States, China, Germany, Japan and United Kingdom. In the last 5 years, the digital book market has experienced significant changes, with fluctuating trends and behaviors. In most territories, this market represents between 5% and 10% of the total share. However, in some more developed markets, this share can reach between 15% and 25%. In the markets with the highest shares, it can exceed 35%.

Market	Total business	Revenues generated by digital books
United States ¹	USD 28.10 billion	USD 1.95 billion
United Kingdom ²	£6.9 billion	£3.1 billion ³
Germany ⁴	EUR 9.44 billion	EUR 560 million
Spain ⁵	EUR 1.2 billion	EUR 79 million
France ⁶	EUR 2.9 billion	EUR 285 million
China ⁷	YUAN 87 billion	YUAN 38 billion
Japan ⁸	1.63 trillion yen	501.3 billion yen ⁹

Table 1. Digital books in developed markets

In addition to the logic described above, there is a much wider and more diverse universe, constantly growing and experimenting. There are new formats and business models that move away from the traditional book idea. For example, digital books that incorporate interactive and multimedia resources or that develop new non-linear narratives. Likewise, new distribution and marketing models are emerging, ranging from free-to-access content to various forms of licensing, membership or subscription.

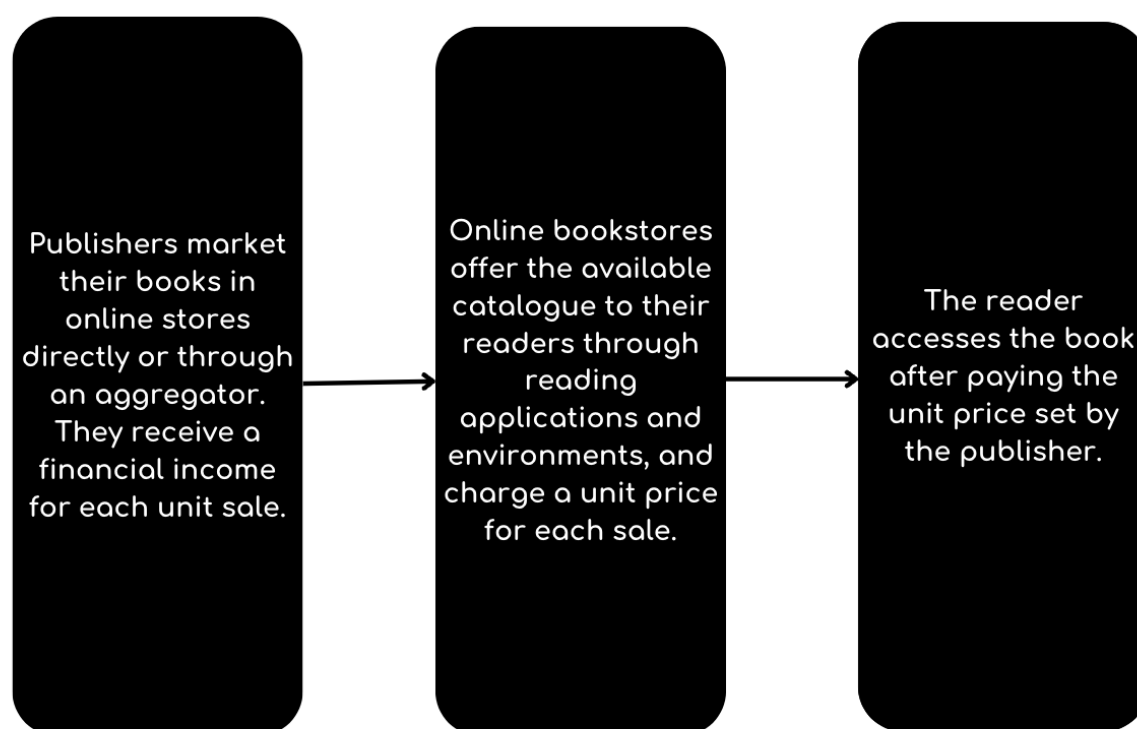
In this less traditional scheme, it is often not the usual players in the book value chain (authors and publishers) who play a leading role. This digital book sector is not usually recognized as part of the publishing industry and is not usually represented in official reports, trade fairs and industry associations. However, given that this ecosystem involves both authors and readers, and that it has grown at an accelerated rate particularly in the last 5 to 10 years, it is relevant to define and conceptualize it as an integral part of the publishing industry.

Distribution models mostly adopted by publishers

There are three distribution and business models most commonly adopted by the traditional publishing sector for digital book commerce: unit sales, subscription access systems, and licensing systems.

Unit sale: In this model, publishers sell their catalogs in online stores, setting a price for each book and territory, in the same way as they do with printed books. Readers can access the book after paying this price on the platform. A price that is supposed to be more affordable than print editions, due to the lower production and distribution costs involved.

Depending on the options offered by the store, the reader may read the book on different devices, such as smartphones, tablets, computers and e-readers. Some of these options may require an Internet connection, and in most cases reading is carried out through mobile applications.



This model is dominated globally by channels such as Amazon, Apple and Google. According to a report by Librandia (2023), international platforms accounted for 75.3% of the digital book market in Spain and Latin America in 2022 . In addition to these three large stores, there is a proliferation of other international and local platforms that apply the same marketing model, unit sales. Some of these are physical bookstores and chains themselves, which also have online digital book stores.

Country	Digital book local stores
Germany	Tolino Media, Thalia, Hugendubel, Beam and eBook.de
Saudi Arabia	Jarir Bookstore and Neelwafurat

Argentina	Bajalibros and Librería Santa Fe
Australia	Booktopia, Angus & Robertson and Dymocks
Brazil	Saraiva, Livraria Cultura and Livraria da Travessa
Canada	Chapters Indigo
China	Dangdang, JD, Bider & Tanner and Tencent
Colombia	Librería de la U, Librería Siglo del Hombre, Panamericana and Librería Nacional
South Korea	Yes24, Kyobo Book Centre and Interpark
Egypt	Alef Bookstores, Kotobarabia and Diwan Bookstore
Spain	Casa del Libro, El Corte Inglés, FNAC and La Central
United States	Barnes & Noble, Walmart and Bookshop.org

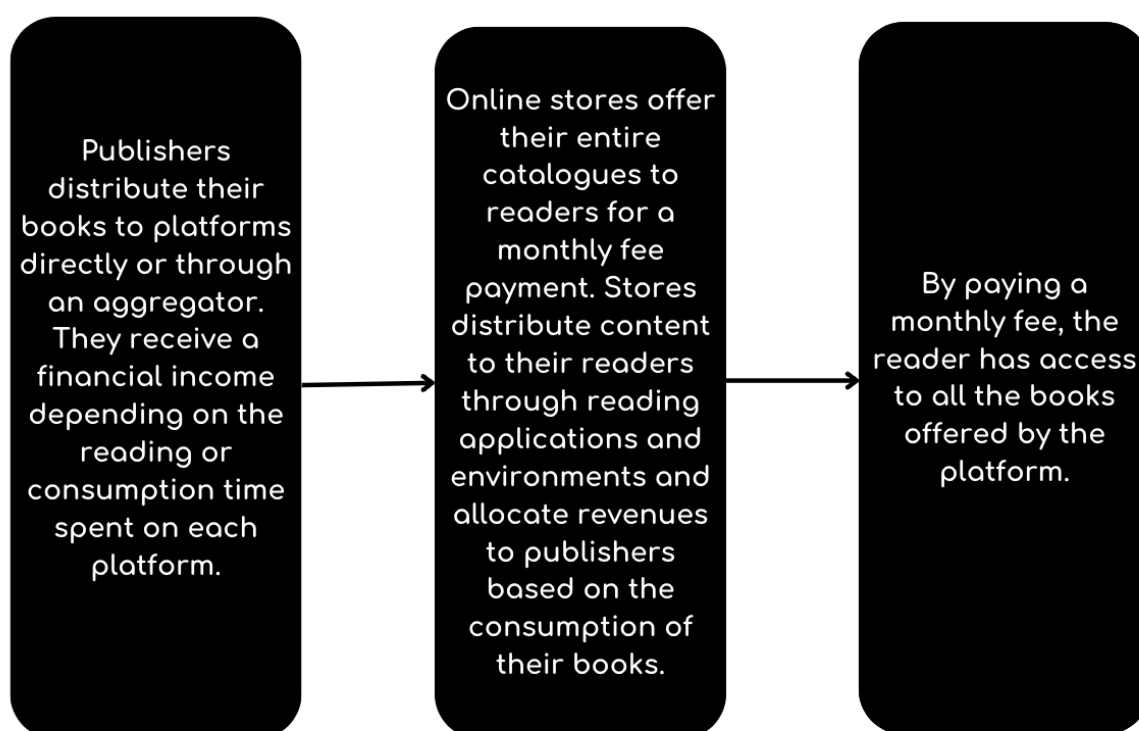
France	Fnac, Decitre and Cultura
India	Flipkart, Infibeam, Juggernaut Books and Crossword
Israel	Steimatzky and Tzomet Sfarim
Italy	Mondadori Store and La Feltrinelli
Japan	Rakuten, BookLive and Kinokuniya
Mexico	Gonvill, Gandhi, Porrúa and El Sótano
Netherlands	Bol, Bruna.nl and BookSpot
Peru	Crisol
United Kingdom	WHSmith, Waterstones and Hive.co.uk
Russia	Ozon, LitRes and Bookvoed
South Africa	Jumia,Takealot, Exclusive Books and LOOT

Sweden	Adlibris, Bokus and Akademibokhandeln
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Table 2. Local digital book stores by country.

Subscription systems: These models allow consumers to access digital content by paying a regular fee, usually monthly or annually. This content marketing model has become increasingly familiar to digital consumers due to the expansion of platforms that offer music and audiovisual content under this scheme, such as Spotify, HBO, Disney+, Google Play Music, Netflix, Hulu, among others.

Companies such as Scribd, Storytel, Bookmate and Amazon's Kindle Unlimited use this business model for the sale of digital books, offering access to hundreds of thousands of digital books for a recurring monthly payment. This model is one of the fastest growing in the publishing industry in the context of the Covid-19 pandemic. In 2021, subscription platforms accounted for 22% of Hispanic American publishers' digital revenues, up from 6.4% in 2017 (Bookwire, 2022).

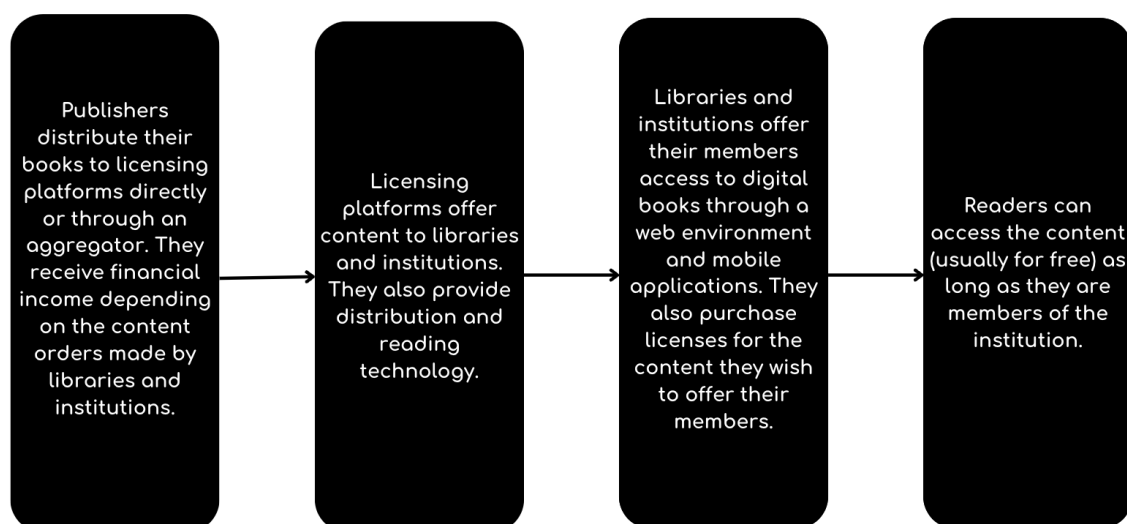


The following list includes the digital book stores that have the largest presence in the world and that apply the membership or subscription modality. These examples offer very broad and diverse catalogs.

- Kindle Unlimited (Amazon)
- Scribd
- Bookmate
- Storytel
- Kobo Plus
- Nextory
- Readfy
- Skoobe
- 24symbols
- Bookbeat
- Legimi
- Skeelo
- Redshelf

Unlike other creative industries, subscription as a method of marketing digital books has not grown as rapidly. This can be attributed to two main reasons. The first is linked to the value perception of the end users, the readers. Unlike a service such as Netflix, in which the price-benefit ratio is obvious (the user can watch dozens of movies in a month for a value similar to a movie ticket), a book subscription system does not guarantee that the reader will read more than one book per month (and the subscription price is usually similar to that of an individual digital book). The second reason is related to the difficulty of attracting many publishers' catalogs to these subscription models. The problem lies in the complexity of setting up a royalty payment system that is clear and attractive.

The licensing model: also known as the "digital book lending" system, it is especially used by library systems, both public and private. It has been initially adopted by public and academic libraries in the United States (the New York Public Library implemented the digital book lending system in 2004), and has then expanded in other territories. Digital reading in libraries has been consolidating as a channel of economic income of growing importance in recent years, "its magnitude depends on public purchases made by state and regional governments" (Bookwire, 2023). Within this model, some of the predominant technology companies are OverDrive, Odilo, Librandia and Hoopla. These platforms offer services to institutions and are responsible for supplying digital books to libraries, which in turn are responsible for offering them to their readers. In these cases, the costs of acquiring digital books are usually borne by government agencies and the institutions themselves. In Latin America, an exemplary case of this model is the Digital Public Library of Chile, an initiative of the Ministry of Culture, Arts and Heritage of Chile, in collaboration with the National Library of Chile.



Some other outstanding examples of public libraries that offer books under this modality are:

- The network of public libraries and universities in the United States and Canada, which offer digital books under this modality, being the Los Angeles Public Library one of the most outstanding cases due to the volume of users and loans reached (the first to reach 10 million loans in a year).
- Bibliothèque Nationale de France
- The eBiblio system (System of Digital Public Libraries of Spain)
- Deutsche Digitale Bibliothek (Germany)
- National Digital Library of China
- National Diet Library Digital Collections (Japan)

This scheme has great similarities with the traditional lending model of paper books in libraries. The most widespread dynamic in public libraries is the purchase of a certain number of copies of digital books, which will be available free of charge to their readers through loans with a specific return period. Unlike what happens with paper books, publishers can establish in the commercial agreements the periods of time in which the book will be available, as well as limitations on the number of possible loans.

In library licensing systems, the standard model generally establishes a number of 20 to 26 loans, with a duration of 21 days per loan. The library can acquire new books or renew the license, which usually has an expiration period of one to two years. This is an area of constant change and experimentation: publishers and libraries generally do not use a single licensing model or a single lending model but vary in terms of user

concurrency, circulation and duration, based on the genres of the books, the needs of different readers or the characteristics of the institutions acquiring the licenses.

This model also experienced a strong growth during the pandemic: in the months of confinement its use reached a quadrupling compared to 2019. In fact, the closure of bookstores during the pandemic triggered a huge demand for digital lending, and various governments devoted to the purchase of licenses.

In addition to libraries, there are other services that also offer access to digital books under this model, many of which are focused on the academic and university environment.

Company	Main Markets
Baker & Taylor	Global
BiblioCommons	Global
Bibliotheca	Global
Bolinda	Global, special emphasis on Australia, UK, and USA
BorrowBox (Bolinda)	Australia, UK, and New Zealand
DiViBib	Germany
EBSCO	Global
ProQuest	Global

Table 3. Examples of services with licensing modality

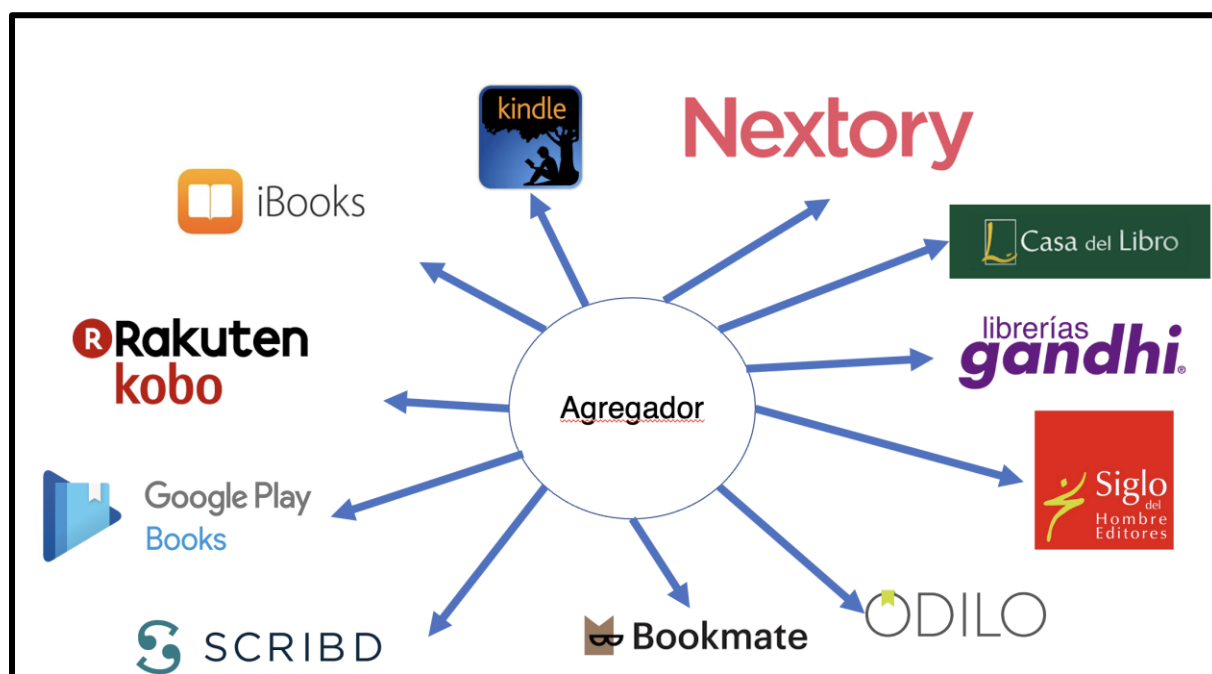
It is important to note at this point that library systems that adopt this licensing modality and publishers are in constant tension over agreements related to content rights. While libraries push for an agreement similar to the one they get when acquiring a physical book (in perpetuity), publishers claim that greater availability of digital content in libraries undermines their main source of economic income, sales to end readers.

Digital distributors or aggregators

In addition to authors, publishers, reading platforms and online sales or consumption stores, a central and growing player in the digital book chain are the distributors or aggregators. These companies provide services mainly to authors and publishers, facilitating the distribution of their books to a wide variety of platforms, stores and libraries. These solutions facilitate aggregated distribution for publishers who would otherwise have to manage their catalog directly to millions of potential users, through a very wide variety of channels and business models.

Aggregators offer a range of services that may include:

- Sales tracking (through reporting and statistics)
- Marketing and visibility services
- Metadata management tools
- Conversion or adaptation of digital book formats required for distribution
- Digital rights management assistance
- Support in the acquisition of the digital ISBN
- Occasionally, editorial services (cover design, text editing, marketing services, among others).



An aggregator as a platform is an agent that enables the simultaneous distribution of books at the same time to multiple stores and business models. This distribution includes the book and associated metadata (which in turn contemplates the protection format adopted for that title).



A traditional distribution scheme involves a publisher sending its books through distributors, who in turn send the books to stores or marketing channels, so that readers can access them.

Although aggregators often offer global distribution services, with agreements with stores and platforms around the world, they also provide local attention to specific catalogs. An example of this is Bookwire, a German company that focuses on publishers in Europe and Latin America, but provides global distribution.

The main companies that offer aggregation or distribution services for digital books are:

Services focused on publishers

Company	Main Markets	Features
Libranda	Europe and Latin America	It is one of the main digital book distribution platforms. It began operating in 2010 and was acquired by the Canadian group De Marque.
Bookwire	Europe and Latin America	Of German origin, it is one of the most important digital book distribution companies in Europe and Latin America.

Immateriel.fr	France, Global	Company that offers digital book distribution services from France.
Ingram Content Group	Global	One of the largest physical book distributors in the United States. It also provides digital book distribution services.
INscribe Digital	Global	US-based ebook and audiobook distribution and marketing services company.
CNPeReading	China, Global	It is the leading ebook sales and distribution platform in China. Founded in 2008, it is a subsidiary of China National Publications Import & Export (Group) Corporation (CNPIEC), one of the leading publication import and export companies in China.
Media Do International	Japan, Global	It is one of the leading digital book distributors in Japan.
Bookjam	Korea, Global	It is one of the leading digital book distributors in Korea.

Table 4. Main solutions for distribution (focused on publishers)

Services focused on authors

Company	Main Markets	Features
Author Solutions	USA, UK, Australia	It is a service focused on self-publishing and marketing for authors.
BookBaby	Global	It offers self-publishing services, including digital book distribution.
Lulu	Global	One of the most relevant book distribution platforms for authors (self-publishing) in the digital ecosystem.
Draft2Digital	Global	Distribution of digital books and self-publishing services.
Streetlib	Global	Italian company with a large presence throughout Europe in the distribution of digital books and self-publishing services. It also offers the service to publishers.
XinXii	Global	Founded in 2008 and headquartered in Germany, it is a digital book distribution platform with a strong presence in the self-publishing market.
PublishDrive	Global	Another of the most relevant platforms focused on services for authors.

Table 5. Main distribution solutions (focused on authors)

Distribution models of disruptive digital books

As we pointed out at the beginning, the expansion of the Internet and the rapid technological evolution have given rise to a variety of new business models and ways of distributing digital books. These projects do not usually have as protagonists the actors of the traditional publishing industry and sometimes their impact is usually minimized (they are not usually considered in the official reports that refer to the digital book business, nor are they present in the most relevant fairs and events of the sector). It is in this space where we find those projects that aim to explore forms of creation and distribution of digital books that are very distant from those usually associated with

the publishing industry. Below, we shall point out some outstanding projects, along with their main peculiarities and features:

- **Perlego**: this is a platform that offers books by subscription, similar to other cases we have already mentioned, such as Scribd or Bookmate. Its main differential lies in the catalog and its value proposition focused on offering nonfiction/academic books for a specific audience of readers (students and researchers from different disciplines). It started operations in 2016, and offers its subscribers access to more than 500,000 academic and professional titles from 2,300 publishers.
- **Comixology**: this is a platform that focuses on distributing comics under the subscription modality. It began operations in 2007, but since 2014 it belongs to Amazon. Its operation is focused on enabling the best possible reading experience of this type of content.
- **Harlequin Plus**: it is a platform developed by Harlequin, the publishing house, and it is focused on romantic literature. It offers access to digital books as well as physical books under subscription.
- **O'Reilly Safari Plus**: it is the O'Reilly publishing platform that offers access to its publisher's books and other similar ones (mostly training content for engineers and programmers) under the modality of a monthly membership, which includes training in video and other formats.
- **GetEpic!** and **Piboco** are just two of the many platforms specifically dedicated to offering children's books in digital format, prioritizing access and reading formats that best suit picture books. In the case of GetEpic!, it far exceeds one million subscribers and is available in more than 200 countries.
- **Blinkist**: a subscription-based reading platform for non-fiction books that relies on the distribution of content in the form of text and audio summaries of no more than 15 minutes. The platform is available in 150 countries. It has more than 17 million subscribers and offers summaries of more than 3,000 books.
- **Wattpad**: founded in 2006, Wattpad offers free access to nearly 90 million readers in more than 50 different languages. Users can write and read content for free. Using the system's own statistics and sophisticated algorithms, Wattpad has managed to obtain commercial revenue from more than 1,000 stories, both in audiovisual format (with agreements with major platforms) and with traditional publishers (for the distribution of these stories in paper format). In 2021, it was acquired by Naver, a company that also owns Webtoons, for USD 600 million.
- **Tapas**: similar to Wattpad, this is a community of writers and readers founded in 2012. It focuses on illustrated stories of serialized delivery (by chapters or fragments). Tapas offers a monetization system to authors that allows them to generate an economic income from providing premium access to content as they write and publish it.

- **Radish:** it is another of the most outstanding serialized fiction reading apps, founded in 2016 in South Korea. It allows writers to upload and monetize their work, with premium episodes available to readers through microtransactions.

These are just a few examples of platforms and ecosystems exploring new ways of distributing and marketing digital books. In most cases, traditional publishers in the book industry do not participate, or do so indirectly. However, these models represent a growing space for interaction between authors and readers, allowing the monetization of creative works in innovative ways.

About self-publishing

Since the Internet greatly facilitates the possibilities of self-publishing (i.e., that an author can publish a book without the necessary participation of a publisher), there has been a proliferation of platforms that specialize in this, offering a series of services to authors. Among the large companies, Amazon, Apple and Kobo are leading the way in the provision of self-publishing services and the inclusion of these books on their platforms, offering this possibility at no cost, and only charging commissions for the sales actually generated (with agreements that reach profits of 70% on the sale price, much higher than those usually received by an author when signing a rights assignment agreement with a publisher).

Advantages of Self-publishing

- **Control:** Authors keep full control over the distribution, sales and promotion of their books.
- **Direct contact with readers:** Authors can interact with and receive feedback from their community of readers.
- **Increased revenue:** Self-published authors can earn higher profit percentages from sales than they typically receive when they license their rights to a publisher.

Disadvantages of Self-Publishing

- **Requires technical skills:** Authors must handle digital production, metadata management, marketing and other aspects.
- **Increased time and investment:** Self-publishing requires investment of time and sometimes money.
- **It is not always sustainable:** May not be a sustainable option for little-known or emerging authors.

Interesting facts

- According to Bowker reports (2022), there were 2,298,004 self-published titles in 2021, a significant increase from 1,551,391 titles in 2018.
- Fiction was the most popular genre in self-publishing, with 335,428 ISBNs registered.
- Amazon, through Kindle Direct Publishing (KDP), publishes more than 1.4 million self-published books annually. This makes it, in some ways, one of the largest book publishing companies in the world.
- Self-published authors accounted for 51% of total ebook sales in 2022, according to Bookstats figures.

What impact does this phenomenon have on publishers?

The growing self-publishing ecosystem may pose a threat to publishers, but at the same time it represents an opportunity for them to strengthen. Given the profusion of content and the abundance of information available, the publishers' role of curator, in charge of selecting and prioritizing content, becomes especially valuable and in demand by readers. The curatorial work of a publishing house ranges from the selection of original works for publication to the processes of text editing, paratext production (such as back covers, forewords, etc.), design of each copy, development of promotional strategies and maintenance of networks of contacts to increase the book visibility through reviews, interviews, events, book fairs and, above all, its inclusion in a catalog or collection of its own. A book is still considered a "trusted good", a quality that comes not only from the author, but also from the publishing house that publishes it and includes it in its catalog, thus transferring its symbolic capital to the authors. This is especially important in the case of authors publishing for the first time.

Technologies for copyright protection in the digital environment

Copyright protection is key to ensuring fair recognition for the work of creators and to encouraging authors and publishers to invest in the creation and circulation of works, as recognized by various international treaties and conventions.¹⁰ Since copyright legislation varies from country to country, special care must be taken when establishing commercial agreements in the digital environment. With the globalization brought about by the Internet, consumers can access protected works that were created under different legislations, which sometimes leads to conflicts that are settled by resorting to private international law.

Illegal copying and appropriation have always existed, but the ease, speed and magnitude with which content circulates on the Internet has increased the concern for copyright protection. The concept of original and copy loses meaning in the digital universe where both are the same. The scale, scope and potential impact of piracy has increased to the point where it can be said that "every successful e-book will be

pirated and that unlawful copies can be found on the internet to download for free, at times before official publication” (WIPO, 2021).¹¹ This concern is one of the main reasons why the development of the digital book business has been negatively affected, as many publishers are hesitant to market content in digital format.

Although difficult to assess, there are some estimates about the dimensions of piracy and the losses generated by illegal access and downloads:

- In 2019, 60% of Internet users in Spain accessed unauthorized content up to 11 times a month.
- In 2021, U.S. publishers reported a loss of USD 300 million due to ebook piracy.
- It is estimated that nearly 92% of readers in Russia and China download digital books in an unauthorized manner.
- In a Google-funded study, between 6% and 21% of respondents in 13 countries admitted to having engaged in acts of piracy.
- A 2017 UK Intellectual Property Office study found that 17% of ebooks were consumed illegally, equivalent to about four million books (Kozlowski, 2018).¹²
- According to a survey by the German firm GfK, only 10% of eBooks on devices in Germany were purchased legally.
- In Spain, according to the Piracy Observatory 2021, digital piracy has experienced a significant decrease since 2018, but the economic impact on the Spanish industry remains significant: it was estimated at €217 million.¹³
- According to the Digimarc and Nielsen survey,¹⁴ contrary to popular belief, those who illegally downloaded files were mostly members of the upper-middle class.
- Piracy is also a widespread phenomenon in academia. Sites such as Sci-Hub provide access to millions of research papers. Despite legal efforts to shut down Sci-Hub, this site remains popular worldwide, also in economically richer countries.

However, not all segments of the publishing market are affected in the same way by piracy. Some, such as the academic sector, derive most of their income from other sources and are less vulnerable to unauthorized circulation of content. In this sector, the mere circulation of content does not have such an evident adverse effect, at least not as much as that suffered by a large part of the commercial and educational publishing sector, which is much more sensitive and sees its commercial dynamics seriously affected when books circulate in unauthorized forms.

To protect digital books, there are several strategies and technologies that can be implemented, such as unique identifiers, watermarks, encryption and DRM systems. These tools seek to prevent unauthorized access and use of digital content.

Digital Rights Management (DRM)

DRM is the most common system for copyright protection in the digital book environment. It is both a concept and a technology that applies encryption systems to establish the permitted uses of a digital work, based on different circumstances and conditions. It is used by authors, publishers, stores and aggregators.

In general terms, DRM employs various techniques that allow rights owners or their distributors to control users' content use and access. Its legal framework is based on various conventions, including the WIPO Copyright Treaty (WCT) and WIPO Performances and Phonograms Treaty (WPPT adopted in 1996 and ratified by Community Directive 2001/29/EC of May 22, 2001, entitled "Copyright on the Internet".

DRM procedures are not standardized, since encryption and protection systems differ depending on the companies that design them, and they can be implemented in different ways. However, they exhibit some features in common:

- They are applied to creative content in digital format.
- They are used to establish who accesses the works and under which conditions (established by the work provider).
- They can facilitate the statistics of accesses and uses of a digital file, which helps to determine its value.

In the publishing industry, DRM is widely used by content aggregators and generally acts as a "wrapper" for the ebook file (PDF and ePUB) or as part of the digital book file package itself. In the field of mobile applications, DRM is commonly used to set conditions on the content uses.

DRM technology seeks to combat copyright infringement or piracy, allows content owners to track each file, and helps authors maintain the integrity of the work by restricting editing and alteration of the original work. To understand how the application of DRM affects digital book reading experience and access, it is common to compare the practice of buying a physical copy of a book with the purchase of a digital book. In the case of a paper book, the purchase involves the acquisition of a physical object that belongs to the buyer in perpetuity. In contrast, when acquiring a digital book, a license is acquired that grants some access rights, but does not guarantee possession in perpetuity, and also restricts the possible uses:

- Loan
- Printing
- Copy
- Modification
- Resale
- Transfer to another device

Technically, DRM is implemented to control three aspects related to ebooks: access, use and distribution.

Different types of DRM

There are several options for publishers and authors seeking to protect digital books and other content prior to marketing. In general, protection of digital books can be achieved using a DRM system provided by a vendor or through software solutions, which identify, alert or remove illegal logins. There are several specialized software solutions developed by different companies for this purpose.

When a publisher seeks to distribute its digital books through the channels and stores previously discussed in this document (unit sale, subscription and license systems), it can decide whether to implement DRM in the distribution of these books or not. Each store, each channel, will employ its own system, taking into consideration the legal agreement approved by the publisher and the platform's own characteristics. Among the DRM systems employed by the channels we find:

- Amazon's own DRM (today the store that represents the most relevant share of the digital book market), which applies its own DRM to its digital books linked to the Amazon Kindle device or the Kindle application, (therefore, readers only access the books they acquire on these devices);
- Apple's FairPlay DRM, Apple also uses its own DRM, limiting the reading of these books to Apple devices;
- Google's Widevine DRM, which is employed in the Google Play Books digital book store.
- Adobe's DRM, which is used by a very wide range of digital book stores, including Kobo and Barnes & Noble.

These DRM systems in particular seek to regulate the way in which readers access content (for how long they can do so, on what devices, with what possibilities or scopes) and prevent readers from being able to get hold of the digital book to distribute it illegally or without the necessary permissions through other external channels.

In addition to hard DRM systems (which seek to enforce these regulations technically on content access and use), there are also the so-called "passive", "soft" or "social" DRM. These systems do not totally prevent the free use of content, but include watermarks in the books that usually include information about the buyer. The aim of this technique is to track any improper use of the books, as well as to prevent the book from being shared on pirate networks, without restricting the reader's freedoms, such as the possibility of reading the book in different applications or devices, or lending it to a friend or family member. There are companies that specialize in generating and tracking these watermarks (such as Digimarc or BooXtream) that provide a unique identifier to the publisher to match transaction records. The watermark can be used not only to prove legitimate ownership, but also to ensure that the integrity of the

original work is maintained, so that proper attribution is given where appropriate. In other words, this solution is also used to permanently link the right author to the right work.

Main problems with DRM

The use of DRM systems in digital books has generated some controversy since its implementation. While it protects copyright, it also presents challenges in relation to user rights and the reading experience. At least there are three problematic aspects of DRM implementation that can be identified.

1. Conflict with other rights

Although the purpose of DRM systems is to protect copyright, they may conflict with certain consumer rights. Here are some key points to consider:

- **Limitations on the right to copy for private uses:** DRM systems generally limit the number of copies that can be made of a digital book.
- **Restrictions on copying exceptions:** There are certain uses,¹⁵ such as book lending, that may be limited due to DRM.
- **Problems of access to works in the public domain:** Some works already in the public domain may become inaccessible if distributed with DRM.

In addition to these points, there are other important elements to consider:

- **DRM and free software:** This type of system often contradicts the principles of those who defend free software, since it is the distributors who specify which programs are readable, thus limiting access to users who opt for open source programs.
- **Protection of user privacy:** DRM systems need to identify their customers in order to track the use of book copies, which sometimes involves associating user information with the purchaser's credit card. At this point, the author's rights may clash with the ebook reader's right to privacy. A notable case illustrating this problem is George Orwell's "1984" and "Animal Farm", when Amazon had to remove these books from Kindle devices and refund money to purchasers after litigation. Amazon's ability to remove content from readers' digital libraries caused controversy and criticism.¹⁶

2. Discouragement to read and purchase digital books.

Stricter DRM applications may discourage readers from purchasing digital books, affect adoption rates and acquisition in the educational library setting, for example (van Arnhem and Barnett, 2014)¹⁷. Educational and academic library users may face

interoperability issues with different ebook providers, leading to limitations in the use of books for research.

3. Protection efficiency

Despite their purpose, DRM technologies are not always effective in protecting intellectual property and copyrights, as the systems are technically vulnerable. One of the best-known problems in this regard is the so-called "analog hole" involving the duplication of DRM-protected content by analog means (e.g., screen capture of each page). But in addition, many of these systems are technically vulnerable, as their encryption keys can be easily unlocked. A study conducted on popular digital book applications in Korea, such as Kyobo Book Center, Ridibooks ebook and Interpark ebook, which commonly use DRM on Android devices, revealed the vulnerability of their protection systems (Lee et al, 2018).¹⁸

To a large extent, there is growing evidence that DRM has not been able to combat piracy (Roncovic, 2020)¹⁹. Today, it is relatively simple for those who pirate electronics to buy a retail copy, remove the DRM with widely used software, and share the book on different sites.

Although not a widely adopted position, some publishers and authors somewhat accept piracy by considering it, along with the free availability of their books on the Internet, as a form of promotion for the sale of printed books. The "consumers with the highest spending on content might be those purchasing from both legal and unauthorized sources" (WIPO, 2021).²⁰ The assumption is that the losses generated by piracy are balanced at a certain point by the benefits in promotion and public relations of the physical book. Of course, this business scheme would only be sustainable for those publishers or authors who have a consolidated market for printed books, or for academic authors, who obtain their income from other sources, but not for lesser known or emerging authors who are unlikely to obtain any benefit from this scheme (WIPO, 2021).²¹

In short, piracy remains a central concern for most of the digital book industry. And the techniques and technologies implemented by the main channels have not been fully efficient in providing an answer. On the whole, the strategy that generates the greatest consensus in the fight against illegal uses is the construction of a solid legal market that also offers a robust, attractive, accessible and easy-to-use service for readers, which directly discourages access by illegal means, as happens in the audiovisual industry (Kulesz, 2011)²². If a significant portion of publishers refused to enter the digital market for fear of how illegal reproduction may affect the business, there would be "a sort of self-fulfilling prophecy": the less digital content available, the greater the chances of unauthorized mass digitization to access it. In terms of public policies, the task seems to lie in consolidating actions to regulate and strengthen an organized

market for an ecosystem that generates tax revenue, jobs and, above all, books. (WIPO, 2021)²³.

Moreover, there is evidence that Internet users are not actually reluctant to pay for digital content. The We are social report²⁴ shows that more than 7 out of 10 working-age Internet users (71.5%) say they pay for some type of digital content on a monthly basis. In fact, it is estimated that Internet users worldwide spent around USD 300 billion on digital content in 2021. In addition, e-commerce continues to grow: 6 out of 10 working-age Internet users buy something online every week and social media advertising is becoming increasingly effective (We are social).

In addition to DRM, there are, as we shall see later in this report, other mechanisms and technologies that facilitate authentication and provide security in the distribution of content. However, despite these drawbacks and questions, DRM is the system adopted by the vast majority of commercial digital book channels.

The use of mobile applications in the distribution and consumption of digital books

The growing adoption of mobile applications for the distribution and consumption of digital books is part of the unprecedented expansion of Internet use globally, which is reaching new peaks year after year. Mobile applications have become an everyday reality for millions of people. According to the Data.ai report,²⁵ in overall terms, 255 billion downloads were reached in 2022, equivalent to more than 485,000 applications downloaded per minute globally. The growth of the mobile application market is also reflected in advertising expenditure, which is expected to reach \$362 billion in 2023, after surpassing \$336 billion in 2022.

Specific to digital book reading, mobile applications do not make a significant difference for readers compared to accessing those same books through web services. For instance, the experience of accessing and reading digital books on, for example, Amazon's mobile reading applications, is not different from that offered by the same platform on the web. Developing a specific mobile application only makes a substantial difference when particular features of mobile devices are exploited (for example, the camera or GPS system). When this does not happen (this is what usually happens in the reading of digital books), what is generally developed is a web service that, with very similar features and functionalities, is packaged and distributed as an application within the app stores. But in essence, they are the same. In this scenario, as far as book distribution is concerned, the option of distributing books in app format is more related to a commercial action and to facilitating access to content, than to an end in itself, given that there are no significant differences in how the content is accessed and consumed.

Although mobile applications and websites can provide similar functionalities, applications tend to provide a smoother and faster user experience because data can be stored locally on the device, which enables faster access to content.

The following table summarizes the main similarities and differences between applications and websites:

Feature	Mobile Websites	Mobile Reading Applications
Access	Through a web browser	Downloaded and installed on the device
Compatibility	Generally universal	Depends on the device operating system (iOS, Android)
Internet Usage	Requires Internet connection for operation	Many allow downloading content for offline reading
User Interface	Adapted to mobile screens, but may vary depending on the device	Designed specifically for mobile devices, usually more fluid and intuitive
Updates	Automatic, no user action required	Requires a new download from the app store for updates
Functionalities	Limited by browser capabilities	Can integrate advanced device functions (use of GPS or camera)
Storage	Does not store information on the device	Can store information on the device
Copyright protection	All current protection systems can be used.	All current protection systems can be used. There are no specific differences with the consumption of a book on a website. The main difference is given by the possibility of downloading the content to the device.

Table 6. Mobile applications and mobile websites. Main features.

Generally, book reading applications are free to download and offer in-app purchases, following the business models presented previously. Among the most widely used options for reading applications globally are those developed by giants in the technology sector, such as Amazon's Kindle, Apple's iBooks, Google's Google Play Books, Scribd (under the subscription model) or OverDrive's Libby (with the lending system).

Readers and mobile applications

Around 2015, UNESCO²⁶ carried out a study on the scope of reading applications, investigating the habits, preferences and demographic profiles of more than 4,000 "mobile readers" in seven developing countries: Ethiopia, Ghana, India, Kenya, Nigeria, Pakistan and Zimbabwe. The main objective of this study was to clarify the extent to which reading on cell phones is present in countries with low literacy and reading rates, what are the main advantages and obstacles to this type of reading and

the elaboration of recommendations for its optimal development. Thus, UNESCO points out that although there are significant gaps for access in dimensions such as gender, geographic region and socioeconomic conditions, mobile devices are the most widespread information and communication technology in history, and "more to the point, they are plentiful in places where books are scarce" (UNESCO, 2015). Due to their expansion, these devices are one of the most promising ways to encourage reading. In the aforementioned study, the need for a sharper awareness at a global level about the possibility of transforming a cell phone into a library full of books, simply and with low costs, is pointed out, so that access to texts ceases to be an obstacle to literacy.

Among the most significant findings, the report highlights:

- Women have less access to cell phones, but are the majority among the most active mobile readers.
- Mobile reading users tend to be young, with an average age of 24.
- Convenience is the main reason for reading on cell phones in developing countries.
- Affordability and preference for digital reading are also important factors.
- Many readers read to children from their cell phones.
- There is interest in material in English, but also in local languages and local authors.
- Among the main obstacles are: limited content (60%) and connectivity problems (about 50%).
- Mobile reading is useful for literacy education for marginalized groups, especially women and girls.
- Some possible strategies to expand mobile reading are: diversifying content, increasing dissemination efforts, and reducing costs and technological barriers.

Source: adapted from UNESCO 2015

It is important to mention that there is still no general consensus on how digital reading affects, both positively and negatively, the learning, comprehension and cognition processes, especially among children and young people. In this sense, more studies are needed, with greater scope, to help inform decision-making about the appropriate uses of digital reading, mainly by educational systems (CERLALC, 2020).²⁷

Mobile applications present a number of additional advantages and opportunities, as well as challenges:

- **Active and social reading:** applications can enhance active reading and social reading practices, facilitating the reader to interact with different systems inside and outside the book, increase their possibilities for socialization, recommendation and conversation with other people about their readings, improve text comprehension from interventions such as underlining, comments and notes, creation of schemes and tags, search for terms, among others.
- One of the challenges arising from this potential is to improve the user experience. There is still a lot of uncharted territory in this regard. Most reading

applications available on Android and IOS operating systems (such as Kindle, eReader Prestigio, Aldiko, Google Play Books, Kobo, eBoox, iBooks, Bluefire Reader, and Moon+ Reader), developed for reading on tablets and smartphones, still have limitations, especially regarding the possibility of interaction between readers (Dantas, 2018)²⁸.

- **Benefits for young readers:** Young people are the main users of these applications and benefit from interactivity, easy access, text variety, reduced costs, lower environmental impact and portability. Karsenti (2017)²⁹ records 25 advantages that he classifies as: cognitive, affective, social, economic, ecological and of portability.
- **Protection of intellectual property and copyright.** In terms of intellectual property, technically there are no significant differences with websites because the same technology is applied in both spaces. However, mobile applications may present an advantage if we take into account that their use implies downloading through official sites, mainly content and application stores, known as *app stores* (Google Play or Apple Store). That is why mobile applications are considered more effective in protecting copyrights and preventing unauthorized uses of digital books. When installed on devices for personal use, the possibilities of access by other users are significantly reduced.
- On the other hand, this trend poses a challenge in terms of concentration on the dominant platforms (Apple and Google). App stores are the window for users to access content providers, and play a central role in shaping the market, as well as influencing users' perceptions and routines for accessing digital content.

Public policies have an important role to play, not only in terms of protecting the rights of authors and readers, but also in regulating competition in a market of growing importance.

In short, the adoption of mobile applications for the distribution and consumption of digital books poses challenges and possibilities for authors, publishers and distributors in relation to copyright protection and content marketing. The trend towards the use of mobile applications seems to offer greater effectiveness in protecting copyrights and preventing unauthorized uses of digital books thanks to the distribution through official app stores and the use of personal devices. This trend also raises concerns about the concentration on dominant platforms and the need to ensure competitiveness in the market.

Publishers and distributors face the challenge of adapting to the new market dynamics and developing strategies that allow them to take full advantage of the benefits offered

by mobile applications for the distribution of digital books, improving the user experience and ensuring the sustainability of the publishing ecosystem.³⁰

Notes

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- ¹ AAP Statshot Annual Report (2022): <https://publishers.org/news/aap-statshot-annual-report-publishing-revenues-totaled-28-10-billion-for-2022>
- ² Publishers Association (2022): <https://www.publishers.org.uk/publishing-industry-shows-resilience-with-record-breaking-growth>
- ³ In contrast to other reports, this one includes the academic book business, which is currently consolidated in the distribution of digital publications.
- ⁴ Asociación Comercial de la Industria Editorial Alemana (2022): <https://www.boersenverein.de/markt-daten/marktforschung/wirtschaftszahlen>.
- ⁵ Libranda (2023). *Informe Anual del Libro Digital 2022*. <https://libranda.com/category/informes/>
- ⁶ Sindicato Nacional de la Edición en Francia 2022 <https://www.sne.fr/document/synthese-des-chiffres-de-ledition-2022-2023>
- ⁷ Beijing OpenBook 2022 y China Digital Readership Report 2022.
- ⁸ Japan Association of Book and Magazine Publishers (2022).
- ⁹ A very high percentage of this business includes digital comics, which have grown since 2014 by 20% consecutively year after year.
- ¹⁰ The Berne Convention and the WIPO Copyright Treaty (WCT) are among the most relevant.
- ¹¹ Ibid., p. 135.
- ¹² Kozlowski (2018). eBook Piracy Is on the Rise in 2018: <https://goodereader.com/blog/e-book-news/ebook-piracy-is-on-the-rise-in-2018>
- ¹³ La coalición de creadores e industrias de contenidos (2021). *Observatorio de la piratería y hábitos de consumo de contenidos digitales 2021*. España: http://lacoalicion.es/wp-content/uploads/informe-ejecutivo-pirateria_2021.pdf
- ¹⁴ Digimarc (2017), *Inside the Mind of a Book Pirate* <https://kvbboekwerk.nl/wp-content/uploads/2017/09/2017-nielsen-inside-the-mind-of-a-book-pirate.pdf>
- ¹⁵ Such as the so-called fair use, which authorizes format changes for visually impaired users, use for educational and research purposes, digital preservation, etc.
- ¹⁶ Stone, B. (July 17, 2009). Amazon Erases Orwell Books From Kindle. *The New York Times*. <https://www.nytimes.com/2009/07/18/technology/companies/18amazon.html>
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- ¹⁹ Roncevic, M. (2020) Digital Rights Management and Books. *Library Technology Reports, Volume 56, Number 1*. American Library Association.
- ²⁰ Op. cit., p. 137.
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- ²⁸ Dantas, T. (2018). Aplicativos móveis para praticar a leitura social: análise e avaliação de recursos úteis. *Palavra chave*, 7(2), 9-10.
- ²⁹ Karsenti, T. (2017). *25 avantages du livre numérique*. Université de Montreal.

Section 2. Review of solutions for the distribution of digital books in mobile applications and copyright protection

Currently, book publishers have at their disposal two main methods for marketing their digital books. On the one hand, the possibility of distributing their content through the platforms and stores mentioned above, under the three business models described previously (unit sales, subscription and lending or licensing models). As we have seen, different companies that market digital books globally have been able to develop in each of these models. And in most of these companies, reading is done through mobile devices. The companies apply different techniques to regulate the use that readers make of the content.

In addition to these marketing channels, publishers have a wide and diverse range of services and solutions that allow them to distribute their works directly to readers. In this section, we provide a current overview of the technological solutions most commonly used by publishers, authors and content creators. We focus on specific examples that stand out for their features, market segments, technologies implemented to protect copyrights and their ability to turn content into mobile applications. A more complete list of platforms, technologies and companies is provided in the appendix.

Commercial sector

In previous sections of this document, we examined the channels and business models available to an author and/or publisher when distributing their books in digital format, and the measures and technologies that each of them adopt for access regulation and content protection (in terms of copyright). Next, we will focus on the solutions that allow publishers to distribute their content directly to readers, outside the major marketing channels and stores, and that allow them, directly or indirectly, to develop mobile reading applications.

The technological solutions available in this area differ both in terms of the publishing sector they are aimed at and the type of solutions or services they offer for content distribution. In general terms, we can categorize the solutions as follows:

a) Comprehensive solutions: they provide comprehensive services so that publishers can create their own digital book distribution environments in different formats, under different business models. These services range from content management and hosting systems to integration with payment methods and the creation of reading environments in the form of mobile applications.

b) DRM solutions: those that focus exclusively on the development of DRM technologies for the protection of the content to be distributed.

c) Solutions for the distribution of digital books in flipbook format: allow books to be converted to a flipbook-type format (a simulated display of a book on screen), and sometimes allow the creation of stores and applications for the distribution of digital books in this format.

d) Solutions for the marketing of digital content of all kinds: those that provide solutions aimed at facilitating the marketing of digital content in general, and therefore can also be used for the distribution of digital books, but are not specific to this sector and this type of content.

In addition to these types of services, there are platforms and solutions that focus exclusively on the textbook sector and academic publishing. These markets present unique and specific dynamics, which will be detailed later in this document.

The following are examples of platforms currently active and adopted by the publishing sector for each of the types of solutions mentioned.

a) Comprehensive solutions

Kotobee, Publica.la and Joomag cases

The first group of services includes those that offer a comprehensive solution to publishers for the creation of digital book distribution stores. These services usually include the management of digital books and their hosting, the possibility of enriching the contents with multimedia experiences, the integration with different payment methods and systems for the commercialization of the contents, the management of access and rights of use in each work by end users, the possibility of configuring different business models, and the development of mobile reading applications, among others. These are white label solutions, which allow publishers to offer a content library under their own name. They are usually known for making all of this very simple, requiring no technical knowledge. As an example, we will highlight three platforms in this section: Kotobee, Publica.la and Joomag.

Kotobee is a platform that allows the design and publishing of digital books in a simple way. The books can be accessed from multiple devices. It is used in the commercial publishing sector mainly, but also in education and corporate training. It has around 200,000 customers including Harvard, Yale, Pearson, Oracle. The platform enables the creation of digital books enriched with images, videos, animations and also supports the most standardized digital book formats. Its products include Kotobee Author, Kotobee Reader, Kotobee Cloud, Kotobee Library and Kotobee Mini-apps. In other words, a whole range of tools that are focused both on the creation of books as well as on distribution, focusing on the creation of mobile applications.

Content protection in Kotobee is mainly done through storing and distributing all content from cloud technologies. On their site they explain that through this system:

"an ebook is encrypted with an encryption key, stored on a server, and unique for each user. Once the ebook is opened, the user will be asked for an email/password combination, or for a code. Authenticating correctly would retrieve the encryption key from the server, and decrypt the ebook content." The advantage that this approach would present is that it is not specific to a certain device model, but can protect books running on different devices and environments (webs or mobile applications). For this, the digital book must first be transformed using the technology offered by Kotobee.

Publica.la is a platform that allows the commercialization of digital books through the creation of customized stores and multi-device digital libraries. Currently, it provides services to commercial publishers from very different parts of the world and works with very diverse content genres. From commercial publishers (such as Editorial Planeta) to educational (such as Santillana) and technical publishers (such as Alfaomega). Publishers have direct access to monitor their sales through a control panel, where they can view all transactions in real time. The platform protects content through streaming technology. Publications are hosted on Amazon AWS servers (the same ones used by Spotify and Netflix). As they explain on their site: "All stores developed with Publica.la are SSL-certified, every communication between the application and the user is encrypted, and, also, users will never be able to download the publications as these are served using streaming technology. Over the years, it has been proven that the use of DRM is not only insecure, but also uncomfortable for readers." To validate access, different techniques are used according to the business model adopted: from mediated access with a username and password, to the possibility of restricting use using an institution's IP ranges (for example, for a library that wants to provide access to content only within a specific physical space).

With Publica.la, publishers can choose their sales scheme (unit sales, licenses, subscription), integrate different payment systems and set the price of their books in any currency. It also allows the creation of its own distribution and reading applications. It has no exclusivity conditions and does not charge commissions for the generated sales. All this, together with its simplicity in use and implementation, has made it a tool massively adopted by the industry.

Finally, Joomag is another platform that offers a comprehensive solution for publishers, allowing them to create, distribute, track and monetize digital content on multiple devices (including mobile applications). It is used by around 500,000 companies, with regional offices in the United States, China, Germany and Armenia. Joomag is generally used for the creation and distribution of magazines, brochures, catalogs, albums, but is also sometimes used by commercial book publishers.

Joomag supports the uploading of PDF files that can be transformed into rich content with the addition of images, videos and other interactive elements. The platform offers the creation of a custom branded application, which it makes available on both the App Store and Google Play. It also offers the possibility of setting different business alternatives, such as unit sales and subscription.

Joomag adopts a DRM system to protect content from unauthorized distribution to third parties. Among the restrictions applied, the publication text and images cannot be copied or pasted, and readers cannot pass on a purchased publication to another person by sharing its link.

The three platforms discussed in this section offer similar services to a wide range of publishers (mostly commercial, educational and technical), and allow the simple management of their own digital book store, under different business models. The concept behind these services is that of "white label". That is, a technological solution through which publishers can offer their content directly to their readers, presenting the content library as their own. When it comes to regulating and protecting content access and distribution, each platform has adopted different techniques and technologies: from the application of its own DRM to the management of content on cloud servers. We always refer to security systems developed by the company itself, often with the requirement that the content is created or adapted in its own environment.

b) DRM solutions

Adobe Content Server, EditionGuard and Vitrium cases

There are different DRM protection solutions on the market that offer publishers direct distribution of digital books to their readers. Unlike the alternatives mentioned in the previous section, these services, including Adobe Content Server, EditionGuard and Vitrium, only offer file protection technology. That is, they are not comprehensive solutions. They require publishers to develop the entire sales ecosystem on their own, which makes it necessary to resolve, among other issues, the creation of their own marketing store, user (reader) management, the development of access and reading applications, and integration with payment methods, among other things. In this sense, they require a greater investment in time and resources, but can be useful for publishers or projects that seek to have direct control over access and distribution of books, or require greater versatility and options different from those offered by comprehensive solutions.

These DRM protection solutions allow you to regulate aspects such as access permissions, as well as copy and print permissions. In addition, they often facilitate integration with e-commerce sites through the use of APIs, which is why they are frequently adopted by large online bookstores.

Adobe Content Server has its own DRM, which supports EPUB, EPUB3 and PDF formats. Its files can be read in applications such as Adobe Digital Editions and Bluefire Reader. It is one of the solutions most widely adopted in the publishing industry, but its popularity also makes it an attractive target for piracy.

EditionGuard offers different levels of security and three DRM alternatives: Adobe's own DRM, Radium LCP and different types of Social DRM. The latter is usually adopted by smaller-scale startups or independent authors looking to expand audiences. The platform protects EPUB, MOBI and PDF files.

Vitrium Security is another content protection and DRM solution that has been adopted by publishers. It integrates with content management and e-commerce platforms and offers analytical services to monitor consumption.

In all these cases, we find solutions that enable the protection of digital books by adopting DRM techniques. It is the publisher (or the project that adopts a DRM solution) who must take care of the development of the entire ecosystem of content distribution and reading, making use of this technology for the protection and management of content usage. This implies a large investment, but also more flexibility when designing the content distribution application.

c) Solutions for the distribution of digital books in flipbook format

Another range of solutions adopted by the sector are those that provide services for the creation of flipbooks, a format that mimics on a screen the turning of the pages of a physical book. These platforms initially start with PDF content that must be adapted with the platform's own tools. These solutions do not use the most standardized formats in the book industry, such as EPUB, but use PDF to generate their own format, generally based on HTML5 technology. Based on this model, they enable the distribution of content in both web environments and mobile applications.

Among the most popular solutions for conversion to flipbook format is Heyzine, which offers a series of services to customize the reading experience, enables the incorporation of multimedia elements for the creation of interactive books and provides access to content reading statistics. Other similar and widespread solutions in this area are FlipHTML5, which offers predefined templates and animations as well; ISSUU, which allows the monetization of publications through advertisements and subscriptions; and Calaméo, which is characterized by facilitating the customization of the flipbook's appearance.

Content protection on these platforms is usually based mainly on the use of passwords to regulate access, control by domain or the implementation of watermarks on the content. They do not usually apply direct content protection technologies such as DRM, and as mentioned above, they do not use the formats that are most common in the industry.

These solutions are not focused on offering robust content protection. They mainly solve the hosting of the books, the adaptation to the flipbook format, and the viewing experience. In many cases, it is the publishers who must find solutions to protect their books. These solutions can be attractive to authors and publishers looking for a simple,

cost-effective and visually appealing way to distribute their digital publications, especially when the visual aspect of a work is important, as in the case of illustrated or educational books.

d) Solutions for the marketing of digital content of all kinds

There are numerous software solutions that make it possible to market a variety of digital content, including ebooks, magazines, music, movies, and more. These platforms mainly focus on providing a service for the creation of a sales cart in a simple way, both to individual creators and to companies and organizations. Among the most popular platforms used for this type of operations are Payloadz and Gumroad. Both platforms offer services for the commercialization of digital content and generate revenue by charging commissions for each sale made. This type of solution usually also includes marketing and promotion services to help creators increase their products' visibility and sales.

These platforms are simple to operate: in just a few steps, you can create a seller's profile, upload digital content, set prices and configure payment options. However, the content protection measures offered by these platforms tend to be less robust compared to more focused or specialized solutions, such as those we have reviewed above. Some protection measures typically implemented include limiting the number of downloads, accessing content through passwords and incorporating personalized watermarks, over which it is possible to include the buyer's information or data to discourage illegal redistribution. It is possible to use additional DRM solutions or to combine these sales platforms with other more specific protection solutions such as those mentioned earlier. The main advantage of these solutions lies in their simplicity for the creation and implementation of a digital content sales system, requiring low investments and efforts, and being able to combine the commercialization of books with other types of content. Furthermore, a disadvantage is that these platforms do not usually optimize the reading experience of digital books in an efficient way, since they do not specialize exclusively in the distribution of this type of content.

The educational sector

If technologies and digital environments for education have been gaining ground in recent years, the pandemic caused by COVID-19 drastically accelerated these processes at a global level, in a context where most countries turned to emergency remote education (ERE). In the early days of the pandemic, around April 2020, the virus led to the closure of schools in 190 countries, a scenario that presented governments, educational institutions, teachers and specialized publishers with a series of complex challenges (WIPO, 2021). Many publishers promptly made digital books and platforms available free of charge. In addition, the emergency promoted innovation and implementation of virtual platforms for learning and teaching. By 2022, a global report on technologies in education showed that in Spain and Latin America

9 out of 10 teachers worked with digital tools in their classrooms (BlinkLearning, 2022)¹. Practically all available studies agree that the crisis context caused by the COVID-19 pandemic made possible the expansion, acceleration and deepening of the role of digital technologies in educational systems. In Latin America, ECLAC (2020)² recorded an increase in the use of virtual education of more than 60%. However, it is necessary to highlight the inequalities that also took place during this process, especially in the most socioeconomically vulnerable sectors (UNESCO, 2021).³ In Latin America, the widespread adoption of cell phones has driven the development of various initiatives, including applications and platforms designed for their use, consolidating these devices as protagonists in the classroom (BlinkLearning, 2022).

From an economic point of view, the publication of school materials is an essential part of national publishing markets. In contrast to what tends to happen in more economically developed countries, the growth of these industries depends heavily on public policies regarding the acquisition of digital educational content and materials.

In the midst of an accelerated expansion and development of educational technologies, many publishers have adopted an approach in which digital textbooks are part of an integrated and virtual learning environment (EVA) that articulates educational content, didactic resources, and tools such as teacher monitoring, forums and exchanges, tests, exercises, among others. In general, this integrated environment is part of a single package of educational services, with different options and variants, which is usually centered on the licensed content sales model.

In general terms, three alternatives can be identified for the distribution of content in the educational environment, with different control levels for publishers:

a) Publishers' own solutions: Publishers provide access to their content through a self-developed platform or by contracting and implementing pre-existing technology. This alternative gives them greater control over the distribution and protection of their content, as they can establish their own access policies, usage restrictions and copyright protection measures. In addition, publishers can tailor their platforms to meet their specific needs and those of their target audience, while obtaining direct data on sales and reader behavior.

b) Third-party solutions: There are platforms in this market that typically provide content to educational institutions, allowing publishers to integrate and distribute their own publications. In this case, publishers may lose some degree of control over the distribution and protection of their content, as they must adhere to the technologies, policies and restrictions established by the platform.

c) State solutions: In some cases, States develop their own solutions (or contract third-party solutions), licensing publishers' content to be included. During the pandemic, many States turned to the development of platforms to ensure educational continuity in the context of school closures. While state purchasing represents a very

important source of income for educational publishers, the protection of content in these environments can be fragile, which has led to some harshness and reluctance on the part of publishers to move forward with this type of content distribution. In these cases, publishers may have little or no control over how their content is distributed, used, shared and protected, which can lead to problems of piracy and copyright infringement.

Some outstanding examples will be reviewed below, and further available solutions can be found in the appendix.

A popular platform in education, mainly in the United States and Canada, is Overdrive Education. It is a solution that offers distribution services for schools and libraries of both digital and audiobooks, focusing on primary, secondary and university levels. OverDrive has various solutions, services, and tools, most of which offer content protection with Adobe DRM. Overdrive Education also developed an application called Sora, which facilitates access to digital resources in schools by students, while offering the possibility of integration with the institutions' own learning systems. Sora is available on Google Play and Apple Store and allows users to borrow books and audiobooks from their library, with a simple system that only requires them to log in to their school. It allows them to download the books to a device or open them in streaming. Depending on the licensing agreement with the publishers, it allows publishers to stipulate the number of loans and how long the loans will last.

VitalSource is another platform widely used in education, especially in the United States and the United Kingdom, although it has a presence in 240 countries. It is dedicated to the distribution of digital content for educational institutions, schools, universities and academic libraries. It offers publishers the possibility to sell and distribute their content on multiple devices. This solution developed the Bookshelf application that allows teachers and students to access books from their mobile devices. The books can be downloaded for offline reading. To protect the distributed content, the platform has its own DRM technology, VitalSource DRM, with multiple encryption protocols. Depending on the license agreements, VitalSource offers to open or restrict functions for copying and pasting, downloads to devices and printing of digital learning materials.

Another proposal that has gained popularity in the school environment, especially in Spain and Latin America, are platforms like BlinkLearning, which offer the integration of digital books with a varied series of tools and didactic resources, from the enrichment of books with multimedia interactions and content, to evaluation and monitoring tools. BlinkLearning focuses on primary and secondary educational levels, and allows access to content through any device, as well as offline reading. For educational publishers, the platform offers services for the creation, distribution and design of interactive books with integrated didactic resources and allows them to manage content rights and licenses as well as to have control over access and

distribution. BlinkLearning's mobile applications use content protection measures such as data encryption and access control to digital content through authentication.

Among the solutions that offer educational publishers robust content protection tools, the Kitaboo platform stands out, mainly in the United States, United Kingdom and Canada. This is a solution focused on the creation and distribution of DRM-enabled K12 content (primary and secondary education), with access control functions, print restrictions, content expiration management and device limitation. Kitaboo also offers interactive reading applications and a digital book store where publishers can market their content.

GetMagic and Learnetic are two other relevant platforms in the educational field. GetMagic is an educational platform that offers online and offline learning solutions, mainly in Europe. Its focus is on providing interactive and personalized content for primary and secondary school students. Educational publishers use this technology to be able to offer and license their content on their own to educational institutions, in an environment that also incorporates specific functionalities for teachers. Learnetic is a Polish company specialized in the development of educational technologies and e-learning solutions for the educational sector, covering primary, secondary and tertiary levels. Its solutions include interactive content creation, authoring and learning management tools. Learnetic has a significant presence in Europe but is also frequently used in Latin America and Asia. Again, it is a service adopted by publishers to offer their content directly to educational institutions.

There are other solutions similar to those mentioned above that focus on other regions and markets. In India, for example, the Extramarks Education platform stands out, while in Africa, the Ekitabú aggregator supplies digital books to dozens of schools, with a catalog provided by both local and international publishers, covering primary and secondary school levels. Also in Africa, there is the Snapplify platform, which provides specific solutions for the educational sector, such as integration with different learning management systems. In this case, it uses its own DRM system, SnappSafe, for content protection.

The academic sector

In this document, the academic publishing sector requires a special section, as it exhibits singular dynamics. Publishers in this segment sometimes use many of the solutions, services and business models detailed throughout this document. However, the particular features of its production and consumption generate a slightly different value chain. Firstly, this sector has a markedly digital and global character, although the academic publishing industry is concentrated in Western Europe and North America (WIPO, 2021). This is already a differential feature, in contrast to other segments that make up the book industry where digital business is still a minority. The second differential aspect of this sector is that authors rarely receive an economic

retribution from authorship, but rather obtain indirect rewards from their publications (such as the possibility of enhancing their professional and academic careers).

The publishing sector specifically in this area has a very strong concentration: only six companies publish more than 40% of the content: Elsevier (Netherlands), John Wiley & Sons (United States of America), SAGE Publications (United Kingdom), Springer Nature (Germany), Taylor & Francis (United Kingdom) and Wolters Kluwer (Netherlands) (WIPO, 2021, p. 39).

The academic environment is particularly prone to controversies and debates about unauthorized access and downloading of content, especially in developing countries, whose universities have fewer economic resources to finance subscriptions and licenses.

There is also a growing multiplicity of technological solutions and platforms for the distribution of digital books and academic journals. Among the most widely used are those that base their business model on licensing and subscription. In general, academic institutions and libraries pay an annual subscription that allows researchers and students to access a wide range of journals, articles, books and academic chapters, such as ScienceDirect (Elsevier), JSTOR, SpringerLink, Project MUSE, Taylor & Francis Online. For the protection and control of access to content, they usually apply the IP authentication mechanism (which prevents access to content outside certain devices in particular). Platforms such as Redalyc, SciELO and DOAJ (Directory of Open Access Journals) provide open access to academic journals and are funded by institutions, corporations and sponsorships. These platforms generally use Creative Commons licenses, where the conditions for the use and distribution of content are established and explained, but do not usually apply a direct restriction on access. Creative Commons (CC) licenses offer different levels of permissions for free open access works, from the most open (CC0) to the most restrictive (BY-NC-ND).

Solutions for managing rights of use of digital books implemented in mobile applications

As we have observed throughout this document, there is a huge diversity of formats, distribution methods and business models around digital books. We are in a dynamic and constantly evolving scenario. Virtually all marketing platforms and stores offer mobile reading applications, and manage the access rights and content use through various mechanisms. Regarding the techniques they implement, in fact there are no major differences between those used in the distribution of digital books within websites and those applied specifically within mobile applications.

Specifically, we identify these systems or mechanisms to safeguard and manage the distribution of digital books:

- Hard and social DRM systems, which are the most widely adopted by large stores and marketing channels (such as Amazon, Apple or Google). Each store can develop its own or adopt one of the existing DRM systems on the market. Social DRM systems include watermarking, which makes it possible to identify and track possible copyright infringement.
- The distribution of content in the cloud in streaming format, without the possibility of downloading, regulating access through user authentication. This is a technique implemented mostly on platforms that market books under the subscription business model, or for many technological solutions used and/or contracted directly by publishers.
- Access restriction via IP, aimed at the distribution of content in a specific establishment, preventing people outside those devices from accessing the content.

There follows a summary table highlighting the solutions and approaches used in different market sectors for the distribution of digital books and the protection systems commonly implemented.

Type of solution	Description	Application	Protection system used	Cases
Comprehensive solutions	These are technologies that, in a very simple way, allow a publisher to create its own platform for marketing digital books.	Commercial, educational and academic	IP range, user authentication, encryption key, DRM	Kotobee, Publica.la and Joomag
DRM protection technologies	These are technologies employed to protect content using DRM technology, and are usually implemented in stores or reading applications.	Commercial, educational and academic	DRM, encryption, access control, copy and print protection.	Adobe Content Server, EditionGuard and Vitrium
Solutions for flipbook creation	These are technologies that enable the creation and distribution of digital books in the flipbook format, both on the web and in mobile applications.	Primarily commercial	Watermarking, phosphor links	Heyzine, FlipHTML5, ISSUU and Calaméo

Systems for digital content marketing	These are technologies that are used for digital content marketing in a broad sense and can be implemented for digital book distribution with some limitations.	Primarily commercial	Distribution with encryption and watermarking	Payloadz and Gumroad
Educational content distribution platforms	These are technologies used specifically for the distribution of textbooks in digital format.	Educational (especially primary, but also university)	Access control, download and copy protection, data encryption, watermarking, DRM	Kitaboo, VitalSource, BlinkLearning, Learnetic, GetMagic
Academic content distribution platforms	These are technologies used for the distribution of academic digital books.	Academic	IP Authentication	JSTOR, Project MUSE, SciELO

Table 7. Digital book distribution and protection solutions by market sector.

The emergence of new technologies

Technological advances create a landscape full of unprecedented opportunities and challenges for the creative industries. Technologies such as Artificial Intelligence (AI), Internet of Things (IoT) and Blockchain are changing everyday life and different industrial sectors. These bring new opportunities to interact, create, disseminate, sell and consume within the creative sector. And they pose new threats, challenges and controversies, such as loss of control over works and creativity, increasing inequality in access and participation in the creative and cultural sector, threats to privacy and data security, ethical, authorship and liability issues, and concerns about potential job losses.

It is a fact that emerging technologies such as Blockchain and AI are revolutionizing the way we operate in various fields. Blockchain enables the existence of a decentralized network of globally interconnected servers that digitally record an exact copy of the information added to that chain. This development could improve the control that authors have over their work and facilitate the scheduling and collection of intellectual property rights and royalties for the use of digital products. In this sense, smart contracts, which apply Blockchain technology, show potential in the management and protection of digital assets. Added to them is the emergence of Non Fungible Tokens (NFT), units of digital value stored in a digital registry, which are generating new business models in the creative sector (CERLALC, 2022)⁴.

Within the publishing ecosystem, innovative initiatives in this field include platforms such as Creatokia, Readl and Book.io, which are using NFT technology to manage ownership of digital creations, enable authors and publishers to benefit from digital content resales (uniquely enabled by this technology) and provide greater security against piracy. Some educational publishers, such as Pearson, are actively exploring the use of NFTs, perceiving them as a novel opportunity to boost book sales and safeguard copyrights.

However, the implementation of these technologies also brings with it ethical and legal challenges. It is therefore essential to develop a clearer and more specific legal framework, including laws and regulations that address intellectual property issues in this scenario. Emerging technologies are not only a current reality, but also a disruptive element that, by all indications, will transform the publishing landscape in the near future.

Notes

¹ Blinklearning (2022). *VII Estudio sobre el uso de la tecnología en la educación 2022*. https://www.blinklearning.com/portal/news/Estudio+sobe+el+uso+de+la+tecnolog%C3%ADa+en+la+educaci%C3%B3n_4146298_402836722

² Comisión Económica para América Latina y el Caribe. CEPAL (2020). *Las oportunidades de la digitalización en América Latina frente al COVID-19*: https://repositorio.cepal.org/bitstream/handle/11362/45360/OportDigitalizaCovid-19_es.pdf?sequence=4&isAllowed=y

³ UNESCO (2021). *Políticas digitales educativas en América Latina frente a la pandemia de COVID-19*. Autoras: Ana Rivoir y María Julia Morales. Colaborador: Luis Garibaldi.

⁴ CERLALC, 2022. *Guía. Tecnologías emergentes: ¿Qué son y cómo aprovechar las tecnologías emergentes en las industrias creativas y culturales?* <https://cerlalc.org/publicaciones/tecnologias-emergentes-que-son-y-como-aprovecharlas-en-las-industrias-creativas-y-culturales/>

Conclusions

The unprecedented advance of digital technology is revolutionizing the creation, distribution and consumption of content. In the publishing ecosystem, this transition to digital has brought countless opportunities, but it has also generated significant challenges. In the case of digital book distribution, mobile applications have become a central element in the daily lives of millions of people. In this environment, players in the book ecosystem, including publishers, booksellers, distributors, authors and content creators, have sought and found several technological solutions.

Throughout this report, we have reviewed the complexities and intricacies of digital book distribution and copyright protection in the mobile application environment. We have examined multiple technological solutions and the challenges they pose, highlighting the importance of emerging trends and recognizing the associated challenges.

The first part of the report presented an analysis of the digital book distribution chain and copyright protection in the digital environment, and a description of the role that mobile applications play in the distribution and consumption of digital books. We identified the key players in this chain, which include authors, publishers, reading platforms and online stores. Within these, distributors or aggregators play a central and increasingly important role, facilitating the distribution of books through various channels and business models, and offering increasingly diversified services.

Copyright protection is vital for ensuring fair compensation for the work of creators and for promoting investment in the creation and circulation of works. However, the challenges associated with digital piracy have negatively impacted the development of the digital book business, and have made many publishers reluctant to commercialize content in digital format. The most common method for copyright protection in the digital book environment is Digital Rights Management (DRM). However, DRM has been the subject of controversy due to its implications for user rights and the reading experience. Despite these criticisms, it remains the system most adopted by commercial digital book channels.

As for mobile applications, they have become an increasingly common resource for the distribution and consumption of digital books, given the unprecedented penetration of mobile devices globally. Mobile applications offer advantages for readers, authors and publishers alike, but also pose challenges in terms of concentration on dominant platforms and the need to ensure competitiveness in the market.

The second part of the report presented an analysis of the different existing solutions for digital book distribution and copyright protection, illustrating the complexity and dynamism of the current ecosystem. The technological solutions and services most commonly adopted by publishers, authors and content creators are presented,

showing how these systems can be categorized and differentiated by their functions and the sectors they address. Digital book distribution presents a dynamic and complex landscape. There is a great diversity of solutions available ranging from comprehensive solutions, DRM solutions and solutions for flipbook distribution to solutions for marketing digital content of all kinds. Each of these solutions has its own strengths and areas of focus, and each meets different needs and sectors of the book ecosystem. The "white label" model has gained popularity in the industry, allowing publishers to have greater control over the distribution and protection of their content. On the other hand, DRM solutions are valuable for publishers looking to uniquely protect their files.

In addition, this section discussed specific solutions for content distribution in the educational and academic fields, which present unique dynamics in the distribution of digital content. In the educational field, solutions tend to be integrated into a virtual learning environment that articulates educational content, teaching resources, and teacher monitoring tools. The solutions available in this sector can be categorized into publisher-owned solutions, third-party solutions and state solutions. Each entails different levels of control for publishers. In the academic sector, the most widespread solutions are based on the licensing and subscription business model.

Finally, it is imperative to mention the influence of emerging technologies in the evolution of digital content distribution and copyright protection. Technologies such as Artificial Intelligence, Internet of Things and Blockchain are changing different industrial sectors, including the book sector. These technologies not only present opportunities for new methods of interaction, creation and distribution, but also challenges in terms of loss of control over works, inequalities in access, threats to privacy and data security, and ethical and labor concerns. But they are also creating new paths for copyright protection, and some experiences seem to indicate that they would allow authors and publishers to maintain greater control over their works and generate profits more efficiently and fairly.

In this rapidly changing digital landscape, it is critical for book industry players to be aware of these trends and understand their implications in order to be able to make informed and strategic decisions.

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Appendix

The following list highlights the main services and solutions currently used to distribute digital books on mobile applications. Each of them has different features and applies various file protection techniques.

Name	Solution / Service	Website
Digify	Digital file control and protection services	https://digify.com
PallyCon	Digital file control and protection services	https://pallycon.com
LockLizard	Digital file control and protection services	https://www.locklizard.com
DRM-X	Digital file control and protection services	https://www.drm-x.com
EditionGuard	Digital file control and protection services	https://www.editionguard.com
FlowPaper	Digital flipbook creation and distribution	https://flowpaper.com
AnyFlip	Digital flipbook creation and distribution	https://anyflip.com
FlippingBook	Digital flipbook creation and distribution	https://flippingbook.com
3D Issue	Digital flipbook creation and distribution	https://www.3dissue.com
Simplebooklet	Digital flipbook creation and distribution	https://simplebooklet.com
DCatalog	Digital flipbook creation and distribution	https://dcatalog.com
Heyzine	Digital flipbook creation and distribution	https://heyzine.com
Publuu	Digital flipbook creation and distribution	https://publuu.com
FlipHTML5	Digital flipbook creation and distribution	https://fliphtml5.com
Flipsnack	Digital flipbook creation and distribution	https://www.flipsnack.com
BookBaby	Ebooks creation and distribution	https://www.bookbaby.com
Smashwords	Ebooks creation and distribution	https://www.smashwords.com
Draft2Digital	Ebooks creation and distribution	https://www.draft2digital.com
StreetLib	Ebooks creation and distribution	https://www.streetlib.com
Calaméo	Digital flipbook creation and distribution	https://www.calameo.com
Publitas	Digital flipbook creation and distribution	https://www.publitas.com
Yumpu	Digital flipbook creation and distribution	https://www.yumpu.com
Nxtbook Media	Digital flipbook creation and distribution	https://www.nxtbookmedia.com
Issuu	Digital flipbook creation and distribution	https://issuu.com
PandaSuite	Interactive content creation and publishing	https://pandasuite.com
Twixl Media	Interactive content creation and publishing	https://twixlmedia.com
Vivliostyle	Ebooks creation and distribution	https://vivliostyle.org
StoryChief	Ebooks creation and distribution	https://www.storychief.io
Designrr	Digital flipbook creation and distribution	https://designrr.io
Hipertexto	Ebooks creation and distribution	https://hipertexto.com.co
ePubli	Ebooks creation and distribution	https://www.epubli.com
Myebook	Digital flipbook creation and distribution	https://myebook.com
FlipBuilder	Digital flipbook creation and distribution	https://www.flipbuilder.com
FlipViewer Xpress	Digital flipbook creation and distribution	https://www.flipviewer.com
Mobissue	Digital flipbook creation and distribution	https://mobissue.com
Paperturn	Digital flipbook creation and distribution	https://www.paperturn-view.com
Joomag	Digital flipbook creation and distribution	https://www.joomag.com
MagicBox	Education platform	https://www.getmagicbox.com

Bluefire Reader	Digital file control and protection services	https://www.bluefirereader.com
Kotobee	Interactive content creation and publishing	https://www.kotobee.com
Publica.la	Ebooks creation and distribution	https://publica.la
BookWidgets	Education platform	https://www.bookwidgets.com
KooBits	Education platform	https://www.koobits.com
Knewton	Education platform	https://www.knewton.com
Blinklearning	Education platform	https://www.blinklearning.com
Learnetic	Education platform	https://www.learnetic.com
Schoology	Education platform	https://www.powerschool.com/classroom/schoology-learning
VitalSource	Education platform	https://www.vitalsource.com
Odilo	Education platform	https://www.odilo.es