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Economic Perspectives on Piracy Preference: A Systematic Literature Review of Copyright Violation and Related Factors

ABSTRACT

The widespread use of digital technology facilitates unauthorized access to copyrighted works. Various disciplines have studied the determinants of piracy since the early 1980s. Based on the different conceptual frameworks, diverse relevant components of piracy preference are under investigation. While some frameworks such as the Theory of Reasoned Action offer consistent choices of variables across studies, some frameworks are more flexible regarding the variable choices. Therefore, it is necessary for a literature review to collect and organize the diverse factors. This research applies a systematic review methodology to discern the research trends toward piracy determinants and adopt an economics framework to analyze current empirical evidence on piracy behavior determinants. The research established a corpus of 85 interdisciplinary studies withdrawn from Scopus and Web of Science using both automatic and manual screening methods. Through descriptive analysis, the review reveals the peak of the research interest in piracy determinants occurs in 2008 with research topics diversifying in subsequent years. The geographic distribution of the target area is unbalanced, the student sample is the most common sample choice, and the most popular theoretical frameworks are those based on economics and psychology theories. There is also a wide range of research methods included in the corpus papers, but the major methods are quantitative analysis based on survey data. By integrating the demand model with the psychological theories, this research identifies eight determinants impacting piracy preference including state-imposed costs; socially imposed costs; self-imposed costs; search costs; price; information; valuation; related goods, and characteristic factors. The results show that an extended demand framework could explain most of the cross-disciplinary variables. Determinants like price, search costs, state-imposed costs, socially imposed costs, and self-imposed costs are usually supported by interdisciplinary evidence while determinants that have complex impact mechanisms like age and gender usually have ambiguous results. The systematic literature review shows that piracy is a complicated consumption choice that is caused by the aggregation of multiple individual and social factors. Regarding future studies, contents other than music and software require more academic attention. More research should focus on developing countries in Africa or South America. The research advises futural analysis to be based on more rigorous frameworks, carefully choose the variables, and include more intervariable correlation into consideration.

KEYWORDS**:** *Piracy behavior, Copyright infringement, Systematic literature review, Economics factors*

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1. Introduction

The definition of piracy refers to the unauthorized usage (replicating, sharing, or modification) of copyrighted works that are not in the public domain. The history of piracy began with the establishment of copyright. From the unauthorized publication in seventeenth-century England to the music bootleg that flourished in the 1960s, sharing and consuming illegal copies prevails, and even forms its own economic ecosystem, despite repeated prohibitions around the world (Varian, 2005). Nowadays, with the development of digitalization, piracy behavior has its new transmit mechanism and dissemination platform. According to OECD (2022), international trade in counterfeit mounted up to 2.5% of world trade. Although it fell from roughly 6% in 1998, it is a significant amount, close to the GDPs of Austria or Belgium (Holm, 2003). The software industry has become one of the industries most threat by piracy. The Business Software Alliance (BSA) shows that around the world, the software piracy rate has been above 35% since 1992. The traditional cultural industries also face severe challenges. For instance, because of the popularized unauthorized access brought by Napster, the global sales of recorded music decreased by about 30% from 1999 to 2009 (Adermon & Liang, 2010).

Industries and legal authorities adopt various pricing strategies and digital rights solutions to confront piracy. The shutdown of the Napster file-sharing service in 2001 and the emergence of music streaming services brings great changes to the demand for authorized and unauthorized content. There is evidence showing that the piracy rate has been controlled to an extent in recent years, at least for the software industry. The BSA software rate has declined continuously since 2013. However, it is not clear whether the reduction is due to price incentives, copyright law enforcement through the years, the enhancement of the social acknowledgment of copyright, or the combination of a series of social economics factors.

As an incentive for social creativity, and economic and moral rights for creators, the copyright system is essential for the global economic environment by promising economic rent for the creators. The piracy demand not only restricts the development of the creative industries but also a deprivation of creators' rewards. In a nutshell, the identification and analysis of the piracy determinants are socially important because they may explain the piracy trends through the years, predict the futural piracy demand, examine the effectiveness of the piracy control, and help to refine the copyright system to balance the demand of the consumers and the income of the suppliers.

Academics from different disciplines have provided various explanations for access to pirated content. From the legal deterrent perspective, as an illicit behavior, the possible penalty from the legal authorities increases the perceived costs of piracy. From the social networks, the social context including the influence of peers is an important factor leading to piracy behavior. Individuals may have a lower cost of piracy if “everyone around them accesses unauthorized products” or have a higher cost of piracy if they perceive access to authorized properties will be condemned by their social networks. Notably, the social norm toward piracy is usually more tolerant compared to other

forms of crime, like dodging tax or shoplifting. As Balestrino (2008) points out, millions of people view piracy behavior as "a theft but not a crime". People may take unauthorized cultural products, believing they should be free. Such ideology is demonstrated by Sci-Hub to “remove all barriers in the way of science” (Kjellström, 2022, p.532). Regarding moral concern, individual moral beliefs may lead to additional emotional costs, and accessibility of the contents causes the search costs. Furthermore, the information on copyright and the relationship between pirate and original content may also impact the preference among different consumption channels.

From an economic perspective, firstly copyrighted intangible goods have the features of public goods, that are non-excludable and non-rival. Pirates are free riders who benefit from the content without paying directly to the content producers (Novos & Waldman, 1984). Then, from the perspective of economic strategy, pirate consumers are under price discrimination. They are willing to pay a lower price for similar intangible goods (Hill, 2007). Regarding piracy being transmitted through copying, the piracy market is also considered a secondary market of authorized goods.

Although with extensive interdisciplinary academic attention from different aspects, the researches on piracy determinants are quite disorganized and unstructured. The notions of the same variables are often inconsistent. The inclusion of the factors is often incomplete or repetitive. It is hard for policy-makers and academic researchers to grasp the vital evidence and make promising contributions. The literature review regarding piracy determinants could be the solution for such a situation. Previous literature reviews have focused on the causes of piracy (Kariithi, 2011) or analyzing the piracy determinants through the social cognitive framework (Lowry et al., 2017) and the utility framework (Watson et al., 2015) of the piracy determinants. However, no review aims to explain the determinants of piracy with an economic demand framework. Consequently, this research tries to explore the determinants of piracy based on interdisciplinary academic papers. By reviewing past academic papers, this research tries to answer two questions: how does previous academic literature discuss piracy factors? And how can the empirical evidence be explained by the extended demand framework?

This paper views piracy preference from a demand perspective. In this context, consumers face consumption choices among three different channels: access to authorized content, access to unauthorized content, and no access. The consumers’ preference is reflected by the consumption choice depending on the costs of authorized and unauthorized content and the expected utility of the consumers. This research only discusses the preference for consuming pirated content. The individuals or study subjects, in this context, are not “sellers” but “buyers”, and regardless of whether they pay for pirate copies or not, they are consumers making decisions among consuming pirate copies, consuming authorized copies, and not consuming. Or as Kariithi (2011) puts it, they are end-user, who conduct “non-commercial but unauthorized copying of information goods for personal use” (p.135).

This paper utilizes the systematic literature review methods. By documenting the search strategy and screening criteria, the paper establishes a repeatable literature collection process for futural studies. By extending the traditional neoclassical demand framework to encompass the non-monetary variables, this paper considers the cost from states, social networks, personal belief, and searching process, the information asymmetry between authorities and consumers, and the substitute extent between authorized and unauthorized content and characteristics. The results show that such a framework can encompass most factors explored by previous studies and have the potential to support futural research.

The paper contains four parts. The first is the literature review focusing on the utilization of economics theory in piracy issues. The second is the method section discussing the search strategies and screening process. The third is the descriptive analysis of the research trend. Then this paper uses an economics model to identify different factors from the corpus. And finally, the paper concludes and provides constructive suggestions for future studies.

2. Piracy in Terms of Economics Theory

2.1 Demand Theory: From Neoclassical Economics to Becker

The Neoclassical demand theory provides a framework to analyze the consumer's choices based on utility maximization, budget constraint, and the principle of rationality. According to Hicks (1986), preferences are revealed by observed market choices and behaviors. Building upon Hicks's revealed preferences hypothesis, Becker extends the fundamental demand theory to encompass various forms of social behavior and human behavior can be generalized and calculated by the utility-maximizing model. Becker and Landes further apply such a theory to crime and punishment, showing economic approach can do away with theories of psychological inadequacies and view criminals as rational individuals making decisions to maximize their utility under restrictions. According to Becker and Stigler (1977), individual preferences are shifted by a wide range of factors but stay stable once form and allow for economic predictability. In this way, the preference for unauthorized content could view as the optimal preference bundle that maximizes individual utility. If the cost of piracy is lower than the value or benefit of piracy, the individual will prefer unauthorized access. If the cost of piracy is lower than the value or benefit of piracy but higher than the cost of authorized content, the individual will prefer authorized access. If the value or benefit of piracy is lower than the cost of authorized content, the individual will prefer no access at all.

Becker's primary consideration is the cost of deterrence, which refers to the certainty and severity of legal sanctions associated with piracy. In a study conducted by Bhattacharjee & Gopal (2006), Becker's demand theory is utilized to investigate how legal threats would shift file-sharing behavior. They find out the implementation of stricter penalties and enforcement may reduce piracy by increasing the perceived cost of risk-averse individuals.

2.2 Extended Framework: Introduction of Psychological Models

In addition to Becker's economic framework, multiple psychological models are supported by empirical criminal behavior evidence. Some of the most preferred theories and models are the theory of reasoned action, the theory of planned behavior, social learning, and neutralization and rationalization theory. The theory of reasoned action (TRA) was proposed by Fishbein & Ajzen (1975), considering behavior is revealed by intention, determined by attitudes and subjective norms. Attitudes are a person's assessment of behavior, and subjective norms are the perceived social pressure to engage in a certain action. The theory of planned behavior (TPB) was proposed by Ajzen (1985) based on the theory of reasoned action. A basic TPB model implies intentions are influenced by attitudes, subjective norms, and perceived behavior control. Perceived behavior control refers individual's ability to perform certain actions, including skills and resources. In piracy studies, computer skill is often considered a positive factor in piracy. Social learning theory, on the other hand, emphasizes individuals learn their behaviors from observing and imitating others (Bandura, 1977). Higgins (2012) applies social learning theory to piracy tendency and supports that piracy tendency could cause by observing others. Neutralization and rationalization theory go deeper into the psychological process. It refers to the effort to counter the feelings of guilt and embarrassment about deviant behavior. Neutralization techniques include denial of responsibility, denial of injury, denial of victims, and higher loyalties. Multiple studies have applied neutralization and rationalization theory to piracy analysis. For instance, Moore & McMullan (2009) find that all 44 participants hold at least one technique of neutralization to justify their piracy behavior. Regarding piracy issues, there are some unique neutralization narratives, such as anti-industries, perception of price fairness, and loyalty to the subcultural value that intangible content should be free.

To include psychology and criminology into the economic narratives, Grasmick and Bursik (1990) extend Becker's crime economics model by incorporating perceived social norms and moral beliefs. They distinguish the state-imposed cost, such as material deprivation by legal enforcement, socially imposed costs referred to the unpleasant emotions when they transgress social norms valued by significant others (such as friends or family), and self-imposed costs, such as negative feelings because of involving in actions that oneself deems unethical or immoral. According to a wealth of empirical research, including McCorkle et al. (2012) and Williams et al. (2010), perceived social norms and moral convictions are key determinants of copyright violation. The more people are concerned that engaging in piracy is unethical for both them and their significant others, the less they will access unauthorized channels.

Ward et al. (2006) further purpose a new version of rational choice theory for illicit behavior. The new version highlights the role of imperfect information in criminal actions. This notion could be interpreted as information asymmetry between law enforcement authorities and pirates. The lack of

awareness of copyright reduces the perceived penalty, socially imposed cost, and self-imposed costs, and leads to a preference for piracy consequently. Udo et al. (2016) find that awareness of copyright law and the harm of piracy is negatively associated with piracy intention. However, this is doubted by Krawczyk et al. (2015). Their study compares the piracy behavior between a typical student group and a group with relatively greater awareness of the intelligent property. The results support there is an inconsistency between piracy and copyright awareness.

Although econometrics provides tools to distinguish the direct variables and indirect variables, the economics framework usually does not discuss this perspective like sociology or psychology models. Regarding the analysis of deviant behaviors, the economics framework has learned to include the interaction between variables from the models of other disciplinary. For instance, by combining economics and psychological frameworks, Funk (2005) explores the dynamic relationship between social norms and moral belief and suggests that the intensity of moral belief and the effectiveness of governmental deterrence is affected by social groups. This inspires the economics analysis especially quantitative regression analysis to carefully choose the variables and introduce interaction terms to avoid multicollinearity.

With the interview data of 500 individuals on their music piracy behavior, Pryor et al. (2008) test the predictive effectiveness of Becker's demand model (rational choice model), TRA model, and an aggregated model. The TRA model employs variables including age, social norms, ethical values, and interaction terms, while the demand model adopts variables including perceived punishment certainty and severity, age, and interaction terms. The aggregated model encompasses variables from both demand and TRA models without cross-model interaction. And the regression results show the aggregated model is superior and has better predictive outcomes. Although Pryor et al. (2008) omit a few factors that may affect piracy such as gender and computer skills, they provide valid support for the explanatory power of the aggregated models and inspire further economics studies to extend demand models when studying illicit preference. Based on Pryor et al. (2008), McCorkle et al. (2012) develop a model combining household production theory, demand theory, reasoned action theory, and store and channel choice model to test the determinants of music piracy. The independent variables they use include market value, acquiring time, potential risk or harm, ability to access music on the internet, perception of social ethics of piracy and music quality. The result reveals that except for acquiring time all variables significantly influence the music piracy behavior. According to household production theory, the decision to pirate or not is directly influenced by personal resources such as time and money. According to models of store choice, convenience which is represented by acquiring time is an important motivator when choosing a consumption channel. The insignificance impact of time on illicit copy usage may indicate the weak explanatory power of the household production and store-choice theory. However, the consideration of acquiring time and accessibility may be explained together with the search costs, which is the effort to obtain pirated content.

2.3 Extended Framework: Piracy Modeling

The economic modeling of piracy behavior has begun around the 1980s. The modeling generally aims to predict the impact of unauthorized copies on consumers' surplus, suppliers' profit, and overall welfare. Liebowitz (1981) presents one of the earliest analyses of the impact of reprographics technology on copyright. He concludes that unauthorized copy is efficient if the price of originals can be raised to capture the valuation of the unauthorized copies. That is to say, because of the possible exposure effect, the value of an authorized copy does not only depend on the legit demand but also on the illicit demand. Economic models can consequently be divided into two categories according to whether consider the positive exposure effect (Bensen & Kirby, 1989). One is "indirect appropriability", in which the demand for originals reflects the value placed by direct purchasers and the pirates. Gopal & Sander (1997), Gopal et al. (2004), and Varian (2005) all adopt this perspective when analyzing piracy issues. The other is "direct appropriability", in which the value is entirely placed by direct purchasers, used by Holm (2003), Bae & Choi (2006), and Bensen & Kirby (1989).

Therefore, when analyzing the determinants of piracy consumption, it is important to include authorized goods. If the authorized goods and unauthorized goods are substituted, then when the market price of authorized goods decreases, the demand for unauthorized goods also declines. If the authorized goods and unauthorized goods are complementary, then the market price of authorized goods is negatively associated with the unauthorized goods. This factor is especially important when taking the spread of digital technology into account. If unauthorized digital content and authorized digital content are complementary, then the availability of digital tools will encourage the consumption of both types of content. However, the preference for piracy is ambiguous if its relationship with authorized contents is substituted, which is determined by the elastics of both products.

In conclusion, Becker's demand models provide the foundation for analyzing piracy preference within the demand framework, considering two sets of variables: cost and valuation. By aggregating the Theory of Reasoned Action, the Theory of Planned Behavior and Neutralization and Rationalization Theory, the extended framework is expected to enhance the predictive ability of the initial demand model by dividing costs into state-imposed costs, socially imposed costs and self-imposed costs. The impact of legal information and search costs is advised to be explored by previous integrated framework analysis. Moreover, related goods which are usually considered by the economic modeling also play an important role in identifying the determinants of piracy preference.

This systematic review adopts an extended demand theory that integrates Becker's crime economics model while considering the impact of related goods. Similar to the approach taken by Becker and Landes (1974) when they analyze criminal behaviors from an economic perspective, this paper avoids delving into the origins of piracy preference. The morality of piracy is not the topic of this research either. This literature review collects empirical evidence from the relevant studies and

aims to structure and explain the evidence with the extended demand framework and provide a possible framework for future studies.

3. Method

3.1 Systematic literature review

Systematic review is traditionally used in the healthcare domain to integrate all controlled studies on a specific topic but has been used in social science in recent years. The systematic reviews require repeatable and transparent documentation of the literature scoping process, inclusion and exclusion criteria, and screening process (Jesson et al., 2011). A systematic review can be categorized into theory-based, method-based, meta-analytical, and domain-based. Domain-based can be further divided into framework-based, bibliometric, or theory development reviews.

Various systematic reviews explore copyright infringement and relevant issues from different aspects. Montoro-Pons et al. (2021) conduct a bibliometrics review on 452 papers about music consumption. Using co-citation analysis, bibliographic coupling, and co-word analysis, the review finds that "most successful methodological avenues draw on economics and marketing", and in the past twenty years, academics have shown sustained interest in copyright and its relation to consumer behavior. Kariithi (2011) uses a framework-based review of the literature about music, film, and software piracy, and suggests the causes and correlates of piracy have monolithic explanations. Lowry et al. (2017) conduct a meta-analysis of the factors of piracy behavior with the framework of social cognitive theory. They identify four sets of factors: outcome expectancies, social learning, self-efficacy and self-regulation, and moral disengagement. Moreover, Peitz & Waelbroeck (2006) specifically review the theoretical literature on digital piracy and discuss the application of different modeling strategies. Additionally, Watson et al. (2015) conduct a systematic literature review on papers about piracy predictors published from 2003 to 2013 using utility theory. They suggest there is valid evidence for various determinants, but more behavioral research and topic concentrated on media other than music are in need.

Based on the previous study, this research adopts the framework-based systematic review. This kind of domain-based review is preferred since this paper primarily focuses on answering what are the determinants of copyright violations. Moreover, in contrast to bibliometric and theory development reviews, the framework-based review could offer a systematic evaluation of the empirical evidence. It also provides an economic framework to reduce the problems of reuse and omitted variables. Additionally, a framework-based systematic literature review is easier to conduct than a meta-analytical literature review, which requires the metadata of the empirical evidence to estimate the effect size. As a result, this paper simply tries to organize causal evidence between factors and piracy preference.

3.2 Databases and search strategy

The review aims to collect literature on determinants of piracy behavior in any discipline. Two electronic databases, Scopus and Web of Science, serve as the corpus's sources. Both Scopus and Web of Science not only offer abundant cross-disciplinary academic literature but also provide complete metadata for title and abstract screening. The search query is developed through multiple methods. The draft search query is based on the search string of previous systematic reviews on piracy (Watson et al.,2015; Lowry et al., 2017). The synonymous and relevant terms "piracy" and "determinants" are added. The synonymous terms are generated with the help of chatGPT (see Appendix A). A set of umbrella terms (copyright, IP; intellectual propert*) is used to limit the scope of the search and the literature subject. All literature published before 2023 is considered because of the lack of credible impact indicators for recently published articles. This setting also allows the review to illustrate the research trend and understand how piracy behavior shifted. The same search query is applied to both databases on the abstract, title, author keyword, and index keyword of the literature.

This initial search query renders 3520 and 1766 results from Scopus and Web of Science, respectively. A robustness check was conducted by adding more interchangeable terms, such as "unlawful copy" and "intangible propert*" to the search query. In Scopus the search query with interchangeable terms will generate two more results than the initial search query, while in Web of Science, it will return three more papers, but none of the new results are relevant enough for further analysis. This robustness check process makes sure the exclusion error is minimized and the initial search term is reliable.

Irrelevant or unwanted information, also known as "noise" may clutter search results, introducing by ambiguous search terms or homonyms. By utilizing "NOT" or "AND NOT" operator, the search query could filter out irrelevant papers containing noise-induing terms, thereby enhancing the precision of results. This research develops a noise terms query eliminating themes including forgery patents, trademarks, hardware, maritime and medical issue. To strike a balance between precision and recall, ensuring the research obtains the desired information and avoiding unnecessary omissions. The noise words are determined by an iteration process, including three stages. The first stage is checking the quality of the returned results by screening the titles of 100 randomly sampled articles and drafting a noise word query based on the irrelevant literature. The second stage occurred when searching the excluded literature containing noise words. The third stage is checking the quality of the excluded results by screening the titles and abstracts of 50 randomly sampled articles and deleting noise words that render relevant literature and adding the new noise words' query to the initial search query. Repeat this process until there is no relevant literature in the excluded group and around 9.5% of the included literature are not focusing on any aspects of copyright and piracy. This group of words was also added in the initial search query and applied to both databases.

Scopus and Web of Science returned 1343 and 1303 results respectively, after appending the query. The noise keywords effectively reduce the irrelevant papers for further screening. The full search query and the robustness check query can be seen in Table 3.2. This corpus containing 2646 papers in total is used in the further process.

Concerning the limit of the databases and potential omitted articles, additional papers are added according to the references of the papers in the corpus. This study adopted VOSviewer, a software for systematic review and network visualization, to locate the top reference papers inside the corpus. In total, articles from Web of Science have 40632 references in total and articles from Scopus have 35175. To control the quality, this research only includes the most cited papers, the minimum number of citations of an included cited reference is 20. There are 65 most cited references from Web of Science, and 55 from Scopus are added to 2646 papers, which makes up a total of 2766 papers for screening in total.

Table 3.2 Search query keywords and robustness check query

Search query keywords	Robustness check query
Piracy behavior	
(piracy OR pirat* OR "unauthorized copie*" OR "unauthorized copy" OR "illegal copy" OR "illegal copie*" OR "copyright infring*" OR "copyright violat*" OR "copyright abus*" OR "content infring*"OR "intellectual property violat*" OR "intellectual property infring*" OR "intellectual property theft" OR "online theft" OR "software theft" OR "media theft" OR "media infring*" OR "content theft" OR "copyright theft" OR "unauthorized us*" OR "unauthorized reproduct*" OR "unauthorized duplicat* " OR "unauthorized material" OR "unlicensed material" OR "unlicensed distribut*" OR "unlicensed duplicat*" OR "unlicensed reproduct*" OR "unlicensed us*" OR "illegal download*" OR "unauthorized download*" OR "illicit download*" OR "unauthorized download*" OR counterfeit* OR "file shar*" OR "media shar*" OR "digital shar*" OR "content shar*" OR bootleg* OR "unlawful distribut*" OR "online steal*" OR "software cracking" OR "cracked software")	("unlawful copy" OR "unlawful copie*"OR "illicit copy" OR "illicit copie*"OR "digital rights infring*"OR "content infring*" OR "copyright noncompliance"OR "digital theft"OR "unlawful reproduct*" OR "unlawful duplicat*"OR "digital steal*") (modif*)
AND: Determinant	
(motivation OR determinant OR influence OR impact OR predict* OR indicat* OR tigger* OR root OR source OR catalyst OR explanation OR prox* OR "contributing force" OR incentiv* OR willingness OR factor OR caus* OR driv* OR intention OR reason OR facilitat* OR attribut* OR component OR trait OR amplifier)	(modif*)
AND: Restriction	
(copyright OR "IP" OR "intellectual propert*")	(intangible propert*)
AND: Publication year	

2023>PUBYEAR
AND NOT: Noise keywords
(fraud OR luxury OR knockoff OR fake OR forgery OR medic* OR clinic* OR navy OR climate OR medieval OR naval OR maritime OR patent OR trademark OR nursing OR disease OR nutrition OR vaccine OR injury OR nerve OR necrosis OR cytokine OR hardware OR circuit OR cryptography OR encryption OR laser)

Note: * refers to the wildcard search; The ambiguous search in both academic databases ignores plural and character case

3.3 Screening

There are three stages in the screening process to further exclude irrelevant articles. The first is automatic screening, according to the metadata of the literature. The second is manually screening according to the titles and abstracts. The third is full-text screening.

All inclusion and exclusion criteria are determined by the aim of the study, criteria from existing systematic reviews, and topic analysis. The language of the literature is limited to English, but there is no restriction on the geographic context of the research. Articles and conference papers are both included, while the other types of research are excluded due to the possible poor quality. To reduce the workload, this systematic review only includes highly influential papers which were cited more than 2 times per year since publication. The citation numbers scored in Scopus and Web of Science might be limited because they only return citation counts in their own databases, so it is possible that some high-quality papers are omitted. Moreover, the additional inclusion criteria could be a limitation for the review, however, since the real citation numbers are equal or higher, the included papers are relatively more influential and can represent the research trend and academic concern in years. Duplicate papers are also identified automatically and removed. The above criteria are all carried out by automatic screening. A total of 379 papers remain in the corpus.

The next stage is manually screening the abstracts and titles. To create additional criteria, the review utilities LDA model for topic analysis was presented by Morashti et al. (2022). Based on the Bayesian network, the LDA model is a convenient and generally acceptable tool for categorizing and identifying topics. To find the optimal result, LDA hyperparameters were developed through experimentation with various threshold and keyword counts. The setting is determined as topics=2, keywords=10, max_df (corpus-specific stop words) =0.85 and min_df (minimize keywords frequency) =5. Two topics are generated (see Appendix B). One is inclined to humanities and social science with words like "piracy", "music", "digital", and "consumer". The other displays software engineering and information technology with words like "watermarking", "traffic" and "image". The development of various digital techniques is indeed an essential determinant of piracy behavior. For example, it may change the cost and the quality of piracy. However, this research aims to analyze the impact of the utilization of the technology, such as how the introduction of streaming services will change piracy actions.

Therefore, 115 papers on the latter topic are excluded. For example, Shivakumar & Garcia-Molina (1996) study the performance of copyright detection mechanisms. The accuracy of illicit copy detection could be a determinant of piracy behavior; however, this paper does not reveal how this technique would impact human behavior. Aguilar (2017) also focuses on changes in technology, but through website visit data, he shows how free streaming technique shapes piracy preference, so this paper is included. Additionally, papers on the impact of piracy behavior are ruled out. The ambiguous influence of piracy behavior on social welfare or company profit could be an excuse for some people to conduct piracy. Nonetheless, this literature review excludes them from exploring the consequences

of piracy instead of the reasons. For example, Slive & Bernhardt (1998) examines why the industry may be willing to permit limited piracy of its software. It indeed indicates one catalyst of piracy is the pricing strategy of the companies, but the object of this paper is that the company may profit from a certain level of piracy.

Additionally, papers without any novel empirical data are excluded, though they may provide valuable suggestions on the triggers of copyright infringement. For instance, Savelyev (2018) discusses the impact of blockchain on copyright. Although containing multiple data from different sources, it is excluded for not containing any analysis of the data. Tunca &Wu (2013) is also excluded for lack of empirical data despite their inspiring work on stimulating the impact of anti-piracy action with the economics model. Some papers fit more than one exclusion criterion. For example, articles on optimal pricing such as Khouja & Smith (2007) are excluded from studying the impact of piracy, and also no empirical data.

This process also eliminates papers with other topics. These topics are most relevant with intellectual property infringement, such as tangible good counterfeits, or behavior that may contain a risk of piracy such as social sharing, or content intended to be copied freely and lawfully, like open-source software, nevertheless, none of them directly impact piracy behavior. Some topics such as file sharing require more careful analysis. Not all file sharing violates copyright, in some studies, they consider specific consider illicit file sharing. This requires a full-text review to distinguish what "file sharing" means in their narratives. For instance, Shang et al. (2008) studied music file sharing in the P2P environment and this paper is included because the authors imply, they study the file-sharing of the copyrighted music files and consider this action as illegal. There are other more distant topics such as geoarchaeology, and they are also eliminated. All the criteria are demonstrated in Table 3.3.1 and Table 3.3.2. After the second stage, there are 192 papers remain in the corpus.

The third stage is full-text screening. It is followed by the above criteria, to rule out papers that cannot be judged by their titles and abstract. In this process, 24 papers are excluded for no empirical data, 41 for other topics, and 37 for impact. 5 papers including 1 book chapter, 3 reviews, and 1 duplicate are excluded for not meeting the criteria but fail to be excluded automatically in the first stage, and this leaves 85 papers for detailed review. The PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) diagram in Figure 3.3 demonstrates the exclusion process. PRISMA is a crucial component of the systematic reviews as they show the readers how authors gathered and screened all the references (Gough et al., 2012).

Table 3.3.1 Inclusion criteria

Inclusion criteria
Be published in the English language

Explore the determinants of piracy behavior

Published articles, proceeding articles and conference paper

More than 2 citation per year

Not duplicate

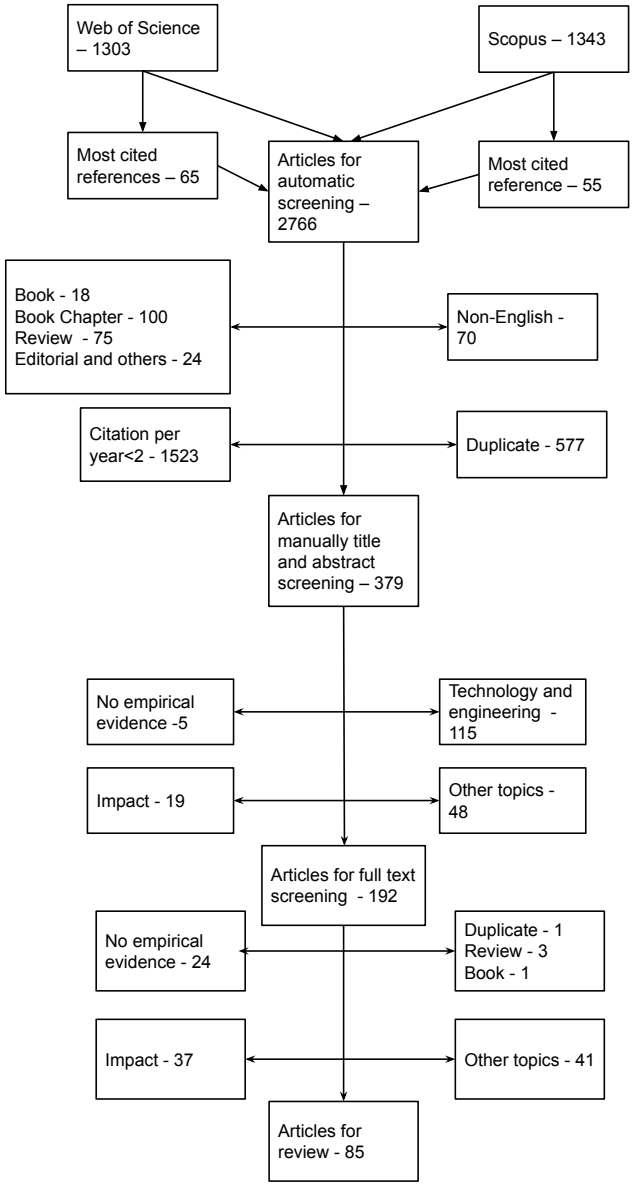

Figure 3.3 The PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) diagram

Table 3.3.2 Exclusion criteria

Exclusion criteria	Explanation	Example	Count
No empirical evidence	Do not adopt novel data or observation on human behavior.	Savelyev, A. (2018). Copyright in the blockchain era: Promises and challenges. Computer law & security review, 34(3), 550-561. Landes, W. M., & Posner, R. A. (1989). An economic analysis of copyright law. The Journal of Legal Studies, 18(2), 325-363.	29
Other topics	Contain keywords from the search query but are irrelevant.	Green, R. T., & Smith, T. (2002). Executive insights: Countering brand counterfeiters. Journal of international Marketing, 10(4), 89-106. Pirazzoli, P. A., Ausseil-Badie, J., Giresse, P., Hadjidaki, E., & Arnold, M. (1992). Historical environmental changes at Phalasarna harbor, West Crete. Geoarchaeology, 7(4), 371-392.	89
Digital technology and software engineering	Explore the information technology of piracy detection, ownership verification, digital copies transmission.	Shivakumar, N., & Garcia-Molina, H. (1996, April). Building a scalable and accurate copy detection mechanism. In Proceedings of the first ACM international conference on Digital libraries (pp. 160-168). Ahmadi, S. B. B., Zhang, G., & Wei, S. (2020). Robust and hybrid SVD-based image watermarking schemes: A survey. *Multimedia tools and applications,* 79, 1075-1117.	115
Impact	The influence of unauthorized access on profits, welfare and consumer surplus.	Khouja, M., & Smith, M. A. (2007). Optimal pricing for information goods with piracy and saturation effect. European Journal of Operational Research, 176(1), 482-497. Slive, J., & Bernhardt, D. (1998). Pirated for profit. Canadian Journal of Economics, 886-899.	56

4. Results

4.1 Descriptive results

4.1.1 Source Journals

The corpus articles come from scattered source journals with only three journals that have appeared more than twice in the corpus, which are the Journal of Business Ethics, Communications of ACM, and the Journal of Management Information. The Journal of Business Ethics stands out as the most popular one, with 19 publications and a total of 3182 citations in the corpus. The Journal of Business Ethics usually covers a wide range of disciplinary perspectives concerning ethical issues related to business. This indicates that the issue of piracy behavior is predominantly considered an ethical concern within the realm of cultural economics. The act of consuming and disseminating illicit copies highlights the inherent conflict between producers and consumers, as well as between lawful and unlawful consumers.

Another highly referenced source is Communications of ACM, which has been cited in five publications. This suggests a strong correlation between the piracy problem and information technology. This correlation is expected. Not only because software piracy is a huge concern of the IT community, but also because the advent of digital technology has significantly reduced the cost of copying to almost zero, thereby fostering high piracy possibilities as well as the discussion of copyright management.

The corpus also encompasses three publications from the Journal of Management Information Systems, a top-tier journal dedicated to information technology deployment, information resource management, and policymaking. The copyright issue was first raised as a control to information dissemination, and it has been examined and modeled using the ethical information system. The publications (Cheng et al., 1997; Gopal & Sanders, 1997; Peace et al., 2003) from the Journal of Management Information Systems have the highest average citation per publication per year and are all targeted at software piracy. While the rest of the papers are spread across various journals, the diversity of the publication sources further emphasizes piracy is of interdisciplinary concern.

Table 4.1.1 Top 3 Journals in the corpus

Source Title (Top 3 Journals)	Number of Publication	Average citation for a publication per year	Aggregate citation
Journal of Business Ethics	19	9.32	3182
Communications of the ACM	5	11.02	1131
Journal of Management Information Systems	3	14.03	983

4.1.2 Publication Year

The number of publications experienced fluctuation and growth since 1990, reaching its peak in 2008 with a significant increase to 13 papers published (see Figure 4.1.2). Subsequently, there was a slight decline in the number of publications. From 2008 to 2020, there was an average of approximately 3.4 studies per year.

Out of the total of 85 publications, the earliest one can be traced back to 1990. In this paper, Swinyard et al. (1990) compared the morality and behavior toward software piracy in America and Singapore. Treating piracy as a moral issue, the researchers discovered that Singaporean students exhibited stronger intentions to engage in software piracy compared to their American counterparts, primarily due to a more casual attitude towards piracy. While the study provided valuable insights into the formation of moral decisions, it lacked a systematic theoretical foundation, control variables, and the concepts used, such as "decision," were somewhat ambiguous.

The latest one was published in 2020. In this paper, Pham et al. (2020) analyzed the factors of intention and behavior of digital piracy in Vietnam. One notable improvement over the course of 30 years of research is the availability of new theoretical models. Pham et al. (2020), along with several other studies on piracy factors, adopted the theory of planned behavior (TPB) as their research model. The TPB model offers a comprehensive framework for understanding and predicting human behavior concerning piracy and has been used in crime studies such as violent criminal acts and cybercrime (Pryor et al., 2008). Although the adoption of the same single model or theory could lead to negligence of certain factors, these studies are followed with more rigorous models and theory frameworks and reduce the difficulties of comparing and applying to empirical evidence.

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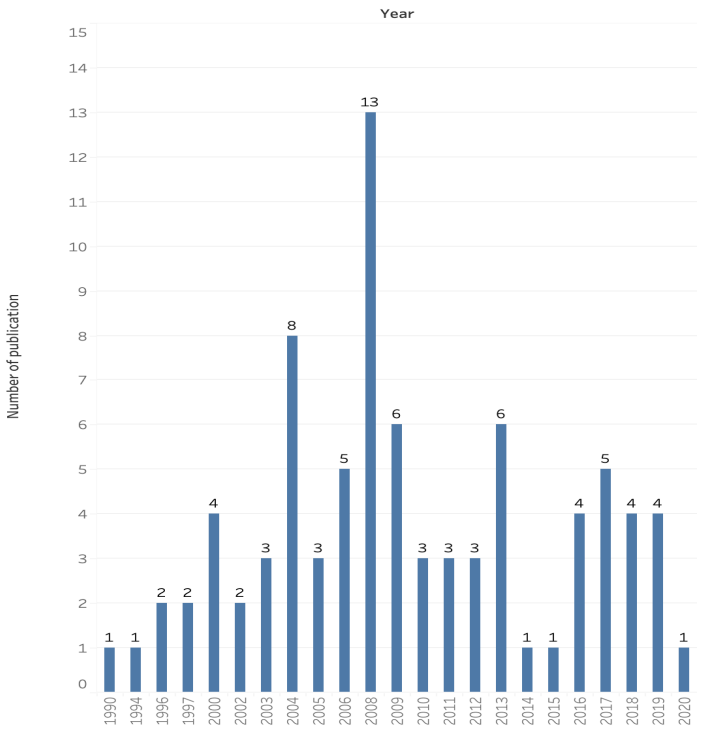

Figure 4.1.2 Number of publications per year

4.1.3 Content

Regarding piracy content, this corpus encompasses research on software, music, books, movies, TV, academic papers, and generic content. Over time, the subject content has become more and more varied. Before 2008, software and music were the main subjects of research, however, after 2008, more studies began to focus on various cultural content from academic papers to movies. This change may be related to the declining amount of software and music piracy. According to Aguiar (2017), the steaming services that were introduced after 2008 have had a detrimental influence on music piracy. And as shown in Figure 4.1.3.1, according to the Business Software Alliance (BSA), the software piracy rate has been declining since 2013.

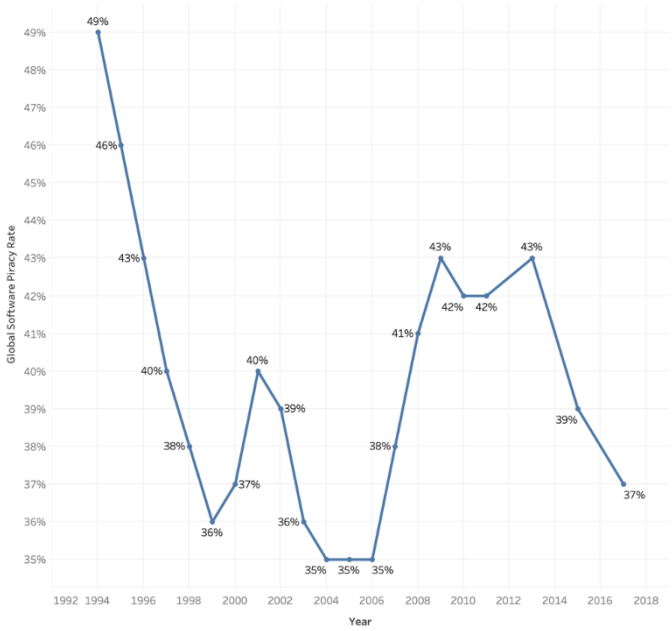

Figure 4.1.4.3 Global software piracy rate from 1992 to 2018 (Source: Business Software Alliance (2011); Business Software Alliance (2003); Business Software Alliance. (2018))

Software is the most studied content in total (see Figure 4.1.3.2). One possible explanation aside from its deterioration on industry is the availability of the data. In the corpus, all research identifies marco-perspective factors of piracy using country-level data studies software and using piracy rate data from Business Software Alliance (BSA). Although some scholars doubted the BSA software piracy rate for its assumption, methodology and statistical bias (Kariithi, 2011; Dejean, 2009), it provides a generally accepted indicator for cross-countries comparison, and no other media content holds such data coverage.

29 out of 85 papers focus on music piracy. Music is the most frequently examined content, claim Watson et al. (2015). Such mismatch could be brought on by Watson et al.'s (2015) exclusion of papers published before 2013. Our corpus shows that before 2013, software piracy was the subject of most studies. In comparison to other cultural mediums, software piracy has a longer history of scholarly attention. And it is contradictory to the history of piracy and copyright, which emerged in

the book publishing sector, this suggests that digital technologies and the prevalence of personal computers are stimulating modern scholarly interest in the piracy problem. Traditional piracy like physical books and bootleg recording did not disappear, rather they were replaced by digital piracy in this “creative destruction” process, which lessened academic attention.

Papers studied academic papers, movies, TV, and books take up 9.42% of the corpus. Two papers (Ibosiola et al., 2018; Cockrill & Goode., 2012) discuss movie piracy. Exploring a more traditional kind of movie piracy, Cockrill & Goode (2012) identify the antecedent of DVD piracy behavior including downloading, copying, receiving, and buying. Looking into an emerging piracy medium, Ibosiola et al. (2018) explore the role cyberlockers play in movie and video copyright infringement. They observed 21.8 million infringing URLs in 33 streaming cyberlockers in 9 months in 2017, providing a glimpse of the ecosystem's active pirate activity. Danaher et al., (2010) is the only article in the corpus study Television piracy using the case of NBC material being removed from Apple's iTunes store in 2007. This event provides an opportunity to investigate the impact of legal streaming channels on piracy using the difference-in-difference model. Due to the similar forms and sometimes overlapping pirate sources (shadow libraries), academic papers and books occasionally overlapped in the discussion. However, the different functions and publishing ecosystem set them apart, as they are in the corpus articles in this review.

With their entertaining nature and growing prevalence, video games have also emerged as a distinct subject of research, setting them apart from software piracy. Nevertheless, in this corpus, video games are still studied as a type of software in at least 18 papers, and 13 of them use the BSA piracy rate which encompasses video games piracy in its annual piracy rate calculation methods.

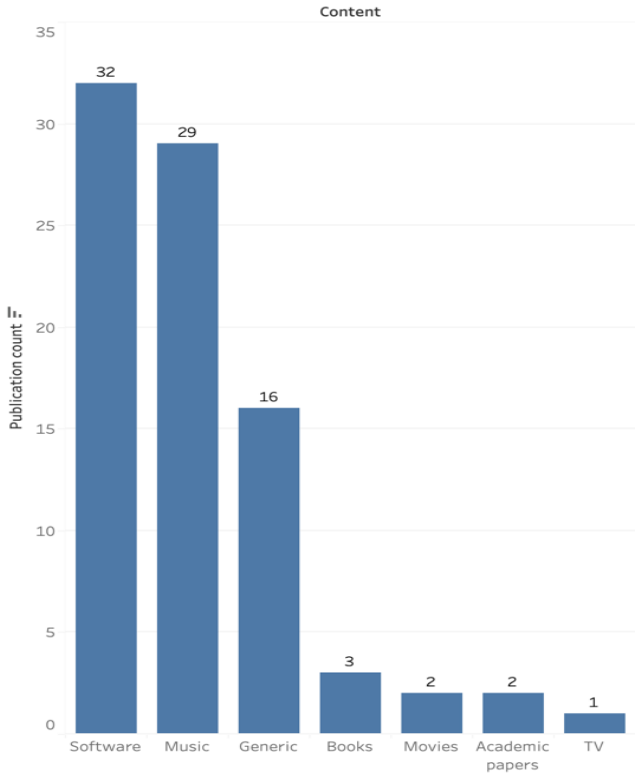

Figure 4.1.3.2 Number of publications per content

There are a few papers indicating the non-entertainment use of the software in their questionnaire scenario-setting such as Swinyard et al. (1990) and Tan (2000). The rest of the papers do not explicit if they include video games.

16 studies consider all piracy contents together. Some of them, such as Zimmer et al. (2017) and Rutter & Bryce (2008) discuss the distribution of copyright infringement by content categories in social live streaming services, while others ignore the heterogeneous content to reach a more general conclusion. Nevertheless, this generic analysis may lead to measurement error. According to Watson et al. (2015), the content effect of the software is significantly different from other visual-audio content. They suggest the acquisition of the software is not elective, and that the piracy preference is determined by "practical considerations such as affordability and availability" (p. 17). Gopal et al. (2004) further suggest that the deterrence strategy for software piracy is not suitable for music, implying a different consumption model of software piracy.

4.1.4 Area

There are three types of the target area in the corpus, that are a single country, cyber space, and multi-countries analysis. The single-country analysis covers 14 countries in North America, Europe, and Asia, targeting the piracy issue in the specific demographic's context. In North America, studies concentrate in the U.S. with only one study based in Canada. However, in Europe and Asia, studies locate in diverse countries with different cultures and social contexts, and among them, UK and Hongkong are hit areas with more than three studies. The cyber space is an emerging targeted area with increasing academic attention since 2013 (see Figure 4.1.4.2). Multi-countries analysis also takes up a significant part of the total research and keep a steady amount from 2000 to 2017.

The U.S. is the leading target area with 29 papers regarding the piracy issue (see Figure 4.1.4.1). The piracy rate in the U.S. is not remarkably serve compared to many other countries. The U.S. holds the lowest software piracy rate around the world through the years, though its music piracy rate maybe once higher than global the average (Bustinza et al., 2013). The focus on the U.S. can be explained by three reasons. The first is its abundant academic resources. The second explanation is that there are more content providers, including software providers and entertainment content providers settling in the U.S. Such threat to the industry leads to higher academic concern. The third is the active anti-piracy legal action the U.S. leads. For instance, the U.S. use trade sanction to pressure those countries that the U.S. regard as insufficient protection of intellectual property (Shadlen et al., 2005). However, while having the most studies, piracy subjects in the U.S. studies are limited to music, software, and generic content. Those studies are also inclined to use similar samples (university students) and methodologies, and such homogeneity needs to be alerted.

Various countries in Asia and Europe are also studied, however, South America, Africa, and Oceania lack of analyzing according to the corpus. Regarding the prevalence of piracy behavior in those regions, it appears that academic concentration is unbalanced with the distribution of global

piracy severity. This unbalance was also noticed by the previous literature review (Kariithi, 2011), and had little improvement in the past ten years. Although there are no case studies focusing on a unique African country, two papers (Andrés & Asongu, 2013; Asongu, 2013) in the corpus discuss the piracy issue in 11 African countries using macro-data. Those two related articles explore how government enforcement and the intellectual property legal form shift country-level piracy preference in Africa. The chosen African nations' shared characteristics serve as the foundation for policy research, something that several cross-continental multi-country studies have struggled to do.

Among the 22 multi-countries research, four of them apply comparative analysis upon two or three countries to identify the cross-country variation, and 14 of them use country-data and macroeconomics models to identify the general piracy factors. It is also notable that all four comparative papers include the U.S. This may again indicate the special position of the U.S. in the copyright infringement discussion. Another group of studies crawling cross-broader data on the international piracy site but with the identification of the country. For instance, Aguiar & Martens (2016) followed 16500 internet users in five EU countries.

7 studies focus on the online piracy community or crawling data from the piracy site. The difference between this category and the “cross-countries” is that the administrative restriction is removed. The case they study is cyber space, an imagined community that shares unique social relationships. This unique space has formed its own social norms but a gift economics system that is based on pirated material (Gardner & Caffrey, 2017). For instance, Steinmetz & Tunnell (2013) explore a BitTorrent piracy discussion forum and Karnik et al. (2013) target the music file-sharing group on Facebook. Additionally, diverse cultural content is most likely studied in cyber space (see Figure), which correlates with the growth of cross-broader and transcontinental piracy (Kariithi, 2011).

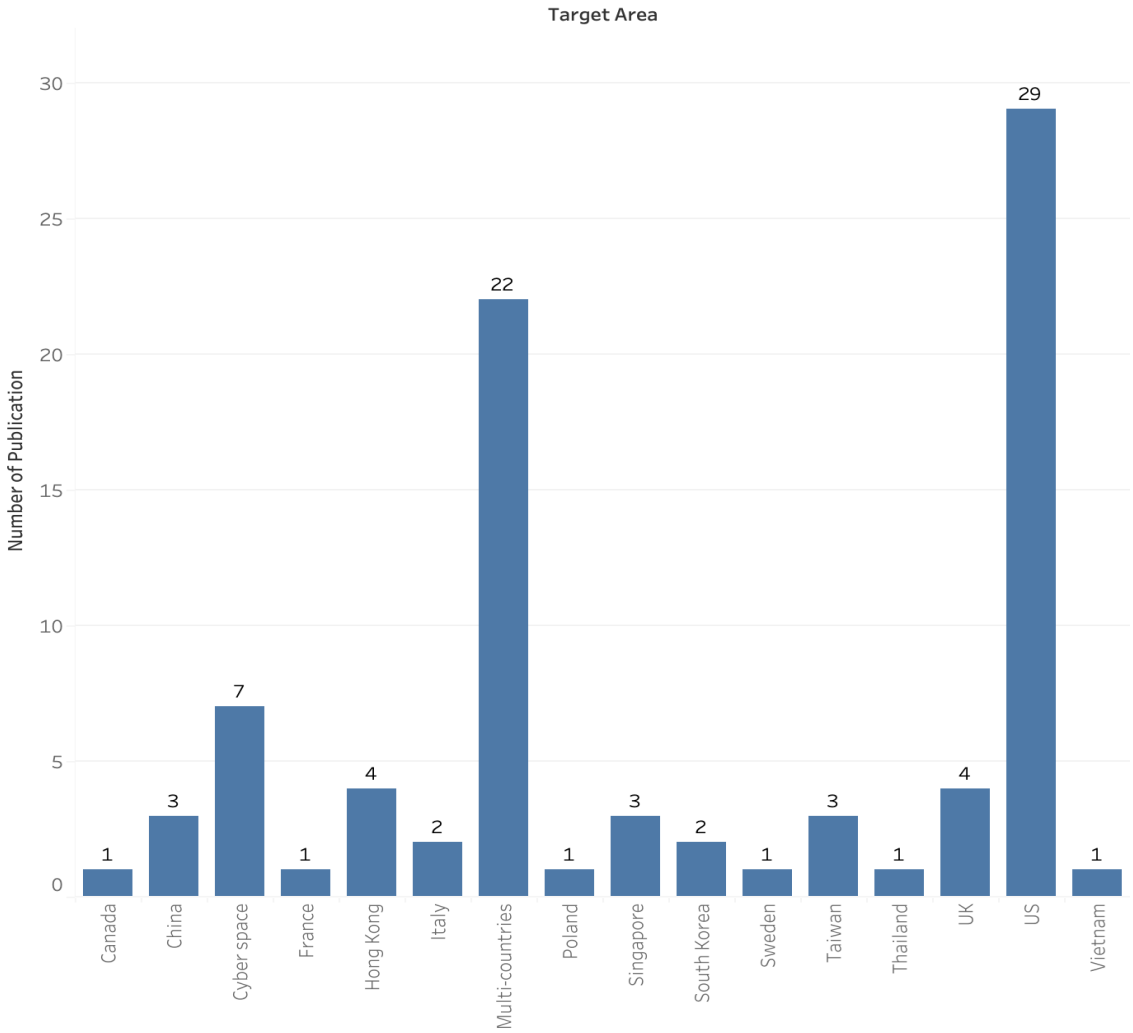

Figure 4.1.4.1 Number of publications in different areas

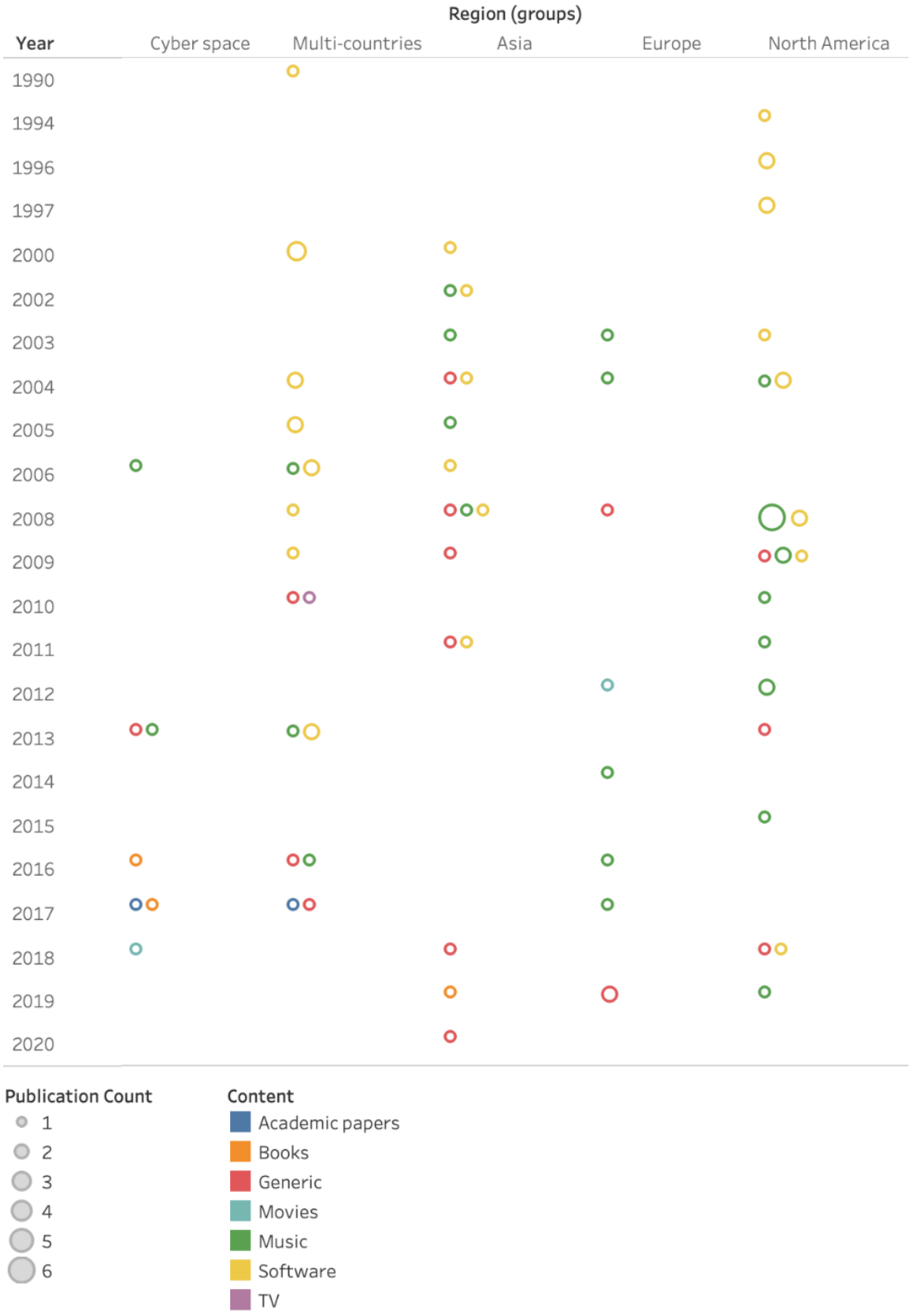

Figure 4.1.4.2 The distribution of publications according to year, area, and content

4.1.5 Sample and Theory

The corpus may be divided into five categories according to their research methods, which are survey, experiment, interview, focus group, and observational data. Among them, the survey is the most popular methodology, used by 53 studies, followed by 25 observational data analyses. Regarding the analysis methodologies, there are 8 qualitative analyses and the rest of them are all quantitative analyses. Qualitative methods have been used to analyze the results from survey, interview, focus group, and observational data, and quantitative method has been applied to all data form. It appears that behavior science (including the theory of planned behavior, the theory of reasoned action, and Ethics theory) and economics theories (including behavioral economics and general demand theory) are the most common theories when conducting quantitative analysis and sociology, criminology, and communication theory has been used for qualitative analysis. University students are the most common sample in the survey analysis and also used in the interview. For academic research, a University student's sample requires lower cost compared to other samples. Some studies, for example, Kinnally et al. (2008) provide course credit or extra credit for participants as an incentive mechanism. This factor is epically considered in the experiment research required higher cost, and thereby all three experiments in the corpus adopt university students.

Moreover, university students are an ideal sample for analyzing piracy preference, because of their familiarity with digital technologies, high demand for intangible cultural content, and limited budget (Borja et al., 2015; Morton & Koufteros, 2008; Coyle et al., 2009; Chiang & Assane, 2008). An additional concern is the predictive function of the student's sample, mentioned by Sims et al. (1996) that business students are likely to be future managers and bring their piracy behavior into the industry. One limitation is that students fail to represent the public, however, Krawczyk et al. (2015) using a vignette experiment find out digital piracy follows similar patterns in students and the general population, which confirms the representation of the student sample.

On the other hand, the general sample has been used by survey, interview, and focus group intending to provide a broader examination of the public. Some general samples follow the logic of using university samples. They intend to access the population with a high piracy tendency. For instance, Kwong et al. (2003) recruits their respondents in the high concentrations of stalls selling pirated CDs. For those studies, they tend to focus on psychological factors using behavior models and theories such as the theory of planned behavior, and social learning theories. Other studies tend to use random samples to grasp the determinants between pirates and not pirates. Those studies, such as Rutter & Rryce (2008) and Bustinza et al. (2013) value heterogeneous samples and large sample sizes. They incline to use demand theory or mixed economics or behavioral models to analyze the result, leaving them to resemble observational data research in a theoretical framework.

General questionnaires and scenarios questionnaires are used in the survey research. A general self-administration questionnaire is the most popular tool, while 9 studies use scenario questionnaires. Advocators of scenario questionnaires value their ability to control stimulation and

avoid dishonesty on ethical questions (Lysonski & Durvasula, 2008). Criticism points out that the scenario questionnaire may lead to an inconsistent and extreme effect size, with a high possibility of common-methods bias (Lowry et al., 2017). There is no strong indication that the scenario questionnaire and general questionnaire have distinctive theoretical frameworks. Most theories, perhaps except social learning theories are adopted by both scenario questionnaires and general ones in the survey research. Additionally, not all the questions in the scenario questionnaires target the hypothesis situation, the scenario questionnaires still gather the demographics to draw the correlation between personal characteristics and stated preferences.

Three studies in the corpus employ experiment methods. Maffioletti & Ramello (2004) and Gopal et al. (2004) use auction experiments to explore how willingness to pay affects piracy behavior. while Depoorter et al. (2010) adopt a scenario experiment with how people would react to punishment and sanction for copyright infringement.

Five studies utilize interviews and four of them use content analysis. More unconventional motivations can be identified with interview material. For instance, Sinclair & Green (2003) find identity investment can be a reason for uploading and downloading pirated products. The Focus group holds the same advantage as the interview. Treating piracy as a subculture instead of an unethical crime, Steinmetz & Tunnell (2013) find that cultural bounds may play an important role in the justification of piracy behavior. This further implies the differences in perspective due to different methodologies and theoretical frameworks.

The analysis methods for observational data are more consistent compared with other data sets, with most of the studies adopting quantitative economics methods. Among them, 5 studies explore the influence of copyright legalization on the political economy and 15 use demand economics to identify various piracy factors. 8 studies address factors of piracy based on web crawler data.

Table 4.1.5 The distribution of the publications according to theory and samples

Research method (Number of publication)	Sample (Number of publication)	Tool (Number of publication)	Analysis Method (Number of publication)	Theory / Model (Number of publication)
Survey (57)	University students (38)	Scenario questionnaire (7)	Quantitative (7)	Preventives and deterrent theory (1) Ethical ideology theory (1) Social exchange (1) The Theory of planned behavior (1) Mixed theory (3)
		General questionnaire (31)	Quantitative (30)	The Theory of planned behavior (6) Social learning theory (5) Preventives and deterrent theory (1) Theory of reasoned action (1) Unified theory of acceptance and use of technology (1) The uses and gratifications model (1) Ethics theory (5) Mixed theory (7) Demand theory (2) Neutralization and rationalization theory (2)
			Qualitative (1)	Preventives and deterrent theory (1)
	General participants (14)	Scenario questionnaire (1)	Quantitative (1)	Theory of reasoned action (1)
		General questionnaire (13)	Quantitative (13)	Theory of planned behavior (2) Unified theory of acceptance and use of technology (1) Mixed theory (6) Demand theory (3) The uses and gratifications model (1) Mixed sociology theory (1)

			Qualitative (1)	The uses and gratifications model (1)
	High school or middle school students (4)	Scenario questionnaire (1)	Quantitative (1)	Ethical theory (1)
		General questionnaire (3)	Quantitative (3)	Social learning (1) Theory of reasoned action (1) Mixed theory (1)
Experiment (3)	University students (3)	Auction experiment (2)	Quantitative (2)	Demand theory (2)
		Scenario experiment (1)	Quantitative (1)	Preventives and deterrent theory (1)
Interview (5)	University students (1)		Qualitative (1)	Neutralization and rationalization theory (1)
	General participants (4)		Quantitative (1)	Theory of reasoned actions (1)
			Qualitative (3)	The uses and gratifications model (1) Mixed theory (2)
Focus group (1)	General participants (1)		Qualitative (1)	Mixed sociology theory (1)
Observational data (23)	Country-level (15)		Quantitative (15)	Demand theory (12) Political economics (3)
	Web crawler (7)		Quantitative (7)	Demand theory (3) Mixed theory (3) Political economics (1)
	Other observational data (2)		Quantitative (1)	Political economics (1)
			Qualitative (1)	Mixed theory (1)

Note: Karnik et al. (2013) use a mixed method of survey and interview. Maffioletti & Ramello (2004) and Gopal et al. (2004) a mixed method of survey and experiment.

For the cross-countries analysis. The independent variables are largely consistent across different studies. They often contain the national economics index (Gini index GDP per capita or GNP per capita), cultural index (individualism level, literacy rate, uncertain avoidance, or power distance), and government ability (corruption level or IPR laws). Crawling from the digital platform, data such as internet traffic, pirate website visit, and BitTorrent tracker sites is a straightforward and reliable source to identify the personal-level or social-level factors. Three studies use another observational data source. Reimer (2006) studies the effectiveness of private copyright protection according to e-book sales of one publisher. Sarikakis et al. (2017) examine the attitude toward copyright and authorship based on online discussion in a fandom forum. Some scholars like Pryor (2008) point out that using aggregated data to test the economics models is unreliable. However, these studies are useful from the political economics standpoint as a measurement of piracy demand, and it is challenging to discern the broad demand shift brought on by policy changes from individual survey data. For instance, with observational data from 80 countries between 1994 and 2002, Shalden et al. (2005) analyze the impact of bilateral political pressure on the piracy rate.

4.2. Factors Analysis

Based on Becker's demand model, this paper developed a basic framework to identify the determinants of piracy preference. I assume there are three consumption choices for every consumer under the assumption that the cost of authorized content is higher than pirated one. When the valuation of the products is higher than the cost of authorized products, the consumer prefers authorized access. When the valuation of the products is higher than the cost of unauthorized products and lower than the authorized products, the consumer prefers unauthorized access. If the valuation is lower than the cost of piracy, the consumer will not access any content.

In the model, V is the valuation of the intangible products, depending on individual taste and product characteristics. This paper utilizes the assumption of Gopal et al. (2004) that the valuation for the authorized contents and unauthorized contents are the same. The authorized access and the unauthorized access are treated as two consumption channels for the same products. And this is empirically supported by Maffioletti & Ramello (2004). Their research show that consumers do not value pirated and authorized CD significantly differently. Furthermore, the paper assumes the difference between the quality of authorized copies and unauthorized ones is zero or close to zero. C_A is the cost of authorized content. In this research, the transaction cost, and the market price of authorized content. C_U is the cost of unauthorized content including state-imposed costs, socially imposed costs, self-imposed costs, search costs, and the market price of the piracy. The cost of unauthorized access is the major concern in the following analysis due to it is associated with multiple specific factors.

$$Preference = \begin{cases} Authorized\ access, & V \geq C_A \\ Unauthorized\ access, & C_A > V \geq C_U \\ No\ access, & V < C_U \end{cases} \qquad s.t.\ \ C_A > C_U$$

This section will respectively discuss the independent and dependent variables that appeared in the corpus articles. Table 4.2.1 presents different measurements for the consumers' valuation. Publications counts are also documented according to the measurement and the research contents. Table 4.2.2 presents the independent variables and their causal relationship with piracy preference. The casual evidence refers to the causal relationship between variables and piracy preference. The causal evidence count is the number of evidence in the publications whose primary results support such correlation between variables and piracy preference. The statistical process follows three rules. (1) To simplify the question, the table only documents the main variables that appeared more than once. For instance, Aguia & Martens (2016) find that people with a higher interest in music have a higher degree of unauthorized music downloading. This find supports the characteristics of the individual shift in their preference for piracy, however, because no other publication adopts a similar indication, music interest does not include in the table. (2) The variables included in the table may have different appellations in the corpus papers. For instance, the ethics level, moral judgment, and moral position are coded under "ethical concern", implying their ethical and moral consideration of piracy. The term "ethical concern" is chosen because this term is more general than "moral concern" and is consistent with the key discipline of piracy study: business ethics, which is discussed in the previous section. Although the concepts such as moral intensity and moral obligation have nuanced differences, this paper does not aim to discuss the psychological process of piracy behavior. As a result, they are all coded as "ethical concerns". (3) Only the main results withdrawn from the total sample are considered. For instance, Zimmer et al. (2017) find that females conduct more music copyright infringement, but males have a higher frequency of copyright infringement in the generic media on the live streaming platform. In this case, the paper targets at generic media, the music category is a subsample group, therefore, the table only captures the principal results: the males have higher piracy preference regarding generic contents compared to the females. (4) The counts are the number of evidence instead of publications. If an article studies the impact of one factor on two preference measurements. Then the factor is documented twice.

4.2.1 Preference

According to Watson et al. (2015), piracy preference has six measurements: qualitative, stated preference, intentions, willingness to pay, stated behavior, and observed behavior. In the corpus, all six measurements have been used as proxies to indicate the consumers' preferences among authorized access, unauthorized access, and no access. Studies adopt qualitative methods and subsequently choose the qualitative measurement of piracy preference. Stated preference refers to the perception or

judgment of piracy behavior, often used by scenario questionnaire surveys. Stated behavior is reflected by past piracy behavior from self-reported questionnaires. Intention refers to the preference to consume piracy in the future. The intention is the dependent variable in the TRA model, thereby most studies measuring intention adopt TRA or extended TRA theories. Additionally, the observed behavior is the statistical measurement of the piracy demand, such as sales data, BSA piracy rate, and web-crawling data.

Moreover, willingness to pay (WTP) is the price that consumers are willing to pay for the contents. WTP indicates that paying a certain amount of money can increase individual utility. It can be used to measure the subjective assessment of the value of contents, and the content access preference under the assumption that individuals with a high willingness to pay prefer authorized content and vice versa. Four studies adopt the WTP indication and use different quantitative measurement methods. Machado & Sellman (2010) use the Becker-DeGroot-Marshak lottery procedure to measure the willingness to pay for the music. Hsu & Shiue (2008) use the payment card method to measure the willingness to pay toward Microsoft Windows and Office. Sinha & Mandel (2008) adopt the contingent valuation method, called the double-bound dichotomous choice (DBDC) format. Maffioletti & Ramello (2004) adopt a behavior economics auction experiment to measure the willingness to pay for music for Italian students. Although willingness to pay may capture the valuation of piracy to an extent, it is important for the researchers to make a careful demonstration of how the willingness to pay for authorized access reflects piracy preference. One possible solution to this issue is adding other measurements in the research like stated preferences or intentions to enhance the reliability (Sinha & Mandel, 2008). Despite as an indication of piracy preference, willingness to pay may also be used to measure the valuation of contents, which is discussed later in the text.

In the corpus, the most prevalent measurement is stated behavior, probably because it is convenient to inquire about and can directly reflect desire. The intention is the second common measurement and might be explained by the prevalence of TRA models. In the systematic review of Watson et al. (2015), intentions and stated behavior are also the top two measurements. This reflects a consistent trend in academic research. Major software studies use observed behavior due to the large amount of them using BSA piracy rates. Music piracy studies use mostly intentions and stated behavior, implying that most of the results depend on survey material. It is possible that these measurements may conflict with each other. For instance, despite the supported evidence about other behaviors, some studies find the intention to pirate is not significantly correlated with the stated piracy behavior (Limayem et al., 2004; Morres & Chang, 2006). Therefore, the integration of multiple measurements may enhance the validation of the results.

Table 4.2.1 Valuation measurement across different contents

	Qualitative	Stated preferences	Intentions	Willingness to pay	Stated behavior	Observed behavior	Total
Books	1				1		2
Movies						1	1
Software	1	9	9	1	8	15	43
Music	2	5	10	2	10	4	33
Academic					1	1	2
Generic	3	3	6	1	8	2	23
Total	7	17	25	4	28	23	

Table 4.2 Variables and their causal relationship with piracy preference

	Variable	Causal evidence (count)		
		Positive	Negative	Insignificant
State-imposed costs	Punishment severity		4	5
	Punishment certainty / risk		14	2
	Anti-piracy policy implementation		2	
	Effectiveness of law enforcement		4	
Socially imposed costs	Social norms		27	3
Self-imposed costs	Neutralization	8		4
	Ethical concern		24	3
Search costs	Perceived accessibility toward unauthorized contents	12		2
	private anti-piracy		3	
	Internet accessibility	1		1
Price	Price of the authorized access	7	1	
	The relative monetary cost of unauthorized access		3	1
	The relative monetary cost of authorized access	6		1
Valuation	Subjective value		2	
	Quality	1		1
Legal Information	Regulation awareness		6	3
Related goods	Authorized content	2	3	

	Sampling	5		
	Novelty-seeking	1		1
Characteristics	Income		2	5
	Self-control		3	
	Gender (Male=1; Female=0)	16		8
	Educational level		2	6
	Computer ability	4		4
	Music capital	1		1
	Age	7	7	5
	GDP/GNI		10	2
	Cultural collectivism-individualism		5	
	Uncertainty avoidance		1	1
	Power distance	1		1
	Inequality	1	2	1
	Major (positive=relevant)	1		2
	Region (positive=relevant)	2		2

4.2.2 State-imposed costs

State-imposed cost refers to the deterrent cost brought by governmental enforcement. In the models of Bae & Choi (2006), the state-imposed cost is calculated as proportional to the valuation of the authorized content, because they assume the law enforcement carries in the form of confiscation or fine based on the value of the original works. However, this method limits the possible form of the penalty and lacks general explanatory power compared with the nonproportional cost. Therefore, in this review, the deterrent cost is treated as a nonproportional cost. The results show that regarding piracy, state-imposed costs are negative but limited preference determinants.

The individual level covers two types of state-imposed cost: punishment severity and punishment certainty. In the corpus, individual studies often used risk or perceived risk to indicate the certainty of the punishment and as the only variable related to the state-imposed cost (Coyle et al., 2009; Lee et al., 2019; Chiang & Assane, 2008; Akbulut & Donmez, 2008). The results are largely consistent in that punishment certainty or risk would decrease the piracy intention or piracy behavior, There are only two insignificant exceptions (Morton & Koufteros, 2008; Hsu et al., 2008) compared with 14 significant results.

The severity of the punishment presents a more controversial result. Five studies reveal that the severity of the punishment does not impact the piracy intention or behavior, but four studies show it is effective just as punishment certainty. Depoorter et al. (2010) use two empirical studies analyzing

how the degree of the punishment would affect the intention to break the copyright law. The result shows that enhancing sanctions has a deterrent effect on piracy behavior, but it also bolsters the anti-copyright sentiment among frequent copyright offenders. The backfire of copyright law is also observed by Sinha & Mandel (2008) when the level of sanction is above the optimal level, especially for risk preference individuals. Overall, controlling the copyright violation by enhancing penalties may not reduce piracy behavior as expected.

Two studies analyze the anti-piracy policy with data before and after the events. The results suggest that the legal threats have limited negative impacts on piracy preference. The limitations reflect in the population and the effective period of the policy. Bhattacharjee et al. (2006) find substantial unauthorized file sharers reduce their file shared more than non-substantial sharers facing legal threats. Moreover, both Bhattacharjee et al. (2006) and Adermon & Liang (2014) find such negative effects on piracy preference could be temporary. The demand for unauthorized products is expected to rebound after three to six months.

Four studies consider the effectiveness of anti-piracy law enforcement from a government ability perspective. Three studies find corruption level is positively correlated with the national software piracy rate. Andrés & Asongu (2013) use six indications for the government's ability and find out a more effective government leads to less piracy in Africa.

It is expected that the implementation of an anti-piracy policy would raise the perceived punishment certainty and severity. However, the possible information gap between the legal authorities and the general public and the law enforcement ability may weaken the relationship between these factors. If individuals do not expect or are aware of an increasing state-imposed cost, their preference for piracy does not shift.

4.2.3 Socially imposed costs

Socially imposed costs indicate embarrassment or shame when violating the norms valued by significant others Grasmick and Bursik (1990). Subjective norms, reciprocity, social networks, social bonding, and peer effect are all used as proxies of social norms in different texts. Their definitions may be slightly different across the studies but all reflect the individual's subjectively perceived social consensus and more specifically, the perception of the social pressure to comply with the wishes of others or not (Cockrill & Goode, 2012). Reciprocity is also included because according to exchange theory, reciprocity motivates individuals to help each other and get payback (Shang et al., 2008).

27 out of 30 research discovered that those who prefer piracy view it as supported by social norms, and vice versa, backup the influence of socially-imposed costs. The social norms can come from peers, family, and the online imagined community (Hinduja & Ingram, 2009). The peer effect is the most common source, mainly suggested by university samples. Additionally, the family may generate social norms when students rely on their parents' attitudes toward piracy (Tomczyk, 2019). Through examining the online fandom of the Game of Thrones, Sarikakis (2017) discovers that

fandom holds a regulatory value against the current copyright regulation. The impact of social norms is enhanced by peer surveillance and self-regulation inside the fandom.

Three studies do not observe a significant effect of social norms on pirate preference. Lee et al. (2018) find the peer effect for South Korean students' stated preference for piracy is weak due to the social culture. Furthermore, Pham et al. (2020) find that social norms have an impact on Vietnamese stated piracy behavior but have no effect on their intention to do so, probably because the piracy-friendly social norms in Vietnam are normalized as a consensus and lose their effect. Bateman et al.(2013) do not find such a correlation with the U.S. university student sample either. Their result is inconsistent with similar studies. The scenario questionnaire Bateman et al. (2013) use is doubted unreliable.

The review shows a strong correlation between socially-imposed costs and piracy regardless of research samples and area. The prevalence of global piracy behavior may be explained by the low average socially imposed costs (Williams et al., 2010).

4.2.4 Self-imposed costs

Self-imposed costs are the negative feelings that occur after transgressing a moral principle they value. Regarding the piracy issue, such moral principle is that is unethical like theft. In the research, self-imposed costs are referred to as embarrassment, guilt, moral obligation, moral judgment, and ethical index. It often contains two levels of meaning. The first is the general ethical belief of an individual, the second is the ethical belief toward piracy behavior. Because these two levels are often considered together in the same section of a questionnaire. Therefore, this review assumes an individual's general ethical belief is consistent with his or her belief in whether piracy is ethical. There are 24 pieces of evidence supporting that the higher the ethical belief an individual is, the more likely the individual has higher self-imposed costs and will engage in unauthorized copying. The impact of self-imposed costs is generally supported except for three studies. Two of them use scenario questionnaires which are considered to be problematic (Lysonski & Durvasula, 2008; Bateman, 2013). Another study is by Logsdon et al.(1994). They find limited support for the correlation between moral judgment and piracy preference. A possible explanation they provided is that there's a prevalent tolerant attitude around piracy so that it will not affect by individual moral differences. This result is not consistent with others probably because of the early publication date or student sample they used is biased in that most of the students have the same moral judgment.

On the other hand, neutralization and rationalization as means to diffuse responsibility or justified behavior may decrease the self-imposed costs (Sahni & Gupta, 2019). Loyalty to piracy subculture and anti-industry attitude are two commonly used neutralization techniques in piracy issues. Examining the piracy issue from the perspective of sociology, Steinmetz & Tunnell (2013) points out that subculture bounds may override the consensus treating piracy as unethical. An anti-copyright identity was built in the process of sharing and receiving pirated products. This subcultural

identity is enhanced when involved in piracy clubs. Sinclair & Green (2016) also notice some individuals gain recognition and confirm their subculture identity through file sharing. Anti-industry attitude is studied by six studies and half of them find a hostile attitude against industry leads to piracy. Individuals with anti-business attitudes believe copyright is a monopoly strategy that only benefits big companies instead of artists or consumers and refuses to use the moral framework to judge their behavior. Overall, there are right studies suggest the level of neutralization is positively correlated with the level of piracy, for reducing the self-imposed cost.

Despite a few exceptions, the major piracy researchers support the negative impact of self-imposed costs. Nevertheless, it is hard to make the statement that the existence of the neutralization techniques does not offset these effects, for the majority of the research does not consider them together.

4.2.5 Search costs

Search cost refers to the time, effort, and resources to obtain products. In this context, the search costs are considered as the search costs toward unauthorized content. The high search costs lead to low piracy preference. The search costs further include three factors: the perceived accessibility toward unauthorized content, internet availability, and private anti-piracy efforts. The private anti-piracy efforts function through the search costs. Because industries cannot cause state-imposed costs using penalties, but they can detect piracy content online and withdraw it by themselves or with the help of the authorities, or they can use tools like Watermark to make unauthorized content less accessible.

Among 14 studies that consider the perceived accessibility toward unauthorized content, 8 of them utilize perceived behavior control as a measurement with the Theory of Planned Behavior as a framework. And only one of them (Moores et al., 2009) does not find a significant correlation. Moores et al. (2009) purposes the reason may be the limited stated software piracy behavior in the sample. With only 103 university students as survey participants, this result can be treated as a sample bias.

The private anti-piracy efforts may also increase the search cost by making pirated content less available. To protect their profit, the industry may devote itself to combat piracy with strategies other than market price. Three papers adopt this aspect. Reimers (2016) investigates the measures taken by book publishers to combat piracy. Book publishing industries usually outsource the task of detection to private companies. Through an analysis of legal publication sales, Reimers (2016) discovers that copyright protection measures prove to be relatively effective, with nonfiction titles benefiting the most from such efforts. Yang et al. (2004) and Yang et al. (2008) examine foreign companies' anti-piracy strategies in China by sending questionnaires to company executives.

Internet accessibility is an indication for the cross-countries analysis. It is measured by national internet users. The results are ambiguous since Goel & Nelson (2009) find a significant

correlation while Bagchi et al.(2006) do not. However, this does not imply the search costs are not an effective factor with the macro-level observational data. Bagchi et al. (2006) show that IT infrastructure is positively correlated with piracy rate. This may also imply piracy demand is more elastic than authorized copies since internet accessibility along with computer ability factors impacts both the search cost of authorized and unauthorized access.

An inherent assumption is that pirate copies need higher search costs than authorized copies in most studies. However, if the authorized copies are not available or difficult to access, then the search cost for pirate copies is lower than the authorized ones. In this way, the absence of authorized copies decreases the relative search cost. Cenite et al. (2009)'s interview analysis in Singapore is the only study in the corpus that noticed this problem and includes the unavailable or difficult access of the content as one explanation of piracy. The absence of consideration may be explained by the fact that the majority of the studies in the corpus focus on Europe and North America, where authorized intangible contents are more affluent compared to other parts of the world.

4.2.6 Price

The corpus contains two kinds of price determinants that appear more than once: the external price of authorized contents and the relative price of the authorized contents or unauthorized contents. The relative price implies the subjective judgment on the price of the piracy, such as affordability, fair price, overprice, and economic utility.

Seven out of eight studies show that unauthorized contents and authorized ones are substitutes. The price of authorized content is higher, the piracy preference is also higher. McCorkle et al. (2012) notice the complimentary feature that the self-reported market value of music downloading is negatively correlated with piracy preference for both downloaders and legal buyers. The results for subjective perception of the prices show that the judgment toward price is consistent with the market price, with one exception for each of the relative prices. Shanahan & Hyman (2010) show the motivation of saving money cannot explain the generic behavior in the US and UK. Furthermore, the overprices cannot explain music piracy according to Coyle et al. (2009). The relative price is valued more in the corpus research, probably because when analyzing more than one type of content, the external prices are hard to be given. The price of unauthorized content is studied by one paper, so it is not included in the table. The difficulty to gather the piracy price may be one of the reasons. Also, the monetary prices of unauthorized copies are often zero or close to zero.

4.2.7 Valuation

The indexes of valuation include subjective valuation and objective quality. Chiang & Assane (2008) and Cockrill & Goode (2012) are the only two papers that investigate the impact of subjective valuation. The former finds the willingness to pay is negatively correlated with music piracy

preference and the latter finds the Likely Scale for the statement “DVD is excellent value for money” (p.5) is also negatively correlated with movie piracy.

One music piracy research and one book research adopt objective quality criteria. Danaher et al. (2010) using a survival analysis find the higher-ranked albums experienced a greater reduction due to more piracy. Higher quality products which is corresponding with higher valuation are more likely to be pirated. Nevertheless, Reimers (2016) finds that the popularity of the books is not significantly associated with piracy risks.

The valuation is not a commonly investigated determinant, probably due to it being more often adopted as the dependent variable to indicate preference. With limited evidence, the research shows subjective valuation is likely to be more precise than product quality indicators when predicting piracy preference.

4.2.8 Legal Information

The information on regulation would impact the utility maximization of consumers (Ward et al., 2006). Individuals who fail to be aware of the copyright law would not have the self-imposed cost or the socially imposed cost and perceived state-imposed cost. Six out of seven research show that information on copyright negatively determines piracy. Some directly test the knowledge of individuals (Moores et al., 2009; Moores & Chang, 2006; Bateman et al., 2013), while some question participants' perception of public awareness (Yang et al., 2004) or their awareness of copyright (Lee et al., 2018). This supports that some piracy behavior happens because of the lack of copyright knowledge and unable to recognize the copyright regulation.

Two of the three insignificant results come from Lee et al.(2018), which do not find that perceived legality impacts stated piracy behavior or piracy preference. One explanation is the sample bias. The student participants Lee et al. (2018) investigated are students in fifth to seventh grade whose knowledge of copyright regulation is low on average, and could not reveal the impact of legal information.

4.2.9 Related goods

The advance of the legal consumption alternatives would decrease the substitute extent of the authorized copies and the unauthorized ones. Koh et al. (2019), Borja et al. (2015), Aguiar (2017) and Aguiar & Martens (2016) all adopt quantitative regression to analyze the impact of streaming platforms on music piracy. Koh et al. (2019) find out the substitute effect of the alternative legal music consumption channels. Others, however, fail to find the positive substitute effect between streaming services and piracy behavior. Borja et al. (2015) and Aguiar & Martens (2016) find limited evidence of online digital sales displacement, and people who have higher music consumption capital, legal streaming, and illegal download channels have higher degrees of complementarity. With data

from French streaming platform Deezer, Aguiar (2017) notice evidence of the negative impact of the introduction of the listening cap (limitation free content on the platform) on unlicensed and licensed music downloading, implying free streaming may have a positive impact on piracy. Based on interview data, Sinclair & Green (2016) demonstrate the impact of legal streaming platforms and indicate heterogeneous consumers may lead to a complex reaction against the streaming platform. While the legal alternative may change the consumption choice of ex-downloaders, steadfast pirate stick to pirate music.

Other research pays attention to video streaming platforms. Ibosiola et al. (2018) conducted a study on illegal streaming cyber lockers, platforms that go beyond traditional peer-to-peer (P2P) platforms, which provide ample opportunities for the dissemination of pirated copies. Additionally, Zimmer et al. (2017) examined a social live streaming service that facilitates piracy by evading conventional detection methods. Overall, the introduction of the streaming service is an ambiguous factor in music, but it is likely to provide more opportunities for video or movie piracy. However, it is notable that Ibosiola et al. (2018), Zimmer et al. (2017) both adopt the streaming platform as a case study, while Aguiar & Martens (2016) and Sinclair & Green (2016) view the introduction of the streaming service as an assumption or background, thereby neglecting the shift before and after the introduction.

Sampling is related to the exposure effect of piracy access. Most intangible goods are experience goods whose value is difficult to ascertain before purchasing. To reduce information asymmetry, consumers have access to pirated copies, whose prices are often zero or nearly zero. Although in the long term, authorized and sampling copies are complementary, sampling means possible future consumption of authorized copies. Nevertheless, at present, they are substituted, because the higher prices of the authorized copies are, the higher risk for consumers to purchase quality ambiguous products, therefore, leading to higher demand to sample before accessing authorized copies. Five research in the corpus, including Chen et al. (1997), Sinclair & Green (2016), Cenite et al. (2009), Bhattacharjee et al. (2003), and Steinmetz & Tunnell (2013), all support some pirates are driven by the need to sample.

Novelty-seeking is mentioned in two papers. Novelty seeking is a psychological concept describing people who pirate for obtaining new or rare cultural products. Cheng et al. (1997) imply accessing new products as soon as possible constructs an important reason for software piracy. However, Hus & Shiue (2008) view the impact of the novelty-seeking as indifferent, suggesting the limited impact of novelty-seeking .

4.2.10 Characteristics

Characteristics are individual or national features indirectly impact piracy preference and are often used as control variables in regression methods. The most common characteristics in the corpus articles are gender, age, income, GDP, computer ability, and culture. Compared the factors like

information, price, and costs, the impacts of characteristic factors are usually more inconsistent across the studies. Major characteristics are discussed separately in the following text.

Gender: males have a higher piracy preference

Characteristics factors include multiple variables. From an individual perspective, education, income (social economics status), gender, and age are usually used as control variables. However, how they impact piracy behavior is not consistent among studies. For instance, although 16 studies acknowledge that males are more prone to pirating compared to females, 8 studies do not find evidence that gender has a significant impact on pirate preference. Moores & Esichaikul (2011) investigate the gender effect and find that males and females have different kinds of piracy behavior, males tend to buy unauthorized software while females tend to share it. It implies gender plays its role by influencing the social cost. Morton & Koufterous (2008) on the other hand believe the different perceived punishment severity cause the gender difference in piracy. According to them, females usually perceived higher punishment severity than males, thereby being less likely to involve in piracy. This perspective is also observed by Ciang & Assane (2008). Moreover, they also notice female students have a higher willingness to pay for legal products. In other words, for female students the legal products are more likely to substitute pirate products. Additionally, they find that female students share greater consistency, while male students are more heterogeneous in their preference to pirate or not.

Age: inconsistent results

19 studies consider age as a factor but have inconsistent results. Seven studies find age is a negative factor in piracy, and another seven studies find older individuals are more likely to pirate, and seven studies do not find any significant relation. How age impacts piracy is a lack of research. Age could increase piracy by offering more experience and knowledge of the internet and decrease piracy by reducing the motivation for novelty seeking and knowing more information on copyright law. Additionally, an interesting observation is all studies suggesting age is positive correlate with piracy preference are studies on university students. It may imply that, for university students, when choosing whether to pirate or not, the knowledge of the internet and familiarity with the computer may surpass the motivation to access the newest content.

Income: inconsistency between individual and national data

Individual income or economic status does not have a significant impact on piracy. Five out of seven studies find income as an irrelevant factor. It implies higher personal endowment is unlikely to increase the willingness to pay for the legal copies. It appears that absolute income has less predictive ability than relative income, which is the relative price discussed before. On the country level, however, the measurement of economic status on the country level such as Gross Domestic

Product (GDP) per capita and Gross National Income (GNI) negatively relates to the piracy rate in most case studies. The inconsistency between micro and macro levels may raise the question of the mechanism of such factors. GDP or GNI possibly does not impact piracy through the level of wealth but through the quality of government administration or copyright law. However, most cross-country studies do not scrutinize this factor.

Education: insignificant piracy determinants

Education has little impact on piracy preference based on both micro and country-level data. Only two study finds the higher the education level, the lower the music piracy rate. Ki et al. (2006) suggest that individuals with higher education are more likely to understand the harm of piracy and view it as unethical. However, Ki et al. (2006) do not check this correlation with empirical evidence. Aforementioned empirical results counter Kariithi (2011)' s opinion that age, gender, income levels, and experience are determining factors of piracy, and require future studies to further examine its impact mechanism.

Computer ability

Eight studies analyze computer ability. The hypothesis is that those who are more familiar with computers could find unlicensed copies online with less effort and time. However, half of the empirical evidence does not support that. Four studies (Borja et al., 2015; Sims et al, 1996; Lee et al., 2019; Goles et al., 2008) find the correlation between computer ability and piracy is insignificant. The only common in these studies is that they all choose university students as the sample, but three of the four studies find significant results also use university students. Such evidence may show that computer familiarity may not impact the effort to access piracy. For most individuals, access to unauthorized content has a low entry level. And such entry level is expected to be lower with the new digital platform, such as cyberlockers and social live-streaming services (Ibosiolka, 2018; Zimmer et al., 2017). Such a new platform decreases search costs by increasing the accessibility of the contents and mitigates private anti-piracy efforts by disabling piracy detection techniques.

Culture: significant piracy determinants

In some areas, copying, and piracy are treated as cultural exercises (Bagchi et al., 2006). For instance, for cross-country analysis, the cultural collectivism-individualism index is one of the most tested cultural factors, with five studies suggesting the higher level of the cultural collectivism, the higher the piracy rate. Countries with high collectivism rating tend to favor larger community value, which implies a higher peer effect and higher reciprocity, and result in a higher piracy rate. Bagchi et al. (2006) provide an alternative explanation suggesting countries high on collectivism tend to be more xenophobic, and most of the pirated software is imported from the U.S. In this case, foreign products may be an alternative content type affected by economics or cultural cross-border relations.

For example, from the political economy perspective, Shadlen et al.(2005) mention that trade dependence on the U.S. could significantly impact the software piracy rate for 80 countries under the assumption that most pirated software is imported from the U.S.

Uncertainty avoidance index is another cultural factor, which is often used in cross-cultural analysis. Countries with higher uncertainty avoidance tendencies are expected to have lower piracy rates, due to the higher possibility of avoidance of legal punishment. While Bagchi et al.(2006) find such a correlation between uncertainty avoidance and the piracy rate among 37 countries, Husted (2000) does not find a significant relationship between them among 30 countries. The ambiguous result indicates that uncertainty avoidance may have a complex impact mechanism on piracy, shifting by the effectiveness and competence of regional intellectual property law enforcement.

5. Conclusion

This systematic review is based on 85 influential and high-quality academic papers. They are gathered from Scopus and Web of Science, and processed through a documented search strategy and a screening process. The review answers two research questions based on the corpus data: how do past relevant studies discuss the piracy factors? And how can the research evidence be explained by the extended demand framework? Regarding the first question, the research explores the research trends in the past decades. The peak of academic attention was around 2008. Most of the studies focus on music and software piracy in Asia and North America. Nevertheless, interest in other media and regions are rising through the years. Cyber space is an emerging area with a raising numbers of academic papers in recent years. The web-crawling data from cyber space can reflect piracy in limited scopes but in a relatively accurate way. It is expected that more future piracy research will focus on movies, digital books, and academic papers. The less investigated areas such as Africa and South America are also required more academic attention.

Concerning the research design, corresponding with the findings of Kariithi (2011), the education sample is the dominant sample choice. The survey is used by 53 studies, making it the most popular methodology choice. 25 studies adopt observational data from reports and the Internet. Only a few studies choose interview data, focus groups, and experiments. Among 85 academic papers, only eight of them use qualitative analysis and the rest all adopt quantitative methods. Qualitative methods are often used along with mixed sociology theories and communication theories based on focus groups or interview data. Compared with quantitative methods, qualitative methods better capture the heterogenous of pirates. For instance, Sinclair & Green (2016) distinguish samples into four groups according to their piracy consumption history and notices their different reaction toward the introduction of streaming services. This consideration inspires the quantitative studies to build the subsample group not only based on demographic characteristics but the consumption history. According to the corpus, studies with the same type of sample and methods usually lead to similar

conclusions, indicating the determinants of piracy preference are reasonably general across time and various territories and populations.

From the perspective of the theoretical framework, psychological frameworks such as TRA and TPB are the top choice theories. They are mostly accompanied by survey and quantitative analysis methods. The demand theories are the most adaptable frameworks that can be used to explain observational data, survey data and experiment results. Interdisciplinary mixed theories are also popular. Overall, the economics perspective holds the advantage of clear definitions and relatively clearly defined concepts and statements regarding falsifiable, expected causal associations between these concepts. On the contrary, studies in other social disciplines are more flexible and ambiguous in their narratives. However, other disciplines are more expert in identifying new factors, which can be used to enrich economic models. For instance, Kinnally (2008) adopts the uses and gratification models and finds seeking entertainment and information motivates stated piracy behavior.

To answer the second question, the extended demand model could explain the majority of the variables with nine determinants. Every nine determinants identified in this paper quite yielded significant results to a certain degree, but do not always present the same casual relationship, especially for characteristics and related goods. Such inconsistent results may be explained by the characteristics and related goods that have indirect and complicated mechanisms toward piracy preference. For instance, gender determines piracy through subjective valuation, ethical concern, and perceived punishment. And this requires further studies to refine the current extended demand framework and better identify the precise impact. The ambiguous impacts of demographic factors such as age, gender, and income, which are often used as control variables, advise the researchers to turn to alternative variables. For instance, the cultural profile or the past consumption behaviors of the participants.

The exception results in state-imposed costs, socially imposed costs, self-imposed costs, and search costs. This research identifies two types of bias. The first is the method-based bias of scenario questionnaires. The research finds some of the scenario questionnaires (Tan, 2002; Shang et al., 2008; Glass & Wood, 1996; Gopal & Sanders, 1997) do not have extreme results compared with similar studies. However, Bateman et al. (2013) do not find a significant relationship between social norms and stated piracy preference. Lysonki & Durvasula (2008) and Bateman et al. (2013) do not find a significant correlation between ethical concern with piracy intention. The second is sample-based bias. The small-sized, regional, and homogenous sample may generate excepted results. However, some of the sample-based bias may be also caused by the special features of the groups. Such as Lee et al. (2018)'s research on early South Korean adolescents and Pham et al. (2020)'s study in Vietnam.

Aside from more careful choices of methods and sample, there are other four notable suggestions for upcoming studies. Firstly, very few of the current economic studies could bring up a clear and rigorous frameworks. Some analysis tends to overlook the theoretical aspects and fail to offer a concrete explanation for the research design. For instance, most of the cross-countries analyses

do not provide a convincing explanation for including GDP as a variable, let alone the quantitative analyses of the mechanism of the GDP. It is crucial for futural researchers to elucidate their fundamental theories more explicitly. This review emphasizes how a systematic framework can reduce the negligence of variables and the correlation between independent variables. In particular, the adoption of the extended demand theory in this literature review offers a promising framework for a future economic investigation into piracy preference. Secondly, the inconsistent definition of the variables in psychology and sociology research may cause unnecessary difficulty. It is expected that the standardization of variables is promoted in the future. Thirdly, the intercorrelation of the factors has been largely neglected by the economic regression analysis. Only a few studies such as McCorkle et al. (2012) explore such correlation. Fourthly, there are no studies in the corpus that examine the determinant factors of the no-access option. Such preference may also offer some insight into the consumption channels.

This systematic review has some noticeable limitations. First, the databases are limited to Scopus and Web of Science. Therefore, some high-quality and influential papers may be omitted. However, the additional inclusion of the highly cited reference reduces such bias. The corpus is not comprehensive, but reliable enough to identify the research trend and commonly studied factors. Moreover, when analyzing factors, this research does not clearly distinguish direct and indirect factors. For instance, the perceived punishment severity may impact piracy preference through social norms this is neglected in the review considering the concise of the framework. Also, the hypothesis of the research omits some factors such as the quality difference between the authorized copies and pirated copies. Some of the variables that appeared in the corpus do not fit in the framework but also deserve academic attention. For instance, Jamali (2017) explores the copyright infringement of the information providers based on observational data on ResearchGate. This implies another new aspect is to investigate the exchange relationship between piracy and creators. And further discussion on the relationship between open access and piracy is in need.

By explaining the determinants of piracy preference with extended demand theories, the research finds the complex relationship between state-imposed costs and piracy preference. This implies that deterrence through monetary penalty would not function as expected concerning the copyright violation. The significant association between legal information and piracy preference indicates the need to introduce integrated policies to raise the recognition the intellectual property rights. Moreover, the authorities could play a role in easing the conflict between industry and consumers through the implementation of economic regulations and the refinement of copyright law. Ultimately, a well-structured copyright legal framework may strike a balance by defending consumers' interests, helping the growth of industries, and assuring the income of copyright holders.

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Appendix A

The synonymous phrases in search queries are generated with the help of chatGPT 4.0, below prompt are used.

Prompt 1: “I'm writing a systematic literature on the determinants of piracy behavior, I need to conduct a rigorous and comprehensive search for ALL relevant studies, therefore would you list for me all the synonyms of "piracy"?”

Prompt 2: “Can you list more” (ask seven times until the answers are restricted to different forms of cultural products such as online piracy of podcasts, or digital piracy of concerts.)

Prompt 3: “I'm writing a systematic literature on the determinants of piracy behavior, I need to conduct a rigorous and comprehensive search for ALL relevant studies, therefore would you list me all the synonyms of "determinants"?”

Prompt 4: “Can you list more” (repeat four times until the answers are mostly uncommon phrases)

Appendix B

Below are the results of the topic analysis.

Topic 0 (humanities and social science): piracy, music, software, digital, property, intellectual, consumers, online, rights, model

Topic 1(techniques and engineer): peer, content, sharing, copyright, image, network, data, watermarking, traffic, proposed