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Legal Challenges and Opportunities in Regulating Free and Open Source Software Within the European Union

Avrupa Birliği'nde Özgür ve Açık Kaynak Kodlu Yazılımların Düzenlenmesinde Yasal Zorluklar ve Fırsatlar

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LEGAL CHALLENGES AND OPPORTUNITIES IN REGULATING FREE AND OPEN SOURCE SOFTWARE WITHIN THE EUROPEAN UNION

AVRUPA BİRLİĞİ'NDE ÖZGÜR VE AÇIK KAYNAK KODLU YAZILIMLARIN DÜZENLENMESİNDE YASAL ZORLUKLAR VE FIRSATLAR

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ABSTRACT

This paper investigates the intricate link that exists between Free and Open Source Software (FOSS) and the legal and regulatory framework that exists inside the European Union. The study illustrates the problems and possibilities given by this dynamic area by charting the growth of FOSS from its ideological roots to its current standing as a significant economic and technical force. The paper examines the policy steps taken by the European Union to encourage the use of FOSS in public administration, as well as the influence that new technologies, such as artificial intelligence, have had on the ecology of FOSS. In addition, it digs into the legal complications that surround FOSS, including concerns about licensing and the enforcement of copyright. In its conclusion, the paper provides policy proposals with the goal of fostering a sustainable and thriving FOSS ecosystem inside the European Union while maintaining a balance between the need for innovation and regulatory control.

Keywords: Free and Open Source Software, FOSS, European Union, eGovernment, Public Administration, Open Source Software Adoption, Cyber Resilience Act, Artificial Intelligence Act, Copyright.

ÖZET

Bu kapsamlı çalışma, Özgür ve Açık Kaynak Kodlu Yazılımın (AKKY) ile Avrupa Birliği içinde var olan yasal ve düzenleyici çerçeve arasında var olan karmaşık bağlantıyı araştırmaktadır. Çalışma, AKKY'nin ideolojik köklerinden önemli bir ekonomik ve teknik güç olarak mevcut konumuna kadar büyümesinin haritasını çıkararak bu dinamik alanın sunduğu sorunları ve olasılıkları göstermektedir. Çalışma, Avrupa Birliği'nin kamu yönetiminde AKKY kullanımını teşvik etmek için attığı politika adımlarının yanı sıra yapay zekâ gibi yeni teknolojilerin AKKY ekolojisi üzerindeki etkisini incelemektedir. Buna ek olarak, lisanslama ve telif hakkının uygulanması ile ilgili endişeler de dahil olmak üzere AKKY'ı çevreleyen yasal komplikasyonları araştırmaktadır. Sonuç bölümünde ise, Avrupa Birliği içinde sürdürülebilir ve gelişen bir AKKY ekosistemini teşvik etmek ve aynı zamanda inovasyon ihtiyacı ile düzenleyici kontrol arasında bir denge sağlamak amacıyla politika önerileri sunmaktadır.

Anahtar Kelimeler: Açık Kaynak Kodlu Yazılım, Avrupa Birliği, eDevlet Girişimleri, İdari Otoritelerde Açık Kaynak Kod Kullanımı, Siber Direnç Yasası, Yapay Zekâ Yasası, Telif Hakkı.

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1. INTRODUCTION

The incorporation of Free and Open Source Software (FOSS) into the digital and administrative systems of the European Union has resulted in significant economic and technical changes. According to research commissioned by the European Commission, FOSS makes a substantial contribution to the economy of the European Union. Estimates suggest that FOSS contributes between €65 and €95 billion to the EU economy each year.[1] Only in 2018, firms made an investment of almost €1 billion in FOSS initiatives, highlighting the significant economic opportunities associated with this paradigm. A modest 10% augmentation in donations to FOSS projects might potentially lead to an extra 0.4-0.6% expansion in gross domestic product for the European Union, demonstrating the economic advantage provided by FOSS.[2]

The origins of FOSS may be traced back to Richard Stallman's release of the GNU Manifesto in 1983 and the subsequent creation of the GNU General Public License (GPL).[3] Stallman's endeavors reached their peak with the establishment of the Free Software Foundation (FSF), which has played a crucial role in promoting the principles of software freedom and transparency.[4] The development of the Linux kernel by Linus Torvalds in 1991 greatly advanced the FOSS movement, leading to the creation of GNU/Linux, a significant achievement in the world of free and open-source software.[5] The development model of FOSS, which involves collaborative contributions from a wide group of developers, has created an atmosphere that promotes creativity and efficiency. The Open Source Initiative (OSI) and the FSF have defined the specific characteristics that define open-source and free software, respectively. These principles emphasize the significance of transparency, cooperative development, and the free distribution of software.[6]

The European Union's goal of a digital single market has prompted a radical overhaul of public administration. While the switch to electronic platforms has reduced costs, it has also shown the limitations of proprietary software in promoting interoperability and collaboration across government organizations. In response, the EU has deliberately used FOSS products to solve these obstacles and improve public service delivery. The EU's goal in embracing FOSS is to build a public sector that is more efficient, transparent, and focused on citizens. However, FOSS' quick expansion and increasing incorporation

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1 European Commission. Directorate General for Communications Networks, Content and Technology., *The Impact of Open Source Software and Hardware on Technological Independence, Competitiveness and Innovation in the EU Economy: Final Study Report.* (Publications Office 2021) 15 <https://data.europa.eu/doi/10.2759/430161> accessed 4 June 2024.

2 ibid.

3 'The GNU Manifesto - GNU Project - Free Software Foundation' <https://www.gnu.org/gnu/manifesto.html> accessed 4 June 2024.

4 Richard Stallman, *Free Software, Free Society: Selected Essays of Richard M. Stallman* (GNU Press 2006) 35; Ian Walden, 'Open Source as Philosophy, Methodology, and Commerce: Using Law with Attitude' in Amanda Brock (ed), *Open Source Law, Policy and Practice* (Oxford University Press 2022) 8

5 JG MacKinnon, 'Review of The Linux Operating System: Debian GNU/Linux' (1999) 14 Journal of Applied Econometrics 443 1.

6 Walden (n 4) 8-12.

with essential infrastructure have resulted in complicated legal and regulatory hurdles. The rise of AI and cybersecurity issues has exacerbated the need for a comprehensive and flexible legal framework. The EU's involvement in navigating this complicated terrain is critical to determining the future of FOSS and its influence on society. The relationship between FOSS and the legal environment is especially visible in the area of copyright and licensing. While FOSS has proved its worth in generating innovation and public benefit, its open-source nature has created new issues for established intellectual property regimes. As FOSS grows in significance, establishing a clear and enforceable legislative framework becomes more important for sustaining a sustainable and vibrant FOSS ecosystem inside the EU.

This paper explores the complex relationship between FOSS and the EU legal and regulatory environment. It commences by examining the foundational principles and historical development of the FOSS movement, including its governance structures and licensing models. Subsequently, it analyzes the EU's policy initiatives to promote FOSS adoption in public administration and the impact of emerging technologies, such as AI, on the FOSS landscape. The paper then delves into the legal challenges surrounding FOSS, focusing on copyright enforcement, licensing complexities, and the implications for the broader ecosystem. Finally, it concludes by discussing the policy implications and recommendations for fostering a sustainable FOSS ecosystem within the EU.

2. UNDERSTANDING THE FOSS ENVIRONMENT

2.1. HISTORY AND PRINCIPLES

The FOSS movement was first sparked by Richard Stallman's publication of the GNU Manifesto[7] and the subsequent start of his GNU Project in 1983. Stallman's commitment to creating a software environment that is both free and open originates from his disagreement with Symbolics regarding a Lisp machine.[8] Stallman desired to gain access to the Lisp computer constructed by Symbolics, which was built using MIT's code. Symbolics refused Stallman access and the utilization of MIT's code by Symbolics did not alter the result. Following this momentous encounter, Stallman established the Free Software Foundation. In 1989, he released the initial iteration of the GNU GPL. The General Public License[9] is considered one of the pioneering instances of FOSS licenses in the software industry. The key achievement of the free software movement is attributed to the contributions of Linus Torvalds in 1991. Stallman endeavored to create a completely unrestricted operating system, and by 1991, all components of the operating system were prepared except for the kernel. Linus, while studying as an undergraduate at the University of Helsinki, filled in the missing portion and developed what would later become recognized as the Linux kernel. The initial iteration of a liberated operating system has been successfully finalized, and it has

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7 'The GNU Manifesto - GNU Project - Free Software Foundation' (n 3).

8 Lisp machines are general-purpose computers designed to run Lisp as their main software language.

9 'GNU General Public License v1.0 - GNU Project - Free Software Foundation' <https://www.gnu.org/licenses/old-licenses/gpl-1.0.html> accessed 4 June 2024.

been designated as GNU/Linux.[10]

Furthermore, apart from the triumph of GNU/Linux, it was Linus who effectively harnessed the substantial and distinctive capabilities of the FOSS development paradigm. Eric Raymond coined the term *Linus's Law* to describe the phenomena that "*Given enough eyeballs, all bugs are shallow*".[11] Raymond argues that including users as co-developers and beta testers provides FOSS development with a distinct momentum and potential, which sets it apart from the traditional closed-source paradigm. Raymond attempted to leverage the competitive advantage of FOSS development in order to entice additional developers to join the FOSS community. In order to achieve his objective, he subsequently established the Open Source Initiative.

The main objective of the initiative is to acquaint commercial enterprises with open source software. Raymond and Stallman are the most influential individuals in the FOSS movement. Their activities and initiatives had a significant impact on the development and trajectory of FOSS. Nevertheless, they hold contrasting perspectives. Stallman, upon establishing FSF, embraced a political ideology centered around the concept of free software. However, Raymond was astounded by the efficacy of the FOSS development paradigm and desired to incorporate this model into a multitude of projects. Stallman expressed apprehension regarding Raymond's pragmatic objectives and advocated for the original concept of free software. Raymond strongly advocated for his goals and contended that an open source software project has the capability to create digital rights management software that restricts software freedom. Despite their ideological differences, they only have minor disagreements in practice. Hence, it can be concluded that the divergence in viewpoints between FSF and OSI does not significantly affect the practical operation of the FOSS ecosystem.

Like ideological viewpoints, FOSS is defined by many explanations and principles worldwide, with no ultimate authority to determine the classification of a project as FOSS or non-FOSS.[12] The number of licenses is rapidly expanding, and upon closer examination, it becomes evident that the FSF and OSI hold the foremost authority in this realm. To comprehend the definition of a FOSS project or a FOSS public license, it is advisable to examine the viewpoints of these influential organizations. Principles of OSI and FSF are similar to each other, but according to the FSF, there are finer differences between the two organizations' understandings.[13] The first noticeable difference is terminology: while the FSF uses "*free software*", the OSI prefers "*open source software*". Although these terms are often considered synonyms, the FSF claims otherwise, highlighting two substantial differences. Firstly, the FSF argues that the OSI's principles are weaker and may allow licenses that do not permit modifying the source code and using the modified version privately. Secondly, the FSF points out that open source software sometimes includes technical measures in the source

[10] 'Linus Torvalds Biography by The Linux Information Project' <https://www.linfo.org/linus.html> accessed 4 June 2024.

[11] Eric S Raymond, *The Cathedral & the Bazaar by Eric S. Raymond (2001) Paperback*, 9.

[12] Walden (n 4) 7.

[13] 'Why Open Source Misses the Point of Free Software - GNU Project - Free Software Foundation' <https://www.gnu.org/philosophy/open-source-misses-the-point.html> accessed 4 June 2024.

code that prohibit users from running a modified version of the program. For example, some Android products, despite being open source, contain technological measures that prevent the creation of modified versions. These differences stem from the organizations' distinct understandings of software freedom.

2.2. MOTIVATIONS AND GOVERNANCE

The diverse reasons that drive individuals in the FOSS ecosystem reflect a complex interplay of competing agendas, each linked with different personal and professional goals, which is different from classic copyright motivations.[14] The authors' inclination to participate in typically unpaid roles as co-authors or original authors is a distinctive characteristic of the FOSS ecosystem. These motives are not only important for understanding why contributors participate in FOSS projects, but they also influence the governance structures that are used inside these communities.

One prominent motivating factor is reputation. Authors engage in large-scale projects to establish their personal brand or strategically position themselves for more lucrative employment opportunities.[15] This is particularly noticeable when the FOSS project is established and well-known.[16] Furthermore, there is compelling evidence that participation in FOSS projects can serve as a valuable stepping stone to obtaining venture financing. This was proven by the founders of firms such as Sun, Netscape, and Red Hat, who demonstrated their abilities in the FOSS community before attaining great success.[17] On the other hand, empirical evidence reveals that for many contributors, intrinsic incentives take precedence over the pursuit of career possibilities or reputation.[18] These individuals are motivated mostly by the pleasure they get from working in the FOSS environment and interacting with its products.[19] This internal fulfillment, rather than external compensation, is frequently used as the major motivator for their continuing contributions to FOSS projects.[20] Another significant motivation is cognitive stimulation. The process of solving complex issues within a sophisticated software environment brings them a sense of gratification comparable to the satisfaction derived from solving intricate puzzles. This experience also enhances their ability to address similar issues in their professional occupations more effortlessly.[21] This

[14] Walden (n 4) 2.

[15] Josh Lerner and Jean Tirole, 'Some Simple Economics of Open Source' (2002) 50 The Journal of Industrial Economics 197, 21.

[16] Jürgen Bitzer, Wolfram Schrettl and Philipp JH Schröder, 'Intrinsic Motivation in Open Source Software Development' (2007) 35 Journal of Comparative Economics 160 17.

[17] Lerner and Tirole (n 15) 22.

[18] Guido Hertel, Sven Niedner and Stefanie Herrmann, 'Motivation of Software Developers in Open Source Projects: An Internet-Based Survey of Contributors to the Linux Kernel' (2003) 32 Research Policy 1159; Karim Lakhani and Robert G Wolf, 'Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects' [2003] SSRN Electronic Journal <http://www.ssrn.com/abstract=443040> accessed 18 August 2024.

[19] Sonali K Shah, 'Motivation, Governance, and the Viability of Hybrid Forms in Open Source Software Development' (2006) 52 Management Science 1000, 26.

[20] Bitzer, Schrettl and Schröder (n 16) 17.

[21] Hertel, Niedner and Herrmann (n 18) 1176.

experience not only improves their capacity to solve comparable difficulties in their professional responsibilities with more ease, but it also indicates a significant beneficial association between professional FOSS activities and voluntary FOSS contributions during one's leisure time.[22] Raymond identifies another incentive for FOSS authors, namely ego gratification. He notes that Linus motivated his hacker/users by consistently stimulating and rewarding them, offering the satisfaction of being part of the action.[23] In typical settings, individuals with egoistic tendencies rarely choose to share their accomplishments with others. However, in the FOSS environment, Raymond asserts that an adept gatekeeper overseeing a project can optimize productivity even with self-centered developers, thanks to the rapid communication facilitated by the internet. A boundless supply of co-developers ultimately resolves issues at the individual level, allowing any coder to be substituted when the project manager has the ability to connect with anyone online. These different motivations not only drive individual engagement, but they also have a substantial impact on the governance structures that arise in FOSS projects.

Individuals' different motives for contributing to FOSS projects influence not just their individual engagement, but also the governance structures that emerge inside these communities. The organizational structures in the FOSS field are noticeably diverse, ranging from projects managed by a single developer to those supported by thousands of contributors,[24] including both volunteers and salaried contributors, non-profit organizations, and international corporations.[25] Furthermore, these initiatives use a variety of intellectual property management methodologies, ranging from completely open content development to a combination of private and open material.[26] Because contributors have a variety of goals—such as reputation-building, professional growth, or the intrinsic satisfaction of problem-solving—the governance models must accommodate and convey these variances. This link between individual goals and collective decision-making procedures is crucial for maintaining a healthy, productive community because it guarantees that the governance structure supports both the project's success and the contributors' continued engagement.

There are a lot of different jobs and titles for people who run FOSS projects, such as leader, administrator, first developer, manager, senior hacker, or moderator. Still, there isn't a proper job description, clear guidelines for professional growth, a single authority in charge,

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[22] Jürgen Bitzer and Ingo Geishecker, 'Who Contributes Voluntarily to OSS? An Investigation among German IT Employees' (2010) 39 Research Policy 165; Sladjana Vujovic and John P Ulhøi, 'An Organizational Perspective on Free and Open Source Software Development' in Jürgen Bitzer and Philipp JH Schröder (eds), *The Economics of Open Source Software Development* (Elsevier 2006) 201.

[23] Raymond (n 11) 8.

[24] Greg Madey, Vincent Freeh and Renee Tynan, 'The Open Source Software Development Phenomenon: An Analysis Based on Social Network Theory' [2002] Eighth Americas Conference on Information Systems.

[25] Brian Fitzgerald, 'The Transformation of Open Source Software' (2006) 30 MIS Quarterly 587; Joel West and Siobhan O'Mahony, 'The Role of Participation Architecture in Growing Sponsored Open Source Communities' (2008) 15 Industry & Innovation 145.

[26] Dilan Aksoy-Yurdagul, 'The Impact of Open Source Software Commercialization on Firm Value' (2015) 22 Industry and Innovation 1.

or a list of skills.[27] Leaders with technical competence and strong community-building abilities have authority in the "*benevolent dictator*" (BD) paradigm, as Linus Torvalds did with the Linux Kernel, although dissidents can branch the project due to its open-source nature. To sustain unity and avoid splintering, this method must strike a balance between authority and community involvement.[28] Alternatively, many FOSS initiatives use a meritocracy, in which authority is obtained by contributions rather than prestige or financial investment.[29] This paradigm eliminates inefficiencies associated with centralized authority while relying on clear rules and common community goals. Effective meritocratic administration is dependent on the community's capacity to manage contributions and foster collaboration, independent of external ties.[30]

The impact of developers' physical closeness on the code source development process has been highlighted by software industry observers.[31] Additionally, early institutional affiliations and common technical backgrounds have a major impact on contributor participation. These variables provide many chances for engagement, reflecting the dynamic nature of FOSS communities in which contributor roles and standards are always evolving.[32]

The FOSS ecosystem's governance structures are diverse, reflecting the many incentives that motivate its contributors. Individuals participate in FOSS projects for a variety of objectives, including reputation-building and cognitive stimulation, therefore governance systems must fit these various agendas.[33] The "*benevolent dictator*" paradigm, meritocracies, and decentralized networks are all strategies for aligning individual desires with community objectives. FOSS governance's strength is its capacity to adapt and remain sensitive to these changing incentives, ensuring that the community remains productive and cohesive even as the landscape of contributors' demands evolves. On the other hand, As FOSS grew, company involvement became more closely reflected with strategic business goals.[34] Companies are driven to FOSS projects not only for the freedom of intellectual property management, which allows them to avoid restrictive licensing costs and legal dangers, but also for the chance to improve product compatibility[35] and leverage communal creativity. These com-

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27 Clement Bert-Erboul and Nicholas Vonortas, 'Personal and Social Proximity: Shaping Leadership in a Free Software Project' (18 September 2018) 4

28 Ross Gardler and Stephen R Walli, 'Evolving Perspective on Community and Governance' in Amanda Brock (ed), *Open Source Law, Policy and Practice* (Oxford University Press 2022) 54

29 ibid 55.

30 Siobhán O'Mahony and Fabrizio Ferraro, 'The Emergence of Governance in an Open Source Community' (2007) 50 Academy of Management Journal 1079.

31 For detailed discussion see Robert E Kraut and others, 'Understanding Effects of Proximity on Collaboration: Implications for Technologies to Support Remote Collaborative Work', *Distributed work* (Boston Review 2002).

32 Bert-Erboul and Vonortas (n 27) 26.

33 Vujovic and Ulhøi (n 22) 203.

34 Cristina Rossi and Andrea Bonaccorsi, 'Intrinsic Motivations and Profit-Oriented Firms in Open Source Software: Do Firms Practise What They Preach?' in Jürgen Bitzer and Philipp JH Schröder (eds), *The Economics of Open Source Software Development* (Elsevier 2006) 87–89.

35 Wichmann T., 'Firms' Open Source Activities: Motivations and Policy Implications. Free/Libre and Open Source Software: Survey and Study' (2002) 32-50.

panies profit from FOSS' collaborative character, which allows them to leverage community-driven developments and get access to a network of highly competent experts.[36] Thus, although individual contributors may be driven by personal aims, corporate engagement is frequently a planned strategy to capitalizing on the economic and competitive benefits that FOSS provides.[37]

As a result, the license chosen by a project is going to have a considerable influence on the type of community, and consequently the type of production model, that a project chooses, and it plays a surprisingly important role in community growth.[38] As previously stated, initial licenses were based on individual cooperative experiments; but, as more individuals and corporations were engaged, the licenses began to fall into broad categories, and the benefits of standardizing became evident. This observation prompts a more in-depth assessment of the numerous licenses now in use, their impact on FOSS community development and governance, and their larger implications for the ecosystem's sustainability and growth.

2.3. PUBLIC LICENSES

In the late 1980s, two alternative approaches to achieving the goals of FOSS philosophy emerged: permissive licensing and copyleft licensing, which represent the main differentiations among licenses.[39] Copyleft licenses are alternatively referred to as viral licenses or share-alike licenses. Typically, they compel subsequent developers to adhere to the same license when they release their changed software.[40] This procedure is referred to as connecting. By advocating for the original license, they guarantee the essential liberties in all subsequent iterations of the project.[41] An exemplary instance of this category of license is the GPL developed by the FSF. The GPL, currently in its third iteration, includes a specific clause that states: "*Whenever you distribute a covered work, the recipient is automatically granted a license from the original licensors to execute, alter, and distribute that work, in accordance with the terms of this License*."[42] This article, due to its licensing terms, restricts the future user of the project from having any alternatives.[43] Users that utilize copyleft licenses typically endorse the concept of freely available software and perceive the exploitation of software as ethically objectionable.

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[36] ibid.

[37] Aksoy-Yurdagul (n 26) 13.

[38] Gardler and Walli (n 28) 42; P McCoy Smith, 'Copyright, Contract, and Licensing in Open Source' in Amanda Brock (ed), *Open Source Law, Policy and Practice* (Oxford University Press 2022) 83

[39] Smith (n 38) 83.

[40] Lawrence E Rosen, *Open Source Licensing: Software Freedom and Intellectual Property Law* (Prentice Hall PTR 2005) 181.

[41] Aram Sinnreich, 'Copyleft and Copyfight', *The Essential Guide to Intellectual Property* (Yale University Press 2019) 209

[42] 'The GNU General Public License v3.0 - GNU Project - Free Software Foundation' <https://www.gnu.org/licenses/gpl-3.0.html> accessed 4 June 2024.

[43] Malcolm Bain, 'Software Interactions and the GPL' (2010) 2 International Free and Open Source Software Law Review 168.

In contrast, permissive licenses do not require succeeding writers to adhere to the same license. By doing this, they permit the use of proprietary licensing models in altered versions of the FOSS project. This license structure has a tendency to appeal to a larger number of business users, and it is in line with the ideological perspective of the OSI about the FOSS environment. Notable instances of this license include the BSD Licenses, the MIT License, and the Apache License. The permissive license is sometimes referred to as an academic license since universities often apply this sort of license to their academic projects, enabling them to be exploited without significant restrictions.[44] For example, a portion of the Microsoft operating system and Apple's operating system kernel is derived from the BSD-licensed Free-BSD, which is created at the University of California, Berkeley.[45] An example of a permissive use clause may be found in the Apache License 2.0, which states: "*You have the right to include your own copyright statement in any modifications you make and you are allowed to impose additional or different terms and conditions*."[46]

The distinctions between copyleft and permissive licenses are particularly relevant when considering the compatibility, both in terms of downward and upward, among various licenses. While there is no formal or legal definition of compatibility, it is often understood to indicate the ability of a license to be seamlessly integrated into another license within a larger software package. Put simply, this situation arises when components from other licensed FOSS projects are combined to create a separate or new FOSS project. The final project may be subject to a different license compared to previous projects. In order to use these projects, it is necessary for the two licenses to be compatible. Downward and upward compatibility imply that this issue is unidirectional. Regrettably, the reciprocity concept does not extend to the compatibility of FOSS licenses. For example, a project that is licensed by BSD may have been integrated into a bigger project that is licensed under GPL. This indicates that BSD is compatible with the GPL license in terms of upward compatibility. Conversely, it is not possible to convert a finished product licensed under GPL to a BSD license due to the lack of downward compatibility between GPL and BSD licenses. Indeed, the GPL lacks interoperability with other licenses. This is a prevalent problem associated with copyleft licensing. As previously stated in this chapter, copyleft licenses restrict the future usage of derivative works by mandating the same license.[47] Conversely, the permissive license grants users the freedom to modify their license. Consequently, permissive licenses exhibit greater compatibility with both other permissive licenses and copyleft licenses, whereas copyleft licenses typically only align with other copyleft licenses.[48] Regrettably, this statement cannot be applied universally as each case needs a thorough examination and assessment to address compatibility problems.

Another important aspect of FOSS licenses is the practice of dual-licensing. Dual licen-

[44] Smith (n 38) 84.

[45] 'BSD Overview' <https://developer.apple.com/library/archive/documentation/Darwin/Conceptual/KernelProgramming/BSD/BSD.html> accessed 4 June 2024.

[46] 'Apache License, Version 2.0' <https://www.apache.org/licenses/LICENSE-2.0.html> accessed 4 June 2024.

[47] Bain (n 43) 178; Smith (n 38) 87.

[48] Smith (n 38) 84–86.

sing within the FOSS ecosystem exemplifies the adaptability inherent in these licenses, functioning as a distinctive business model. Certain economic conditions, most notably a large user base, are required for dual licensing to be effective. A copyleft license facilitates this by generating significant network effects, in which the product gains value as its user base grows.[49] Typically, firms who own complete software ownership employ this kind of solution. They obtain a license for the program using one of the copyleft licenses and gain advantages from the growth of FOSS. Meanwhile, they provide the same software under a private license to other firms interested in integrating the program into their commercial products.[50] The sole owner of the program, whether a single individual or a corporate entity, can easily dually license it, since this allows them to avoid the need for unanimous agreement from numerous owners in order to implement a proprietary license. Second, the effectiveness of dual licensing depends on price discrimination. A software company that manages all rights to the product may license it according to market demand. For instance, MySQL is a program used for managing databases and is a prime illustration of dual licensing. MySQL is launching multiple editions of their database software concurrently, catering to both business customers with the enterprise edition and FOSS users with the community edition. Third, there does not appear to be any substantial requirements for copyright enforcement. High-end business users who are compelled to acquire a proprietary license do the same.[51] This dual-licensing approach not only demonstrates the flexibility of FOSS licenses, but it also emphasizes the economic and strategic factors that underpin their effective deployment.

Building on these, the European Union is rapidly realizing the strategic importance of profiting on the changing dynamics of FOSS.[52] As FOSS evolves from a philosophy-driven movement to an economically viable model, with businesses now leading the charge and up to 90%[53] and 40% of contributions are paid,[54] the EU sees an opportunity to capitalize on this trend to boost technological independence, competitiveness, and innovation in its economy. The EU is interested in leveraging the cost efficiencies and innovation possibilities that result from the combination between FOSS and proprietary software.[55] By promoting varied licensing schemes and encouraging enterprises to strategically reveal code, the EU hopes to promote an atmosphere in which FOSS becomes a cornerstone of its digital strategy. This strategy is consistent with the EU's wider aims of improving national innovation

[49] Mikko Valimaki, 'Dual Licensing in Open Source Software Industry' [2002] SSRN Electronic Journal 18.

[50] ibid 6.

[51] ibid 18.

[52] Recently, Türkiye also introduced an initiative by presidential decree for the integration of open-source software across all of its public institutions. <https://www.resmigazete.gov.tr/eskiler/2023/07/20230729-34.pdf> accessed 4 June 2024.

[53] Dongyang Hu and others, 'Multi-Reviewing Pull-Requests: An Exploratory Study on GitHub OSS Projects' (2019) 115 Information and Software Technology 1.

[54] Michael Cusumano and others, 'Perspectives on Free and Open Source Software', *Script-ed*, vol 3 (2007) 1–22.

[55] Josh Lerner and Mark Schankerman, *The Comingled Code: Open Source and Economic Development* (The MIT Press 2010) 1 <https://direct.mit.edu/books/monograph/3301/The-Comingled-CodeOpen-Source-and-Economic> accessed 19 August 2024.

systems, encouraging inclusion through ecosystems and platforms, and enforcing competitive forces that benefit both the market and society.[56] As FOSS grows more linked with economic development and technical innovation, the EU is well positioned to capitalize on its potential, ensuring that FOSS plays an important role in determining the future of the European digital environment.

3. FOSS IN EUROPEAN UNION

3.1. EU ADMINISTRATIVE POLICIES

The development of FOSS in European Union public administrations is based on the EU's initiatives to improve compatibility, save expenses, and promote technical advancement. The EU's single market enables unrestricted movement of individuals and companies across national boundaries, requiring streamlined interactions with several government agencies. Due to the emergence of digital technology, these exchanges have transitioned to electronic platforms, which has resulted in a decrease in administrative costs. However, it has also led to the creation of electronic barriers between public bodies. The presence of electronic obstacles impedes the effectiveness of the single market and collaboration across European public agencies, highlighting the need for a unified strategy to update governmental services.

The European Commission has been leading the effort to promote electronic interoperability within the Union. The notion of interoperability across governments was initially introduced in the 1993 Bangemann Report, which emphasized the possibilities of linked networks for public administration.[57] The Lisbon Agenda, initiated in 2000, has the objective of converting the European Union into the most competitive and dynamic economy based on information by the year 2010.[58] This ambitious objective prioritized eGovernment, acknowledging the potential of digital technology to improve public services. The use of open-source software in the public sector was supported by subsequent action plans, such as eEurope 2002 and eEurope 2005.[59] These plans emphasized the importance of open-source software in establishing interoperability and reducing reliance on proprietary solutions. The Europe 2020 Strategy underscored the importance of smart, sustainable, and

[56] Jon McPhedran Waitzer and Roshan Paul, 'Scaling Social Impact: When Everybody Contributes, Everybody Wins' (2011) 6 Innovations: Technology, Governance, Globalization 143; Georg von Krogh and others, 'Carrots and Rainbows: Motivation and Social Practice in Open Source Software Development' (2012) 36 MIS Quarterly 649.

[57] 'Report on Europe and the Global Information Society: Recommendations of the High-Level Group on the Information Society to the Corfu European Council. Bulletin of the European Union, Supplement No. 2/94. [Followup to the White Paper] (Commonly Called the Bangemann Report)' (1994) <https://aei.pitt.edu/1199/> accessed 4 June 2024.

[58] eEurope 2002 - An Information society for all - Draft Action Plan prepared by the European Commission for the European Council in Feira - 19-20 June 2000 2000.

[59] ibid 22.

inclusive growth for the future of the European Union.[60] The Digital Agenda for Europe aimed to establish a digital single market, emphasizing interoperability and the promotion of FOSS technologies. Building on this, the eGovernment Action Plan 2011-2015 advocated the use of FOSS to enhance governmental services and reduce expenses.[61]

Several significant initiatives were implemented to encourage the adoption of FOSS in public agencies. The establishment of the Open Source Observatory and Repository (OSOR) created a platform for the exchange and utilization of FOSS solutions across European public administrations. Additionally, the introduction of the European Union Public License (EUPL) provided a standardized open-source license, simplifying the legal framework for sharing and reusing software.[62] The impact of these initiatives has been considerable. Research indicates that FOSS has gained substantial traction in the public sector, with numerous successful implementations across Europe. For instance, the city of Munich's transition to FOSS for its IT infrastructure, known as the LiMux project, resulted in significant financial savings and enhanced flexibility.[63] Similarly, the French Gendarmerie Nationale's adoption of FOSS solutions led to reduced licensing costs and improved security.[64] Furthermore, FOSS has spurred innovation and progress in public service delivery. Open-source communities have played a crucial role in developing tailored solutions to meet the unique needs of public administrations. This collaborative approach has fostered a culture of openness and information sharing, aligning with the European Union's broader goals of promoting transparent governance and engaging citizens in decision-making processes.

To summarize, the widespread use of FOSS across multiple industries, particularly in the public domain, indicates a fundamental shift in both technology and governance norms. This shift is markedly different from the classic software economic model and the traditional copyright understanding of value. One can contends that European governments' strategic integration of FOSS is more than a technical decision; it is a deliberate policy choice that is consistent with greater aims of innovation and efficiency. The European Commission's policy, which emphasizes collaboration and co-development within the FOSS community, has been cited as a key driver of governmental reform. This strategy, which emphasizes shared information and resource efficiency, is expected to improve public service delivery

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60 'Europe 2020: Commission Proposes New Economic Strategy in Europe.' (*European Commission - European Commission*) <https://ec.europa.eu/commission/presscorner/detail/en/IP_10_225> accessed 4 June 2024.

61 'COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European eGovernment Action Plan 2011-2015 Harnessing ICT to Promote Smart, Sustainable & Innovative Government' <https://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX%3A52010DC0743> accessed 4 June 2024.

62 'EUPL [European Union Public Licence]' <https://eupl.eu/> accessed 4 June 2024.

63 Gijs HILLENIUS, 'City of Munich: "Migration to Sustainable Desktop Completed Successfully"' (28 May 2013) <https://joinup.ec.europa.eu/collection/open-source-observatory-osor/news/city-munich-migration> accessed 4 June 2024.

64 Gijs HILLENIUS, 'French Gendarmerie: "Open Source Desktop Lowers TCO by 40%"' (30 September 2013) <https://joinup.ec.europa.eu/collection/open-source-observatory-osor/news/french-gendarmerie-open-sou> accessed 4 June 2024.

while cultivating a culture of transparency and inclusion. Finally, one can claims that FOSS is not only transforming the technology environment, but also redefining governance principles, promoting a model of digital governance that is both adaptable and sensitive to social demands.

3.2. EU REGULATIONS SURROUNDING FOSS

3.2.1. AI ACT AND FOSS

The Artificial Intelligence Act (AI Act)[65] of the European Union is a significant regulation that seeks to regulate and, in specific instances, forbid the advancement, utilization, and dissemination of artificial intelligence (AI) systems and general-purpose AI models (GPAIMs), particularly when they have an influence on life, safety, or individual legal rights. The EU's position as a leader in technology regulation is anticipated to establish a standard for other nations. An area of disagreement during the legislative process was the control of AI technologies that rely on FOSS.

Critics argued that excluding FOSS AI models would hinder innovation and information exchange, while others raised concern about the potential security risks associated with the unrestricted dissemination of FOSS AI models.[66] The eventual AI Act has two exceptions for AI technology based on FOSS. The first exemption applies to AI systems published under FOSS licenses.[67] These systems are not subject to the AI Act's requirements unless they are deliberately advertised or deployed as high-risk AI systems or AI systems that interact directly with humans. The second exemption is a specific exception for GPAIMs, where the model's parameters, such as weights, model architecture, and model use information, must be made publicly accessible.[68] Nevertheless, GPAIMs that present systemic hazards, such as those with significant capacities to cause harm or those officially identified by the Commission, are not eligible for this exemption.

Through the AI Act, the European Union appears to be implicitly supporting some IP regimes, notably those that embrace the FOSS ideals. By including specific exclusions for FOSS in the rule, the EU not only recognizes the value of these models, but also calls for their compliance throughout the Union. This partiality towards FOSS creates serious concerns concerning the legal enforcement of intellectual property rights inside these projects, which will be discussed more in the next section. Furthermore, this method may establish a regulatory precedent that needs a more in-depth study of what constitutes FOSS—whether simply subscribing to a single license is acceptable, or if a broader definition and scope are necessary. One may argue that the EU's stance on supporting openness is an attempt to

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[65] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence [2024] OJ L, 2024/1689, 12.7.2024.

[66] Diego Calanzone and others, 'An Open Source Perspective on AI and Alignment with the EU AI Act' 6.

[67] Article 25(4) of the AI Act; Harry Law and Sébastien Krier, 'Open-Source Provisions for Large Models in the AI Act' <https://www.repository.cam.ac.uk/handle/1810/354175> accessed 4 June 2024; Calanzone and others (n 66) 6.

[68] Article 53(2) of the AI Act.

undermine the dominance of large technology corporations by advocating for widespread use of FOSS methods. This shows that the AI Act might also function as a political tool for encouraging an open culture, possibly as a counterpoint to the proprietary practices common in giant tech businesses.

3.2.2. CYBER RESILLIENCE ACT AND FOSS

The Cyber Resilience Act (CRA) [69] proposed by the European Union aims to introduce additional cybersecurity standards for equipment and software sold in the EU market. The CRA is expected to significantly impact the FOSS ecosystem by shifting the responsibility of ensuring security from consumers to software developers.[70] The legislation applies to software manufacturers that make their code accessible in the European Union, encompassing both FOSS and proprietary software. FOSS developers and maintainers may be subject to the CRA's obligations, depending on their specific circumstances. Individual developers who occasionally receive donations are likely to be exempted, while those who consistently charge or receive recurring payments from commercial enterprises may be included.[71] Nonprofit foundations developing FOSS may need to comply with the CRA requirements, although there is a possibility of amendments that might exclude certain projects with a fully decentralized development structure.

The obligations of the CRA depend on the criticality of the software project, with critical software, both FOSS and closed source, being subject to more stringent requirements.[72] These obligations include risk assessments, documentation, conformity assessments, and vulnerability reporting. The assumptions made by the CRA about software manufacturers may not be applicable to FOSS developers, who might not know all the users of their product and may not be able to practically provide security fixes to downstream users.

The FOSS community has expressed concerns about the potential implications of the CRA on the development model and the disincentives it may create for open-source projects.[73] The Act's stance on donations, even from non-commercial sources, may inadvertently deter larger contributions. During the current draft phase of the CRA, it is essential for the EU to carefully consider the feedback from the FOSS developer community and explore ways to achieve cybersecurity objectives without imposing additional burdens on the open-source ecosystem. In a recent development, the European Cyber Resilience Act has undergone substantial revisions, providing relief to the open-source community.[74] The final text of the CRA, solidified on December 2023, introduces the concept of an "*open-source*

[69] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on horizontal cybersecurity requirements for products with digital elements and amending Regulation (EU) 2019/1020

[70] Pier Giorgio Chiara, 'The Cyber Resilience Act: The EU Commission's Proposal for a Horizontal Regulation on Cybersecurity for Products with Digital Elements' (2022) 3 International Cybersecurity Law Review 255.

[71] Recital 10 of the CRA Proposal.

[72] Filippo Bagni, 'The Regulatory Sandbox and the Cybersecurity Challenge: From the Artificial Intelligence Act to the Cyber Resilience Act' (2023) 5 Rivista italiana di informatica e diritto 201, 212.

[73] Polona Car and Stefano De Luca, 'EU Cyber-Resilience Act' (Committee on Industry, Research and Energy (ITRE) 2022) 9.

[74] Recital 10 of the CRA Proposal.

steward".[75] This term refers to any legal entity dedicated to providing sustained support for the development of specific products with qualifying FOSS elements, ensuring their viability for commercial activities. The revised text demonstrates a clearer understanding of how FOSS operates and its value within the broader software development ecosystem. It explicitly states that the provision of FOSS products without monetization is not considered a commercial activity.[76] This marks a positive step forward for the FOSS community, but vigilance is required to ensure the implementation of the open-source steward concept aligns with the intent and realities of FOSS development.

The European Union's anticipated CRA establishes strict cybersecurity rules that might have a substantial influence on the FOSS ecosystem, notably by setting duties that may distinguish between entirely non-commercial FOSS projects and those with commercial features. Unlike the AI Act, the CRA takes a more stringent approach, possibly excluding FOSS projects with dual licenses or commercial aims from some exemptions. This begs the issue of whether this indicates an excessive openness culture, or if FOSS is simply becoming an inevitable reality in the software industry. Furthermore, it raises the question of whether copyright legislation is current enough to handle these transformations, particularly given that the EU lacks a completely coordinated approach to copyright, instead depending on a patchwork of solutions.[77]

3.3. LEGAL ENFORCEMENT OF FOSS IN EU

With the AI Act and the proposed Cyber Resilience Act making explicit references to FOSS, as well as the growing reliance on FOSS by EU public administrations to achieve compatibility and efficiency, the legal status of FOSS in the European Union has become more prominent, albeit uncertain. While these legislative measures acknowledge FOSS as an important element of the software environment, they also raise doubts regarding FOSS's definitive legal position inside the EU's regulatory framework. The lack of a consistent approach to copyright across the EU, along with a patchwork of state legislation, complicates the enforcement of legal rights and the settlement of issues regarding FOSS. As the EU integrates FOSS into its legal and administrative systems, the question arises as to whether FOSS will reach a clear and stable legal standing, or if it will continue to be susceptible to diverse interpretations and implementations across different jurisdictions.

Several noteworthy incidents that have occurred in France have brought to light the need of adhering to the standards that are associated with these permits. Three individuals who were responsible for the development of free software filed a lawsuit against the internet service provider Free in November of 2008, which was a judicial proceeding of great

[75] For compromised text see <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_17000_2023_INIT> accessed 4 June 2024.

[76] Recital 10 of the CRA Proposal.

[77] Maria Lillà Montagnani and Maurizio Borghi, 'Promises and Pitfalls of the European Copyright Law Harmonization Process', *The European Union and the Culture Industries* (Routledge 2016) <https://www.taylorfrancis.com/chapters/edit/10.4324/9781315616452-11/promises-pitfalls-european-copyright-law-harmonization-process-maria-lill%C3%A0-montagnani-maurizio-borghi> accessed 19 August 2024.

importance.[78] According to their allegations, Free had distributed their *Freebox* modem in a manner that was in violation of the GPL license. This case served as an illustration of the legal choices that developers have available to them in the event that license requirements are violated, despite the fact that the courts had not yet rendered a final verdict. Along the same lines, the CNRS was subjected to legal action by *Educaffix* about software transfer agreements that made use of software that was licensed under the GNU General Public License.[79] Concerns were expressed over the requirement of acquiring permits from third parties, as well as the awareness of the potentially damaging character of derivative works that are licensed under the GNU license. During a legal dispute that took place in 2009 between the National Association for Adult Education (AFPA) and EDU 4, the Court of Appeal of Paris declared that the GNU General Public License license was legitimate.[80] This decision was a significant one. Within the context of this decision, the significance of open and honest communication as well as adherence to the terms of FOSS licenses was remarked upon.

The legal framework for FOSS in Germany has been affected by a number of significant cases to a significant degree.[81] Within the context of the case of *Welte v. Sitecom*, the District Court of Munich I rendered a significant decision in the year 2004.[82] It was brought to the court's attention that a manufacturer and distributor of a W-LAN router had violated the GPLv2 license. The use of the GPLv2 was deemed by the court to not constitute a transfer of copyrights, but rather to serve as a way to ensure that the software is utilized and distributed in an authorized manner. The verdict of the court found that violations of the terms of the GPLv2 resulted in the immediate loss of rights that were given. These violations are classified as copyright infringements. Several subsequent decisions, such as *Welte v. D-Link*, in which the District Court of Frankfurt/Main supported grounds that were comparable to this one, further cemented this legal premise.[83] In a different case, *Welte v. Skype*, it was made clear that it was not sufficient to merely provide a link to a website in order to comply with the GPLv2 when it came to the distribution of software offline.[84] Additionally, the considerable legal repercussions that result from failing to comply with FOSS licenses in Germany were brought to light by these judicial rulings, which collectively established the legality of FOSS licenses in Germany.[85]

The repercussions of these tragedies are so widespread that they extend beyond national boundaries. It was repeatedly decided by the French courts, including a referral to the European Court of Justice, that violations of the GNU GPL should be viewed as business con-

[78] Till Jaeger, 'Enforcement of the GNU GPL in Germany and Europe' (2010) 1 JIPITEC <http://www.jipitec.eu/issues/jipitec-1-1-2010/2419> accessed 4 June 2024.

[79] TGI Paris, 28 March 2007, Educaffix c/ CNRS, Gaz. Pal., n° 22, 22 January 2008, p. 35

[80] CA Paris, 16 September 2009, RG n° 01/24298, SA EDU 4 c/ Association AFPA.

[81] Jaeger (n 78) 35-36.

[82] LG München I, 2004-05-19, Case No. 21 O 6123/04.

[83] LG Frankfurt a.M., 2006-09-06, Case No. 2-6 O 224/06.

[84] Jaeger (n 78) 35-36.

[85] LG München I, 2007-07-12, Case No. 7 O 5245/07.

cerns rather than copyright infringements. This decision was made in the case of Entr'Ouvert against Orange.[86] In line with a more general acknowledgment that software licenses, and FOSS licenses in particular, are legally binding agreements that must be fulfilled in order to avoid legal penalties, this stance is compatible with such recognition.

It is clear from these examples that the legal framework around FOSS in the European Union is undergoing significant transformations. They stress the need of developers and organizations scrupulously adhering to license requirements in order to foster a FOSS ecosystem that is both legally compliant and cooperative.

4. CONCLUSION

The previous research has highlighted the varied character of the FOSS movement, revealing its progression from ideological foundations to a complex ecosystem driven by various impulses and managed by a multifaceted regulatory framework. The European Union's deliberate acceptance of FOSS as a key component of its digital strategy demonstrates its ability to drive innovation, efficiency, and public service improvement.

However, incorporating FOSS into the legislative system, as demonstrated by the AI Act and the Cyber Resilience Act, creates difficulties that require careful consideration. While these policies try to address crucial concerns like AI safety and cybersecurity, they may impose unnecessary constraints on FOSS developers, particularly those working on smaller projects. This potential for legislative overreach might inhibit innovation and undermine the collaborative spirit inherent in FOSS.

Furthermore, the growing prominence of FOSS raises serious concerns regarding the effectiveness of current legal systems. The EU's patchwork approach to copyright, along with the changing nature of FOSS license and distribution strategies, needs a thorough rethink of IP rights. The distinctions between various FOSS license arrangements, as well as the consequences for regulatory treatment, deserve additional elucidation.

To fully reap the benefits of FOSS while addressing these problems, a balanced strategy is required. Policymakers must strike a careful balance between legal requirements and the desire to promote an open and collaborative development environment. By doing so, the EU can cement its position as a worldwide leader in digital innovation while also ensuring that FOSS continues to thrive.

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